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Index of Workpapers
to Mr. Dylan W. D'Ascendis' Direct Testimony and Exhibit

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Roger A. Morin, PhD

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Chapter 6
Alternative Asset Pricing Models

6.1 Empirical Validity of the CAPM

The last chapter showed that the practical difficulties of implementing the CAPM approach are surmountable. Conceptual and empirical problems remain, however.

At the conceptual level, the CAPM has been submitted to criticisms by academicians and practitioners. Contrary to the core assumption of the CAPM, investors may choose not to diversify, and bear company-specific risk if abnormal returns are expected. A substantial percentage of individual investors are indeed inadequately diversified. Short selling is somewhat restricted, in violation of CAPM assumptions. Factors other than market risk (beta) may also influence investor behavior, such as taxation, firm size, and restrictions on borrowing.

At the empirical level, there have been countless tests of the CAPM to determine to what extent security returns and betas are related in the manner predicted by the CAPM. The results of the tests support the idea that beta is related to security returns, that the risk-return tradeoff is positive, and that the relationship is linear. The contradictory finding is that the risk-return tradeoff is not as steeply sloped as predicted by the CAPM. With few exceptions, the empirical studies agree that the implied intercept term exceeds the risk-free rate and the slope term is less than predicted by the CAPM. That is, low-beta securities earn returns somewhat higher than the CAPM would predict, and high-beta securities earn less than predicted. This is shown pictorially in Figure 6-1. A CAPM-based estimate of cost of capital underestimates the return required from low-beta securities and overstates the return required from high-beta securities, based on the empirical evidence. Brealey, Myers, and Allen (2006), among many others,[1] provide recent empirical evidence very similar to the relationship depicted in Figure 6-1. This is one of the most

[1] For a summary of the empirical evidence on the CAPM, see Jensen (1972) and Ross (1978). The major empirical tests of the CAPM were published by Friend and Blume (1975), Black, Jensen, and Scholes (1972), Miller and Scholes (1972), Blume and Friend (1973), Blume and Husic (1973), Fama and Macbeth (1972), Basu (1977), Reinganum (1981B), Litzenberger and Ramaswamy (1979), Banz (1981), Gibbons (1982), Stambaugh (1982), Shanken (1985), Black (1993), and Brealey, Myers, and Allen (2006). Evidence in the Canadian context is available in Morin (1980, 1981).

long-term risk-free rate version of the CAPM has a higher intercept and a flatter slope than the short-term risk-free version which has been tested. Thus, it is reasonable to apply a conservative alpha adjustment. Moreover, the lowering of the tax burden on capital gains and dividend income enacted in 2002 may have decreased the required return for taxable investors, steepening the slope of the ECAPM risk-return trade-off and bring it closer to the CAPM predicted returns.[13]

To illustrate the application of the ECAPM, assume a risk-free rate of 5%, a market risk premium of 7%, and a beta of 0.80. The Empirical CAPM equation (6-6) above yields a cost of equity estimate of 11.0% as follows:

$$K = 5\% + 0.25\,(12\% - 5\%) + 0.75 \times 0.80\,(12\% - 5\%)$$
$$= 5.0\% + 1.8\% + 4.2\%$$
$$= 11.0\%$$

As an alternative to specifying alpha, see Example 6-1.

Some have argued that the use of the ECAPM is inconsistent with the use of adjusted betas, such as those supplied by Value Line and Bloomberg. This is because the reason for using the ECAPM is to allow for the tendency of betas to regress toward the mean value of 1.00 over time, and, since Value Line betas are already adjusted for such trend, an ECAPM analysis results in double-counting. This argument is erroneous. Fundamentally, the ECAPM is not an adjustment, increase or decrease, in beta. This is obvious from the fact that the expected return on high beta securities is actually lower than that produced by the CAPM estimate. The ECAPM is a formal recognition that the observed risk-return tradeoff is flatter than predicted by the CAPM based on myriad empirical evidence. The ECAPM and the use of adjusted betas comprised two separate features of asset pricing. Even if a company's beta is estimated accurately, the CAPM still understates the return for low-beta stocks. Even if the ECAPM is used, the return for low-beta securities is understated if the betas are understated. Referring back to Figure 6-1, the ECAPM is a return (vertical axis) adjustment and not a beta (horizontal axis) adjustment. Both adjustments are necessary. Moreover, recall from Chapter 3 that the use of adjusted betas compensates for interest rate sensitivity of utility stocks not captured by unadjusted betas.

[13] The lowering of the tax burden on capital gains and dividend income has no impact as far as non-taxable institutional investors (pension funds, 401K, and mutual funds) are concerned, and such investors engage in very large amounts of trading on security markets. It is quite plausible that taxable retail investors are relatively inactive traders and that large non-taxable investors have a substantial influence on capital markets.

ARNINGS GROWTH	
etained arnings (4)	Growth Rate of Earnings (5)
$0.40	
$0.42	4%
$0.43	4%
$0.67	56%
$0.72	6%
$0.76	6%

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expectations relative to history, historical growth rates become suspect as a measure of investor expectations.

Yet another issue associated with historical growth is that reliance on history to measure investor expectations renders the replication of that growth a self-fulfilling prophecy. Reliance on forecast growth rates avoids this inherent circularity.

The major point of all this is that it is perilous to apply historical growth when a utility is in a transition between growth paths. When payout ratios, equity return, and market-to-book ratios are changing, reliance on historical growth is hazardous. Such transitions can occur under variable inflation environments, and under fundamental structural shifts, such as deregulation.

Given the choice of variables, length of historical period, and the choice of statistical methodologies, the number of permutations and combinations of historical growth rates is such that other methods and proxies for expected growth must be explored. Historical growth rates constitute a useful starting point and provide useful information as long as the necessary conditions and assumptions outlined in this section are not dramatically violated. Although historical information provides a primary foundation for expectations, investors use additional information to supplement past growth rates. Extrapolating past history alone without consideration of historical trends and anticipated economic events would assume either that past rates will persist over time or that investors' expectations are based entirely on history.

9.4 Growth Estimates: Analysts' Forecasts

Since investor growth expectations are the quantities desired in the DCF model, the use of forecast growth published by investment services merits serious consideration. The growth rates assumed by investors can be determined by a study of the analyses of future earnings and projected long-run growth rates made by the investment community. The anticipated long-run growth rates actually used by institutional investors to determine the desirability of investing in different securities influence investors' growth anticipations.

Typically, growth forecasts are in the form of earnings per share over periods ranging from one to 5 years, and are supported by extensive financial analysis.[10]

[10] Analysts do not generally disseminate their methods of forecasting and do not generally recommend the purchase or sale of a security based on any single growth variable or growth estimating technique. A professional financial analyst is reluctant to reveal the premises and methods of his professional judgment and recommendations. Moreover, analysts' buy/sell recommendations result from complex judgments that cannot be reduced to a single variable or to simple mechanistic equations or models. Several methods and algorithms, involving both quantitative and qualitative factors, are likely to be used in arriving at a final growth forecast, including historical indicators.

The average growth rate estimate from all the analysts that follow the company measures the consensus expectation of the investment community for that company. In most cases, it is necessary to use earnings forecasts rather than dividend forecasts due to the extreme scarcity of dividend forecasts compared to the widespread availability of earnings forecasts. Given the paucity and variability of dividend forecasts, using the latter would produce unreliable DCF results. In any event, the use of the DCF model prospectively assumes constant growth in both earnings and dividends. Moreover, as discussed below, there is an abundance of empirical research that shows the validity and superiority of earnings forecasts relative to historical estimates when estimating the cost of capital.

The uniformity of growth projections is a test of whether they are typical of the market as a whole. If, for example, 10 out of 15 analysts forecast growth in the 7%–9% range, the probability is high that their analysis reflects a degree of consensus in the market as a whole. As a side note, the lack of uniformity in growth projections is a reasonable indicator of higher risk. Chapter 3 alluded to divergence of opinion amongst analysts as a valid risk indicator.

Because of the dominance of institutional investors and their influence on individual investors, analysts' forecasts of long-run growth rates provide a sound basis for estimating required returns. Financial analysts exert a strong influence on the expectations of many investors who do not possess the resources to make their own forecasts, that is, they are a cause of g. The accuracy of these forecasts in the sense of whether they turn out to be correct is not at issue here, as long as they reflect widely held expectations. As long as the forecasts are typical and/or influential in that they are consistent with current stock price levels, they are relevant. The use of analysts' forecasts in the DCF model is sometimes denounced on the grounds that it is difficult to forecast earnings and dividends for only one year, let alone for longer time periods. This objection is unfounded, however, because it is present investors' expectations that are being priced; it is the consensus forecast that is embedded in price and therefore in required return, and not the future as it will turn out to be.

Empirical Literature on Earnings Forecasts

Published studies in the academic literature demonstrate that growth forecasts made by security analysts represent an appropriate source of DCF growth rates, are reasonable indicators of investor expectations and are more accurate than forecasts based on historical growth. These studies show that investors rely on analysts' forecasts to a greater extent than on historic data only.

Academic research confirms the superiority of analysts' earnings forecasts over univariate time-series forecasts that rely on history. This latter category

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includes many *ad hoc* forecasts from statistical models, ranging from the naive methods of simple averages, moving averages, etc. to the sophisticated time-series techniques such as the Box-Jenkins modeling techniques. The literature suggests that analysts' earnings forecasts incorporate all the public information available to the analysts and the public at the time the forecasts are released. This finding implies that analysts have already factored historical growth trends into their forecast growth rates, making reliance on historical growth rates somewhat redundant and, at worst, potentially double counting growth rates which are irrelevant to future expectations. Furthermore, these forecasts are statistically more accurate than forecasts based solely on historical earnings, dividends, book value equity, and the like.

Summary of Empirical Research

Important papers include Brown and Rozeff (1978), Cragg and Malkiel (1968, 1982), Harris (1986), Vander Weide and Carleton (1988), Lys and Sohn (1990), and Easterwood and Nutt (1999).

The study by Brown and Rozeff (1978) shows that analysts, as proxied by Value Line analysts, make better forecasts than could be obtained using only historical data, because analysts have available not only past data but also a knowledge of such crucial factors as rate case decisions, construction programs, new products, cost data, and so on. Brown and Rozeff test the accuracy of analysts' forecasts versus forecasts based on past data only, and conclude that their evidence of superior analyses means that analysts' forecasts should be used in studies of cost of capital. Their evidence supports the hypothesis that Value Line analysts consistently make better predictions than historical time-series models.

Using the IBES consensus earnings forecasts as proxies for investor expectation, Harris (1986) estimates the cost of equity using expected rather than historical earnings growth rates. In his review of the literature on financial analysts' forecasts, Harris concludes that a growing body of knowledge shows that analysts' earnings forecasts are indeed reflected in stock prices. Elton, Gruber, and Gultekin (1981) show that stock prices react more to changes in analysts' forecasts of earnings than they do to changes in earnings themselves, suggesting the usefulness of analysts' forecasts as surrogates for market expectations. In an extensive National Bureau of Economic Research study using analysts' earnings forecasts, Cragg and Malkiel (1982) present detailed empirical evidence that the average analyst's expectation is more similar to expectations being reflected in the marketplace than historical growth rates, and that it is the best possible source of DCF growth rates. The authors show that historical growth rates do not contain any information that is not already impounded in analysts' growth forecasts. They conclude that the expectations formed by Wall Street professionals get quickly and thoroughly impounded

into the prices of securities and that the company valuations made by analysts are reflected in security prices.

Vander Weide and Carleton (1988) update the Cragg and Malkiel study and find overwhelming evidence that the consensus analysts' forecasts of future growth is superior to historically oriented growth measures in predicting the firm's stock price. Their results also are consistent with the hypothesis that investors use analysts' forecasts, rather than historically oriented growth calculations, in making stock buy-and-sell decisions. A study by Timme and Eiseman (1989) produced similar results.

Using virtually all publicly available analyst earnings forecasts for a large sample of companies (over 23,000 individual forecasts by 100 analyst firms), Lys and Sohn (1990) show that stock returns respond to individual analyst earnings forecasts, even when they are closely preceded by earnings forecasts made by other analysts or by corporate accounting disclosures. Using actual and IBES data from 1982–1995, Easterwood and Nutt (1999) regress the analysts' forecast errors against either historical earnings changes or analysts' forecasting errors in the prior years. Results show that analysts tend to underreact to negative earnings information, but overreact to positive earnings information.

The more recent studies provide evidence that analysts make biased forecasts and misinterpret the impact of new information.[11] For example, several studies in the early 1990s suggest that analysts either systematically underreact or overreact to new information. Easterwood and Nutt (1999) discriminate between these different reactions and reported that analysts underreact to negative information, but overreact to positive information. The recent studies do not necessarily contradict the earlier literature. The earlier research focused on whether analysts' earnings forecasts are better at forecasting future earnings than historical averages, whereas the recent literature investigates whether the analysts' earnings forecasts are unbiased estimates of future earnings. It is possible that even if the analysts' forecasts are biased, they are still closer to future earnings than the historical averages, although this hypothesis has not been tested in the recent studies. One way to assess the concern that analysts' forecasts may be biased upward is to incorporate into the analysis the growth forecasts of independent research firms, such as Value Line, in addition to the analyst consensus forecast. Unlike investment banking firms and stock brokerage firms, independent research firms such as Value Line have no incentive to distort earnings growth estimates in order to bolster interest in common stocks.

[11] Other relevant papers corroborating the superiority of analysts' forecasts as predictors of future returns versus historical growth rates include: Fried and Givoly (1982), Moyer, Chatfield and Kelley (1985), and Gordon, Gordon and Gould (1989).

Some argue that analysts tend to forecast earnings growth rates that exceed those actually achieved and that this optimism biases the DCF results upward. The magnitude of the optimism bias for large rate-regulated companies in stable segments of an industry is likely to be very small. Empirically, the severity of the optimism problem is unclear for regulated utilities, if a problem exists at all. It is interesting to note that Value Line forecasts for utility companies made by independent analysts with no incentive for over- or understating growth forecasts are not materially different from those published by analysts in security firms with incentives not based on forecast accuracy, and may in fact be more robust. If the optimism problem exists at all, it can be circumvented by relying on multiple-stage DCF models that substitute long-term economic growth for analysts' growth forecasts in the second and/or third stages of the model.

Empirical studies have also been conducted showing that investors who rely primarily on data obtained from several large reputable investment research houses and security dealers obtain better results than those who do not.[12] Thus, both empirical research and common sense indicate that investors rely primarily on analysts' growth rate forecasts rather than on historical growth rates alone.

Ideally, one could decide which analysts make the most reliable forecasts and then confine the analysis to those forecasts. This would be impractical since reliable data on past forecasts are generally not available. Moreover, analysts with poor track records are replaced by more competent analysts, so that a poor forecasting record by a particular firm is not necessarily indicative of poor future forecasts. In any event, analysts working for large brokerage firms typically have a following, and investors who heed a particular analyst's recommendations do exert an influence on the market. So, an average of all the available forecasts from large reputable investment houses is likely to produce the best DCF growth rate.

Growth rate forecasts are available online from several sources. For example, Value Line Investment Analyzer, IBES (Institutional Brokers' Estimate System), Zacks Investment Research, Reuters, First Call, Yahoo Finance, and Multex Web sites provide analysts' earnings forecasts on a regular basis by reporting on the results of periodic (usually monthly) surveys of the earnings growth forecasts of a large number of investment advisors, brokerage houses, and other firms that engage in fundamental research on U.S. corporations. These firms include most large institutional investors, such as pension funds, banks, and insurance companies. Representative of industry practices, the Zacks Investment Research Web site is a central location whereby investors

[12] Examples of these studies include Stanley, Lewellen and Schlarbaum (1981) and Touche Ross Co. (1982).

are able to research the different analyst estimates for any given stock without necessarily searching for each individual analyst. Zacks gathers and compiles the different estimates made by stock analysts on the future earnings for the majority of U.S. publicly traded companies. Estimates of earnings per share for the upcoming 2 fiscal years, and a projected 5-year growth rate in such earnings per share are available at monthly intervals. The forecast 5-year growth rates are normalized in order to remove short-term distortions. Forecasts are updated when analysts formally change their stated predictions.

Exclusive reliance on a single analyst's growth forecast runs the risk of being unrepresentative of investors' consensus forecast. One would expect that averages of analysts' growth forecasts, such as those contained in IBES or Zacks, are more reliable estimates of investors' consensus expectations likely to be impounded in stock prices.[13] Averages of analysts' growth forecasts rather than a single analyst's growth forecasts are more reliable estimates of investors' consensus expectations.

One problem with the use of published analysts' forecasts is that some forecasts cover only the next one or two years. If these are abnormal years, they may not be indicative of longer-run average growth expectations. Another problem is that forecasts may not be available in sufficient quantities or may not be available at all for certain utilities, for example water utilities, in which case alternate methods of growth estimation must be employed.

Some financial economists are uncomfortable with the assumption that the DCF growth rates are perpetual growth rates, and argue that above average growth can be expected to prevail for a fixed number of years and then the growth rate will settle down to a steady-state, long-run level, consistent with that of the economy. The converse also can be true whereby below-average growth can be expected to prevail for a fixed number of years and then the growth rate will resume a higher steady-state, long-run level. Extended DCF models are available to accommodate such assumptions, and were discussed in Chapter 8.

Earnings versus Dividend Forecasts

Casual inspection of the Zacks Investment Research, First Call Thompson, and Multex Web sites reveals that earnings per share forecasts dominate the information provided. There are few, if any, dividend growth forecasts. Only Value Line provides comprehensive long-term dividend growth forecasts. The wide availability of earnings forecasts is not surprising. There is an abundance of evidence attesting to the importance of earnings in assessing investors'

[13] The earnings growth rates published by Zacks, First Call, Reuters, Value Line, and IBES contain significant overlap since all rely on virtually the same population of institutional analysts who provide such forecasts.

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expectations. The sheer volume of earnings forecasts available from the investment community relative to the scarcity of dividend forecasts attests to their importance. The fact that these investment information providers focus on growth in earnings rather than growth in dividends indicates that the investment community regards earnings growth as a superior indicator of future long-term growth. Surveys of analytical techniques actually used by analysts reveal the dominance of earnings and conclude that earnings are considered far more important than dividends. Finally, Value Line's principal investment rating assigned to individual stocks, Timeliness Rank, is based primarily on earnings, accounting for 65% of the ranking.

Historical Growth Rates Versus Analysts' Forecasts

Obviously, historical growth rates as well as analysts' forecasts provide relevant information to the investor with regard to growth expectations. Each proxy for expected growth brings information to the judgment process from a different light. Neither proxy is without blemish; each has advantages and shortcomings. Historical growth rates are available and easily verifiable, but may no longer be applicable if structural shifts have occurred. Analysts' growth forecasts may be more relevant since they encompass both history and current changes, but are nevertheless imperfect proxies.

9.5 Growth Estimates: Sustainable Growth Method

The third method of estimating the growth component in the DCF model, alternately referred to as the ''sustainable growth'' or ''retention ratio'' method, can be used by investment analysts to predict future growth in earnings and dividends. In this method, the fraction of earnings expected to be retained by the company, b, is multiplied by the expected return on book equity, r, to produce the growth forecast. That is,

$$g = b \times r$$

The conceptual premise of the method, enunciated in Chapter 8, Section 8.4, is that future growth in dividends for existing equity can only occur if a portion of the overall return to investors is reinvested into the firm instead of being distributed as dividends.

For example, if a company earns 12% on equity, and pays all the earnings out in dividends, the retention factor, b, is zero and earnings per share will not grow for the simple reason that there are no increments to the asset base (rate base). Conversely, if the company retains all its earnings and pays no dividends, it would grow at an annual rate of 12%. Or again, if the company earns 12% on equity and pays out 60% of the earnings in dividends, the

models, such as the Arbitrage Pricing Model (APM) and the Fama-French Three-Factor Model, assert that there are several broad factors that influence security returns and formally quantify the impact of these factors on security returns. What weights should be assigned to the competing approaches? Who is the winner? The quick answer is that all the relevant capital market data and financial theories available should be used in estimating the cost of capital.

15.2 Use of Multiple Methods

There are four broad generic methodologies available to measure the cost of equity: DCF, Risk Premium, and Capital Asset Pricing Model (CAPM), which are market-oriented, and Comparable Earnings, which is accounting-oriented. Each generic market-based methodology in turn contains several variants: For example, the Empirical CAPM and the Fama-French Three-Factor Model are sub-species of the CAPM methodology. The multiple-stage DCF model is a variation of the generic DCF approach.

Each methodology requires the exercise of considerable judgment on the reasonableness of the assumptions underlying the methodology and on the reasonableness of the proxies used to validate the theory. The inability of the DCF model to account for changes in relative market valuation, discussed below, is a vivid example of the potential shortcomings of the DCF model when applied to a given company. Similarly, the inability of the CAPM to account for variables that affect security returns other than beta tarnishes its use.

No one individual method provides the necessary level of precision for determining a fair return, but each method provides useful evidence to facilitate the exercise of an informed judgment. Reliance on any single method or preset formula is inappropriate when dealing with investor expectations because of possible measurement difficulties and vagaries in individual companies' market data.

Examples of such vagaries include dividend suspension, insufficient or unrepresentative historical data due to a recent merger, increased competition, impending merger or acquisition, and a new corporate identity due to restructuring activities. To illustrate, there were difficulties in applying cost of capital methodologies while the electric utility industry was experiencing structural change in the late 1990s and early 2000s. The traditional cost of equity estimation methodologies were difficult to implement during the fast-changing circumstances of the electric utility industry during that period. This is because utility company historical data had become less meaningful for an industry in a state of change. Past earnings and dividend trends were simply not indicative of the future. For example, historical growth rates of earnings and dividends had been depressed by eroding margins due to a variety of factors, including structural transformation and the transition to a more competitive

environment. As a result, historical data were not representative of the future long-term earning power of these companies. Moreover, historical growth rates were not representative of future trends for several electric utilities involved in mergers and acquisitions, as these companies going forward were not the same companies for which historical data were available. A similar argument applied to historical risk measures. Historical risk measures, such as beta, were downward-biased in assessing the current industry risk circumstances.

As a general proposition, it is extremely dangerous to rely on only one generic methodology to estimate equity costs. The difficulty is compounded when only one variant of that methodology is employed. It is compounded even further when that one methodology is applied to a single company. Hence, several methodologies applied to several comparable-risk companies should be employed to estimate the cost of common equity. The advantage of using several different approaches is that the results of each one can be used to check the others. If the cost of equity estimation process is limited to one methodology, such as DCF or CAPM, it may severely bias the results. One major problem that results from using only one methodology is the lack of corroborating evidence. There is simply no objective cross check on the result. All the market data and financial theories available should be used in making an estimate.

There is no single model that conclusively determines or estimates the expected return for an individual firm. Each methodology possesses its own way of examining investor behavior, its own premises, and its own set of simplifications of reality. Each method proceeds from different fundamental premises that cannot be validated empirically. Investors do not necessarily subscribe to any one method, nor does the stock price reflect the application of any one single method by the price-setting investor. There is no monopoly as to which method is used by investors. In the absence of any hard evidence as to which method outdoes the other, all relevant evidence should be used and weighted equally, in order to minimize judgmental error, measurement error, and conceptual infirmities. A regulator should rely on the results of a variety of methods applied to a variety of comparable groups, and not on one particular method. There is no guarantee that a single DCF result is necessarily the ideal predictor of the stock price and of the cost of equity reflected in that price, just as there is no guarantee that a single CAPM or Risk Premium result constitutes the perfect explanation of that stock price. The DCF, CAPM, and Risk Premium models are three different ways of getting a handle on the same problem.

If a regulatory commission relies on a single cost of equity estimate or on a single methodology, that commission greatly limits its flexibility and increases the risk of authorizing unreasonable rates of return. The results from one

methodology or from a one-company sample are likely to contain a high degree of measurement error and may be distorted by short-term aberrations. A commission's hands should not be bound to one single company-specific estimate of equity costs, nor should the commission ignore relevant evidence and back itself into a corner.

The financial literature supports the use of multiple methods. Professor Eugene Brigham, a widely respected scholar and finance academician, asserts:[1]

> Three methods typically are used: (1) the Capital Asset Pricing Model (CAPM), (2) the discounted cash flow (DCF) method, and (3) the bond-yield-plus-risk-premium approach. These methods are not mutually exclusive—no method dominates the others, and all are subject to error when used in practice. Therefore, when faced with the task of estimating a company's cost of equity, we generally use all three methods and then choose among them on the basis of our confidence in the data used for each in the specific case at hand.

Another prominent finance scholar, Professor Stewart Myers, in an early pioneering article on regulatory finance, stated:[2]

> Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information. That means you should not use any one model or measure mechanically and exclusively. Beta is helpful as one tool in a kit, to be used in parallel with DCF models or other techniques for interpreting capital market data.

Reliance on multiple tests recognizes that no single methodology produces a precise definitive estimate of the cost of equity. As stated in Bonbright, Danielsen, and Kamerschen (1988), "*no single or group test or technique is conclusive.*" Only a fool discards relevant evidence.

15.3 Musings on DCF

While the DCF model has been fashionable in regulatory proceedings, although not nearly as much in academic circles, uncritical acceptance of the standard DCF equation vests the model with a degree of accuracy that simply is not

[1] See Brigham and Ehrhardt (2005).

[2] See Myers (1972).

there. One of the leading experts on regulation, Dr. C. F. Phillips,[3] discussed the dangers of relying on the DCF model:

> Use of the DCF model for regulatory purposes involves both theoretical and practical difficulties. The theoretical issues include the assumption of a constant retention ratio (i.e., a fixed payout ratio) and the assumption that dividends will continue to grow at a rate g in perpetuity. Neither of these assumptions has any validity, particularly in recent years. Further, the investors' capitalization rate and the cost of equity capital to a utility for application to book value (i.e., an original cost rate base) are identical only when market price is equal to book value. Indeed, DCF advocates assume that if the market price of a utility's common stock exceeds its book value, the allowable rate of return on common equity is too high and should be lowered; and vice versa. Many question the assumption that market price should equal book value, believing that the earnings of utilities should be sufficiently high to achieve market-to-book ratios which are consistent with those prevailing for stocks of unregulated companies.
>
> . . . [T]here remains the circularity problem: Since regulation establishes a level of authorized earnings which, in turn, implicitly influences dividends per share, estimation of the growth rate from such data is an inherently circular process. For all of these reasons, the DCF model suggests a degree of precision which is in fact not present and leaves wide room for controversy about the level of k [cost of equity].

While it is certainly appropriate to use the DCF methodology to estimate the cost of equity, there is no proof that the DCF produces a more accurate estimate of the cost of equity than other methodologies. Sole reliance on the DCF model ignores the capital market evidence and financial theory formalized in the CAPM and other risk premium methods. The DCF model is one of many tools to be employed in conjunction with other methods to estimate the cost of equity. It is not a superior methodology that supplants other financial theory and market evidence. The broad usage of the DCF methodology in regulatory proceedings in contrast to its virtual disappearance in academic textbooks does not make it superior to other methods. The same is true of the Risk Premium and CAPM methodologies.

Applicability of the DCF Model

Caution has to be used in applying the DCF model to utility stocks for four reasons. The first reason is that the stock price used as input in the dividend

[3] See Phillips (1993), pp. 395–96.

TABLE 15-1
EFFECT OF MARKET-TO-BOOK RATIO ON MARKET RETURN

	Situation 1	Situation 2	Situation 3
1 Initial purchase price	$25.00	$50.00	$100.00
2 Initial book value	$50.00	$50.00	$50.00
3 **Initial M/B**	**0.50**	**1.00**	**2.00**
4 **DCF Return 10% = 5% + 5%**	**10.00%**	**10.00%**	**10.00%**
5 Dollar Return	$5.00	$5.00	$5.00
6 Dollar Dividends 5% Yield	$1.25	$2.50	$5.00
7 Dollar Growth 5% Growth	$3.75	$2.50	$0.00
8 **Market Return**	**20.00%**	**10.00%**	**5.00%**

But what if investors expect an increase in the price/earnings ratio from 12.5 to 13.5? Then, the growth in value is from $100 to $114.48, or 13.5 times next year's earnings of $8.48, for a total return of 18.5% (dividend yield of 4%, plus growth in value of 14.5%). The orthodox DCF model would indicate returns of 10%, whereas the investors' true expected return is 18.5%. Investor-expected returns are substantially understated whenever investors anticipate increases in relative market valuation, and conversely.

The third and perhaps most important reason for caution and skepticism is that application of the DCF model produces estimates of common equity cost that are consistent with investors' expected return only when stock price and book value are reasonably similar, that is, when the M/B is close to unity. As shown below, application of the standard DCF model to utility stocks understates the investor's expected return when the market-to-book (M/B) ratio of a given stock exceeds unity. This was particularly relevant in the capital market environment of the 1990s and 2000s where utility stocks were trading at M/B ratios well above unity and have been for nearly two decades. The converse is also true, that is, the DCF model overstates the investor's return when the stock's M/B ratio is less than unity. The reason for the distortion is that the DCF market return is applied to a book value rate base by the regulator, that is, a utility's earnings are limited to earnings on a book value rate base.

The simple numerical illustration shown in Table 15-1 demonstrates the impact of M/B ratios on the DCF market return. The example shows the result of applying a market value cost rate to book value rate base under three different M/B scenarios. The three columns correspond to three M/B situations: the stock trades below, equal to, and above book value, respectively. The latter situation is noteworthy and representative of the capital market environment of the last two decades. As shown in the third column, the DCF cost rate of 10%, made up of a 5% dividend yield and a 5% growth rate, is applied to

19.2 Critique of Double Leverage

Adherents to the double leverage calculation argue that the true cost of capital to a utility subsidiary is the weighted cost of its own debt and the weighted cost of the parent's debt and equity funding. Moreover, unless the subsidiary's equity is assigned the parent's weighted cost of capital, parent shareholders will reap abnormally high returns. Although persuasive on the surface, these arguments conceal serious conceptual and practical problems. Moreover, the validity of double leverage rests on highly questionable assumptions.

The flaws associated with the double leverage approach have been discussed thoroughly in the academic literature. Pettway and Jordan (1983) and Beranek and Miles (1988) point out the flaws in the double leverage argument, particularly the excess return argument, and also demonstrate that the stand-alone method is a superior procedure. Rozeff (1983) discusses the ratepayer cross-subsidies of one subsidiary by another when employing double leverage. Lerner (1973) concludes that the returns granted an equity investor must be based on the risks to which the investor's capital is exposed and not on the investor's source of funds.

Theoretical Issues

The double leverage approach contradicts the core of the cost of capital concept. Financial theory clearly establishes that the cost of equity is the risk-adjusted opportunity cost to the investors and not the cost of the specific capital sources employed by investors. The true cost of capital depends on the use to which the capital is put and not on its source. The *Hope* and *Bluefield* doctrines have made clear that the relevant considerations in calculating a company's cost of capital are the alternatives available to investors and the returns and risks associated with those alternatives. The specific source of funding and the cost of those funds to the investor are irrelevant considerations.

Carrying the double leverage standard to its logical conclusion leads to even more unreasonable prescriptions. If the common shares of the subsidiary were held by both the parent and by individual investors, the equity contributed by the parent would have one cost under the double leverage computation while the equity contributed by the public would have another. This is clearly illogical. Or, does double leverage require tracing the source of funds used by each individual investor so that its cost can be computed by applying double leverage to each individual investor? Of course not! Equity is equity, irrespective of its source, and the cost of that equity is governed by its use, by the risk to which it is exposed.

To illustrate, let us say that an individual investor borrows money at the bank at an after-tax cost of 8% and invests the funds in a speculative oil exploration venture. Clearly, the required return on the oil venture investment is not the

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Portfolio Beta Coefficients

A portfolio consisting of low-beta securities will itself have a low beta, since the beta of any set of securities is a weighted average of the individual securities' betas:

$$b_p = \sum_{i=1}^{n} w_i b_i. \tag{6-5}$$

Here b_p is the beta of the portfolio, which reflects how volatile the portfolio is in relation to the market index; w_i is the fraction of the portfolio invested in the *i*th stock; and b_i is the beta coefficient of the *i*th stock.

If an investor holds a $100,000 portfolio consisting of $10,000 invested in each of 10 stocks, and if each stock has a beta of 0.8, then the portfolio will have $b_p = 0.8$. Thus, the portfolio is less risky than the market, and it should experience relatively narrow price swings and have small rate of return fluctuations.

Now suppose one of the existing stocks is sold and replaced by a stock with $b_i = 2.0$. This action will increase the riskiness of the portfolio from $b_{p1} = 0.8$ to $b_{p2} = 0.92$:

$$b_{p2} = \sum_{i=1}^{n} w_i b_i = 0.9(0.8) + 0.1(2.0) = 0.92.$$

Had a stock with $b_i = 0.2$ been added, the portfolio beta would have declined from 0.8 to 0.74. Adding this stock would, therefore, reduce the riskiness of the portfolio.

The Relationship between Risk and Rates of Return

In the preceding section, we saw that under the CAPM framework, beta is the appropriate measure of a stock's relevant risk. Now we must specify the relationship between risk and return—if beta rises by some specific amount, by how much must the stock's expected return increase to compensate for the increase in risk? To begin, let us define the following terms:

$\hat{k}_i$ = expected rate of return on the *i*th stock.

k_i = required rate of return on the *i*th stock. If $\hat{k}_i$ is less than k_i, then you would not purchase this stock, or you would sell it if you owned it.

R_F = riskless rate of return, generally measured by the rate of return on U.S. Treasury securities.

b_i = beta coefficient of the *i*th stock.

k_M = required rate of return on an average ($b = 1.0$) stock. k_M is also the required rate of return on a portfolio consisting of all stocks, or the market portfolio.

$RP_M = (k_M - R_F)$ = market risk premium. It is the additional return over the riskless rate required to compensate investors for assuming an "average" amount of risk.

$RP_i = b_i(k_M - R_F)$ = risk premium on the *i*th stock. The stock's risk premium is less than, equal to, or greater than the premium on an average stock, depending on whether its beta is less than, equal to, or greater than 1.0. If $b_i = 1.0$, then $RP_i = RP_M$.

The market risk premium, RP_M, depends on the degree of aversion that investors, in the aggregate, have to risk.[11] Let us assume that at the current time Treasury bonds yield $R_F = 8\%$, and an average share of stock has a required return of $k_M = 12\%$. Therefore, the market risk premium is 4 percent:

$$RP_M = k_M - R_F = 12\% - 8\% = 4\%.$$

It follows that, if one stock were twice as risky as some other, its risk premium would be twice as high, and, conversely, if its risk were only half as high, its risk premium would be half as high. Further, we can measure a stock's relative riskiness by its beta coefficient. Therefore, if we know the market risk premium, RP_M, and the stock's beta coefficient, b_i, we can find its risk premium as the product $b_i(RP_M)$. For example, if $b_i = 0.5$ and $RP_M = 4\%$, then RP_i is 2 percent:

$$\text{Risk premium for Stock i} = RP_i = b_i(RP_M) = 0.5(4\%) = 2.0\%. \quad (6\text{-}6)$$

To summarize, given estimates of R_F, k_M, and b_i, we can find the required rate of return on Stock i:

$$\begin{aligned} k_i &= R_F + b_i(k_M - R_F) = R_F + b_i(RP_M) \\ &= 8\% + 0.5(12\% - 8\%) = 8\% + 0.5(4\%) = 10\%. \end{aligned} \quad (6\text{-}7)$$

If some other stock, j, were more risky than Stock i and had $b_j = 2.0$, then its required rate of return would be 16 percent:

$$k_j = 8\% + 2.0(4\%) = 16\%.$$

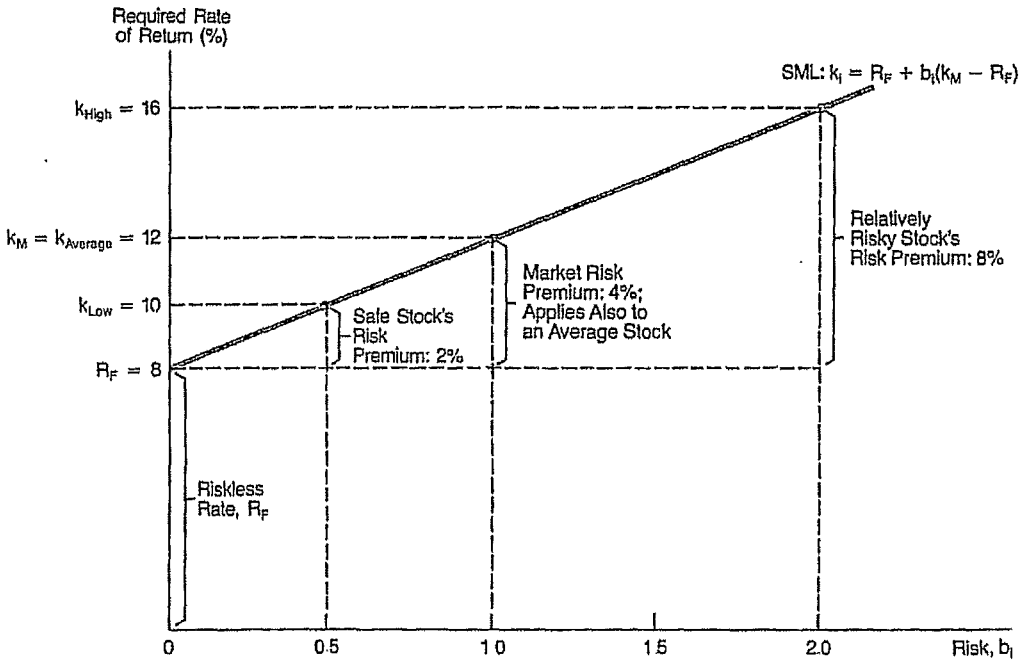
An average stock, with $b = 1.0$, would have a required return of 12 percent, the same as the market return:

$$k_{Average} = 8\% + 1.0(4\%) = 12\% = k_M.$$

Equation 6-7 is often expressed as a graph called the *Security Market Line (SML)*; Figure 6-9 shows the SML when $R_F = 8\%$ and $k_M = 12\%$. Note the following points:

[11] This concept is discussed in some detail in Appendix 6B. It should be noted that the risk premium of an average stock, $k_M - R_F$, cannot be measured with great precision because it is impossible to obtain precise values for k_M. However, empirical studies suggest that, where long-term U.S. Treasury bonds are used to measure R_F and where k_M is the expected return on the S&P 400 Industrial Stocks, the market risk premium varies somewhat from year to year, and it has generally ranged from 3 to 6 percent during the last 20 years.

Figure 6-9
The Security Market Line (SML)



1. Required rates of return are shown on the vertical axis, while risk as measured by beta is shown on the horizontal axis.

2. Riskless securities have $b_i = 0$; therefore, R_F appears as the vertical axis intercept.

3. The slope of the SML reflects the degree of risk aversion in the economy—the greater the average investor's aversion to risk, then (1) the steeper is the slope of the line, (2) the greater is the risk premium for any risky asset, and (3) the higher is the required rate of return on risky assets.[12] These points are discussed further in a later section.

[12]Students sometimes confuse beta with the slope of the SML. This is a mistake. As we saw earlier in connection with Figure 6-8, and as is developed further in Appendix 6A, beta does represent the slope of a line, but *not* the Security Market Line. This confusion arises partly because the SML equation is generally written, in this book and throughout the finance literature, as $k_i = R_F + b_i(k_M - R_F)$, and in this form b_i looks like the slope coefficient and $(k_M - R_F)$ the variable. It would perhaps be less confusing if the second term were written $(k_M - R_F)b_i$, but this is not generally done.

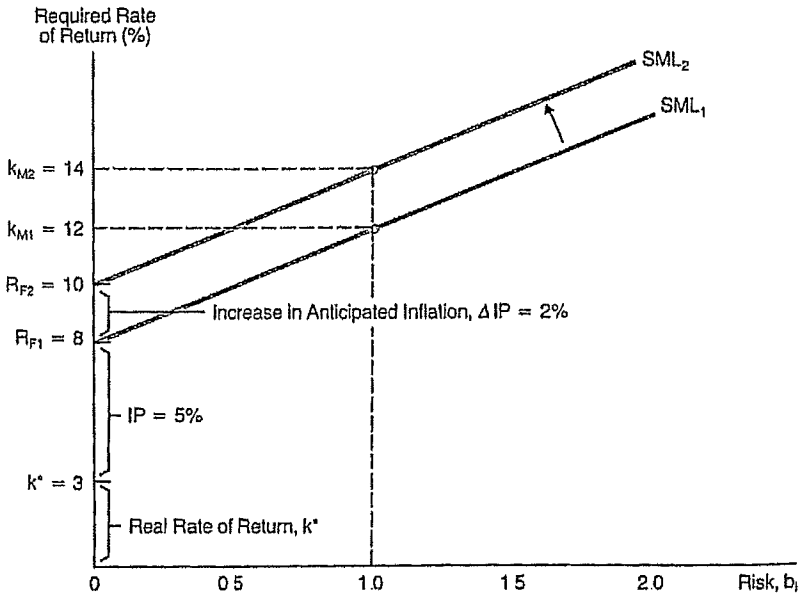
4. The values we worked out for stocks with $b_i = 0.5$, $b_i = 1.0$, and $b_i = 2.0$ agree with the values shown on the graph for k_{Low}, $k_{Average}$, and k_{High}.

The Security Market Line, and a company's position on the line, change over time as interest rates, investors' risk aversion, and individual companies' betas change. Such changes are discussed in the following sections.

The Impact of Inflation

As we saw in Chapter 3, interest amounts to "rent" on borrowed money, or the "price" of money. Thus, R_F is the price of money to a riskless borrower. The existing market risk-free rate is called the *nominal rate*, and it consists of two elements: (1) a *real*, or *inflation-free, rate of return*, k^*, and (2) an *inflation premium*, IP, equal to the anticipated rate of inflation. Thus, $R_F = k^* + IP$. The real rate on risk-free government securities has, historically, ranged from 2 to 4 percent, with a mean of about 3 percent. Thus, if no inflation were expected, risk-free government securities would tend to yield about 3 percent. However, as the expected rate of inflation increases, a premium must be added to the real rate of return to compensate investors for the loss of purchasing

Figure 6-10
Shift in the SML Caused by an Increase in Inflation



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Again, note that this estimate of $\hat{k}_s$ is based upon the assumption that g is expected to remain constant in the future. If this assumption is not correct, then it will be necessary to solve for $\hat{k}_s$ using Equation 7-5.[8]

To illustrate the DCF approach, suppose a firm's stock sells for $18.82; its next expected dividend is $1.43; and its expected growth rate is a constant 6.6 percent. The firm's expected and required rate of return, and hence its cost of retained earnings, is 14.2 percent:

$$\hat{k}_s = k_s = \frac{\$1.43}{\$18.82} + 6.6\% = 7.6\% + 6.6\% = 14.2\%.$$

This 14.2 percent is the minimum rate of return that management must expect to earn on equity capital to justify retaining earnings and plowing them back into the business rather than paying them out to stockholders as dividends. Henceforth, in this chapter we assume that equilibrium exists, so we use the terms k_s and $\hat{k}_s$ interchangeably.

In practical work, *it is often best to use all three methods*—CAPM, bond yield plus risk premium, and DCF—and then apply judgment when the methods produce different results. People experienced in estimating equity capital costs recognize that both careful analysis and some very fine judgments are required. It would be nice to pretend that these judgments are unnecessary and to specify an easy, precise way of determining the exact cost of equity capital. Unfortunately, this is not possible. Finance is in large part a matter of judgment, and we simply must face this fact.

Cost of Newly Issued Common Stock, or External Equity, k_e

The cost of new common stock, or external equity capital, k_e, is higher than the cost of retained earnings, k_s, because of flotation costs involved in selling new common stock. What rate of return must be earned on funds raised by selling stock in order to make issuing new stock worthwhile? To put it another way, what is the cost of *new common stock*?

For a firm with a constant growth rate, the answer is found by applying the following formula:

[8]When the DCF method is used, we are implicitly assuming that the stock's price is in equilibrium, with $\hat{k}_s = D_1/P_0 + g = R_F + \text{Risk premium} = k_s$. Thus, the DCF and the CAPM methods will, if all inputs are estimated correctly, produce similar cost of capital estimates. Also, growth rates may be estimated (1) by projecting past trends if there is reason to think these trends will continue, (2) by asking security analysts what growth rates they are projecting (or, alternatively, by looking up projected growth rates in such publications as *Value Line*, a financial service subscribed to by many investors), and (3) by projecting the firm's dividend payout ratio and the complement of this ratio, the *retention rate*, and then multiplying the retention rate by the company's projected rate of return on equity (ROE):

$$g = (\text{Retention rate})(\text{ROE}) = (1.0 - \text{Payout rate})(\text{ROE}).$$

These methods of estimating dividend growth are discussed in more detail in Appendix 7A.

The Regulation of Public Utilities

Theory and Practice

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an appropriate allowance for underpricing in connection with sales of additional shares, including allowance for market pressure and for costs of flotation and underwriting. The capitalization rate before the allowance for underpricing is the discount rate that equates all expected dividends in the future plus the market price that investors eventually expect to realize to the present market price. While this is a simple enough concept, it is difficult to measure since measurement requires the estimation of the expectations of the investors who determine the present market price. Such estimates, of course, involve the exercise of informed judgment.[102]

The DCF model represents an attempt to estimate the equity investors' capitalization rate. Mathematically,

$$K = \frac{d}{p} + g$$

where: k is the investor's capitalization or discount rate (i.e., the cost of capital)
d is the current dividend per share
p is the current market price per share
g is the expected rate of growth in dividends per share.[103]

Thus, if the stock of a particular utility pays a $3 dividend, which is expected to grow at a rate of 4.5 percent per year, and if investors are willing to pay $38 for the stock, the required return on common equity (assuming a 5 percent allowance for flotation costs) is 12.81 percent.[104] However, use of the DCF model for regulatory purposes involves both theoretical and practical difficulties.

The theoretical issues include the assumption of a constant retention ratio (i.e., a fixed payout ratio) and the assumption that dividends will continue to grow at rate g in perpetuity. Neither of these assumptions has any validity, particularly in recent years. Further, the investors' capitalization rate and the cost of equity capital to a utility for application to book value (i.e., an original cost rate base) are identical only when market price is equal to book value.[105] Indeed, DCF advocates assume that if the market price of a utility's common stock exceeds its book value, the allowable rate of return on common equity is too high and should be lowered — and vice versa.[106] Many question the assumption that market price should equal book value, believing that "the earnings of utilities should be sufficiently high to achieve market-to-book ratios which are consistent with those prevailing for stocks of unregulated companies."[107]

Most frequently, the major practical issue involves the determination of the growth rate, a determination that is highly complex and that requires

Principles of Public Utility Rates

Second Edition

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the literature with some commissions totally disregarding the new issue to those that apply an adjustment to the entire equity balance.

The Market to Book Ratio Issue

Introduction. One ongoing critical issue is whether the allowed rate of return should be designed to prevent the market prices of public utility stocks from rising to substantially above book value or falling to substantially below book value? A rigorous and literal application of a cost-of-capital-measure of a fair rate of return as outlined above would indicate that a commission should attempt to regulate rates so as to maintain the market value of a utility's stock on a par with its book value (or rate-base value) plus some allowance for underpricing. Yet such an attempt may be impractical or even impossible.

In the first place, commissions cannot forecast, except within wide limits, the effect their rate orders will have on the market prices of the stocks of the companies they regulate. In the second place, whatever the initial market prices may be, they are sure to change not only with the changing prospects for earnings, but with the changing outlook of an inherently volatile stock market. In short, market prices are beyond the control, though not beyond the influence, of rate regulation. Moreover, even if a commission did possess the power of control, any attempt to exercise it in the manner just suggested would result in harmful, uneconomic shifts in public utility rate levels. In addition, many utilities are regulated by more than one jurisdiction. Even if one commission were to attempt to regulate on the basis of market to book ratios, the commissions in the other jurisdictions would not be bound by its actions. Finally, even if regulators could put them in parity it may be undesirable following the theory of the second best if the comparable earnings exceed the cost of capital (see Kahn, 1970, pp. 52-53).

Two Facts. This situation is recognized even by supporters of a cost-of-capital standard of a fair rate of return, who undertake to meet the difficulty in two ways. First, the current cost of equity capital is rarely identified as a spot cost. Instead, it is taken to mean a normal or average capital-attracting rate of return characteristic of the recent market and typical of the market anticipated in the not distant future. Secondly, the estimated weighted average cost of capital resulting from the application of this normalized estimate of the current cost of equity may be characterized as a minimum allowance, subject to a

reasonable upward adjustment perhaps justified on the basis of possible attrition.

It follows that the common stocks of public utilities which actually succeed in earning a fair rate of return as derived by a cost of capital approach may be expected to sell at a premium over their book values or rate-base values except in periods of a depressed stock market. The premiums may be greater than the modest allowance for underpricing associated with stock offerings sometimes granted by commissions. A question arises whether the prevalence of these premiums is persuasive evidence of a corporate earning power higher than required to give adequate assurance of the continued ability to attract needed capital on terms that do not impair the integrity of the existing capital. Conversely, when market to book ratios fall below one, the questions arise whether this is persuasive evidence that a utility is not earning its cost of capital.

Consistent with the opinion that regulation is simply powerless to set rates which insure any particular market to book ratio, the answer must be in the negative. Lacking this power, regulation should recognize the possibility of earnings liberal enough to permit market to book ratios of utilities to rise slightly above one. Some argue that these ratios should be roughly at the level of well-managed companies that actually succeed in realizing these earnings fairly continuously. For many years in the 1970s and 1980s utilities in general sold at market prices well below book. The call was for rates sufficient to produce market to book ratios of 1.1 to 1.2. Now the question of what constitutes a proper *degree* of liberality remains and has not received a convincing answer. We doubt whether a conclusive answer can ever be found under such an indefinite standard of a fair rate of return as that of a flexible rate designed to rise and fall with changes in the anticipated rates of income necessary to induce new investments of equity capital.

The Q-Ratio and Market to Book Ratio

One interpretation of the mandates of the Supreme Court, and one consistent with a present-value standard of reasonable rates rather than with an original-cost standard, is that regulated enterprises should be permitted to earn on the current values of their corporate assets, as based on replacement-cost appraisals, rates of return similar to the rates actually being earned by unregulated enterprises on the values of their assets, similarly appraised. This is a mere attempt to spell out a criterion which the Supreme Court itself has never undertaken to rid of its ambiguities.

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THE COST OF CAPITAL, CORPORATION FINANCE AND THE THEORY OF INVESTMENT

By FRANCO MODIGLIANI AND MERTON H. MILLER*

What is the "cost of capital" to a firm in a world in which funds are used to acquire assets whose yields are uncertain; and in which capital can be obtained by many different media, ranging from pure debt instruments, representing money-fixed claims, to pure equity issues, giving holders only the right to a pro-rata share in the uncertain venture? This question has vexed at least three classes of economists: (1) the corporation finance specialist concerned with the techniques of financing firms so as to ensure their survival and growth; (2) the managerial economist concerned with capital budgeting; and (3) the economic theorist concerned with explaining investment behavior at both the micro and macro levels.[1]

In much of his formal analysis, the economic theorist at least has tended to side-step the essence of this cost-of-capital problem by proceeding as though physical assets—like bonds—could be regarded as yielding known, sure streams. Given this assumption, the theorist has concluded that the cost of capital to the owners of a firm is simply the rate of interest on bonds; and has derived the familiar proposition that the firm, acting rationally, will tend to push investment to the point

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[1] The literature bearing on the cost-of-capital problem is far too extensive for listing here. Numerous references to it will be found throughout the paper though we make no claim to completeness. One phase of the problem which we do not consider explicitly, but which has a considerable literature of its own is the relation between the cost of capital and public utility rates. For a recent summary of the "cost-of-capital theory" of rate regulation and a brief discussion of some of its implications, the reader may refer to H. M. Somers [20].

where the marginal yield on physical assets is equal to the market rate of interest.[2] This proposition can be shown to follow from either of two criteria of rational decision-making which are equivalent under certainty, namely (1) the maximization of profits and (2) the maximization of market value.

According to the first criterion, a physical asset is worth acquiring if it will increase the net profit of the owners of the firm. But net profit will increase only if the expected rate of return, or yield, of the asset exceeds the rate of interest. According to the second criterion, an asset is worth acquiring if it increases the value of the owners' equity, *i.e.*, if it adds more to the market value of the firm than the costs of acquisition. But what the asset adds is given by capitalizing the stream it generates at the market rate of interest, and this capitalized value will exceed its cost if and only if the yield of the asset exceeds the rate of interest. Note that, under either formulation, the cost of capital is equal to the rate of interest on bonds, regardless of whether the funds are acquired through debt instruments or through new issues of common stock. Indeed, in a world of sure returns, the distinction between debt and equity funds reduces largely to one of terminology.

It must be acknowledged that some attempt is usually made in this type of analysis to allow for the existence of uncertainty. This attempt typically takes the form of superimposing on the results of the certainty analysis the notion of a "risk discount" to be subtracted from the expected yield (or a "risk premium" to be added to the market rate of interest). Investment decisions are then supposed to be based on a comparison of this "risk adjusted" or "certainty equivalent" yield with the market rate of interest.[3] No satisfactory explanation has yet been provided, however, as to what determines the size of the risk discount and how it varies in response to changes in other variables.

Considered as a convenient approximation, the model of the firm constructed via this certainty—or certainty-equivalent—approach has admittedly been useful in dealing with some of the grosser aspects of the processes of capital accumulation and economic fluctuations. Such a model underlies, for example, the familiar Keynesian aggregate investment function in which aggregate investment is written as a function of the rate of interest—the same riskless rate of interest which appears later in the system in the liquidity-preference equation. Yet few would maintain that this approximation is adequate. At the macroeconomic level there are ample grounds for doubting that the rate of interest has

[2] Or, more accurately, to the marginal cost of borrowed funds since it is customary, at least in advanced analysis, to draw the supply curve of borrowed funds to the firm as a rising one. For an advanced treatment of the certainty case, see F. and V. Lutz [13].

[3] The classic examples of the certainty-equivalent approach are found in J. R. Hicks [8] and O. Lange [11].

as large and as direct an influence on the rate of investment as this analysis would lead us to believe. At the microeconomic level the certainty model has little descriptive value and provides no real guidance to the finance specialist or managerial economist whose main problems cannot be treated in a framework which deals so cavalierly with uncertainty and ignores all forms of financing other than debt issues.[4]

Only recently have economists begun to face up seriously to the problem of the cost of capital *cum* risk. In the process they have found their interests and endeavors merging with those of the finance specialist and the managerial economist who have lived with the problem longer and more intimately. In this joint search to establish the principles which govern rational investment and financial policy in a world of uncertainty two main lines of attack can be discerned. These lines represent, in effect, attempts to extrapolate to the world of uncertainty each of the two criteria—profit maximization and market value maximization—which were seen to have equivalent implications in the special case of certainty. With the recognition of uncertainty this equivalence vanishes. In fact, the profit maximization criterion is no longer even well defined. Under uncertainty there corresponds to each decision of the firm not a unique profit outcome, but a plurality of mutually exclusive outcomes which can at best be described by a subjective probability distribution. The profit outcome, in short, has become a random variable and as such its maximization no longer has an operational meaning. Nor can this difficulty generally be disposed of by using the mathematical expectation of profits as the variable to be maximized. For decisions which affect the expected value will also tend to affect the dispersion and other characteristics of the distribution of outcomes. In particular, the use of debt rather than equity funds to finance a given venture may well increase the expected return to the owners, but only at the cost of increased dispersion of the outcomes.

Under these conditions the profit outcomes of alternative investment and financing decisions can be compared and ranked only in terms of a *subjective* "utility function" of the owners which weighs the expected yield against other characteristics of the distribution. Accordingly, the extrapolation of the profit maximization criterion of the certainty model has tended to evolve into utility maximization, sometimes explicitly, more frequently in a qualitative and heuristic form.[5]

The utility approach undoubtedly represents an advance over the certainty or certainty-equivalent approach. It does at least permit us

[4] Those who have taken a "case-method" course in finance in recent years will recall in this connection the famous Liquigas case of Hunt and Williams, [9, pp. 193–96] a case which is often used to introduce the student to the cost-of-capital problem and to poke a bit of fun at the economist's certainty-model.

[5] For an attempt at a rigorous explicit development of this line of attack, see F. Modigliani and M. Zeman [14].

to explore (within limits) some of the implications of different financing arrangements, and it does give some meaning to the "cost" of different types of funds. However, because the cost of capital has become an essentially subjective concept, the utility approach has serious drawbacks for normative as well as analytical purposes. How, for example, is management to ascertain the risk preferences of its stockholders and to compromise among their tastes? And how can the economist build a meaningful investment function in the face of the fact that any given investment opportunity might or might not be worth exploiting depending on precisely who happen to be the owners of the firm at the moment?

Fortunately, these questions do not have to be answered; for the alternative approach, based on market value maximization, can provide the basis for an operational definition of the cost of capital and a workable theory of investment. Under this approach any investment project and its concomitant financing plan must pass only the following test: Will the project, as financed, raise the market value of the firm's shares? If so, it is worth undertaking; if not, its return is less than the marginal cost of capital to the firm. Note that such a test is entirely independent of the tastes of the current owners, since market prices will reflect not only their preferences but those of all potential owners as well. If any current stockholder disagrees with management and the market over the valuation of the project, he is free to sell out and reinvest elsewhere, but will still benefit from the capital appreciation resulting from management's decision.

The potential advantages of the market-value approach have long been appreciated; yet analytical results have been meager. What appears to be keeping this line of development from achieving its promise is largely the lack of an adequate theory of the effect of financial structure on market valuations, and of how these effects can be inferred from objective market data. It is with the development of such a theory and of its implications for the cost-of-capital problem that we shall be concerned in this paper.

Our procedure will be to develop in Section I the basic theory itself and to give some brief account of its empirical relevance. In Section II, we show how the theory can be used to answer the cost-of-capital question and how it permits us to develop a theory of investment of the firm under conditions of uncertainty. Throughout these sections the approach is essentially a partial-equilibrium one focusing on the firm and "industry." Accordingly, the "prices" of certain income streams will be treated as constant and given from outside the model, just as in the standard Marshallian analysis of the firm and industry the prices of all inputs and of all other products are taken as given. We have chosen to focus at this level rather than on the economy as a whole because it

is at the level of the firm and the industry that the interests of the various specialists concerned with the cost-of-capital problem come most closely together. Although the emphasis has thus been placed on partial-equilibrium analysis, the results obtained also provide the essential building blocks for a general equilibrium model which shows how those prices which are here taken as given, are themselves determined. For reasons of space, however, and because the material is of interest in its own right, the presentation of the general equilibrium model which rounds out the analysis must be deferred to a subsequent paper.

I. *The Valuation of Securities, Leverage, and the Cost of Capital*

A. *The Capitalization Rate for Uncertain Streams*

As a starting point, consider an economy in which all physical assets are owned by corporations. For the moment, assume that these corporations can finance their assets by issuing common stock only; the introduction of bond issues, or their equivalent, as a source of corporate funds is postponed until the next part of this section.

The physical assets held by each firm will yield to the owners of the firm—its stockholders—a stream of "profits" over time; but the elements of this series need not be constant and in any event are uncertain. This stream of income, and hence the stream accruing to any share of common stock, will be regarded as extending indefinitely into the future. We assume, however, that the mean value of the stream over time, or average profit per unit of time, is finite and represents a random variable subject to a (subjective) probability distribution. We shall refer to the average value over time of the stream accruing to a given share as the return of that share; and to the mathematical expectation of this average as the expected return of the share.[6] Although individual investors may have different views as to the shape of the probability distri-

[6] These propositions can be restated analytically as follows: The assets of the ith firm generate a stream:

$$X_i(1),\ X_i(2) \cdots X_i(T)$$

whose elements are random variables subject to the joint probability distribution:

$$\chi_i[X_i(1),\ X_i(2) \cdots X_i(t)].$$

The return to the ith firm is defined as:

$$X_i = \lim_{T\to\infty} \frac{1}{T} \sum_{t=1}^{T} X_i(t).$$

X_i is itself a random variable with a probability distribution $\Phi_i(X_i)$ whose form is determined uniquely by χ_i. The expected return $\bar{X}_i$ is defined as $\bar{X}_i = E(X_i) = \int_{X_i} X_i \Phi_i(X_i) dX_i$. If N_i is the number of shares outstanding, the return of the ith share is $x_i = (1/N)X_i$ with probability distribution $\phi_i(x_i)dx_i = \Phi_i(Nx_i)d(Nx_i)$ and expected value $\bar{x}_i = (1/N)\bar{X}_i$.

bution of the return of any share, we shall assume for simplicity that they are at least in agreement as to the expected return.[7]

This way of characterizing uncertain streams merits brief comment. Notice first that the stream is a stream of profits, not dividends. As will become clear later, as long as management is presumed to be acting in the best interests of the stockholders, retained earnings can be regarded as equivalent to a fully subscribed, pre-emptive issue of common stock. Hence, for present purposes, the division of the stream between cash dividends and retained earnings in any period is a mere detail. Notice also that the uncertainty attaches to the mean value over time of the stream of profits and should not be confused with variability over time of the successive elements of the stream. That variability and uncertainty are two totally different concepts should be clear from the fact that the elements of a stream can be variable even though known with certainty. It can be shown, furthermore, that whether the elements of a stream are sure or uncertain, the effect of variability per se on the valuation of the stream is at best a second-order one which can safely be neglected for our purposes (and indeed most others too).[8]

The next assumption plays a strategic role in the rest of the analysis. We shall assume that firms can be divided into "equivalent return" classes such that the return on the shares issued by any firm in any given class is proportional to (and hence perfectly correlated with) the return on the shares issued by any other firm in the same class. This assumption implies that the various shares within the same class differ, at most, by a "scale factor." Accordingly, if we adjust for the difference in scale, by taking the *ratio* of the return to the expected return, the probability distribution of that ratio is identical for all shares in the class. It follows that all relevant properties of a share are uniquely characterized by specifying (1) the class to which it belongs and (2) its expected return.

The significance of this assumption is that it permits us to classify firms into groups within which the shares of different firms are "homogeneous," that is, perfect substitutes for one another. We have, thus, an analogue to the familiar concept of the industry in which it is the commodity produced by the firms that is taken as homogeneous. To complete this analogy with Marshallian price theory, we shall assume in the

[7] To deal adequately with refinements such as differences among investors in estimates of expected returns would require extensive discussion of the theory of portfolio selection. Brief references to these and related topics will be made in the succeeding article on the general equilibrium model.

[8] The reader may convince himself of this by asking how much he would be willing to rebate to his employer for the privilege of receiving his annual salary in equal monthly installments rather than in irregular amounts over the year. See also J. M. Keynes [10, esp. pp. 53–54].

analysis to follow that the shares concerned are traded in perfect markets under conditions of atomistic competition.[9]

From our definition of homogeneous classes of stock it follows that in equilibrium in a perfect capital market the price per dollar's worth of expected return must be the same for all shares of any given class. Or, equivalently, in any given class the price of every share must be proportional to its expected return. Let us denote this factor of proportionality for any class, say the kth class, by $1/\rho_k$. Then if p_j denotes the price and $\bar{x}_j$ is the expected return per share of the jth firm in class k, we must have:

$$p_j = \frac{1}{\rho_k}\bar{x}_j; \tag{1}$$

or, equivalently,

$$\frac{\bar{x}_j}{p_j} = \rho_k \text{ a constant for all firms } j \text{ in class } k. \tag{2}$$

The constants ρ_k (one for each of the k classes) can be given several economic interpretations: (a) From (2) we see that each ρ_k is the expected rate of return of any share in class k. (b) From (1) $1/\rho_k$ is the price which an investor has to pay for a dollar's worth of expected return in the class k. (c) Again from (1), by analogy with the terminology for perpetual bonds, ρ_k can be regarded as the market rate of capitalization for the expected value of the uncertain streams of the kind generated by the kth class of firms.[10]

B. *Debt Financing and Its Effects on Security Prices*

Having developed an apparatus for dealing with uncertain streams we can now approach the heart of the cost-of-capital problem by dropping the assumption that firms cannot issue bonds. The introduction of debt-financing changes the market for shares in a very fundamental way. Because firms may have different proportions of debt in their capi-

[9] Just what our classes of stocks contain and how the different classes can be identified by outside observers are empirical questions to which we shall return later. For the present, it is sufficient to observe: (1) Our concept of a class, while not identical to that of the industry is at least closely related to it. Certainly the basic characteristics of the probability distributions of the returns on assets will depend to a significant extent on the product sold and the technology used. (2) What are the appropriate class boundaries will depend on the particular problem being studied. An economist concerned with general tendencies in the market, for example, might well be prepared to work with far wider classes than would be appropriate for an investor planning his portfolio, or a firm planning its financial strategy.

[10] We cannot, on the basis of the assumptions so far, make any statements about the relationship or spread between the various ρ's or capitalization rates. Before we could do so we would have to make further specific assumptions about the way investors believe the probability distributions vary from class to class, as well as assumptions about investors' preferences as between the characteristics of different distributions.

tal structure, shares of different companies, even in the same class, can give rise to different probability distributions of returns. In the language of finance, the shares will be subject to different degrees of financial risk or "leverage" and hence they will no longer be perfect substitutes for one another.

To exhibit the mechanism determining the relative prices of shares under these conditions, we make the following two assumptions about the nature of bonds and the bond market, though they are actually stronger than is necessary and will be relaxed later: (1) All bonds (including any debts issued by households for the purpose of carrying shares) are assumed to yield a constant income per unit of time, and this income is regarded as certain by all traders regardless of the issuer. (2) Bonds, like stocks, are traded in a perfect market, where the term perfect is to be taken in its usual sense as implying that any two commodities which are perfect substitutes for each other must sell, in equilibrium, at the same price. It follows from assumption (1) that all bonds are in fact perfect substitutes up to a scale factor. It follows from assumption (2) that they must all sell at the same price per dollar's worth of return, or what amounts to the same thing must yield the same rate of return. This rate of return will be denoted by r and referred to as the rate of interest or, equivalently, as the capitalization rate for sure streams. We now can derive the following two basic propositions with respect to the valuation of securities in companies with different capital structures:

Proposition I. Consider any company j and let $\overline{X}_j$ stand as before for the expected return on the assets owned by the company (that is, its expected profit before deduction of interest). Denote by D_j the market value of the debts of the company; by S_j the market value of its common shares; and by $V_j \equiv S_j + D_j$ the market value of all its securities or, as we shall say, the market value of the firm. Then, our Proposition I asserts that we must have in equilibrium:

$$(3) \qquad V_j \equiv (S_j + D_j) = \overline{X}_j/\rho_k, \text{ for any firm } j \text{ in class } k.$$

That is, the *market value of any firm is independent of its capital structure and is given by capitalizing its expected return at the rate ρ_k appropriate to its class.*

This proposition can be stated in an equivalent way in terms of the firm's "average cost of capital," $\overline{X}_j/V_j$, which is the ratio of its expected return to the market value of all its securities. Our proposition then is:

$$(4) \qquad \frac{\overline{X}_j}{(S_j + D_j)} \equiv \frac{\overline{X}_j}{V_j} = \rho_k, \text{ for any firm } j, \text{ in class } k.$$

That is, *the average cost of capital to any firm is completely independent of*

its capital structure and is equal to the capitalization rate of a pure equity stream of its class.

To establish Proposition I we will show that as long as the relations (3) or (4) do not hold between any pair of firms in a class, arbitrage will take place and restore the stated equalities. We use the term arbitrage advisedly. For if Proposition I did not hold, an investor could buy and sell stocks and bonds in such a way as to exchange one income stream for another stream, identical in all relevant respects but selling at a lower price. The exchange would therefore be advantageous to the investor quite independently of his attitudes toward risk.[11] As investors exploit these arbitrage opportunities, the value of the overpriced shares will fall and that of the underpriced shares will rise, thereby tending to eliminate the discrepancy between the market values of the firms.

By way of proof, consider two firms in the same class and assume for simplicity only, that the expected return, X, is the same for both firms. Let company 1 be financed entirely with common stock while company 2 has some debt in its capital structure. Suppose first the value of the levered firm, V_2, to be larger than that of the unlevered one, V_1. Consider an investor holding s_2 dollars' worth of the shares of company 2, representing a fraction α of the total outstanding stock, S_2. The return from this portfolio, denoted by Y_2, will be a fraction α of the income available for the stockholders of company 2, which is equal to the total return X_2 less the interest charge, rD_2. Since under our assumption of homogeneity, the anticipated total return of company 2, X_2, is, under all circumstances, the same as the anticipated total return to company 1, X_1, we can hereafter replace X_2 and X_1 by a common symbol X. Hence, the return from the initial portfolio can be written as:

$$Y_2 = \alpha(X - rD_2). \tag{5}$$

Now suppose the investor sold his αS_2 worth of company 2 shares and acquired instead an amount $s_1 = \alpha(S_2 + D_2)$ of the shares of company 1. He could do so by utilizing the amount αS_2 realized from the sale of his initial holding and borrowing an additional amount αD_2 on his own credit, pledging his new holdings in company 1 as a collateral. He would thus secure for himself a fraction $s_1/S_1 = \alpha(S_2 + D_2)/S_1$ of the shares and earnings of company 1. Making proper allowance for the interest payments on his personal debt αD_2, the return from the new portfolio, Y_1, is given by:

[11] In the language of the theory of choice, the exchanges are movements from inefficient points in the interior to efficient points on the boundary of the investor's opportunity set; and not movements between efficient points along the boundary. Hence for this part of the analysis nothing is involved in the way of specific assumptions about investor attitudes or behavior other than that investors behave consistently and prefer more income to less income, *ceteris paribus*.

$$Y_1 = \frac{\alpha(S_2 + D_2)}{S_1} X - r\alpha D_2 = \alpha \frac{V_2}{V_1} X - r\alpha D_2. \tag{6}$$

Comparing (5) with (6) we see that as long as $V_2 > V_1$ we must have $Y_1 > Y_2$, so that it pays owners of company 2's shares to sell their holdings, thereby depressing S_2 and hence V_2; and to acquire shares of company 1, thereby raising S_1 and thus V_1. We conclude therefore that levered companies cannot command a premium over unlevered companies because investors have the opportunity of putting the equivalent leverage into their portfolio directly by borrowing on personal account.

Consider now the other possibility, namely that the market value of the levered company V_2 is less than V_1. Suppose an investor holds initially an amount s_1 of shares of company 1, representing a fraction α of the total outstanding stock, S_1. His return from this holding is:

$$Y_1 = \frac{s_1}{S_1} X = \alpha X.$$

Suppose he were to exchange this initial holding for another portfolio, also worth s_1, but consisting of s_2 dollars of stock of company 2 and of d dollars of bonds, where s_2 and d are given by:

$$s_2 = \frac{S_2}{V_2} s_1, \qquad d = \frac{D_2}{V_2} s_1. \tag{7}$$

In other words the new portfolio is to consist of stock of company 2 and of bonds in the proportions S_2/V_2 and D_2/V_2, respectively. The return from the stock in the new portfolio will be a fraction s_2/S_2 of the total return to stockholders of company 2, which is $(X - rD_2)$, and the return from the bonds will be rd. Making use of (7), the total return from the portfolio, Y_2, can be expressed as follows:

$$Y_2 = \frac{s_2}{S_2}(X - rD_2) + rd = \frac{s_1}{V_2}(X - rD_2) + r\frac{D_2}{V_2} s_1 = \frac{s_1}{V_2} X = \alpha \frac{S_1}{V_2} X$$

(since $s_1 = \alpha S_1$). Comparing Y_2 with Y_1 we see that, if $V_2 < S_1 \equiv V_1$, then Y_2 will exceed Y_1. Hence it pays the holders of company 1's shares to sell these holdings and replace them with a mixed portfolio containing an appropriate fraction of the shares of company 2.

The acquisition of a mixed portfolio of stock of a levered company j and of bonds in the proportion S_j/V_j and D_j/V_j respectively, may be regarded as an operation which "undoes" the leverage, giving access to an appropriate fraction of the unlevered return X_j. It is this possibility of undoing leverage which prevents the value of levered firms from being consistently less than those of unlevered firms, or more generally prevents the average cost of capital $\overline{X}_j/V_j$ from being systematically higher for levered than for nonlevered companies in the same class.

Since we have already shown that arbitrage will also prevent V_2 from being larger than V_1, we can conclude that in equilibrium we must have $V_2 = V_1$, as stated in Proposition I.

Proposition II. From Proposition I we can derive the following proposition concerning the rate of return on common stock in companies whose capital structure includes some debt: the expected rate of return or yield, i, on the stock of any company j belonging to the kth class is a linear function of leverage as follows:

$$i_j = \rho_k + (\rho_k - r) D_j/S_j. \tag{8}$$

That is, *the expected yield of a share of stock is equal to the appropriate capitalization rate ρ_k for a pure equity stream in the class, plus a premium related to financial risk equal to the debt-to-equity ratio times the spread between ρ_k and r.* Or equivalently, the market price of any share of stock is given by capitalizing its expected return at the continuously variable rate i_j of (8).[12]

A number of writers have stated close equivalents of our Proposition I although by appealing to intuition rather than by attempting a proof and only to insist immediately that the results were not applicable to the actual capital markets.[13] Proposition II, however, so far as we have been able to discover is new.[14] To establish it we first note that, by definition, the expected rate of return, i, is given by:

$$i_j \equiv \frac{\overline{X}_j - rD_j}{S_j}. \tag{9}$$

From Proposition I, equation (3), we know that:

$$\overline{X}_j = \rho_k(S_j + D_j).$$

Substituting in (9) and simplifying, we obtain equation (8).

[12] To illustrate, suppose $\overline{X} = 1000$, $D = 4000$, $r = 5$ per cent and $\rho_k = 10$ per cent. These values imply that $V = 10{,}000$ and $S = 6000$ by virtue of Proposition I. The expected yield or rate of return per share is then:

$$i = \frac{1000 - 200}{6000} = .1 + (.1 - .05)\frac{4000}{6000} = 13\tfrac{1}{3} \text{ per cent.}$$

[13] See, for example, J. B. Williams [21, esp. pp. 72–73]; David Durand [3]; and W. A. Morton [15]. None of these writers describe in any detail the mechanism which is supposed to keep the average cost of capital constant under changes in capital structure. They seem, however, to be visualizing the equilibrating mechanism in terms of switches by investors between stocks and bonds as the yields of each get out of line with their "riskiness." This is an argument quite different from the pure arbitrage mechanism underlying our proof, and the difference is crucial. Regarding Proposition I as resting on investors' attitudes toward risk leads inevitably to a misunderstanding of many factors influencing relative yields such as, for example, limitations on the portfolio composition of financial institutions. See below, esp. Section I.D.

[14] Morton does make reference to a linear yield function but only " . . . for the sake of simplicity and because the particular function used makes no essential difference in my conclusions" [15, p. 443, note 2].

C. *Some Qualifications and Extensions of the Basic Propositions*

The methods and results developed so far can be extended in a number of useful directions, of which we shall consider here only three: (1) allowing for a corporate profits tax under which interest payments are deductible; (2) recognizing the existence of a multiplicity of bonds and interest rates; and (3) acknowledging the presence of market imperfections which might interfere with the process of arbitrage. The first two will be examined briefly in this section with some further attention given to the tax problem in Section II. Market imperfections will be discussed in Part D of this section in the course of a comparison of our results with those of received doctrines in the field of finance.

Effects of the Present Method of Taxing Corporations. The deduction of interest in computing taxable corporate profits will prevent the arbitrage process from making the value of all firms in a given class proportional to the expected returns generated by their physical assets. Instead, it can be shown (by the same type of proof used for the original version of Proposition I) that the market values of firms in each class must be proportional in equilibrium to their expected return net of taxes (that is, to the sum of the interest paid and expected net stockholder income). This means we must replace each $\overline{X}_j$ in the original versions of Propositions I and II with a new variable $\overline{X}_j^{\tau}$ representing the total income net of taxes generated by the firm:

$$\overline{X}_j^{\tau} \equiv (\overline{X}_j - rD_j)(1 - \tau) + rD_j \equiv \bar{\pi}_j^{\tau} + rD_j, \tag{10}$$

where $\bar{\pi}_j^{\tau}$ represents the expected net income accruing to the common stockholders and τ stands for the average rate of corporate income tax.[15]

After making these substitutions, the propositions, when adjusted for taxes, continue to have the same form as their originals. That is, Proposition I becomes:

$$\frac{\overline{X}_j^{\tau}}{V_j} = \rho_k^{\tau}, \text{ for any firm in class } k, \tag{11}$$

and Proposition II becomes

$$i_j \equiv \frac{\bar{\pi}_j^{\tau}}{S_j} = \rho_j^{\tau} + (\rho_k^{\tau} - r)D_j/S_j \tag{12}$$

where ρ_k^{τ} is the capitalization rate for income net of taxes in class k.

Although the form of the propositions is unaffected, certain interpretations must be changed. In particular, the after-tax capitalization rate

[15] For simplicity, we shall ignore throughout the tiny element of progression in our present corporate tax and treat τ as a constant independent of $(X_j - rD_j)$.

$\rho_k{}^r$ can no longer be identified with the "average cost of capital" which is $\rho_k = \overline{X}_j / V_j$. The difference between $\rho_k{}^r$ and the "true" average cost of capital, as we shall see, is a matter of some relevance in connection with investment planning within the firm (Section II). For the description of market behavior, however, which is our immediate concern here, the distinction is not essential. To simplify presentation, therefore, and to preserve continuity with the terminology in the standard literature we shall continue in this section to refer to $\rho_k{}^r$ as the average cost of capital, though strictly speaking this identification is correct only in the absence of taxes.

Effects of a Plurality of Bonds and Interest Rates. In existing capital markets we find not one, but a whole family of interest rates varying with maturity, with the technical provisions of the loan and, what is most relevant for present purposes, with the financial condition of the borrower.[16] Economic theory and market experience both suggest that the yields demanded by lenders tend to increase with the debt-equity ratio of the borrowing firm (or individual). If so, and if we can assume as a first approximation that this yield curve, $r = r\ (D/S)$, whatever its precise form, is the same for all borrowers, then we can readily extend our propositions to the case of a rising supply curve for borrowed funds.[17]

Proposition I is actually unaffected in form and interpretation by the fact that the rate of interest may rise with leverage; while the average cost of *borrowed* funds will tend to increase as debt rises, the average cost of funds from *all* sources will still be independent of leverage (apart from the tax effect). This conclusion follows directly from the ability of those who engage in arbitrage to undo the leverage in any financial structure by acquiring an appropriately mixed portfolio of bonds and stocks. Because of this ability, the ratio of earnings (*before* interest charges) to market value—*i.e.*, the average cost of capital from all

[16] We shall not consider here the extension of the analysis to encompass the time structure of interest rates. Although some of the problems posed by the time structure can be handled within our comparative statics framework, an adequate discussion would require a separate paper.

[17] We can also develop a theory of bond valuation along lines essentially parallel to those followed for the case of shares. We conjecture that the curve of bond yields as a function of leverage will turn out to be a nonlinear one in contrast to the linear function of leverage developed for common shares. However, we would also expect that the rate of increase in the yield on new issues would not be substantial in practice. This relatively slow rise would reflect the fact that interest rate increases by themselves can never be completely satisfactory to creditors as compensation for their increased risk. Such increases may simply serve to raise r so high relative to ρ that they become self-defeating by giving rise to a situation in which even normal fluctuations in earnings may force the company into bankruptcy. The difficulty of borrowing more, therefore, tends to show up in the usual case not so much in higher rates as in the form of increasingly stringent restrictions imposed on the company's management and finances by the creditors; and ultimately in a complete inability to obtain new borrowed funds, at least from the institutional investors who normally set the standards in the market for bonds.

sources—must be the same for all firms in a given class.[18] In other words, the increased cost of borrowed funds as leverage increases will tend to be offset by a corresponding reduction in the yield of common stock. This seemingly paradoxical result will be examined more closely below in connection with Proposition II.

A significant modification of Proposition I would be required only if the yield curve $r=r(D/S)$ were different for different borrowers, as might happen if creditors had marked preferences for the securities of a particular class of debtors. If, for example, corporations as a class were able to borrow at lower rates than individuals having equivalent personal leverage, then the average cost of capital to corporations might fall slightly, as leverage increased over some range, in reflection of this differential. In evaluating this possibility, however, remember that the relevant interest rate for our arbitrage operators is the rate on brokers' loans and, historically, that rate has not been noticeably higher than representative corporate rates.[19] The operations of holding companies and investment trusts which can borrow on terms comparable to operating companies represent still another force which could be expected to wipe out any marked or prolonged advantages from holding levered stocks.[20]

Although Proposition I remains unaffected as long as the yield curve is the same for all borrowers, the relation between common stock yields and leverage will no longer be the strictly linear one given by the original Proposition II. If r increases with leverage, the yield i will still tend to

[18] One normally minor qualification might be noted. Once we relax the assumption that all bonds have certain yields, our arbitrage operator faces the danger of something comparable to "gambler's ruin." That is, there is always the possibility that an otherwise sound concern—one whose long-run expected income is greater than its interest liability—might be forced into liquidation as a result of a run of temporary losses. Since reorganization generally involves costs, and because the operation of the firm may be hampered during the period of reorganization with lasting unfavorable effects on earnings prospects, we might perhaps expect heavily levered companies to sell at a slight discount relative to less heavily indebted companies of the same class.

[19] Under normal conditions, moreover, a substantial part of the arbitrage process could be expected to take the form, not of having the arbitrage operators go into debt on personal account to put the required leverage into their portfolios, but simply of having them reduce the amount of corporate bonds they already hold when they acquire underpriced unlevered stock. Margin requirements are also somewhat less of an obstacle to maintaining any desired degree of leverage in a portfolio than might be thought at first glance. Leverage could be largely restored in the face of higher margin requirements by switching to stocks having more leverage at the corporate level.

[20] An extreme form of inequality between borrowing and lending rates occurs, of course, in the case of preferred stocks, which can not be directly issued by individuals on personal account. Here again, however, we would expect that the operations of investment corporations plus the ability of arbitrage operators to sell off their holdings of preferred stocks would act to prevent the emergence of any substantial premiums (for this reason) on capital structures containing preferred stocks. Nor are preferred stocks so far removed from bonds as to make it impossible for arbitrage operators to approximate closely the risk and leverage of a corporate preferred stock by incurring a somewhat smaller debt on personal account.

rise as D/S increases, but at a decreasing rather than a constant rate. Beyond some high level of leverage, depending on the exact form of the interest function, the yield may even start to fall.[21] The relation between i and D/S could conceivably take the form indicated by the curve MD

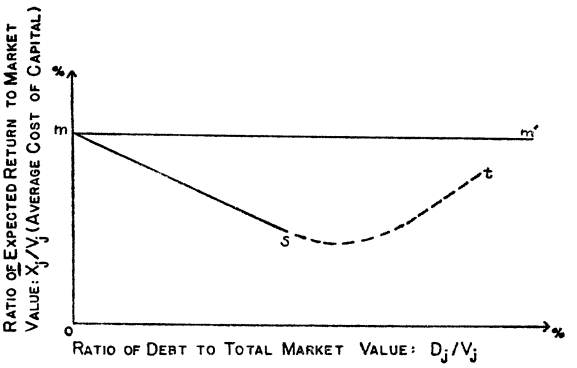

FIGURE 1

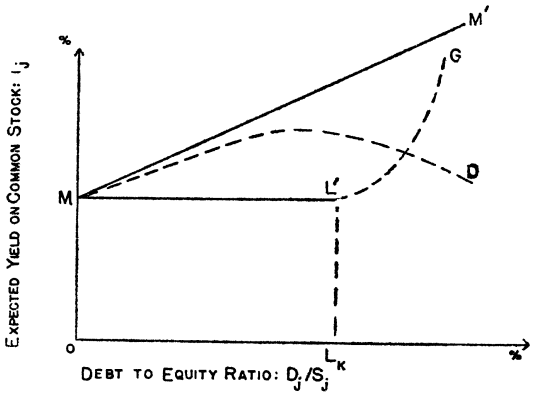

FIGURE 2

in Figure 2, although in practice the curvature would be much less pronounced. By contrast, with a constant rate of interest, the relation would be linear throughout as shown by line MM', Figure 2.

The downward sloping part of the curve MD perhaps requires some

[21] Since new lenders are unlikely to permit this much leverage (*cf.* note 17), this range of the curve is likely to be occupied by companies whose earnings prospects have fallen substantially since the time when their debts were issued.

comment since it may be hard to imagine why investors, other than those who like lotteries, would purchase stocks in this range. Remember, however, that the yield curve of Proposition II is a consequence of the more fundamental Proposition I. Should the demand by the risk-lovers prove insufficient to keep the market to the peculiar yield-curve MD, this demand would be reinforced by the action of arbitrage operators. The latter would find it profitable to own a pro-rata share of the firm as a whole by holding its stock *and* bonds, the lower yield of the shares being thus offset by the higher return on bonds.

D. *The Relation of Propositions I and II to Current Doctrines*

The propositions we have developed with respect to the valuation of firms and shares appear to be substantially at variance with current doctrines in the field of finance. The main differences between our view and the current view are summarized graphically in Figures 1 and 2. Our Proposition I [equation (4)] asserts that the average cost of capital, $\overline{X}_j{}^\tau/V_j$, is a constant for all firms j in class k, independently of their financial structure. This implies that, if we were to take a sample of firms in a given class, and if for each firm we were to plot the ratio of expected return to market value against some measure of leverage or financial structure, the points would tend to fall on a horizontal straight line with intercept $\rho_k{}^\tau$, like the solid line mm' in Figure 1.[22] From Proposition I we derived Proposition II [equation (8)] which, taking the simplest version with r constant, asserts that, for all firms in a class, the relation between the yield on common stock and financial structure, measured by D_j/S_j, will approximate a straight line with slope $(\rho_k{}^\tau - r)$ and intercept $\rho_k{}^\tau$. This relationship is shown as the solid line MM' in Figure 2, to which reference has been made earlier.[23]

By contrast, the conventional view among finance specialists appears to start from the proposition that, other things equal, the earnings-price ratio (or its reciprocal, the times-earnings multiplier) of a firm's common stock will normally be only slightly affected by "moderate" amounts of debt in the firm's capital structure.[24] Translated into our no-

[22] In Figure 1 the measure of leverage used is D_j/V_j (the ratio of debt to market value) rather than D_j/S_j (the ratio of debt to equity), the concept used in the analytical development. The D_j/V_j measure is introduced at this point because it simplifies comparison and contrast of our view with the traditional position.

[23] The line MM' in Figure 2 has been drawn with a positive slope on the assumption that $\rho_k{}^\tau > r$, a condition which will normally obtain. Our Proposition II as given in equation (8) would continue to be valid, of course, even in the unlikely event that $\rho_k{}^\tau < r$, but the slope of MM' would be negative.

[24] See, *e.g.*, Graham and Dodd [6, pp. 464–66]. Without doing violence to this position, we can bring out its implications more sharply by ignoring the qualification and treating the yield as a virtual constant over the relevant range. See in this connection the discussion in Durand [3, esp. pp. 225–37] of what he calls the "net income method" of valuation.

tation, it asserts that for any firm j in the class k,

$$\frac{\overline{X}_j^r - rD_j}{S_j} \equiv \frac{\bar{\pi}_j^r}{S_j} = i_k^*, \text{ a constant for } \frac{D_j}{S_j} \leq L_k \tag{13}$$

or, equivalently,

$$S_j = \bar{\pi}_j^r / i_k^*. \tag{14}$$

Here i_k^* represents the capitalization rate or earnings-price ratio on the common stock and L_k denotes some amount of leverage regarded as the maximum "reasonable" amount for firms of the class k. This assumed relationship between yield and leverage is the horizontal solid line ML' of Figure 2. Beyond L', the yield will presumably rise sharply as the market discounts "excessive" trading on the equity. This possibility of a rising range for high leverages is indicated by the broken-line segment $L'G$ in the figure.[25]

If the value of shares were really given by (14) then the over-all market value of the firm must be:

$$V_j \equiv S_j + D_j = \frac{\overline{X}_j^r - rD_j}{i_k^*} + D_j = \frac{\overline{X}_j^r}{i_k^*} + \frac{(i_k^* - r)D_j}{i_k^*}. \tag{16}$$

That is, for any given level of expected total returns after taxes ($\overline{X}_j^r$) and assuming, as seems natural, that $i_k^* > r$, the value of the firm must tend to *rise* with debt;[26] whereas our Proposition I asserts that the value of the firm is completely independent of the capital structure. Another way of contrasting our position with the traditional one is in terms of the cost of capital. Solving (16) for $\overline{X}_j^r / V_j$ yields:

$$\overline{X}_j^r / V_j = i_k^* - (i_k^* - r)D_j / V_j. \tag{17}$$

According to this equation, the average cost of capital is not independent of capital structure as we have argued, but should tend to *fall* with increasing leverage, at least within the relevant range of moderate debt ratios, as shown by the line *ms* in Figure 1. Or to put it in more familiar terms, debt-financing should be "cheaper" than equity-financing if not carried too far.

When we also allow for the possibility of a rising range of stock yields for large values of leverage, we obtain a U-shaped curve like *mst* in

[25] To make it easier to see some of the implications of this hypothesis as well as to prepare the ground for later statistical testing, it will be helpful to assume that the notion of a critical limit on leverage beyond which yields rise rapidly, can be epitomized by a quadratic relation of the form:

$$\bar{\pi}_j^r / S_j = i_k^* + \beta(D_j/S_j) + \alpha(D_j/S_j)^2, \qquad \alpha > 0. \tag{15}$$

[26] For a typical discussion of how a promoter can, supposedly, increase the market value of a firm by recourse to debt issues, see W. J. Eiteman [4, esp. pp. 11–13].

Figure 1.[27] That a yield-curve for stocks of the form *ML'G* in Figure 2 implies a U-shaped cost-of-capital curve has, of course, been recognized by many writers. A natural further step has been to suggest that the capital structure corresponding to the trough of the U is an "optimal capital structure" towards which management ought to strive in the best interests of the stockholders.[28] According to our model, by contrast, no such optimal structure exists—all structures being equivalent from the point of view of the cost of capital.

Although the falling, or at least U-shaped, cost-of-capital function is in one form or another the dominant view in the literature, the ultimate rationale of that view is by no means clear. The crucial element in the position—that the expected earnings-price ratio of the stock is largely unaffected by leverage up to some conventional limit—is rarely even regarded as something which requires explanation. It is usually simply taken for granted or it is merely asserted that this is the way the market behaves.[29] To the extent that the constant earnings-price ratio has a rationale at all we suspect that it reflects in most cases the feeling that moderate amounts of debt in "sound" corporations do not really add very much to the "riskiness" of the stock. Since the extra risk is slight, it seems natural to suppose that firms will not have to pay noticeably higher yields in order to induce investors to hold the stock.[30]

A more sophisticated line of argument has been advanced by David Durand [3, pp. 231-33]. He suggests that because insurance companies and certain other important institutional investors are restricted to debt securities, nonfinancial corporations are able to borrow from them at interest rates which are lower than would be required to compensate

[27] The U-shaped nature of the cost-of-capital curve can be exhibited explicitly if the yield curve for shares as a function of leverage can be approximated by equation (15) of footnote 25. From that equation, multiplying both sides by S_j we obtain: $\bar{\pi}_j{}^\tau = \bar{X}_j{}^\tau - rD_j = i_k{}^* S_j + \beta D_j + \alpha D_j{}^2 / S_j$ or, adding and subtracting $i_k{}^* D_k$ from the right-hand side and collecting terms,

$$\bar{X}_j{}^\tau = i_k{}^*(S_j + D_j) + (\beta + r - i_k{}^*)D_j + \alpha D^2{}_j / S_j. \tag{18}$$

Dividing (18) by V_j gives an expression for the cost of capital:

$$\bar{X}_j{}^\tau / V_j = i_k{}^* - (i_k{}^* - r - \beta)D_j/V_j + \alpha D_j{}^2/S_j V_j = i_k{}^* - (i_k{}^* - r - \beta)D_j/V_j + \alpha(D_j/V_j)^2/(1 - D_j/V_j) \tag{19}$$

which is clearly U-shaped since α is supposed to be positive.

[28] For a typical statement see S. M. Robbins [16, p. 307]. See also Graham and Dodd [6, pp. 468-74].

[29] See *e.g.*, Graham and Dodd [6, p. 466].

[30] A typical statement is the following by Guthmann and Dougall [7, p. 245]: "Theoretically it might be argued that the increased hazard from using bonds and preferred stocks would counterbalance this additional income and so prevent the common stock from being more attractive than when it had a lower return but fewer prior obligations. In practice, the extra earnings from 'trading on the equity' are often regarded by investors as more than sufficient to serve as a 'premium for risk' when the proportions of the several securities are judiciously mixed."

creditors in a free market. Thus, while he would presumably agree with our conclusions that stockholders could not gain from leverage in an unconstrained market, he concludes that they can gain under present institutional arrangements. This gain would arise by virtue of the "safety superpremium" which lenders are willing to pay corporations for the privilege of lending.[31]

The defective link in both the traditional and the Durand version of the argument lies in the confusion between investors' subjective risk preferences and their objective market opportunities. Our Propositions I and II, as noted earlier, do not depend for their validity on any assumption about individual risk preferences. Nor do they involve any assertion as to what is an adequate compensation to investors for assuming a given degree of risk. They rely merely on the fact that a given commodity cannot consistently sell at more than one price in the market; or more precisely that the price of a commodity representing a "bundle" of two other commodities cannot be consistently different from the weighted average of the prices of the two components (the weights being equal to the proportion of the two commodities in the bundle).

An analogy may he helpful at this point. The relations between $1/\rho_k$, the price per dollar of an unlevered stream in class k; $1/r$, the price per dollar of a sure stream, and $1/i_j$, the price per dollar of a levered stream j, in the kth class, are essentially the same as those between, respectively, the price of whole milk, the price of butter fat, and the price of milk which has been thinned out by skimming off some of the butter fat. Our Proposition I states that a firm cannot reduce the cost of capital—*i.e.*, increase the market value of the stream it generates—by securing part of its capital through the sale of bonds, even though debt money appears to be cheaper. This assertion is equivalent to the proposition that, under perfect markets, a dairy farmer cannot in general earn more for the milk he produces by skimming some of the butter fat and selling it separately, even though butter fat per unit weight, sells for more than whole milk. The advantage from skimming the milk rather than selling whole milk would be purely illusory; for what would be gained from selling the high-priced butter fat would be lost in selling the low-priced residue of thinned milk. Similarly our Proposition II—that the price per dollar of a levered stream falls as leverage increases—is an ex-

[31] Like Durand, Morton [15] contends "that the actual market deviates from [Proposition I] by giving a changing over-all cost of money at different points of the [leverage] scale" (p. 443, note 2, inserts ours), but the basis for this contention is nowhere clearly stated. Judging by the great emphasis given to the lack of mobility of investment funds between stocks and bonds and to the psychological and institutional pressures toward debt portfolios (see pp. 444–51 and especially his discussion of the optimal capital structure on p. 453) he would seem to be taking a position very similar to that of Durand above.

act analogue of the statement that the price per gallon of thinned milk falls continuously as more butter fat is skimmed off.[32]

It is clear that this last assertion is true as long as butter fat is worth more per unit weight than whole milk, and it holds even if, for many consumers, taking a little cream out of the milk (adding a little leverage to the stock) does not detract noticeably from the taste (does not add noticeably to the risk). Furthermore the argument remains valid even in the face of instituional limitations of the type envisaged by Durand. For suppose that a large fraction of the population habitually dines in restaurants which are required by law to serve only cream in lieu of milk (entrust their savings to institutional investors who can only buy bonds). To be sure the price of butter fat will then tend to be higher in relation to that of skimmed milk than in the absence such restrictions (the rate of interest will tend to be lower), and this will benefit people who eat at home and who like skim milk (who manage their own portfolio and are able and willing to take risk). But it will still be the case that a farmer cannot gain by skimming some of the butter fat and selling it separately (firm cannot reduce the cost of capital by recourse to borrowed funds).[33]

Our propositions can be regarded as the extension of the classical theory of markets to the particular case of the capital markets. Those who hold the current view—whether they realize it or not—must as-

[32] Let M denote the quantity of whole milk, B/M the proportion of butter fat in the whole milk, and let p_M, p_B and p_α denote, respectively, the price per unit weight of whole milk, butter fat and thinned milk from which a fraction α of the butter fat has been skimmed off. We then have the fundamental perfect market relation:

(a) $$p_\alpha(M - \alpha B) + p_B\alpha B = p_M M, \qquad 0 \leq \alpha \leq 1,$$

stating that total receipts will be the same amount $p_M M$, independently of the amount αB of butter fat that may have been sold separately. Since p_M corresponds to $1/\rho$, p_B to $1/r$, p_α to $1/i$, M to $\bar{X}$ and αB to rD, (a) is equivalent to Proposition I, $S+D=\bar{X}/\rho$. From (a) we derive:

(b) $$p_\alpha = p_M \frac{M}{M - \alpha B} - p_B \frac{\alpha B}{M - \alpha B}$$

which gives the price of thinned milk as an explicit function of the proportion of butter fat skimmed off; the function decreasing as long as $p_B > p_M$. From (a) also follows:

(c) $$1/p_\alpha = 1/p_M + (1/p_M - 1/p_B)\frac{p_B\alpha B}{p_\alpha(M - \alpha B)}$$

which is the exact analogue of Proposition II, as given by (8).

[33] The reader who likes parables will find that the analogy with interrelated commodity markets can be pushed a good deal farther than we have done in the text. For instance, the effect of changes in the market rate of interest on the over-all cost of capital is the same as the effect of a change in the price of butter on the price of whole milk. Similarly, just as the relation between the prices of skim milk and butter fat influences the kind of cows that will be reared, so the relation between i and r influences the kind of ventures that will be undertaken. If people like butter we shall have Guernseys; if they are willing to pay a high price for safety, this will encourage ventures which promise smaller but less uncertain streams per dollar of physical assets.

sume not merely that there are lags and frictions in the equilibrating process—a feeling we certainly share,[34] claiming for our propositions only that they describe the central tendency around which observations will scatter—but also that there are large and *systematic* imperfections in the market which permanently bias the outcome. This is an assumption that economists, at any rate, will instinctively eye with some skepticism.

In any event, whether such prolonged, systematic departures from equilibrium really exist or whether our propositions are better descriptions of long-run market behavior can be settled only by empirical research. Before going on to the theory of investment it may be helpful, therefore, to look at the evidence.

E. *Some Preliminary Evidence on the Basic Propositions*

Unfortunately the evidence which has been assembled so far is amazingly skimpy. Indeed, we have been able to locate only two recent studies—and these of rather limited scope—which were designed to throw light on the issue. Pending the results of more comprehensive tests which we hope will soon be available, we shall review briefly such evidence as is provided by the two studies in question: (1) an analysis of the relation between security yields and financial structure for some 43 large electric utilities by F. B. Allen [1], and (2) a parallel (unpublished) study by Robert Smith [19], for 42 oil companies designed to test whether Allen's rather striking results would be found in an industry with very different characteristics.[35] The Allen study is based on average figures for the years 1947 and 1948, while the Smith study relates to the single year 1953.

The Effect of Leverage on the Cost of Capital. According to the received view, as shown in equation (17) the average cost of capital, $\overline{X}^r/V$, should decline linearly with leverage as measured by the ratio D/V, at least through most of the relevant range.[36] According to Proposition I, the average cost of capital within a given class k should tend to have the same value $\rho_k{}^r$ independently of the degree of leverage. A simple test

[34] Several specific examples of the failure of the arbitrage mechanism can be found in Graham and Dodd [6, *e.g.*, pp. 646–48]. The price discrepancy described on pp. 646–47 is particularly curious since it persists even today despite the fact that a whole generation of security analysts has been brought up on this book!

[35] We wish to express our thanks to both writers for making available to us some of their original worksheets. In addition to these recent studies there is a frequently cited (but apparently seldom read) study by the Federal Communications Commission in 1938 [22] which purports to show the existence of an optimal capital structure or range of structures (in the sense defined above) for public utilities in the 1930's. By current standards for statistical investigations, however, this study cannot be regarded as having any real evidential value for the problem at hand.

[36] We shall simplify our notation in this section by dropping the subscript j used to denote a particular firm wherever this will not lead to confusion.

of the merits of the two alternative hypotheses can thus be carried out by correlating $\overline{X}^r/V$ with D/V. If the traditional view is correct, the correlation should be significantly negative; if our view represents a better approximation to reality, then the correlation should not be significantly different from zero.

Both studies provide information about the average value of D—the market value of bonds and preferred stock—and of V—the market value of all securities.[37] From these data we can readily compute the ratio D/V and this ratio (expressed as a percentage) is represented by the symbol d in the regression equations below. The measurement of the variable $\overline{X}^r/V$, however, presents serious difficulties. Strictly speaking, the numerator should measure the expected returns net of taxes, but this is a variable on which no direct information is available. As an approximation, we have followed both authors and used (1) the average value of actual net returns in 1947 and 1948 for Allen's utilities; and (2) actual net returns in 1953 for Smith's oil companies. Net return is defined in both cases as the sum of interest, preferred dividends and stockholders' income net of corporate income taxes. Although this approximation to expected returns is undoubtedly very crude, there is no reason to believe that it will systematically bias the test in so far as the sign of the regression coefficient is concerned. The roughness of the approximation, however, will tend to make for a wide scatter. Also contributing to the scatter is the crudeness of the industrial classification, since especially within the sample of oil companies, the assumption that all the firms belong to the same class in our sense, is at best only approximately valid.

Denoting by x our approximation to $\overline{X}^r/V$ (expressed, like d, as a percentage), the results of the tests are as follows:

$$\text{Electric Utilities} \quad x = 5.3 + .006d \quad (\pm .008) \qquad r = .12$$

$$\text{Oil Companies} \quad x = 8.5 + .006d \quad (\pm .024) \qquad r = .04.$$

The data underlying these equations are also shown in scatter diagram form in Figures 3 and 4.

The results of these tests are clearly favorable to our hypothesis.

[37] Note that for purposes of this test preferred stocks, since they represent an *expected* fixed obligation, are properly classified with bonds even though the tax status of preferred dividends is different from that of interest payments and even though preferred dividends are really fixed only as to their maximum in any year. Some difficulty of classification does arise in the case of convertible preferred stocks (and convertible bonds) selling at a substantial premium, but fortunately very few such issues were involved for the companies included in the two studies. Smith included bank loans and certain other short-term obligations (at book values) in his data on oil company debts and this treatment is perhaps open to some question. However, the amounts involved were relatively small and check computations showed that their elimination would lead to only minor differences in the test results.

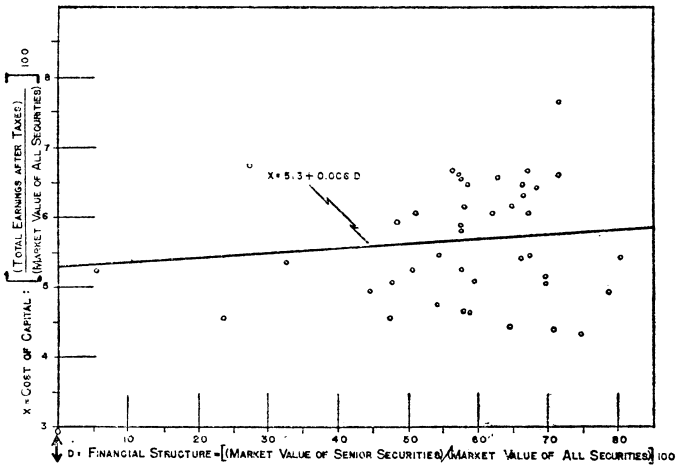

FIGURE 3. COST OF CAPITAL IN RELATION TO FINANCIAL STRUCTURE FOR 43 ELECTRIC UTILITIES, 1947–48

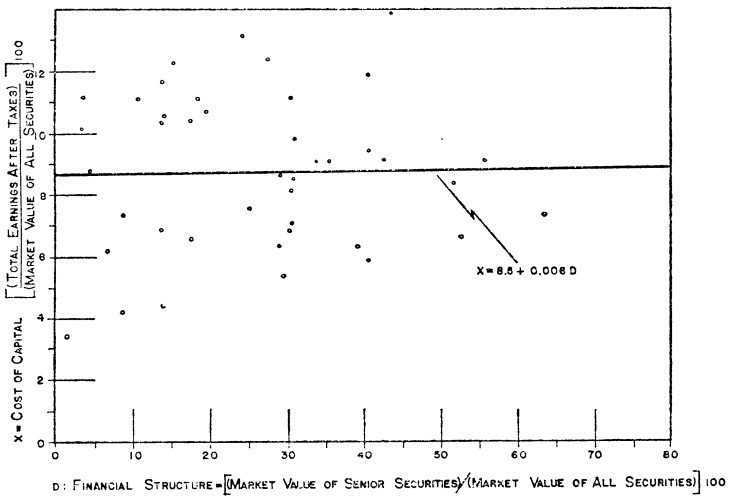

FIGURE 4. COST OF CAPITAL IN RELATION TO FINANCIAL STRUCTURE FOR 42 OIL COMPANIES, 1953

Both correlation coefficients are very close to zero and not statistically significant. Furthermore, the implications of the traditional view fail to be supported even with respect to the sign of the correlation. The data in short provide no evidence of any tendency for the cost of capital to fall as the debt ratio increases.[38]

It should also be apparent from the scatter diagrams that there is no hint of a curvilinear, U-shaped, relation of the kind which is widely believed to hold between the cost of capital and leverage. This graphical impression was confirmed by statistical tests which showed that for both industries the curvature was not significantly different from zero, its sign actually being opposite to that hypothesized.[39]

Note also that according to our model, the constant terms of the regression equations are measures of $\rho_k{}^\tau$, the capitalization rates for unlevered streams and hence the average cost of capital in the classes in question. The estimates of 8.5 per cent for the oil companies as against 5.3 per cent for electric utilities appear to accord well with a priori expectations, both in absolute value and relative spread.

The Effect of Leverage on Common Stock Yields. According to our Proposition II—see equation 12 and Figure 2—the expected yield on common stock, $\bar{\pi}^\tau/S$, in any given class, should tend to increase with leverage as measured by the ratio D/S. The relation should tend to be linear and with positive slope through most of the relevant range (as in the curve MM' of Figure 2), though it might tend to flatten out if we move

[38] It may be argued that a test of the kind used is biased against the traditional view. The fact that both sides of the regression equation are divided by the variable V which may be subject to random variation might tend to impart a positive bias to the correlation. As a check on the results presented in the text, we have, therefore, carried out a supplementary test based on equation (16). This equation shows that, if the traditional view is correct, the market value of a company should, for given $\bar{X}^\tau$, increase with debt through most of the relevant range; according to our model the market value should be uncorrelated with D, given $\bar{X}^\tau$. Because of wide variations in the size of the firms included in our samples, all variables must be divided by a suitable scale factor in order to avoid spurious results in carrying out a test of equation (16). The factor we have used is the book value of the firm denoted by A. The hypothesis tested thus takes the specific form:

$$V/A = a + b(\bar{X}^\tau/A) + c(D/A)$$

and the numerator of the ratio X^τ/A is again approximated by actual net returns. The partial correlation between V/A and D/A should now be positive according to the traditional view and zero according to our model. Although division by A should, if anything, bias the results in favor of the traditional hypothesis, the partial correlation turns out to be only .03 for the oil companies and $-.28$ for the electric utilities. Neither of these coefficients is significantly different from zero and the larger one even has the wrong sign.

[39] The tests consisted of fitting to the data the equation (19) of footnote 27. As shown there, it follows from the U-shaped hypothesis that the coefficient α of the variable $(D/V)^2/(1-D/V)$, denoted hereafter by d^*, should be significant and positive. The following regression equations and partials were obtained:

Electric Utilities $x = 5.0 + .017d - .003d^*$; $r_{xd^*.d} = -.15$

Oil Companies $x = 8.0 + .05d - .03d^*$; $r_{xd^*.d} = -.14$.

far enough to the right (as in the curve MD'), to the extent that high leverage tends to drive up the cost of senior capital. According to the conventional view, the yield curve as a function of leverage should be a horizontal straight line (like ML') through most of the relevant range; far enough to the right, the yield may tend to rise at an increasing rate. Here again, a straight-forward correlation—in this case between $\bar{\pi}^r/S$ and D/S—can provide a test of the two positions. If our view is correct, the correlation should be significantly positive; if the traditional view is correct, the correlation should be negligible.

Subject to the same qualifications noted above in connection with $\overline{X}^r$, we can approximate $\bar{\pi}^r$ by actual stockholder net income.[40] Letting z denote in each case the approximation to $\bar{\pi}^r/S$ (expressed as a percentage) and letting h denote the ratio D/S (also in percentage terms) the following results are obtained:

$$\text{Electric Utilities} \quad z = 6.6 + \underset{(+.004)}{.017h} \qquad r = .53$$

$$\text{Oil Companies} \quad z = 8.9 + \underset{(\pm .012)}{.051h} \qquad r = .53.$$

These results are shown in scatter diagram form in Figures 5 and 6.

Here again the implications of our analysis seem to be borne out by the data. Both correlation coefficients are positive and highly significant when account is taken of the substantial sample size. Furthermore, the estimates of the coefficients of the equations seem to accord reasonably well with our hypothesis. According to equation (12) the constant term should be the value of ρ_k^r for the given class while the slope should be $(\rho_k^r - r)$. From the test of Proposition I we have seen that for the oil companies the mean value of ρ_k^r could be estimated at around 8.7. Since the average yield of senior capital during the period covered was in the order of $3\frac{1}{2}$ per cent, we should expect a constant term of about 8.7 per cent and a slope of just over 5 per cent. These values closely approximate the regression estimates of 8.9 per cent and 5.1 per cent respectively. For the electric utilities, the yield of senior capital was also on the order of $3\frac{1}{2}$ per cent during the test years, but since the estimate of the mean value of ρ_k^r from the test of Proposition I was 5.6 per cent,

[40] As indicated earlier, Smith's data were for the single year 1953. Since the use of a single year's profits as a measure of expected profits might be open to objection we collected profit data for 1952 for the same companies and based the computation of $\bar{\pi}^r/S$ on the average of the two years. The value of $\bar{\pi}^r/S$ was obtained from the formula:

$$\left(\text{net earnings in 1952} \cdot \frac{\text{assets in '53}}{\text{assets in '52}} + \text{net earnings in '1953}\right)\frac{1}{2}$$
$$\div \text{(average market value of common stock in '53).}$$

The asset adjustment was introduced as rough allowance for the effects of possible growth in the size of the firm. It might be added that the correlation computed with $\bar{\pi}^r/S$ based on net profits in 1953 alone was found to be only slightly smaller, namely .50.

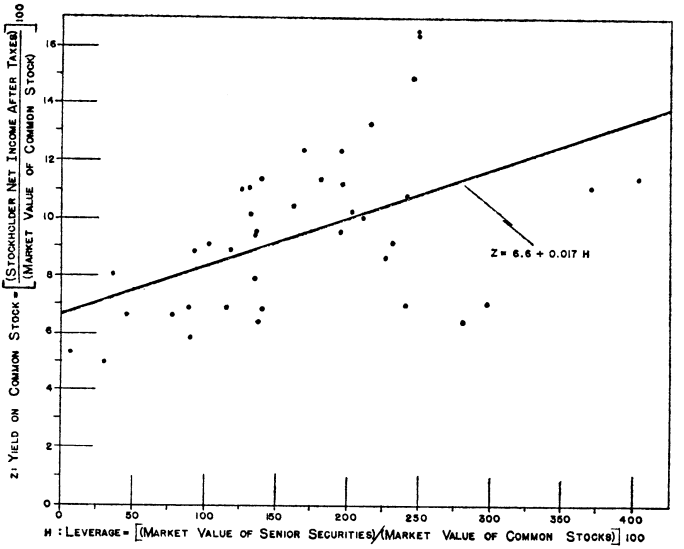

FIGURE 5. YIELD ON COMMON STOCK IN RELATION TO LEVERAGE FOR 43 ELECTRIC UTILITIES, 1947–48

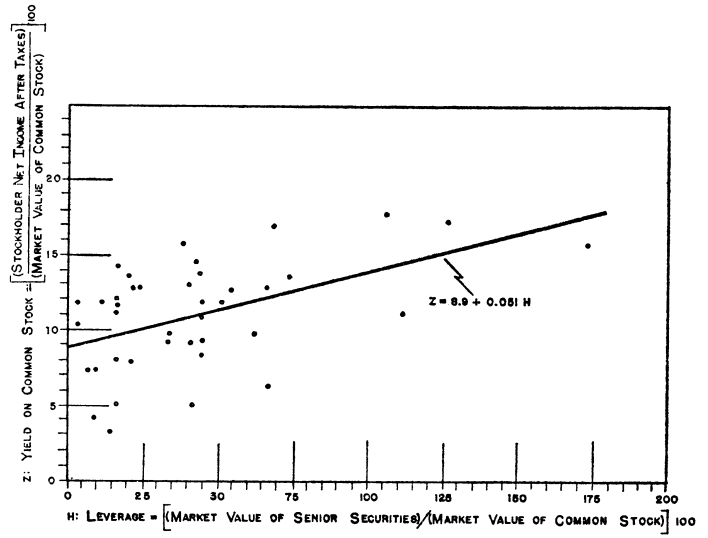

FIGURE 6. YIELD ON COMMON STOCK IN RELATION TO LEVERAGE FOR 42 OIL COMPANIES, 1952–53

the slope should be just above 2 per cent. The actual regression estimate for the slope of 1.7 per cent is thus somewhat low, but still within one standard error of its theoretical value. Because of this underestimate of the slope and because of the large mean value of leverage ($\bar{h}=160$ per cent) the regression estimate of the constant term, 6.6 per cent, is somewhat high, although not significantly different from the value of 5.6 per cent obtained in the test of Proposition I.

When we add a square term to the above equations to test for the presence and direction of curvature we obtain the following estimates:

$$\text{Electric Utilities} \quad z = 4.6 + .004h - .007h^2$$

$$\text{Oil Companies} \quad z = 8.5 + .072h - .016h^2.$$

For both cases the curvature is negative. In fact, for the electric utilities, where the observations cover a wider range of leverage ratios, the negative coefficient of the square term is actually significant at the 5 per cent level. Negative curvature, as we have seen, runs directly counter to the traditional hypothesis, whereas it can be readily accounted for by our model in terms of rising cost of borrowed funds.[41]

In summary, the empirical evidence we have reviewed seems to be broadly consistent with our model and largely inconsistent with traditional views. Needless to say much more extensive testing will be required before we can firmly conclude that our theory describes market behavior. Caution is indicated especially with regard to our test of Proposition II, partly because of possible statistical pitfalls[42] and partly because not all the factors that might have a systematic effect on stock yields have been considered. In particular, no attempt was made to test the possible influence of the dividend pay-out ratio whose role has tended to receive a great deal of attention in current research and thinking. There are two reasons for this omission. First, our main objective has been to assess the prima facie tenability of *our* model, and in this model, based as it is on rational behavior by investors, dividends per se play no role. Second, in a world in which the policy of dividend stabilization is widespread, there is no simple way of disentangling the true effect of dividend payments on stock prices from their apparent effect,

[41] That the yield of senior capital tended to rise for utilities as leverage increased is clearly shown in several of the scatter diagrams presented in the published version of Allen's study. This significant negative curvature between stock yields and leverage for utilities may be partly responsible for the fact, previously noted, that the constant in the linear regression is somewhat higher and the slope somewhat lower than implied by equation (12). Note also in connection with the estimate of $\rho_k{}^r$ that the introduction of the quadratic term reduces the constant considerably, pushing it in fact below the a priori expectation of 5.6, though the difference is again not statistically significant.

[42] In our test, *e.g.*, the two variables z and h are both ratios with S appearing in the denominator, which may tend to impart a positive bias to the correlation (*cf.* note 38). Attempts were made to develop alternative tests, but although various possibilities were explored, we have so far been unable to find satisfactory alternatives.

the latter reflecting only the role of dividends as a proxy measure of long-term earning anticipations.[43] The difficulties just mentioned are further compounded by possible interrelations between dividend policy and leverage.[44]

II. *Implications of the Analysis for the Theory of Investment*

A. *Capital Structure and Investment Policy*

On the basis of our propositions with respect to cost of capital and financial structure (and for the moment neglecting taxes), we can derive the following simple rule for optimal investment policy by the firm:

Proposition III. If a firm in class k is acting in the best interest of the stockholders at the time of the decision, it will exploit an investment opportunity if and only if the rate of return on the investment, say ρ^*, is as large as or larger than ρ_k. That is, *the cut-off point for investment in the firm will in all cases be ρ_k and will be completely unaffected by the type of security used to finance the investment.* Equivalently, we may say that regardless of the financing used, the marginal cost of capital to a firm is equal to the average cost of capital, which is in turn equal to the capitalization rate for an unlevered stream in the class to which the firm belongs.[45]

To establish this result we will consider the three major financing alternatives open to the firm—bonds, retained earnings, and common stock issues—and show that in each case an investment is worth undertaking if, and only if, $\rho^* \geqq \rho_k$.[46]

Consider first the case of an investment financed by the sale of bonds. We know from Proposition I that the market value of the firm before the investment was undertaken was:[47]

$$V_0 = \overline{X}_0/\rho_k \tag{20}$$

[43] We suggest that failure to appreciate this difficulty is responsible for many fallacious, or at least unwarranted, conclusions about the role of dividends.

[44] In the sample of electric utilities, there is a substantial negative correlation between yields and pay-out ratios, but also between pay-out ratios and leverage, suggesting that either the association of yields and leverage or of yields and pay-out ratios may be (at least partly) spurious. These difficulties however do not arise in the case of the oil industry sample. A preliminary analysis indicates that there is here no significant relation between leverage and pay-out ratios and also no significant correlation (either gross or partial) between yields and pay-out ratios.

[45] The analysis developed in this paper is essentially a comparative-statics, not a dynamic analysis. This note of caution applies with special force to Proposition III. Such problems as those posed by expected changes in r and in ρ_k over time will not be treated here. Although they are in principle amenable to analysis within the general framework we have laid out, such an undertaking is sufficiently complex to deserve separate treatment. *Cf.* note 17.

[46] The extension of the proof to other types of financing, such as the sale of preferred stock or the issuance of stock rights is straightforward.

[47] Since no confusion is likely to arise, we have again, for simplicity, eliminated the subscripts identifying the firm in the equations to follow. Except for ρ_k, the subscripts now refer to time periods.

and that the value of the common stock was:

$$S_0 = V_0 - D_0. \tag{21}$$

If now the firm borrows I dollars to finance an investment yielding ρ^* its market value will become:

$$V_1 = \frac{\overline{X}_0 + \rho^* I}{\rho_k} = V_0 + \frac{\rho^* I}{\rho_k} \tag{22}$$

and the value of its common stock will be:

$$S_1 = V_1 - (D_0 + I) = V_0 + \frac{\rho^* I}{\rho_k} - D_0 - I \tag{23}$$

or using equation 21,

$$S_1 = S_0 + \frac{\rho^* I}{\rho_k} - I. \tag{24}$$

Hence $S_1 \gtrless S_0$ as $\rho^* \gtrless \rho_k$.[48]

To illustrate, suppose the capitalization rate for uncertain streams in the kth class is 10 per cent and the rate of interest is 4 per cent. Then if a given company had an expected income of 1,000 and if it were financed entirely by common stock we know from Proposition I that the market value of its stock would be 10,000. Assume now that the managers of the firm discover an investment opportunity which will require an outlay of 100 and which is expected to yield 8 per cent. At first sight this might appear to be a profitable opportunity since the expected return is double the interest cost. If, however, the management borrows the necessary 100 at 4 per cent, the total expected income of the company rises to 1,008 and the market value of the firm to 10,080. But the firm now will have 100 of bonds in its capital structure so that, paradoxically, the market value of the stock must actually be reduced from 10,000 to 9,980 as a consequence of this apparently profitable investment. Or, to put it another way, the gains from being able to tap cheap, borrowed funds are more than offset for the stockholders by the market's discounting of the stock for the added leverage assumed.

Consider next the case of retained earnings. Suppose that in the course of its operations the firm acquired I dollars of cash (without impairing

[48] In the case of bond-financing the rate of interest on bonds does not enter explicitly into the decision (assuming the firm borrows at the market rate of interest). This is true, moreover, given the conditions outlined in Section I.C, even though interest rates may be an increasing function of debt outstanding. To the extent that the firm borrowed at a rate other than the market rate the two I's in equation (24) would no longer be identical and an additional gain or loss, as the case might be, would accrue to the shareholders. It might also be noted in passing that permitting the two I's in (24) to take on different values provides a simple method for introducing underwriting expenses into the analysis.

the earning power of its assets). If the cash is distributed as a dividend to the stockholders their wealth W_0, after the distribution will be:

$$W_0 = S_0 + I = \frac{\overline{X}_0}{\rho_k} - D_0 + I \tag{25}$$

where $\overline{X}_0$ represents the expected return from the assets exclusive of the amount I in question. If however the funds are retained by the company and used to finance new assets whose expected rate of return is ρ^*, then the stockholders' wealth would become:

$$W_1 = S_1 = \frac{\overline{X}_0 + \rho^* I}{\rho_k} - D_0 = S_0 + \frac{\rho^* I}{\rho_k} \cdot \tag{26}$$

Clearly $W_1 \gtreqless W_0$ as $\rho^* \gtreqless \rho_k$ so that an investment financed by retained earnings raises the net worth of the owners if and only if $\rho^* > \rho_k$.[49]

Consider finally, the case of common-stock financing. Let P_0 denote the current market price per share of stock and assume, for simplicity, that this price reflects currently expected earnings only, that is, it does not reflect any future increase in earnings as a result of the investment under consideration.[50] Then if N is the original number of shares, the price per share is:

$$P_0 = S_0/N \tag{27}$$

and the number of new shares, M, needed to finance an investment of I dollars is given by:

$$M = \frac{I}{P_0} \cdot \tag{28}$$

As a result of the investment the market value of the stock becomes:

$$S_1 = \frac{\overline{X}_0 + \rho^* I}{\rho_k} - D_0 = S_0 + \frac{\rho^* I}{\rho_k} = NP_0 + \frac{\rho^* I}{\rho_k}$$

and the price per share:

$$P_1 = \frac{S_1}{N + M} = \frac{1}{N + M}\left[NP_0 + \frac{\rho^* I}{\rho_k}\right]. \tag{29}$$

[49] The conclusion that ρ_k is the cut-off point for investments financed from internal funds applies not only to undistributed net profits, but to depreciation allowances (and even to the funds represented by the current sale value of any asset or collection of assets). Since the owners can earn ρ_k by investing funds elsewhere in the class, partial or total liquidating distributions should be made whenever the firm cannot achieve a marginal internal rate of return equal to ρ_k.

[50] If we assumed that the market price of the stock did reflect the expected higher future earnings (as would be the case if our original set of assumptions above were strictly followed) the analysis would differ slightly in detail, but not in essentials. The cut-off point for new investment would still be ρ_k, but where $\rho^* > \rho_k$ the gain to the original owners would be larger than if the stock price were based on the pre-investment expectations only.

Since by equation (28), $I = MP_0$, we can add MP_0 and subtract I from the quantity in bracket, obtaining:

$$P_1 = \frac{1}{N + M}\left[(N + M)P_0 + \frac{\rho^* - \rho_k}{\rho_k} I\right] \tag{30}$$
$$= P_0 + \frac{1}{N + M} \frac{\rho^* - \rho_k}{\rho_k} I > P_0 \text{ if,}$$

and only if, $\rho^* > \rho_k$.

Thus an investment financed by common stock is advantageous to the current stockholders if and only if its yield exceeds the capitalization rate ρ_k.

Once again a numerical example may help to illustrate the result and make it clear why the relevant cut-off rate is ρ_k and not the current yield on common stock, i. Suppose that ρ_k is 10 per cent, r is 4 per cent, that the original expected income of our company is 1,000 and that management has the opportunity of investing 100 having an expected yield of 12 per cent. If the original capital structure is 50 per cent debt and 50 per cent equity, and 1,000 shares of stock are initially outstanding, then, by Proposition I, the market value of the common stock must be 5,000 or 5 per share. Furthermore, since the interest bill is $.04 \times 5{,}000 = 200$, the yield on common stock is $800/5{,}000 = 16$ per cent. It may then appear that financing the additional investment of 100 by issuing 20 shares to outsiders at 5 per share would dilute the equity of the original owners since the 100 promises to yield 12 per cent whereas the common stock is currently yielding 16 per cent. Actually, however, the income of the company would rise to 1,012; the value of the firm to 10,120; and the value of the common stock to 5,120. Since there are now 1,020 shares, each would be worth 5.02 and the wealth of the original stockholders would thus have been increased. What has happened is that the dilution in expected earnings per share (from .80 to .796) has been more than offset, in its effect upon the market price of the shares, by the decrease in leverage.

Our conclusion is, once again, at variance with conventional views,[51] so much so as to be easily misinterpreted. Read hastily, Proposition III seems to imply that the capital structure of a firm is a matter of indifference; and that, consequently, one of the core problems of corporate finance—the problem of the optimal capital structure for a firm—is no problem at all. It may be helpful, therefore, to clear up such possible misundertandings.

[51] In the matter of investment policy under uncertainty there is no single position which represents "accepted" doctrine. For a sample of current formulations, all very different from ours, see Joel Dean [2, esp. Ch. 3], M. Gordon and E. Shapiro [5], and Harry Roberts [17].

B. *Proposition III and Financial Planning by Firms*

Misinterpretation of the scope of Proposition III can be avoided by remembering that this Proposition tells us only that the type of instrument used to finance an investment is irrelevant to the question of whether or not the investment is worth while. This does not mean that the owners (or the managers) have no grounds whatever for preferring one financing plan to another; or that there are no other policy or technical issues in finance at the level of the firm.

That grounds for preferring one type of financial structure to another will still exist within the framework of our model can readily be seen for the case of common-stock financing. In general, except for something like a widely publicized oil-strike, we would expect the market to place very heavy weight on current and recent past earnings in forming expectations as to future returns. Hence, if the owners of a firm discovered a major investment opportunity which they felt would yield much more than ρ_k, they might well prefer not to finance it via common stock at the then ruling price, because this price may fail to capitalize the new venture. A better course would be a pre-emptive issue of stock (and in this connection it should be remembered that stockholders are free to borrow and buy). Another possibility would be to finance the project initially with debt. Once the project had reflected itself in increased actual earnings, the debt could be retired either with an equity issue at much better prices or through retained earnings. Still another possibility along the same lines might be to combine the two steps by means of a convertible debenture or preferred stock, perhaps with a progressively declining conversion rate. Even such a double-stage financing plan may possibly be regarded as yielding too large a share to outsiders since the new stockholders are, in effect, being given an interest in any similar opportunities the firm may discover in the future. If there is a reasonable prospect that even larger opportunities may arise in the near future and if there is some danger that borrowing now would preclude more borrowing later, the owners might find their interests best protected by splitting off the current opportunity into a separate subsidiary with independent financing. Clearly the problems involved in making the crucial estimates and in planning the optimal financial strategy are by no means trivial, even though they should have no bearing on the basic decision to invest (as long as $\rho^* \geqq \rho_k$).[52]

Another reason why the alternatives in financial plans may not be a matter of indifference arises from the fact that managers are concerned

[52] Nor can we rule out the possibility that the existing owners, if unable to use a financing plan which protects their interest, may actually prefer to pass up an otherwise profitable venture rather than give outsiders an "excessive" share of the business. It is presumably in situations of this kind that we could justifiably speak of a shortage of "equity capital," though this kind of market imperfection is likely to be of significance only for small or new firms.

with more than simply furthering the interest of the owners. Such other objectives of the management—which need not be necessarily in conflict with those of the owners—are much more likely to be served by some types of financing arrangements than others. In many forms of borrowing agreements, for example, creditors are able to stipulate terms which the current management may regard as infringing on its prerogatives or restricting its freedom to maneuver. The creditors might even be able to insist on having a direct voice in the formation of policy.[53] To the extent, therefore, that financial policies have these implications for the management of the firm, something like the utility approach described in the introductory section becomes relevant to financial (as opposed to investment) decision-making. It is, however, the utility functions of the managers per se and not of the owners that are now involved.[54]

In summary, many of the specific considerations which bulk so large in traditional discussions of corporate finance can readily be superimposed on our simple framework without forcing any drastic (and certainly no systematic) alteration of the conclusion which is our principal concern, namely that for investment decisions, the marginal cost of capital is ρ_k.

C. *The Effect of the Corporate Income Tax on Investment Decisions*

In Section I it was shown that when an unintegrated corporate income tax is introduced, the original version of our Proposition I,

$$\overline{X}/V = \rho_k = \text{a constant}$$

must be rewritten as:

$$(11) \qquad \frac{(\overline{X} - rD)(1 - \tau) + rD}{V} \equiv \frac{\overline{X}^{\tau}}{V} = \rho_k{}^{\tau} = \text{a constant.}$$

Throughout Section I we found it convenient to refer to $\overline{X}^{\tau}/V$ as the cost of capital. The appropriate measure of the cost of capital relevant

[53] Similar considerations are involved in the matter of dividend policy. Even though the stockholders may be indifferent as to payout policy as long as investment policy is optimal, the management need not be so. Retained earnings involve far fewer threats to control than any of the alternative sources of funds and, of course, involve no underwriting expense or risk. But against these advantages management must balance the fact that sharp changes in dividend rates, which heavy reliance on retained earnings might imply, may give the impression that a firm's finances are being poorly managed, with consequent threats to the control and professional standing of the management.

[54] In principle, at least, this introduction of management's risk preferences with respect to financing methods would do much to reconcile the apparent conflict between Proposition III and such empirical findings as those of Modigliani and Zeman [14] on the close relation between interest rates and the ratio of new debt to new equity issues; or of John Lintner [12] on the considerable stability in target and actual dividend-payout ratios.

to investment decisions, however, is the ratio of the expected return *before* taxes to the market value, *i.e.*, $\overline{X}/V$. From (11) above we find:

$$\frac{\overline{X}}{V} = \frac{\rho_k{}^\tau - \tau_r(D/V)}{1-\tau} = \frac{\rho_k{}^\tau}{1-\tau}\left[1 - \frac{\tau r D}{\rho_k{}^\tau V}\right], \tag{31}$$

which shows that the cost of capital now depends on the debt ratio, decreasing, as D/V rises, at the constant rate $\tau r/(1-\tau)$.[55] Thus, with a corporate income tax under which interest is a deductible expense, gains can accrue to stockholders from having debt in the capital structure, even when capital markets are perfect. The gains however are small, as can be seen from (31), and as will be shown more explicitly below.

From (31) we can develop the tax-adjusted counterpart of Proposition III by interpreting the term D/V in that equation as the proportion of debt used in any additional financing of V dollars. For example, in the case where the financing is entirely by new common stock, $D=0$ and the required rate of return $\rho_k{}^S$ on a venture so financed becomes:

$$\rho_k{}^S = \frac{\rho_k{}^\tau}{1-\tau}. \tag{32}$$

For the other extreme of pure debt financing $D=V$ and the required rate of return, $\rho_k{}^D$, becomes:

$$\rho_k{}^D = \frac{\rho_k{}^\tau}{1-\tau}\left[1 - \tau\frac{r}{\rho_k{}^\tau}\right] = \rho_k{}^S\left[1 - \tau\frac{r}{\rho_k{}^\tau}\right] = \rho_k{}^S - \frac{\tau}{1-\tau}r.[56] \tag{33}$$

For investments financed out of retained earnings, the problem of defining the required rate of return is more difficult since it involves a comparison of the tax consequences to the individual stockholder of receiving a dividend versus having a capital gain. Depending on the time of realization, a capital gain produced by retained earnings may be taxed either at ordinary income tax rates, 50 per cent of these rates, 25 per

[55] Equation (31) is amenable, in principle, to statistical tests similar to those described in Section I.E. However we have not made any systematic attempt to carry out such tests so far, because neither the Allen nor the Smith study provides the required information. Actually, Smith's data included a very crude estimate of tax liability, and, using this estimate, we did in fact obtain a negative relation between $\overline{X}/V$ and D/V. However, the correlation (−.28) turned out to be significant only at about the 10 per cent level. While this result is not conclusive, it should be remembered that, according to our theory, the slope of the regression equation should be in any event quite small. In fact, with a value of τ in the order of .5, and values of $\rho_k{}^\tau$ and r in the order of 8.5 and 3.5 per cent respectively (*cf.* Section I.E) an increase in D/V from 0 to 60 per cent (which is, approximately, the range of variation of this variable in the sample) should tend to reduce the average cost of capital only from about 17 to about 15 per cent.

[56] This conclusion does not extend to preferred stocks even though they have been classed with debt issues previously. Since preferred dividends except for a portion of those of public utilities are not in general deductible from the corporate tax, the cut-off point for new financing via preferred stock is exactly the same as that for common stock.

cent, or zero, if held till death. The rate on any dividends received in the event of a distribution will also be a variable depending on the amount of other income received by the stockholder, and with the added complications introduced by the current dividend-credit provisions. If we assume that the managers proceed on the basis of reasonable estimates as to the average values of the relevant tax rates for the owners, then the required return for retained earnings $\rho_k{}^R$ can be shown to be:

$$\rho_k{}^R = \rho_k{}^\tau \frac{1}{1-\tau} \frac{1-\tau_d}{1-\tau_g} = \frac{1-\tau_d}{1-\tau_g} \rho_k{}^s \tag{34}$$

where τ_d is the assumed rate of personal income tax on dividends and τ_g is the assumed rate of tax on capital gains.

A numerical illustration may perhaps be helpful in clarifying the relationship between these required rates of return. If we take the following round numbers as representative order-of-magnitude values under present conditions: an after-tax capitalization rate $\rho_k{}^\tau$ of 10 per cent, a rate of interest on bonds of 4 per cent, a corporate tax rate of 50 per cent, a marginal personal income tax rate on dividends of 40 per cent (corresponding to an income of about $25,000 on a joint return), and a capital gains rate of 20 per cent (one-half the marginal rate on dividends), then the required rates of return would be: (1) 20 per cent for investments financed entirely by issuance of new common shares; (2) 16 per cent for investments financed entirely by new debt; and (3) 15 per cent for investments financed wholly from internal funds.

These results would seem to have considerable significance for current discussions of the effect of the corporate income tax on financial policy and on investment. Although we cannot explore the implications of the results in any detail here, we should at least like to call attention to the remarkably small difference between the "cost" of equity funds and debt funds. With the numerical values assumed, equity money turned out to be only 25 per cent more expensive than debt money, rather than something on the order of 5 times as expensive as is commonly supposed to be the case.[57] The reason for the wide difference is that the traditional

[57] See *e.g.*, D. T. Smith [18]. It should also be pointed out that our tax system acts in other ways to reduce the gains from debt financing. Heavy reliance on debt in the capital structure, for example, commits a company to paying out a substantial proportion of its income in the form of interest payments taxable to the owners under the personal income tax. A debt-free company, by contrast, can reinvest in the business all of its (smaller) net income and to this extent subject the owners only to the low capital gains rate (or possibly no tax at all by virtue of the loophole at death). Thus, we should expect a high degree of leverage to be of value to the owners, even in the case of closely held corporations, primarily in cases where their firm was not expected to have much need for additional funds to expand assets and earnings in the future. To the extent that opportunities for growth were available, as they presumably would be for most successful corporations, the interest of the stockholders would tend to be better served by a structure which permitted maximum use of retained earnings.

view starts from the position that debt funds are several times cheaper than equity funds even in the absence of taxes, with taxes serving simply to magnify the cost ratio in proportion to the corporate rate. By contrast, in our model in which the repercussions of debt financing on the value of shares are taken into account, the *only* difference in cost is that due to the tax effect, and its magnitude is simply the tax on the "grossed up" interest payment. Not only is this magnitude likely to be small but our analysis yields the further paradoxical implication that the stockholders' gain from, and hence incentive to use, debt financing is actually smaller the lower the rate of interest. In the extreme case where the firm could borrow for practically nothing, the advantage of debt financing would also be practically nothing.

III. *Conclusion*

With the development of Proposition III the main objectives we outlined in our introductory discussion have been reached. We have in our Propositions I and II at least the foundations of a theory of the valuation of firms and shares in a world of uncertainty. We have shown, moreover, how this theory can lead to an operational definition of the cost of capital and how that concept can be used in turn as a basis for rational investment decision-making within the firm. Needless to say, however, much remains to be done before the cost of capital can be put away on the shelf among the solved problems. Our approach has been that of static, partial equilibrium analysis. It has assumed among other things a state of atomistic competition in the capital markets and an ease of access to those markets which only a relatively small (though important) group of firms even come close to possessing. These and other drastic simplifications have been necessary in order to come to grips with the problem at all. Having served their purpose they can now be relaxed in the direction of greater realism and relevance, a task in which we hope others interested in this area will wish to share.

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THE PRICING OF COMMON STOCKS

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INTRODUCTION

The prices of common stocks differ among corporations due to differences among them in earnings per share, investment policies, financing policies, and business risk. Models which use related variables to explain differences in prices among stocks may be called intrinsic value models. There are at least two important uses for intrinsic value models. One is to discover the investment and financing policies which maximize the price of a company's stock. A related use is to discover the extent to which existing dividend, leverage and other policies depart from price maximizing policies. The other important use for intrinsic value models is to discover over or under-priced stocks. That may take place in either of two ways. One is to use the model to find the stocks that are mispriced on the basis of the current values of the model's independent variables. Alternatively, the model's parameters may be combined with values for the independent variables that are based on new private information that the analyst has obtained in order to discover the value of the information.

Intrinsic value models have had a very uneven history. Prior to the nineteen fifties we had simple heuristic models such as Graham and Dodd's in which price depended on some combination of earnings, dividends and book value. Then Gordon and Miller and Modigliani developed models of stock valuation which follow from plausible or theoretically interesting principles of asset valuation.[1] These models generated further theoretical work and

considerable empirical work designed to implement and test them during the sixties and early seventies. However, the development of the Sharpe-Lintner-Mossin capital asset pricing model during the sixties soon captured the interest of researchers in the area of security valuation. Perhaps that is why there has been comparatively little progress over the last twenty years in theory and practice with respect to intrinsic value models of stock prices.

This paper is devoted to the use of intrinsic value models for the discovery of over or under-priced stocks. The motivation for the paper is the belief that developments over the last decade in data availability and some theoretical ideas raised here make further progress possible. The next section will review the Gordon and the MM models. The second section will critically evaluate the empirical adaptation of these models by their authors and certain other efforts at explaining the cross-section variation in price among stocks. Finally, the last section will discuss how certain data base developments and advances in theory can contribute to the advancement of practice in the area under consideration.

I. THEORETICAL MODELS

The current value of any asset is the present value of its expected future payments. In the case of a stock this expectation is the dividend for the coming period plus the end-of-period price. The expectation reduces to an infinite stream

of dividends. Under the assumption that this dividend expectation can be represented with just two parameters, a current value and a growth rate, with the latter taken to be the same for every future period, I have shown that the price of a share is

$$P = D/(k-g). \qquad (1)$$

Here, P = current price per share, D = current dividend per share, k = expected or required return, and g = expected average rate of growth in the dividend.[2] Notice, the assumption that the growth rate is constant over time is consistent with the fact that the growth rate in the dividend may vary from one period to the next. We only assume that in pricing the stock future growth can be summarized with one number.

Eq. (1) can be given more economic content under the further restrictions that (1) the corporation is not expected to finance through the sale of new shares, and (2) dividend policy, capital structure, and return on investment can each be represented by one parameter. In other words, the value of each of these variables is not expected to change over time, and of course, their values can be estimated currently. Under these assumptions Eq. (1) becomes

$$P = (1-b)Y/(k-br). \qquad (2)$$

The additional variables are Y = normalized current earnings per share, b = fraction of earnings retained and invested, and r = return on equity investment.

In Eq. (2) the dividend becomes D = (1-b)Y, the growth rate

becomes g = br, and dividend policy is investment policy.

The interesting economic content of Eq. (2) lies in what it says about dividend policy, which is represented with b, the fraction of earnings retained. It can be seen that as b rises P falls, on account of the fall in the dividend. On the other hand, P rises with b due to the rise in the growth rate. Whether P rises or falls on balance, and whether or not P is maximized at some retention rate depend on the relative levels of r and k and on how they change with k.

Eq. (2) is based on a number of more or less questionable assumptions. Of particular interest, academic if not practical interest, is the assumption that retained earnings is the sole source of equity funds.[3] In fact, the sale of stock is an alternative to retained earnings as a source of equity funds, but that does not render Eq. (2) useless. Let q be the sum of funds raised through retained earnings and the sale of stock expressed as a fraction of earnings. The value of q is independent of the relative amount of each source of equity funds. If stockholders looked on the sale of stock as a perfect substitute for retained earnings, we could substitute q for b in Eq. (2), and it would then tell us how the price of a share varies with the firm's equity financing rate.[4] However, we all know that taxes and transaction costs make retained earnings dominate the sale of stock as a source of funds. Hence, the assumption that retained earnings is the sole source of equity fund is not among our more questionable assumptions from a practical viewpoint. The more

questionable assumptions will come up shortly.

Miller and Modigliani have shown that under the very strong assumptions of perfectly competitive capital markets, the price of a share is equal to the present value of the earnings on the existing equity plus the present value of the excess return on the expected future equity investment.[5] Under certain simplifying assumptions, we then have

$$P = \frac{Y}{k} + \frac{Yq(r-k)}{k(k-qr)} . \qquad (3)$$

The first term is the present value of the future earnings on the existing equity, and the second term is the present value of the excess return on all future investment. The future equity investment has an initial value of Yq, it has an excess return of r-k, it will grow at the rate qr, and it has a present value of Yq(r-k)/k(k-qr).

Notice that the same variables, Y, q, r, and k enter both the Gordon and MM models, and both models rely on the same simplifying assumptions with regard to their parameterization. Nonetheless, we end up with a fundamental difference between the two models. In the Gordon model the investor buys a dividend expectation, while in MM she buys an earnings expectation. Earnings do enter the Gordon model but only through their influence on the current value and the growth of the dividend expectation.

There are more fundamental differences between the Gordon and the MM models. In both models k, the expected or required return on a stock is equal to a risk-free interest rate plus a

risk premium. The former is the same for all shares and the latter varies among shares, so that given the dividend or earnings expectations on a share, its price will vary depending on the share's risk attributes. However, MM imposed on their model the assumption that k is independent of the expected growth rate, qr, while Gordon allowed the risk of growth to make k an increasing function of qr. In addition, MM assumed that a firm does nothing to create investment opportunities, while Gordon's model has a firm's investment opportunities depend on its history.

II. EMPIRICAL MODELS

Prior to the above theoretical work Meader and Durand explained the variation in price among shares with models in which earnings, dividends and book value were the independent variables.[6] Meader's regressions were linear in the variables while Durand's were linear in their logs. Both obtained high coefficients of multiple correlation, but the regression coefficients were highly unstable from one year to the next, due no doubt to the very high correlations among the independent variables.

Turning back to the Gordon model, we see that it may be summarized with the statement that a stock's price is equal to the dividend divided by the dividend yield. Hence, the task in the econometric implementation of the model is to introduce variables that explain how the dividend yield varies among

shares. Since the dividend yield is k - g, it varies with g and inversely with k. The latter as just stated is equal to a risk-free interest rate that is common to all stocks plus a risk premium that varies among stocks. The empirical adaptation of the model in Gordon was of the form

$$P = \alpha_0 D^{\alpha 1}(1+br)^{\alpha 2}(1+\sigma)^{\alpha 3}(1+h)^{\alpha 4}\ (S)^{\alpha 5}. \qquad (4)$$

The risk variables were σ, the variability in the rate of return on common, h, the leverage rate, and S the firm's size measured by its assets. Eq. (4) is linear in the logs, so that conventional econometric methods may be employed to estimate the α coefficients.

My empirical work employed similar models to Eq. (4) with P/B and P/D the dependent variables, B being the book value per share.[7] The objective with these dependent variables was to abstract from the correlation that may arise due to the variation in price with the dividend or book value among stocks. In all cases the models did an excellent job, explaining a large fraction of the variation in price among stocks for samples of food, machinery, utility and other classes of stocks in different years.[8] The econometric results are discussed in detail in the references cited.

It can be seen that Eq. (4) is a simple and direct representation of the theoretical model Eq. (2). With the constraint $\alpha_1=1$ (its actual value is close to one) price is a multiple of the dividend, the multiple increasing with the growth rate and varying inversely with the risk variables. Notice that

the form of the relation in Eq. (4) makes each coefficient the elasticity of share price with the associated independent variable, so that the change in price with a variable depends upon the ratio of price to that variable. Finally, Eq. (4) provides a plausible explanation of how the dividend yield and the expected return, k=D/P+br vary among shares with growth and risk.

The most serious limitation of the Gordon model is the assumption that the dividend expectation can be represented with just two parameters, D and br. The model breaks down for corporations that are currently paying no dividend, and it can be seriously in error for a corporation that is currently paying a token dividend. In addition, financial statement data for b and r can result in a value for g that cannot be accepted as an average for the indefinite future.

The empirical adaptation of the MM model on how investors value stocks was carried out by MM[9] with the expression

$$\frac{V - \tau L}{A} = a_1 \frac{\bar{X}^{\tau} - \bar{\tau} \bar{R}}{A} + a_2 \frac{\Delta A}{A} + a_3 \frac{10^7}{A} + \alpha_4 \frac{L}{A} + \alpha_5 \frac{D - \bar{D}}{A} \quad . \qquad (5)$$

Here $V - \tau L$ = the market value of a firms's equity and debt less the value due to the tax advantage of debt,

A = book cost of total assets,

$\bar{X}^{\tau} - \tau \bar{R}$ = after tax earnings on common plus interest on debt,

$\Delta A/A$ = rate of growth in assets,

L/A = ratio of debt to assets, and

$D-\bar{D}$ = excess of dividend on common over what it would have been if the firm's payout rate had been the industry average.

Notice that the variables in Eq. (5) except for the dividend variable refer not to the corporation's common stock but to the equity plus the debt.

MM's choice of variables in Eq. (5) was motivated by their special objective. It was not to explain the variation in price among common stock's but to test their theorems on capital structure and dividend policy. According to MM the value of a levered firm increases with debt by rL and it is independent of dividend policy. Hence, by subtracting rL from V in arriving at the dependent variable, it should be independent of the debt ratio as well as dividend policy. That is what they found, α_4 and α_5 not being significantly different from zero in their empirical results. This model, the empirical results and their interpretation by MM were subjected to considerable critical comment, and it will not be considered further here.[10]

A far simpler and more effective empirical adaptation of the MM theory and an important contribution in other respects was due to Malkiel and Cragg.[11] The regression equation they employed to explain the variation in price among stocks was

$$P/Y = \alpha_0 + \alpha_1 g + \alpha_2 (D/Y) + \alpha_3 \beta. \qquad (6)$$

Here, the dependent variable is the price-earnings ratio, g is the foecast rate of growth in earnings, D/Y is the dividend

payout rate, and β is an index of systematic risk. Dividing both sides of MM's Eq. (3) by Y reveals more clearly the similarities between the MM and the Malkiel and Cragg models. It also reveals the difficulty of arriving at a faithful and plausible empirical adaptation of the MM model for pricing common stocks. Eq. (3) now is

$$\frac{P}{Y} = \frac{1}{k} + \frac{q}{k}\left[\frac{r-k}{k-qr}\right] \qquad (7)$$

It can be seen that α_0 in Eq. (6) is an estimate of 1/k under the unreasonable assumption that k does not vary among shares. The coefficient of g is also an estimate of 1/k under the same assumption, and g is an approximation of q(r-k)/(k-qr). In addition, D/Y is included among the independent variables on the assumption that dividend policy matters, and the presence of β among the independent variables (and other risk variables in some regressions) captures in some measure the variation in P/Y among shares due to risk. Finally, with Eq. (6) linear in the variables, the change in P/Y with each independent variable is independent of the values of the variables.

The Malkiel-Cragg model did a very good job of explaining the variation in price-earnings ratios among shares. The correlation with the payout rate as well as the growth rate was very strong, suggesting that dividend policy does influence price.

The major contribution of Malkiel and Cragg was to run their regressions with two alternative sets of data. In one case the earnings and growth variables were obtained from financial

statements, with growth being the growth rate in earnings over the prior five years. In the other case, an average of the estimates or forecasts by a group of security analysts of the normalized earnings for the current year and the growth rate in earnings for the next five years were used. The regression results obtained with the data from the security analysts were much better than the results obtained with the historical financial statement data. Hence, estimates by security analysts can be an improvement on financial statement data for earnings and growth.

Malkiel and Cragg also investigated the use of their model for the discovery of over and under priced shares. They regressed the change in price over the following year on the difference between the actual and predicted price at the start of the year. Unfortunately, they only found very weak evidence in support of the hoped for relation. However, the ability of their model to discover over or under-priced stocks was improved by assuming additional information such as more recent parameter values and better estimates of growth.

III. A METHOD OF PRICING

Let us now turn to consideration of how it may be possible to make substantial advances in the use of econometric models to discover over and under priced stocks. By way of background let us review briefly how econometric models may serve that purpose. First, we establish a model that is considered a theoretically

correct empirical representation of how investors price common stocks. Second, we obtain values of the variables for a sample of stocks and estimate the model's coefficients. These coefficients are then combined with the values of the independent variables for a stock that is in or out of the sample to provide the "correct" price for the stock based on the rules followed for estimating the independent variables. Third, for stocks with a difference between the actual and correct price that is large, the difference is a basis for a buy or sell decision. Finally, if the analyst has superior information which produces a different value for one or more independent variables of a particular stock, a new correct price is obtained with the coefficients on the basis of the superior values for these variables. The difference between the new correct price and the actual price is the basis for a buy or sell decision.

We have seen that earnings and growth estimates by security analysts were found by Malkiel and Cragg to be superior to data obtained from financial statements for the explanation of variation in price among common stocks. That is, better estimates are obtained for the coefficient of the various explanatory variables. Their results should be confirmed by further empirical work, but there is every reason to believe that the confirmation will be forthcoming. First, the estimates by security analysts available from sources such as IBES are far superior to the data available to Malkiel and Cragg. Secondly, the estimates by security analysts must be superior to the

estimates derived solely from financial statements. For earnings we want normalized current earnings and for growth we want expected future growth. It is true that all our knowledge of the future is obtained from the past, and good estimates of Y and g can frequently be obtained from financial statement data. However, such data are available to security analysts, and they have additional information that can be incorporated in their estimates, so that an average over a number of security analysts which eliminates the bias of any one analyst should be superior to exclusive reliance on past financial statement data.

There are other more important ways in which the availability of IBES type data improves the usefulness of econometric models for the discovery of over and under-priced shares. Financial statement data are only available annually, since quarterly data has serious limitations due to seasonal and other distorting influences. With annual data the model's parameters can only be estimated annually, the annual data is not obtained at the same time for all firms, and it is out-of-date when it is obtained. By contrast with IBES or any other such service, the consensus of security analysts on such variables is available monthly. Hence, revised values for the independent variables and revised estimates of the models parameters may be obtained monthly instead of annually. We then have at any point in time a more accurate representation of how the market prices shares. Most important, with monthly data the discovery of over or under-priced shares can take place monthly instead of

annually. Such data represent a critically important breakthrough in making models for pricing stocks useful to security analysts.[12]

Let us now turn to the problem of a model that provides a theoretically correct explanation of how stocks are priced. The model I recommend is

$$P/Y = \alpha_0(1+g)^{\alpha 1}(1+D/Y)^{\alpha 2}(1+L/B)^{\alpha 3}... \qquad (7)$$

with g = growth, D/Y = payout rate, L/B leverage rate and ..... signifying that one or more other risk variables may be added to the model. Eq. (7) is not as elegant as Eq. (4), but it has a good deal more intuitive appeal. It says that investors buy earnings, but what they will pay for a dollar of earnings increases with the extent to which the earnings are reflected in the dividend or in appreciation through growth. Hence, the price per dollar of earnings increases with both the growth rate and the dividend payout rate, and P/Y decreases as leverage or other sources of risk rise. Notice that we avoid having the model blow up because g, D/Y or L/B is equal to zero by using one plus each of these variables. In addition, having a model that is linear in the logs of the variables has the advantages mentioned earlier. Eq. (7) combines the best features of the Gordon and the Malkiel-Cragg models.

I am confident that Eq. (7) with values for earnings and growth based on a consensus of security analyst estimates will do an excellent job of explaining the variation in price among stocks. Whether or not the difference between the actual values

of P/Y and the values predicted by the model will be useful for discovering over and under-priced stocks is open to question. The poor results obtained by Malkiel and Cragg are cause for doubt, but we now have the use of a better model and better data. Finally, there is no doubt that the model will be useful in conjunction with private estimates of earnings, growth and other independent variables. Such private estimates have been and will continue to be developed by security analysts. However, when the estimates are not combined with a sophisticated valuation model, there is no scientific basis for arriving at the impact on price of that information. Revised estimates of one or more independent variables combined with a good valuation model should be superior to the unaided use of such estimates in arriving at buy or sell recommendations.

FOOTNOTES

1 See M.J. Gordon and Eli Shapiro, "Capital Equipment Analysis: The Required Rate of Profit," Management Science (October 1956), pp. 102-110; M.J. Gordon, The Investment, Financing and Valuation of the Corporation, Homewood, IL, R.D. Irwin, 1962; F. Modigliani and M.H. Miller, "The Cost of Capital, Corporation Finance, and the Theory of Investment," American Economic Review (June 1958), pp. 261-297; M.H. Miller and F. Modigliani, "Dividend Policy, Growth, and the Valuation of Shares," Journal of Business (October 1961), pp. 411-433.

2 See M.J. Gordon, The Investment Financing ....., Ch. 4.

3 For an academic treatment of the subject, see M.J. Brennan, "A Note on Dividend Irrelevance and the Gordon Valuation Model," Journal of Finance (December 1971), pp. 1115-1122.

4 This is demonstrated in M.J. Gordon and L.I. Gould, "The Cost of Equity Capital: A Reconsideration," Journal of Finance (June 1978), pp. 849-861.

5 The assumptions common to the MM and Gordon-Gould models are no taxes, no transaction costs, and equal information. In addition, implicit in MM are the assumptions that a corporation's investment opportunities are independent of its history, and risk is independent of growth. For more on this see M.J. Gordon "Corporate Finance Under the MM Theorems," Financial Management (Summer 1989), pp. 19-28.

6 See J.W. Meader, "A Formula for Determining Basic Values Underlying Common Stock Prices," The Analyst Magazine of Finance, Commerce and Economics, Nov. 29, 1935 and June 27, 1940; David Durand, Bank Stock Prices and the Bank Capital Problem, New York: Occasional Paper 54, National Bureau of Economic Research, 1957.

7 See M.J. Gordon, The Investment, Financing ....., Chs. 11 and 12; and M.J. Gordon, The Cost of Capital to a Public Utility, East Lansing, MI, Michigan State University, 1974.

8 The various models experimented with other risk variables than those in Eq. (4). Their performance is not discussed, since the best combination and measurement of risk variables is beyond our purpose here.

9 See M.H. Miller and F. Modigliani, "Some Estimates of the Cost of Capital to the Electric Utility Industry, 1954-1957," American Economic Review (June 1966), pp. 333-391.

10 See the comments on their paper by Jean Crockett and Irwin Friend, M.J. Gordon, and A.A. Robichek, J.G. McDonald and

R.C. Higgins and their reply in the American Economic Review (December 1967), pp. 1258-1299.

11 See B.G. Malkiel and J.G. Cragg, "Expectations and the Structure of Share Prices," American Economic Review (September 1970), pp. 601-617.

12 For instance, with annual data they were compelled to assume that over or under-priced shares at a one point in time predict the change in price over the coming year, whereas the over or under-pricing may be eliminated over a shorter time period.

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GORDON MODEL

$$P = \frac{D}{K-G} = \frac{(1-B)Y}{K-BR}$$

P = SHARE PRICE

D = DIVIDEND PER SHARE

K = RETURN ON SHARE INVESTORS REQUIRE

G = EXPECTED GROWTH RATE IN DIVIDEND AND PRICE

Y = EARNINGS PER SHARE

B = FEACTION OF EARNINGS RETAINED

R = RATE OF RETURN ON INVESTMENT

MM MODEL

$$P = \frac{Y}{K} + \frac{YQ(R-K)}{K(K-QR)}$$

P = SHARE PRICE

Y = EARNINGS PER SHARE

K = RETURN ON SHARE INVESTORS REQUIRE

Q = EQUITY INVESTMENT/EARNINGS

R = RATE OF RETURN ON INVESTMENT

COMPARISON OF MM AND GORDON

EARNINGS VS DIVIDENDS

MM - INVESTOR BUYS EARNINGS

GORDON - INVESTOR BUYS DIVIDENDS

RISK AND REQUIRED RETURN

MM - THEY ARE INDEPENDENT OF GROWTH

GORDON - THEY INCREASE WITH GROWTH

RETURN ON INVESTMENT

MM - INDEPENDENT OF FIRM'S HISTORY

GORDON - DEPEND ON FIRM'S HISTORY

EMPIRICAL MODELS

GORDON

$$P = AO \cdot D^{A1} \cdot (1+G)^{A2} \cdot (1+LEV)^{A3} \cdot \cdot \cdot$$

$$LNP = LN\ AO + A1 \cdot LN\ D + A2 \cdot LN(1+G) + A3 \cdot LN\ (1+LEV) + \cdot \cdot \cdot$$

MALKIEL CRAGG

$$P/Y = A\ O + A1 \cdot G + A2 \cdot (D/Y) + A3 \cdot BETA + \cdot \cdot \cdot$$

P = PRICE D = DIVIDEND

Y = EARNINGS G = GROWTH

LEV = LEVERAGE BETA = RISK

AN INTRINSIC VALUE MODEL

$$P = AO \cdot Y^{A1} \cdot (1+G)^{A2} \cdot (1+D/Y)^{A3} \cdot (1+LEV)^{A4} \cdot BETA^{A5} \cdot \cdot \cdot$$

$$LPN = LN\ AO + A1 \cdot LN\ Y + A2 \cdot LN(1+G) + A3 \cdot LN\ (1+D/Y) + A4 \cdot LN(1+LEV) + A5 \cdot LN\ BETA + \cdot \cdot \cdot \cdot$$

BENEFITS FROM IBES TAPE

1. BETTER ESTIMATES OF MODEL'S PARAMETERS
   SECURITY ANALYST DATA FOR Y AND G
   MONTHLY REVISION OF PARAMETERS

2. DISCOVERY OF MISPRICED STOCKS ON
   BASIS OF CONSENSUS DATA MONTHLY

3. PRICE IMPLICATIONS OF PRIVATE
   INFORMATION CONTINUOUS ON BASIS
   OF CURRENT DATA

Expectations and the Structure of Share Prices

John G. Cragg and
Burton G. Malkiel

The University of Chicago Press

Chicago and London

4 Empirical Connection of the Growth Forecasts with Share-Valuation Models

We suggested in chapter 3 that a relationship should exist between the earnings growth expectations we have collected and the market values of the corresponding shares. The present chapter reports on our empirical investigation of this relationship. This investigation may be regarded in one of two ways. Assuming that growth-rate expectations are a major input used by investors to form expected security returns, our empirical work tests the validity of the valuation models. Conversely, if we maintain the validity of the valuation models, we may be regarded as testing the hypothesis that earnings growth expectations do play a major role, along with the other specified variables, in investors' evaluations of expected security returns.

We begin by investigating the expected rate of return measure suggested by equation (3.3-14) and obtained by using the averages of the long-term expected growth rates. We are particularly concerned with whether the relationship between expected return and the systematic risk variables represented by various regression coefficients holds when expected return is measured with our analysts' forecasts. First, in section 4.1 we specify more precisely exactly what measures of risk will be employed. Next, in section 4.2, we examine the prima facie evidence in favor of hypotheses suggested by the diversification model. Section 4.3 then adopts a more structural approach, which takes into account some econometric problems that were discussed in section 3.4. We switch in section 4.4 to the alternative specification (3.3-15), which we suggested might also give a good representation of the model. This price-earnings ratio formulation allows us to enquire whether other growth forecasts might give a closer explanation of valuation relationships than the expectations data we collected. Failure to find such improvement allows us to conclude that our growth measures are closest to the actual expectations that enter market valuation.

Having a model for prices also allows us to investigate whether knowledge of the model and access to the expectations data would have allowed superior stock selection. The fact that they would not comes as no surprise, but the reasons are of considerable interest. These are the subject of section 4.5. The various findings of these investigations are summarized in section 4.6.

4.1 The Risk Measures Used

It is not clear from the diversification model exactly what measures of risk would be most appropriate. We did provide, in section 3.4, a theoretical justification for the general approach that we shall take. Nevertheless, some empirical investigation is needed before we can ascertain what specific measures are most appropriate: that is, we need to select the exact form of the regression equation whose estimated coefficients will stand for the factor coefficients. We begin by exploring relationships between security returns and some economic variables that are of interest whatever valuation model is appropriate. Once we have established the variables to be used, we proceed to explore the valuation relationships suggested by the theory.

The first set of variables employed are measures of so-called market risk derived from the regressions of the realized rates of return on various market-wide variables.[1] We experimented with several market indicators including the Standard & Poor's 500 Stock Index, the Dow Jones Industrial Average (of 30 stocks), and the (value) weighted and unweighted indexes made available by the University of Chicago's Center for Research in Security Prices (CRSP). The realized rates of return were obtained from the CRSP. Our results turned out not to be sensitive to use of the alternative market indexes, so we report here only the results for the CRSP weighted index. This index tended to give results as strong as any in terms of r^2 for the regressions of company returns on the index and provided coefficients which were marginally stronger for the subsequent simple regressions reported in section 4.2.

Correlation with other types of variables may also yield needed risk measures whether the extended CAPM (involving nonmarketable income streams) or the diversification model is assumed. We selected three such additional variables. They are the rate of change of National Income (NI), the short-term interest rate measured by the ninety-day Treasury Bill rate, and the rate of inflation measured by the increase of the Consumer Price Index.[2] These may be considered typical measures of

1. These are the "beta" coefficients often calculated allegedly to give content to the CAPM.

2. We used alternatively the rate of change of GNP as opposed to NI; the long rate as opposed to the short; and the GNP deflator as opposed to the CPI. The alternative series were so highly correlated that it made little difference which we employed.

some risks to which investors are subject, stemming from variation in other sources of income, from changes in interest rates, and from changes in inflation.

The period over which the regression coefficients should be calculated is not clear a priori. It is not even clear that only past values should be used. The theory involves the covariances of returns with various quantities in the future. These parameters could safely be estimated from past data if they did not change or if investors did not perceive change. Such stability is unlikely. Changes in the nature and type of activities that corporations pursue and alterations in the structure of the economy make it likely that the appropriate regression coefficients change through time. Insofar as investors can perceive and even anticipate these changes, they are unlikely simply to extrapolate past betas into the future. Indeed, many of the popular "beta services" in the financial community explicitly adjust the betas calculated from past data, on the basis of changes that are known to have occurred in the structure of the business. Thus, in calculating the relevant betas at any time, it might be sensible to use values estimated with data following the time at which the valuation took place. Fortunately, our expectations data are not based on calculations using the realizations over the forecast period so we do not have to worry about spurious correlations being found between the expected return and these future values.

We adopted a compromise approach after some experimentation. The regression coefficients are calculated using quarterly observations over ten-year periods. The periods used covered the three years prior to the valuation date and the seven years following it. The results reported in the next section are not very sensitive to variations in the details of this procedure. Almost the same results were obtained, for example, when we took five years before and after the valuation date. Nevertheless, we did find that use of data entirely from past periods gave less satisfactory results than those obtained by including some future data. Extending the estimation period into the future improved the values of r^2 and was particularly important for obtaining some precision in evaluating the effect of inflation.

We also tried monthly rather than quarterly observations and shorter time periods over which to make the calculations of covariances with the market index. Again we found that the results improved when future data were included in the calculations, i.e., when some foresight regarding the future was assumed. However, the use of the shorter period made no substantial difference to the results. Since it is desirable to calculate all the regression coefficients over the same period so that the variance-covariance matrices of these estimates can be easily obtained for use in testing certain hypotheses, and since National Income is available only quarterly, we pursued the quarterly calculations.

4.2 Association of Expected Return and Risk

4.2.1 Strength of Individual Measures

The first question we investigate is the relationship between expected return and each of the various risk measures. The critical questions are whether the regression coefficients specified in the previous section are related to expected return and whether other types of risk measures (not suggested by the CAPM) are more important.

The expected return variable we use is suggested by equation (3.3-14). Let $\bar{g}_{jt}$ be the average of the long-term predicted (percentage) rates of growth available for company j at time t, D_{jt-1} be the dividends expected to be paid per share in the course of the next year (as estimated by the predictor which furnished data in all years), and P_{jt} be the end-of-year closing price (ex dividend where appropriate) for the shares of company j. Then the expected percentage rate of return, $\bar{\rho}_{jt}$, is calculated as

$$\bar{\rho}_{jt} = \bar{g}_{jt} + 100(D_{jt-1}/P_{jt}). \tag{4.2-1}$$

Simple regressions of this expected return measure on the various risk proxies are summarized in table 4.1. The sort of cross-sectional data we are using makes us vulnerable to heteroscedasticity, which can produce some seriously misleading results from our data if the problem is ignored. To avoid the difficulties produced by heteroscedasticity, we calculated the standard errors of the coefficients in the way advocated by White (1980) that allows for any heteroscedasticity that may be present. We report in table 4.1 the asymptotic t-values for the regression coefficients calculated in this way. Because of the adjustment for heteroscedasticity, the coefficient of determination r^2 is not a monotonic transformation of these t-values. The values of r^2 did nevertheless tend to parallel the t-values.

The first risk measure is the regression coefficient of the (excess) rate of return of each security on the (excess) rate of return to the CRSP value-weighted market index. It is denoted by $\hat{\beta}_{Mj}$ and was obtained by estimating the equation

$$\pi_{jt} - \rho_t = \beta_{Mj}(\pi_{Mt} - \rho_t) + u_{jt} \tag{4.2-2}$$

for each company j over forty quarters, that is, forty values of t. Here π_{jt} is the ex post return to company j, ρ_t is the short-term (ninety-day) Treasury Bill rate taken to represent the risk-free rate of interest, and π_{Mt} is the rate of return of the CRSP index. This β_{Mj} coefficient is, of course, the measure suggested by the CAPM if one ignores the problem that the market index must provide complete coverage of marketable securities. We then proceed to estimate the equation

$$\bar{\rho}_{jt} = a_0 + a_1\hat{\beta}_{Mj} + v_{jt}. \tag{4.2-3}$$

Table 4.1 **Risk Measures and Naive Expected Return (asymptotic *t*-values adjusted for heteroscedasticity)**

A. Using Regression Coefficients

Year	$\hat{\beta}_M$	$\hat{\beta}_Y$	$\hat{\beta}_b$	$\hat{\beta}_p$
1961	4.04	2.37	−.59	−1.13
1962	2.01	1.82	.92	−.54
1963	1.74	.96	−.33	−.59
1964	2.21	.77	−1.45	−1.08
1965	1.92	1.48	−1.52	−1.40
1966	3.99	2.48	−4.04	−4.33
1967	3.11	2.93	−4.44	−3.83
1968	3.91	1.98	−4.27	−4.02

B. Using Variance Measures

Year	s_g^2	s_g	s_e	s_r^2
1961	1.90	.99	2.89	1.68
1962	3.63	3.63	1.56	−.32
1963	2.39	2.09	.52	1.51
1964	6.47	2.42	.83	−3.14
1965	4.76	3.30	1.21	−.91
1966	2.21	2.76	1.60	
1967	2.82	3.91	1.35	
1968	8.21	6.98	2.68	

$\hat{\beta}_M$ = coefficient of the CRSP value weighted index.
$\hat{\beta}_Y$ = coefficient of the rate of change of National Income.
$\hat{\beta}_b$ = coefficient of the Treasury Bill rate.
$\hat{\beta}_p$ = coefficient of the rate of change of prices.
s_g^2 = variance of the long-term growth predictions.
s_g = standard deviations of the long-term growth predictions.
s_e = standard error of regression of return on four variables.
s_r^2 = variance of the short-term growth predictions.

This equation is estimated separately for each year t on the basis of all companies j for which we had data in that year. The resulting t-values for a_1 appear in table 4.1.

The t-values obtained from estimating equation (4.2-3) are positive and usually significant. The strength of the association is not great, however: the value of r^2 corresponding to the highest t-value is only 0.16. The weakness of these associations could arise from the particular market index and periods used. However, as noted above, the results did not vary substantially if alternative indexes were used in place of the CRSP weighted index, and seemed more apt to be weaker than stronger. They also were not substantially changed by using the coefficient obtained by regressing individual returns on the market return rather than using excess returns in each case. Moreover, the results were not very sensitive

to changing the period over which the coefficients were estimated, provided that at least some observations following the date at which the growth forecasts were made were included.

Although the regression coefficients with the CRSP index give significant results, strong t-values (and coefficients of determination) are sometimes obtained from using the regression coefficients of the securities' returns on the rate of change of National Income, indicated by $\hat{\beta}_Y$ in table 4.1, in place of $\hat{\beta}_M$ in estimating equation (4.2-3). These t-values are not, however, as strong as those for the coefficient of the CRSP index.

Our next risk measures come from estimating the regression of each security's rate of return on the rate of inflation ($\hat{\beta}_p$) and on the Treasury Bill rate ($\hat{\beta}_r$). Systematic relationships between security returns and inflation and interest rates are consistent with the wider specification of returns being associated with a variety of factors, as we argued in chapter 3. Table 4.1 indicates that these alternative risk measures do not do as well as the standard $\hat{\beta}_M$ measure during the early years. They do, however, tend to have a much stronger influence later in the 1960s when inflation rates and interest rates begin to soar. The signs of β_r and β_p can be expected to be negative if they do not also stand as proxies for other risk measures. A higher value of β_p indicates that a stock provides a better inflation hedge, which is a desirable attribute. Similarly, a positive value of β_r indicates that the stock does well when interest rates rise and hence is negatively correlated with realized returns from fixed income securities.

These results clearly indicate that the various regression coefficients are indeed related to expected return. The next question is whether other types of risk measure have still closer associations. Part B of table 4.1 summarizes the results obtained by using various variance measures for risk instead of regression coefficients.

The first of these alternative risk measures is the variance of the predictions of long-term growth, s_g^2. This quantity may possibly be interpreted as a measure of own variance and thus of specific risk. Nevertheless, the decomposition shown in equation (3.4-14) suggests that it may instead be a particularly good expectational proxy for systematic risk. For the years 1962 through 1965, when our sample was widest, s_g^2 gives stronger results than any of the regression risk measures. It also shows positive associations with expected rates of return in other years, which are clearly significant except in 1961.

Equation (3.4-14), which provides the basis for the possible interpretation of s_g^2 as representing systematic risk, also indicates that s_g^2 would be a quadratic rather than a linear combination of the factor coefficients γ_{jk}. This might suggest that the standard deviations of growth forecasts might be stronger measures of systematic risk than the variances. However, as the column of table 4.1 headed s_g shows, there was no reliable tendency for this to be the case.

If s_x^2 should represent specific risk rather than systematic risk, one might expect a better measure to be provided by the residual variances or standard errors of estimate of the regressions of the rates of return on the various systematic variables. Our findings do not, however, support this supposition. The standard errors from the regression of return on the four variables used to calculate the β coefficients produced weaker results than did s_x^2. They are shown in the column of table 4.1 headed s_e. The residual variances, that is, s_e^2, gave no stronger results.

The success of the variance of the long-term predictors makes one wonder whether the variance of the short-term growth predictions could also be used to provide a useful measure. This did not prove to be the case. The results, given in the final column of table 4.1, show mixed signs and are generally not significant. This risk measure quite clearly is weaker than the variance of the long-term predictions.

4.2.2 Use of Several Risk Measures

These results already have some interesting implications despite the simplistic approach used. There is, however, no reason to limit ourselves to only one risk measure. We now turn to the wider specification where in the first step the realized rate of return is regressed on all the suggested variables.[1] Before looking in the next section at the more structural aspects of this specification, we examine the prima facie case that all these variables are relevant to valuation, even though these inferences may turn out to be influenced by errors-in-variables difficulties.

The coefficients were obtained from the multiple regression of the rate of return of each security on the CRSP value-weighted index (M), on the rate of change of National Income (DY), on the Treasury Bill rate (r), and on the rate of inflation (DP). The equation fitted for each company is

$$\pi_{jt} = \delta_{0j} + \delta_{Mj}M_t + \delta_{Yj}DY_t + \delta_{rj}r_t + \delta_{pj}DP_t + u_{jt}. \tag{4.2-4}$$

and the estimated regression coefficient $\hat{\delta}_{ij}$ serves as risk measures. The cross-section specification for $\bar{\rho}_{jt}$ is expanded from (4.2-3) to

$$\bar{\rho}_{jt} = a_0 + a_1\hat{\delta}_{Mj} + a_2\hat{\delta}_{Yj} + a_3\hat{\delta}_{rj} + a_4\hat{\delta}_{pj}. \tag{4.2-5}$$

Estimates of this equation are given in table 4.2.

A number of findings indicated by table 4.2 are worth emphasizing. Of most importance, each type of coefficient is significant in some years. In the first part of the period only the market coefficient is significant. However, toward the end of the period other coefficients tend to be important, especially those measuring systematic relationships with inflation and interest rates. When these results are taken at face value, two

3. These are the regressions from which the standard errors of estimate referred to in table 4.1 were obtained.

Table 4.2 Regression Estimates for Extended Model for the Expected Rate of Return (asymptotic t-ratios adjusted for heteroscedasticity)

Year	Constant	$\hat{\delta}_w$	$\hat{\delta}_y$	$\hat{\delta}_r$	$\hat{\delta}_p$	R^2
1961	7.01	1.58	.23	−.02	−.03	.15
	(12.75)	(2.78)	(1.47)	(−.73)	(−.59)	
1962	7.82	1.19	.20	.02	−.02	.10
	(10.82)	(1.59)	(1.61)	(.54)	(−.29)	
1963	6.94	1.63	.05	−.03	−.01	.07
	(14.85)	(3.04)	(.44)	(−.46)	(−.12)	
1964	6.00	2.58	−.06	−.08	−.06	.12
	(10.22)	(3.80)	(−.74)	(−1.27)	(−.68)	
1965	8.31	.79	.11	−.07	−.10	.07
	(18.31)	(1.57)	(1.14)	(−1.25)	(−1.04)	
1966	9.85	.90	.17	−.09	−.19	.19
	(21.18)	(2.11)	(1.92)	(−3.25)	(−3.60)	
1967	9.82	1.26	.25	−.15	−.30	.26
	(17.46)	(2.11)	(2.55)	(−4.19)	(−3.67)	
1968	8.83	3.98	.42	−.24	−.52	.28
	(11.70)	(4.69)	(3.28)	(−4.19)	(−3.77)	

explanations for them come to mind. First, in the more stable early part of the period, estimates of the δ coefficients may be sufficiently imprecise that in the subsequent estimation of equation (4.2-5) the relatively greater errors of measurement lead to lack of significance. Second, investors may have become more concerned about the other sources of risk, such as inflation and interest-rate instability, as the decade proceeded.[4] Overall, the results suggest strongly that all influences play a role, though it is an open question whether this is because they act as proxies for other variables.

The signs of the coefficients tend to be the same across the different equations. Although with errors in variables we must be cautious in attaching much importance to the signs of particular coefficients, the patterns obtained do usually conform to the signs suggested by intuition. Positive association with either the market return or income raises the expected rate of return. Correspondingly, positive partial correlation with the rate of inflation, indicating that the stock tends to act as a hedge against inflation, lowers the expected rate of return. Finally, the coefficient for the Treasury Bill rate usually has the expected negative sign. There is, however, a good deal of correlation across securities (roughly about 0.6) between the coefficients for the Treasury Bill rate and for the rate of inflation so that one may be partly serving as an additional proxy for the other. This correlation is sufficiently low, however, that one cannot legitimately presume that variations in the rate of change of prices and in the short-term rate of interest necessarily represent the same

4. Inflation, as measured by the annual rate of change in the Consumer Price Index, remained below the 2 percent level through 1965. Later in the decade, inflation increased to the 6 percent level.

variable. Except for this fairly mild correlation, multicollinearity problems are small, making it less plausible that all the different measures serve as proxies for some single variable.

Inclusion of all these different regression coefficients does not account for the strength we found earlier for the variance of the predictions. When that variable was included in (4.2-5) along with the four $\hat{\delta}$ variables measuring various systematic risks, it usually was highly significant with a positive coefficient. The a coefficients for the four $\hat{\delta}$ variables tended to retain the same signs, though with lessened significance. The apparent importance of s_g^2 may in part result from errors-in-variables problems or misspecification. Nevertheless, it may also indicate that s_g^2 is a particularly useful expectational proxy for several of the systematic risk measures. What is important is that the values of R^2 are sufficiently high and so very highly significant that there is no question about there being some underlying systematic association among the variables included in the specification.

4.3 Structural Relations between Expected Return and Risk Coefficients

The results reported in the previous section may arise because the market actually takes a multifaceted approach to risk. In contrast, they may simply be the outcome of using poor data. To investigate this question, we proceed in two stages. First, we examine the extent to which our risk coefficients exhibit the linear structure that we indicated in section 3.4 would be found if there were fewer factors than the number of independent variables used in the regressions in which the $\hat{\delta}_j$ coefficients were calculated. Establishment of the number of factor coefficients is also needed in order to proceed to take account of the errors of estimation of the $\hat{\delta}$ coefficients. The second stage involves estimating the valuation model allowing for the presence of these errors.

4.3.1 The Number of Factor Coefficients

We showed in equation (3.4-12) that the variance-covariance matrix of the regression coefficients has a particular structure under the common-factor model for rates of return. Let $\bar{\delta}$ be the average of the $\hat{\delta}_j$ vectors, and let $\bar{\alpha}$ be the average of the α_j vectors whose elements α_{jk} are the coefficients of the common K factors in the (true) rate-of-return equation (3.2-16). Letting $\bar{h} = \sum_{j=1}^{J} h_j/J$, where h_j is the residual variance, we can rewrite equation (3.4-12) as

$$V = E\left[\sum_{j=1}^{J} (\hat{\delta}_j - \bar{\delta})(\hat{\delta}_j - \bar{\delta})'/J\right] \tag{4.3-1}$$

$$= \Xi'\left[\sum_{j=1}^{J} (\alpha_j - \bar{\alpha})(\alpha_j - \bar{\alpha})'/J\right]\Xi + \bar{h}(X'X)^{-1}.$$

Table 4.3 Significance Levels for the Hypothesis That More Than Specified Numbers of Factors Are Present in the Regression Coefficients

	Number of Factors			
Years	0	1	2	3
1959–68	.000	.816	.594	.174
1960–69	.000	.134	.266	.126
1961–70	.000	.890	.784	.303
1962–71	.000	.935	.839	.951
1963–72	.000	.767	.789	.305
1964–73	.000	.001	.059	.694
1965–74	.000	.068	.196	.992
1966–75	.000	.005	.065	.398
1967–76	.000	.006	.053	.317

Since $(X'X)$, the cross-product matrix of the variables used to estimate the coefficients, is known,[5] we can investigate the hypothesis that this common-factor structure does apply[6] to the variance-covariance matrix of the estimated coefficients calculated for the different companies. Assuming that the coefficients are normally distributed across companies, we performed likelihood-ratio tests of a variety of hypotheses. In doing so we used the value of $\bar{h}$, the average of the estimates coming from the estimates of the individual regressions, rather than jointly estimating this parameter in the factor analysis. No substantial differences in results occur when instead $\bar{h}$ is estimated from the $\hat{\delta}$ data.

The regression coefficients used for different years are far from being independent, since thirty-six of the quarterly observations are the same in regressions for adjacent years. Nevertheless, the patterns that occur over time are of interest. When we tested the hypothesis that there are less than four factors represented by the four regression coefficients, the data strongly supported the hypothesis that there are fewer factors. These tests are summarized in table 4.3 in terms of the smallest significance levels at which one could reject the (null) hypothesis of only zero, one, two, and three factors over the alternative hypothesis of at least four different factors being present.[7]

The hypothesis of only one factor is very strongly indicated in the early part of the period. However, when observations from the 1970s begin to

5. Of course, when the $\hat{\delta}$ vector being investigated does not contain the constant term, the appropriate row and column are first removed from $(X'X)^{-1}$.

6. Specifically, the procedure involves the principal components of $\Sigma_{i=1}^{J}(\hat{\delta}_i - \bar{\delta})(\hat{\delta}_i - \bar{\delta})'/J$ in the metric of $(X'X)^{-1}$. See Anderson and Rubin (1956) for a discussion of maximum likelihood estimates of the model. The fact that $\bar{h}(X'X)^{-1}$ is known makes more factors identifiable than would usually be the case.

7. Qualitatively similar results are obtained when we test three versus four factors, two versus three, etc.

play an important part, the data indicate that at least two factors are present and would reject at the 0.10 level the hypothesis of two factors in favor of three factors for some of the estimations.

The reason for the success of a one common-factor model in the early estimates was not that the correlations of different quantities, which themselves all varied significantly, could be fully attributed to a single factor. Rather, it was the case that some of the estimated coefficients varied so little across companies, relative to their errors of estimation, that both the variances across companies of their true values, δ_{jk}, and their correlations with other coefficients could be treated as zero.

This problem is illustrated by the data from the 1960s shown in table 4.4. There we present the matrices

$$\sum_{j=1}^{J} (\dot{\delta}_j - \bar{\delta})(\dot{\delta}_j - \bar{\delta})'/J$$

and

$$\left[\sum_{j=1}^{J} (\dot{\delta}_j - \bar{\delta})(\dot{\delta}_j - \bar{\delta})'/J - \bar{h}(X'X)^{-1}\right].$$

All the variances of the $\dot{\delta}_r$ and $\dot{\delta}_p$ coefficients can be attributed to estimation errors, and the hypothesis that the variance across companies in the true coefficients was zero could not be rejected. Indeed, all the variance can be so attributed for $\dot{\delta}_p$, the coefficients of inflation. Later, as interest rates and inflation rates themselves showed more variation, this ceased to be the case and all coefficients showed variation across companies significant beyond the 0.05 level. As noted earlier, while short-term interest rates and inflation may primarily reflect the same factor (as might be the case if the real rate of interest is constant), the magnitude of measurement errors in each variable must then be very substantial since collinearity problems in the data were mild and do not clearly account for the

Table 4.4 **Covariance Matrices of the Regression Coefficients Fitted for 1960–69**

	$\dot{\delta}_w$	$\dot{\delta}_y$	$\dot{\delta}_r$	$\dot{\delta}_p$
A. Unadjusted				
$\dot{\delta}_w$	.09			
$\dot{\delta}_y$	.17	4.46		
$\dot{\delta}_r$	.47	−3.78	58.9	
$\dot{\delta}_p$	−.03	1.27	−22.9	19.3
B. After Subtraction of Estimation Error				
$\dot{\delta}_w$	.05			
$\dot{\delta}_y$	.13	1.08		
$\dot{\delta}_r$	.61	1.63	5.13	
$\dot{\delta}_p$	−.25	−1.21	4.73	−4.25

difficulties. Furthermore, the results about the number of factors were repeated when we dropped the interest-rate variable from the original regressions. The 1964–73 period and later ones indicated the presence of at least two and possibly three factors. Prior to that period, the variance-covariance matrices suggest only a single factor.

Earlier investigations of the appropriateness of the common-factor model to security returns suggested that several factors would be found. King (1966) as well as Roll and Ross (1980) each found support for such a hypothesis. Hence one may suspect that our results for the early years reflect the peculiarities of the data on some of the independent variables in that period.

These tests have involved the variance-covariance matrices of the regression coefficients. This was appropriate in view of our desire to use the adjusted matrices subsequently in estimation where it is necessary to avoid using singular matrices. However, the original hypothesis applies also to the averages (across companies) of the coefficients, that is, to

$$E\left[\sum_{j=1}^{J} \hat{\delta}_j\hat{\delta}_j'/J - \bar{h}(X'X)^{-1}\right].$$

When we investigated the number of factors, recognizing that the means of the regression coefficients should have the same factor structure, we found evidence for two factors rather than only one in the early years. That is, the hypothesis of only one factor can be rejected well beyond the 0.05 level, but not that of there being only two factors. The results for the later years did not change appreciably. We can still conclude that there are certainly two, and possibly three, common factors.

4.3.2 Results Allowing for Estimation Error

The previous findings about the number of factor coefficients present in the rate of return regressions pose a dilemma for the next part of our investigation. We suspect that the reason for finding only one factor in the early years is that the other factors happened to have very little variation in the 1960s. However, if the risk was still present that they would vary, then their coefficients should still enter the valuation equation. Using a one-factor model would then involve misspecification. Testing the hypothesis that more than one factor is actually present does require that the data clearly involve more than one factor. A procedure developed in Cragg (1982) that allows for estimation errors in $\hat{\delta}$ involves the use of

$$\left[\sum_{j=1}^{J} (\hat{\delta}_j - \bar{\delta})(\hat{\delta}_j - \bar{\delta})'/J - h(X'X)^{-1}\right]^{-1}.$$

The procedure makes sense only if the matrix is clearly positive definite. When this is the case, we can allow for the estimation error to see what inferences stand up even when its effects are recognized. In doing so, we

shall use the simplification, discussed in Cragg (1982), in which the u_{jt} of equation (4.2-4) are assumed to be normally distributed.

We resolve the dilemma posed by our findings about the structure of the δ_j coefficients by fitting two types of model, allowing in each case for the estimation errors of the regression coefficients. First, we estimate the equations for the expected rate of return using only the regression coefficient for the market and the variance of the long-term predictors; i.e., we fit the equation

$$\bar{\rho}_{jt} = a_0 + a_1\beta_{Mj} + a_2 s_{gj}^2. \tag{4.3-2}$$

Here, the β_{Mj} are based on the three years before and the seven years after the valuation. Second, we use the coefficients for the 1966–75 period, estimated without the interest-rate variable; that is, we estimate

$$\bar{\rho}_{jt} = b_0 + b_1\gamma_{Mj} + b_2\gamma_{Yj} + b_3\gamma_{pj} + b_4 s_{gj}^2, \tag{4.3-3}$$

where the γ_j are calculated from the regression

$$\pi_{jt} = \gamma_{0j} + \gamma_{Mj}\pi_M + \gamma_{Yj}DY + \gamma_{pj}DP + v_{jt} \tag{4.3-4}$$

for the period 1966–75. As we noted, there γ coefficients do support (though not strongly) the conclusion that a three-factor model is appropriate.

The first approach does little to resolve the puzzle. In the early part of the period, β_M was not significant while s_g^2 was always stronger and usually significant. For 1966 and subsequent years, when the number of predictors available on which to base s_g^2 becomes small, β_M is highly significant, and positive, as is s_g^2 in the last two years. These results suggest that s_g^2 is not simply another proxy for the systematic risk measured with considerable estimation error by β_M. Instead, it suggests that a model with two or more factors is appropriate—or that there is another relevant risk concept proxied by s_g^2.

The results of the second approach shed quite a bit more light on the matter. When adjustment was made for errors in variables and allowance was made for heteroscedasticity, it usually turned out that none of the coefficients was significantly different from zero. At best, but one would be, and then only just at the 0.05 level. This was true whether s_g^2 was included or not. Overall, however, when s_g^2 was included in the equation, the hypothesis that all γ_j parameters had zero coefficients in equation (4.3-3) could be rejected beyond the 0.01 level, except in 1963 and 1965. When s_g^2 was not included, the hypothesis could sometimes be rejected at the 0.10 level and sometimes not.

Part of the difficulty stems from multicollinearity. As lack of certainty about the number of underlying factors indicated, the "corrected" $\hat{\gamma}_j$ coefficients are correlated with each other. Moreover, there is some correlation with s_g^2, though it is small. The technique used involves much

more complicated standard errors than ordinary regression, and for a given covariance matrix of explanatory variables these standard errors are considerably larger. More coherent results were obtained when the γ_Y coefficient for National Income was eliminated from (4.3-3). A pattern then emerged in which the coefficient of inflation and the variance of the predictors were significant, but the coefficient for the market index was not. Eliminating this coefficient as well as the one for national income then produced the results shown in table 4.5.

The results shown in table 4.5 are similar in nature for the different years. The risk variable s_g^2 has a positive and usually significant effect. The notable change in its magnitude in 1966 corresponds to the change in the number of predictors from which the forecast data were collected. The sensitivity of the security's rate of return to the rate of inflation as measured by γ_p had a negative effect as we would expect.

These results suggest that at least two factors are relevant in valuation. One may be equated broadly to inflation and its associated effects. The other, possibly representing market risk, seems to be better represented by the variance of the predictions of long-term growth than by any of the regression coefficients. Its exact nature therefore remains a bit of a puzzle. The first factor has a negative sign and is usually significant at the 0.10 level. This was true even in the early years when the experienced variations in the inflation rate were very small. The second factor is very strongly positive and highly significant.

Table 4.5 Equation for Expected Rates of Return Allowing for Estimation Error in γ_i (asymptotic t-values adjusted for heteroscedasticity)

Year	Constant	γ_p	s_g^2	$\bar{\rho}^2$*	r_e†
1961	9.26	−1.13	.63	.56	—
	(12.62)	(−1.72)	(6.30)		
1962	8.40	−.46	.67	.38	.88
	(30.87)	(−1.70)	(4.96)		
1963	8.18	−.61	.72	.34	.89
	(32.30)	(−1.58)	(2.98)		
1964	8.55	−.74	.63	.54	.84
	(21.17)	(−1.92)	(18.77)		
1965	9.01	−.74	.62	.61	.90
	(24.20)	(−1.99)	(29.39)		
1966	10.72	−.20	.05	.08	.68
	(28.48)	(−.73)	(1.48)		
1967	11.35	−.53	.03	.25	.67
	(24.88)	(−1.65)	(2.05)		
1968	11.93	−.75	.05	.70	.48
	(17.74)	(−1.82)	(7.44)		

*$\bar{\rho}^2$ is 1 − (estimated residual variance)/(variance of ρ_m).

†r_e is correlation of residuals with previous year's residuals.

These results have been corrected for the errors of measurement in the regression coefficients, but errors in s_g^2 have been ignored. The interpretation we have been giving to that variable means that we cannot calculate the variance of errors in its measurement by assuming that it is simply the sampling variance of predictions which all have the same mean for each firm. We did, however, attempt to deal with this measurement error by the use of instrumental variables while continuing to allow for the estimation errors in the regression coefficients. To do so, we used as instruments the regression coefficients γ_M and γ_Y and the residual variances $s_{e_t}^2$, whose usefulness we explored earlier, in table 4.1.

The main difficulty with the instrumental-variable approach in this case was that the proposed instruments are not closely associated with s_g^2. The value of R^2 obtained from regressing s_g^2 on all the instruments and γ_ρ varied from 0.05 to 0.31. The main effect of this weakness on the estimates of the equations for expected return was to reduce the standard errors of the coefficients of s_g^2 sharply. These findings strengthen the impression that s_g^2 contains relevant information about risk not readily available in other forms. However, the significance levels of γ_ρ were not affected by the use of instrumental variables, and the results were qualitatively much the same as those shown in table 4.5 in terms of the signs and magnitudes of the coefficients.

4.3.3 Constancy over Time

One of the interesting questions about valuation equations is whether the coefficients remain the same each year or whether they change. There is nothing in the valuation theory to suggest that they should be constant. The opportunity sets faced by investors, extending beyond simply the financial securities available to them, probably change and so may their preferences and concerns about various types of risk. The results of tables 4.2 and 4.5 give an impression of considerable variation. We now test for variability explicitly.

The residuals from the equations shown in table 4.5 for different years are correlated even after allowance is made for the effects of estimation errors of $\hat{\gamma}_\rho$. Problems of missing observations mean that we can simultaneously calculate the equations for a common set of companies in all years only at the expense of losing a large number of companies. Pairwise comparisons indicated that the residuals for adjacent years are quite highly correlated. The correlations of these residuals are recorded in table 4.5 in the column headed r_ϵ. It gives the correlations of the residuals in one year with those of the year immediately preceding. The quantities tabulated are the correlations of residuals using a common set of companies to estimate the regression coefficients in the two years. The exact values of the coefficients used differ slightly from those shown in table 4.5 because of the reduced number of observations used in their calculation.

The correlations of residuals, which are highly significant, complicate the problem of inquiring into the stability of the regression coefficients over time. Zellner's (1962) "seemingly unrelated regression technique" can be adapted in a straightforward way to the estimation of our equations even when allowing for estimation error of the original regression coefficients as well as for heteroscedasticity. To avoid the extensive loss of observations involved when all equations are fitted simultaneously, only pairs of equations were fitted.

Pairwise estimation of the equations usually produced significant differences in the coefficients of the valuation equation for different years. The main exceptions, where rejection did not occur even at the 0.10 level, are the 1964–65 comparison and the 1962–63 one. The coefficient for 1963 did differ from that for 1964 significantly at the 0.01 level even though the values shown in table 4.5 indicate the same qualitative findings in the sense that the coefficients are of similar magnitude.

The different estimation procedure used in these tests, which involve estimating the coefficients of each of two years jointly, did not change the conclusions about risk that were derived from our regressions in section 4.3.2 for the individual years. Indeed, these estimates indicated stronger support than the ones in table 4.5 for the hypothesis that two types of risk measures are indicated by the data.

4.3.4 Average Realized Return and Risk

The constant term $\hat{\delta}_{0t}$ obtained when equation (4.2-4) was fitted to obtain the other $\hat{\delta}$ coefficient contains implicitly another estimate of the expected rate of return. It is the average rate of return realized over the period, which many empirical studies of valuation presume corresponds to the return expected *ex ante* by investors. We can use this estimate to investigate the *ex post* validity of the APT, or diversification model, which suggests that we should find the same number of factors in the $\hat{\delta}_t$ vector when $\hat{\delta}_{0t}$ is included as when it is not. This consideration induces us to repeat the investigations carried out in section 4.3.1 with the other coefficients, but now including the constant $\hat{\delta}_{0t}$ as well.[8]

The estimates for the earlier periods included in our investigation tend to confirm the model fully in the sense that exactly the same number of factors is significantly present in the covariance matrix including the constant as we found when only the regression coefficients were used. This support for the model is less than might appear to be the case, however. As was the case for some of the coefficients, significant variation across companies was not present in the average rates of return in the

8. All independent variables are measured as deviations from their averages, so the constant term is also the average quarterly rate of return in the period over which the regression coefficients are calculated.

early years. In the final two years, the wider covariance matrix indicated that at least five factors were needed to account for the covariances of the constants with the other coefficients.

With the companies altering their natures over time and with the market valuation of risk quite possibly changing substantially over the decade of the seventies, such a finding should not be surprising even if the common-factor model is a correct description of security returns. However, it does not seem feasible to use these "objective," *ex post* measures of returns to obtain comparisons with the very successful results obtained from the *ex ante* measures we have employed. These estimated average *ex post* returns are not closely correlated with the *ex ante* measures derived from using the long-term growth predictions. The strong and interesting results we have obtained with these *ex ante* measures of expected returns and the fact that the *ex post* ones are not closely related to them emphasize the importance of using genuinely *ex ante* expectations of returns for studying security valuation.

4.4 An Alternative Valuation Specification

The derivation of the valuation model in chapter 3 suggested that the expected return formulation we have been investigating is only one approximation to the underlying model and that an alternative model may also be usefully estimated. The alternative approximation produces a more traditional formulation in which the price-earnings ratio is the dependent variable and earnings (dividend) growth, the payout ratio, and our various risk measures are treated as explanatory variables. The expected return formulation is particularly convenient for focusing on the risk structure suggested by the diversification model. The alternative allows us to ask whether growth-rate expectations are more relevant for valuation than other measures. It also allows us to investigate the role of the short-term growth predictions as well as to examine again which risk measures appear to be strongest.

An empirical analysis of the price-earnings model is also desirable because of an ambiguity of interpretation of the expected return models we have been studying. The results of the return model indicate partly that predicted earnings growth is connected with the regression coefficients giving the associations of rates of return to various economic indicators. Recall, however, that we found evidence in chapter 2 that a common-factor model may fit the growth predictions of security analysts. Our findings for the expected rates of return may reflect this feature of the data, even though the expected rate of return includes the dividend yield as well as the expected growth rate. Thus it is not entirely clear that we have actually been investigating a valuation relationship.

Implementation of the alternative model involved dividing both end-

Table 4.6 Risk Measures in Stock Price Regressions (asymptotic t-values for alternative risk variables in equation (4.4-1))

Year	β_w	β_r	β_c	β_p	s_r^2
1961	−.32	1.10	1.25	.01	−.41
1962	−4.54	−.71	.59	2.58	−5.79
1963	−.33	.74	−.43	.28	−2.37
1964	−2.38	−2.76	−.88	1.65	−9.75
1965	1.43	1.32	−.70	−.43	−1.24
1966	−1.49	−.37	.14	.33	−.19
1967	1.34	.74	−2.29	−2.34	−8.67
1968	2.29	−.22	−1.41	−2.74	−1.12

of-year prices (P) and the dividends projected to be paid (D) by average normalized earnings[9] ($\overline{NE}$) to give the equation

$$P/\overline{NE} = a_0 + a_1\bar{g}_p + a_2 D/\overline{NE} + a_3 RISK. \tag{4.4-1}$$

where $RISK$ stands for the various risk variables used.

4.4.1 Risk Measures

We begin our investigation of equation (4.4-1) by treating each of the risk measures we have been using as alternatives, just as we did when considering equation (4.2-1). In these regressions, both the average expected five-year growth rate and the dividend payout ratio almost always had positive and significant coefficients throughout the sample period.

The pattern for the risk measures is more complicated than earlier. Table 4.6 corresponds to table 4.1. In these regressions, a negative sign should be expected for the risk measures based on covariance with the market index and with national income, since higher risk should, ceteris paribus, lower price-earnings multiples. Although both $\hat{\beta}$ measures have the correct negative values more often than not, the t-values indicate that they are only occasionally significant. Positive signs should be expected for the risk measures based on reported inflation and interest rates. As was found in the regressions in table 4.1, these risk measures are only significant toward the end of the period studied, but their signs are often incorrect in these valuation regressions.

These findings indicate the difficulties of using the simple regression coefficients as risk measures in a specification also containing several other variables. In contrast to these ambiguous results, the variance of

9. The "normalized" earnings were furnished by two of the forecasters and were described in chapter 1. When more than one forecaster's estimates of "normalized" earnings were available for a company, the estimates were averaged. The results are little different (but a bit poorer) if reported earnings over the most recent twelve-month period are substituted for "normalized" earnings.

Table 4.7 *P/VE* Regression Estimates of Equation (4.4-1) (asymptotic *t*-ratios adjusted for heteroscedasticity)

Year	Constant	$\bar{g}_p$	$D/\overline{VE}$	s_g^2	R^2
1961	1.88	3.91	1.22	−.57	.81
	(.64)	(7.51)	(.24)	(−.41)	
1962	3.30	2.23	8.41	−1.17	.75
	(1.75)	(16.69)	(2.91)	(−5.79)	
1963	2.85	2.70	6.71	−.59	.77
	(.94)	(11.20)	(1.75)	(−2.37)	
1964	2.53	2.15	13.16	−1.09	.77
	(1.73)	(23.94)	(6.13)	(−9.71)	
1965	1.76	2.52	4.73	−.66	.67
	(.62)	(6.98)	(1.14)	(−1.24)	
1966	.22	1.74	7.42	−.01	.57
	(.09)	(9.62)	(2.79)	(−.19)	
1967	1.88	2.35	−1.05	−.09	.69
	(.67)	(13.28)	(−.35)	(−8.67)	
1968	2.18	1.78	5.13	−.04	.52
	(.56)	(8.10)	(.99)	(−1.12)	

the predictions always has a negative sign. Its significance does vary considerably across years, primarily reflecting variation in the magnitude of its coefficient. The important point, which agrees with our previous results with the expected return measures, is that s_g^2 provided a better single risk proxy than the regression coefficients based on more objective calculations. It also provided a more significant and consistent measure than the residual variances of the regressions, s_e^2.

Table 4.7 shows the full estimates of equation (4.4-1) using s_g^2 as the risk variable. The growth-rate variable is highly significant in each of the years covered. The payout ratio has the expected sign except in one year but is usually insignificant.[10] As we have already noted, the risk variable always has the correct negative sign and is often significant.

4.4.2 Alternative Growth Measures

The extent to which using truly expectational data is important for valuation models is indicated in table 4.8. Here we show the values of R^2

10. The positive sign of the dividend coefficient should not be interpreted as evidence that dividend policy can affect the value of the shares. This coefficient indicates only that a ceteris paribus change in dividend payout will increase the price of the shares. Among the things held constant in this equation is the growth rate of earnings and dividends per share. A positive dividend coefficient thus indicates only that *given* the future growth rate in earnings and dividends, the price of a share should be higher, the higher is the current percentage of earnings that can be paid out. The famous "dividend irrelevancy" theorem of Miller and Modigliani (1961) says that an increase in dividend payout will tend to reduce the growth rate of earnings per share since new shares will now have to be sold to make up for the extra funds paid out in dividends. A positive dividend coefficient is thus in no way inconsistent with the dividend irrelevancy theorem.

Table 4.8 Values of R^2 for Alternative Specifications of the Valuation Equation

Year	Specification 1	2	3
1961	.42	.45	.81
1962	.50	.53	.75
1963	.49	.50	.77
1964	.37	.43	.77
1965	.29	.31	.67
1966	.31	.44	.57
1967	.32	.36	.69
1968	.33	.41	.52

NOTE. See text for specifications.

for various combinations of historical and expectational data. The first specification (column 2) involved regressing the price-earnings multiple on three historic figures: the past ten-year growth rate of cash earnings, the average (over the preceding seven years) historic dividend-payout rate, and β_M, estimated using only previous data. The third column substitutes the expectational variable s_g^2 for the β_M coefficient. The fourth column repeats the specification of equation (4.4-1) with s_g^2 as the risk variables, $\bar{g}_p$ and $D/\overline{NE}$ in place of historic growth and payout, and $P/\overline{NE}$ as the dependent variable in place of P/E. These r^2 values are the same as in table 4.7.

The dramatic change in the value of r^2 for the valuation equation occurs when $\bar{g}_p$ is used for the growth rate. Other variations have comparatively minor effects. There are, of course, a large number of ways of calculating past growth. Our findings hold up for the wide variety of historical growth rate we tried as well as the one reported in table 4.8. Using the average predicted growth rates substantially improves the fit of the regression. It is therefore safe to conclude that insofar as the market does value growth, the growth rates involved are far better represented by actual predictions made by security analysts than by any mechanically calculated rate.

One may wonder whether we would have done better to use only one forecaster rather than the average we have employed. Problems of missing observations again hinder this investigation. One of the advantages of using the average is that it allows us to include most of the companies in the regressions. However, it is also the case that closer fits tended to be obtained by using the average growth rates of all predictors than by employing the forecasts of any single firm. This suggests that our survey was useful in getting closer to what might be considered the expectations of a "representative" investor.

4.4.3 Role of Short-Term Predictions

In addition to the long-term growth estimates, which have played such an important role in our empirical valuation work thus far, we also collected short-term predictions for earnings in the next year. These were described and analyzed in chapters 1 and 2. Given the long-term growth rate, a stock should sell for a higher price if more of that growth is expected to be realized earlier in the period. Therefore we augmented our valuation equation (4.4-1) to include the term $\bar{E}_{t+1}/\overline{NE}$, the ratio of next year's average predicted earnings ($\bar{E}_{t+1}$) to average normalized earnings (for the present period). Equation (4.4-1) then becomes

$$P/\overline{NE} = a_0 + a_1 g_p + a_2 \bar{E}_{t+1}/\overline{NE} + a_3 D/\overline{NE} + a_4 s_g^2. \tag{4.4-2}$$

The results obtained with this specification are presented in table 4.9. The addition of a term for short-term growth does add some explanatory power to the regression, although the significant t-statistic for the coefficient of $\bar{E}_{t+1}/\overline{NE}$ comes partly at the expense of the long-term growth coefficient. The dividend and risk terms generally retain their usual signs, though they are often not significant.

4.4.4 Variations of Specification

The success of the short-term growth variable raises the question whether more generally a nonlinear specification might be appropriate. As we noted in section 3.4, the linear form of the equation is only an approximation to some more complicated true form. To investigate this

Table 4.9 $P/\overline{NE}$ Regression Estimates of Equation (4.4-2) (asymptotic t-values adjusted for heteroscedasticity)

Year	Constant	$\bar{g}_p$	$\bar{E}_{t+1}/\overline{NE}$	$D/\overline{NE}$	s_g^2	R^2
1961	−35.02	3.07	41.31	−1.58	−.71	.88
	(−4.16)	(11.94)	(4.78)	(−.35)	(−.75)	
1962	−3.36	1.99	8.57	6.96	−1.00	.75
	(−.82)	(14.05)	(2.15)	(1.97)	(−4.20)	
1963	−11.43	2.58	13.66	7.22	−.53	.81
	(−2.61)	(12.25)	(4.33)	(1.57)	(−2.16)	
1964	−7.21	2.13	8.56	13.19	−.84	.81
	(−2.46)	(18.67)	(3.90)	(5.41)	(−2.52)	
1965	−14.53	2.82	10.53	8.20	−1.09	.78
	(−1.89)	(7.12)	(1.73)	(1.82)	(.99)	
1966	−7.67	1.83	6.51	8.94	−.02	.58
	(−1.94)	(10.41)	(2.00)	(3.59)	(−.28)	
1967	−8.55	2.31	9.33	1.15	−.08	.72
	(−1.41)	(12.78)	(1.67)	(.33)	(−7.18)	
1968	−15.77	1.57	18.20	4.66	−.03	.55
	(2.54)	(6.74)	(3.12)	(.96)	(−.86)	

possibility, we used a quadratic specification for the growth and dividend-payout variables. That is, we added the squares of $\overline{g}_p$ and of $D/\overline{NE}$ and their cross-product to the specification (4.4-2).

Use of these nonlinear terms did little to improve the explanatory power of the equation, though in some instances they did have significant coefficients. Stability was found neither in which variables were significant nor in their signs. Since undoubtedly our variables have substantial measurement errors, these findings may well represent little more than the problems such errors produce.

It is not surprising in view of these findings that we sometimes found that breaking the sample into various groups produced significant differences between the groups. Thus, when the equation was run separately for low-dividend/high-growth and high-dividend/low-growth companies, (where the dividing lines are the medians of the variables), we did find some significant differences in coefficients. Similarly, fitting the equation for different industry groups produced some significant differences across industries in the coefficients (e.g., dividends were more highly valued in public utility companies). Since in each case the classifications tended to reduce the variances of the independent variables, the significant differences may arise simply from the changed importance of the variances of the measurement errors relative to the variances of the true underlying variables.

4.4.5 Measurement and Estimation Error

Allowing for errors of estimation in calculating the regression coefficients did not relieve the problems we encountered when we introduced the risk measures (based on regression coefficients) directly in estimating equation (4.4-1). Using either $\hat{\beta}_M$ or the $\hat{\gamma}$ coefficients defined in equation (4.3-4), whether alone or in conjunction with s_ε^2, produced neither stable nor significant coefficients for these variables when they were added to (4.4-2). It is far from clear that the reason for this finding was that such risk terms do not also play a role in valuation; in other words, we cannot conclude that a model with only one factor is appropriate. Instead, we may ascribe the findings, at least partially, to multicollinearity, particularly with the payout ratio. When these regression coefficients were added to the specification, the coefficient of $D/\overline{NE}$ usually became completely insignificant and it was highly correlated with the coefficients for $\hat{\beta}_M$ or for the $\hat{\gamma}_l$ coefficients. As we noted earlier, the growth variable $\overline{g}_p$ is also somewhat correlated with these risk proxies. In this connection, it is interesting to note that Rosenberg and Guy (1976) have suggested that both dividend payout and growth potential are important systematic risk variables.

Measurement errors are far from being confined to the risk variables. Clearly our growth variables are subject to error and the payout variable

also is only an approximation to what the market could perceive to be the payout rate. These errors may account for some of the problems we have encountered.

As was also the case when we sought instruments for s_g^2, finding good instruments for the growth rate and the payout variables was not easy. We have already seen that $\bar{g}_\rho$ contains useful information not available from mechanically calculated growth rates. As a result, satisfactory instruments for it are unlikely to be found. We tried using past four- and ten-year calculated growth rates as instruments for $\bar{g}_\rho$ and the lagged value of $D/\overline{NE}$ for the current value of this variable. When we used the specification (4.4-1), we also included $\bar{E}_{t-1}/\overline{NE}$ as an instrumental variable. We could also take advantage of some of the correlations of risk with growth and payout by treating $\hat{\gamma}_m$ and $\hat{\gamma}_Y$ as additional instruments when only $\hat{\gamma}_\rho$ and s_g^2 were used as risk measures.

Using instrumental variables to deal with these measurement errors did not substantially alter our findings. What we obtained were equations qualitatively similar to those shown in tables 4.7 and 4.9, but with much larger standard errors for the coefficients. This finding may be taken to indicate, at least, that errors in variables have not produced seriously misleading results in those tables. When the problems of multicollinearity of the growth and dividend variables with the risk ones were combined with the complicated variances of the coefficients that were the result of making allowance for the estimation error of the risk parameters, it is small wonder that more precise results could not be obtained about the precise specification of risk.

4.4.6 Stability over Time

We found earlier that the coefficients of the expected return model varied over time. The question of the constancy of the valuation equation is particularly interesting in the present form, where prices are the dependent variable. Stability of the coefficients is also important to those who wish to make practical use of valuation equations in connection with assigned values of the independent variables to estimate the "intrinsic worth" of a security. Furthermore, constancy of the relationship is important if a firm is to seek to follow policies that will maximize the values of its shares, since it will find it hard to please investors if their desires are changing.

An inspection of tables 4.7 and 4.9 indicates that the coefficients of our equations do change considerably from year to year, and in a manner that is consistent with the changing standards of value in vogue at the different times. We may illustrate this finding by the regression results of table 4.9. At the end of 1961, "growth stocks" were in high favor, and it is not surprising to find that the coefficient of the growth rate (3.07) is highest in this year. During 1962, however, there was a conspicuous change in the

structure of share prices that was popularly called "the revaluation of growth stocks." This revaluation is reflected in the decline of the growth-rate coefficient for 1962 to 1.99. At the same time, dividend payout became more highly valued in 1962 than it had been in 1961, the dividend coefficient rising from −1.58 to 6.96. Nineteen sixty-two was also the year when the coefficient of the risk measure was most strongly negative.

In order to test formally whether the coefficients of the valuation equation were the same over time, we again had to recognize that the residuals in different years were not independent. The correlations, which are shown in table 4.10, are somewhat smaller than those found in section 4.3 when we were investigating the expected rates of return, but they are significantly different from zero. They again raise the need to use an appropriate technique for assessing the stability of the coefficients and the problem that calculating all the equations simultaneously for a common set of companies entails the loss of a large proportion of the observations.

Using the seemingly unrelated regression technique for a pair of years, we could reject the hypothesis of equality of the coefficients in each pair of years at least at the 0.01 level. When all years were considered simultaneously, rejection occurred beyond the 0.0001 level despite the large loss of observations. Thus it seems clear that valuation relationships do change over time. While this finding may, of course, be due to problems with the data being used, it certainly lends no credence to the proposition that the parameters do not change.

4.5 Use of the Valuation Model for Security Selection

One of the most intriguing questions concerning empirical valuation models is whether they can be used to aid investors in security selection. The estimated valuation equation shows us, at a moment in time, the average way in which variables, such as growth, payout, and risk, influence market price-earnings multiples. Given the value of these vari-

Table 4.10 Correlations of Residuals in Adjacent Years and with Subsequent Returns

Year	Residuals from (4.4-1)	Residuals from (4.4-2)	Residuals of (4.4-2) with Future Returns
1961/62	.52	.62	−.20
1962/63	.56	.57	.09
1963/64	.41	.46	−.25
1964/65	.30	.39	−.06
1965/66	.37	.32	.06
1966/67	.50	.48	−.03
1967/68	.60	.64	−.10
1968/69	—	—	.20

ables applicable to any specific security, we can compute an estimated price-earnings ratio based on the empirical valuation equation. The next step is to compare the actual price-earnings multiple with that predicted by the valuation equation. If the actual multiple is greater than the predicted one, we might suppose that the security is temporarily overpriced and recommend sale. If the actual price-earnings multiple is less than the predicted multiple, we might designate the security as temporarily underpriced and recommend its purchase.

Even on a priori grounds, it is possible to think of many reasons why such a procedure would prove fruitless. For example, if high growth-rate stocks tended to be overpriced during one particular period, the estimated growth-rate coefficient would be larger (by assumption) than that which is warranted. However, the recommended procedure will not indicate that these stocks are overpriced because "normal" market-determined earnings multiples for these securities will be higher than is warranted. Nevertheless, in view of the popularity of these techniques with some practitioners, it seems worthwhile to try some experiments using our data.

The results of some of our experiments are shown in table 4.10. We measured the degree of "over-" or "underpricing" as the predicted ratio of the residual from the valuation equation (4.4-2) to the predicted earnings multiple, that is, as $(P/\overline{NE} - \hat{P}/\overline{NE})/(\hat{P}/\overline{NE})$. A percentage measure was chosen in view of the considerable variance in actual earnings multiples. If the model is useful in measuring underpricing, then underpriced securities, determined according to this criterion, ought to outperform overpriced issues over some subsequent period. We picked one year as the appropriate horizon and measured subsequent returns in the usual manner as

$$(4.5\text{-}1) \qquad P_{t+1} = (P_{t+1} - P_t + D_{t+1})/P_t.$$

If the empirical valuation model is successful in selecting securities for purchase, the percentage residual (degree of overvaluation) from the valuation equation ought to be negatively related to these subsequent returns. As the fourth column of table 4.10 indicates, in only five of the eight years for which this experiment was performed was the relationship negative, and the degree of association was low. There was a positive relationship for the other three years.[11] Two of these correlations are significant at the 0.05 level: the negative one in 1963/64 and the positive one for 1968/69. The 1961/62 correlation just misses significance at this level. We would not consider these significant correlations as representing forecasting success. As we argue below, we suspect strongly that we

11. We were no more successful at finding wrongly priced securities using expectations data for the individual predictors rather than the average expectations of the particular group.

have left out some common factors and that this omission could lead to correlations over particular periods of time. Unless one can forecast these changes in a way not already available to the general market participant, one can hardly exploit these changes. It is therefore particularly indicative that one of the significant correlations had the "wrong" sign.

Supplementary tests conducted by the type of equation or industry and other groupings produced similar results. For example, subsequent returns were still unrelated to the residuals when we first split the sample into high and low growth and dividend groupings. Similar results were obtained when the experiment was attempted for separate industries. We also found that the residuals from the equations employing historical data in place of our expectational data were no more successful in predicting subsequent performance. Moreover, these results were unaltered when the subsequent returns were measured over alternative time periods such as one-quarter ahead or two or more years ahead. The technique simply did not produce excess returns in any consistent or reliable fashion over any time period in the future. These findings are what we should expect in a reasonably efficient market.

Some statistics are presented in table 4.11 that may be helpful in interpreting the reason for our predictive failures. We note, using the 1963 valuation equation as an example, that the percentage degree of under- or overpricing is not highly correlated with subsequent returns, the coefficient of determination being only 0.06. It is possible to isolate four reasons for our lack of forecasting success.

1. The first reason is that the valuation relationship changes over time. We might be unable to select truly underpriced securities because by the next year the norms of valuation have been significantly altered. Thus what was cheap on the basis of the 1963 relationship may no longer represent good value on the basis of the 1964 equation. To test how important this change might be, we performed the following experiment: We assumed that investors knew at the end of 1963 exactly what the

Table 4.11 Analysis of Lack of Forecasting Success

Year	Description	r^2*
1963	Valuation equation with 1963 predictions	.06
1964	Valuation equation with 1963 data (assumes next year's valuation relationship is known)	.10
1963	Valuation equation with realized growth rates (assumes perfect foresight regarding future long-term growth and next year's earnings)	.14
1963	Valuation equation with 1964 predictions (assumes perfect foresight regarding market expectations next year)	.27

*Percent residuals versus 1964 return.

market valuation relationship would be for the end of 1964; that is, we assumed perfect foresight regarding next year's valuation equation. Then, on the basis of the 1964 valuation equation, we used the 1963 data to calculate warranted $P/\overline{NE}$ multiples, which could then be compared with actual multiples to determine whether each security was appropriately priced. Correlating the percentage residuals with subsequent returns, we found that the coefficient of determination nearly doubled, 10 percent of the variance in subsequent returns now being explained.

2. A second reason for lack of success might be the quality of the expectations data employed. As indicated in chapter 2, the growth-rate forecasts used in the present study were not accurate predictors of realized growth. To determine how much better off we would have been with more accurate forecasts, we assumed perfect foresight regarding the future long-term growth rate of the company. Thus the 1963 empirical valuation equation was used to determine "normal" value, but in place of $\bar{g}_p$ we substituted the realized long-term growth rate through 1968. Using these realized data to determine warranted price-earnings multiples, we correlated the percentage residuals therefrom with future returns. As expected, an even greater improvement in forecasting future returns was found. The r^2 rises to 0.14.

3. As a further experiment, perfect foresight was assumed not about the actual rate of growth of earnings but rather regarding what the market expectations of growth would be next year, that is, about $\bar{g}_p$ next year. Calculating the degree of overpricing as before, we find a much greater improvement in prediction of future returns. Twenty-seven percent of the variability of future returns is now explained, compared with only 6 percent in the original experiment. We conclude that if one wants to explain returns over a one-year horizon, it is far more important to know what the market will think the growth rate of earnings will be next year rather than to know the realized long-term growth rate. This observation brings us back to Keynes's celebrated newspaper contest. What matters is not one's personal criteria of beauty but what the average opinion will expect average opinion to think is beautiful at the close of the contest.

4. A final source of error is that the valuation model does not capture all the significant determinants of value for each individual company. Despite our success in accounting for approximately three-quarters of the variance in market price-earnings multiples, there are likely to be special features applicable to many individual companies that cannot be captured quantitatively. For example, it turned out that the stock of many tobacco companies always appeared to be underpriced. The reason for this is not difficult to conjecture. There is a risk of government sanctions against the tobacco industry that weighs heavily in the minds of investors, but that is not related to the risk measures we have employed. Such an explanation is not at variance with the underlying approach to risk

valuation that we have been using. The common susceptibility of the tobacco companies to an identifiable but ignored hazard is simply an important factor which we have omitted from our data.

This problem of omitted variables may account for the correlations of residuals which we found in the equations. If certain factors specific to individual companies were consistently missing, the residuals from the valuation equations could be expected to be positively correlated over time. This is exactly what we found in table 4.10. Thus, despite our success in using expectations data to estimate a valuation equation which has far more explanatory ability than those based on historic information, it is still quite clear that certain systematic valuation factors are missing from the analysis. Consequently, it cannot be said that all deviations of actual from predicted price-earnings ratios are simply manifestations of temporary over- or underpricing.

4.6 Conclusion

Our investigations of valuation models, while not without some ambiguous results, suggest several notable conclusions. These conclusions concern the role in market valuation of the sort of earnings forecasts we have collected, the nature of risk valuation, and the efficiency of the market.

4.6.1 Valuation of Expected Growth

One of our major findings is that the average of the expected long-term growth rates, together with the risk measure provided by the variance of the growth-rate predictions, gives a closer account of the valuation of common stocks than do alternatives. These growth rates were clearly superior in accounting for prices to any of the simple alternatives we considered. More closely fitting equations are the results that one would expect from smaller errors of measurement or from using data that contain more relevant information in place of less germane measures. Hence one can safely presume that our data are more similar to the expectations being valued in the market than are measures based on *ex post* realized growth or regression coefficients. This conclusion, based on the ability to "explain" prices, is buttressed by noticing that the overall risk-free expected rates of return suggested by the estimates of the expected return regressions are of plausible orders of magnitude.

The finding that prices reflect expected growth occurred in spite of the difficulties we encountered from the large variations in which companies were covered by each of the various predictors. Earlier we saw that there is a great deal of diversity of expectations among forecasters, an aspect of reality with which valuation models do not usually cope. We also found that, while hardly being strong predictions, the expectations data appear to yield forecasts at least as accurate as, and often better than, naive forecasts based on *ex post* realizations. Furthermore, we found that we

could not calculate a linear combination of different types of forecasts whose superior forecasting performance continued over time.

Efficient market hypotheses suggest that valuation should reflect the information available to investors. Insofar as analysts' forecasts are more precise than other types we should therefore expect their differences from other measures to be reflected in the market. It is therefore noteworthy that our regression results do support the hypothesis that analysts' forecasts are needed even when calculated growth rates are available. As we noted when we described the data, security analysts do not use simple mechanical methods to obtain their evaluations of companies. The growth-rate figures we obtained were distilled from careful examination of all aspects of the companies' records, evaluation of contingencies to which they might be subject, and whatever information about their prospects the analysts could glean from the companies themselves or from other sources. It is therefore notable that the results of their efforts are found to be so much more relevant to the valuation than the various simpler and more "objective" alternatives that we tried.

We saw in section 3.2.3 that diversity of expectations together with market imperfections might invalidate the valuation model. However, we also argued that there were theoretical grounds for supposing that the model would still hold for the average of investors' expectations. It is therefore of particular interest that our empirical results do support the hypothesis that prices reflect average expectations.

It is no surprise that we found roles for both short- and long-term expected rates of growth. Models of valuation using only long-term growth rates are clearly only simplifications of the more complicated processes that earnings and dividends follow over time, and we would expect market valuation to reflect the more complicated processes.

4.6.2 Risk Measures and Valuation

The results did not provide wholly unambiguous support for the specific valuation models developed here. A number of aspects of our results about risk are particularly intriguing. It is clear from our results that expected returns do seem to be related to various systematic risk factors. Equally clearly, our results do not give straightforward support to the simple form of the CAPM. It would appear that systematic risk is not entirely captured by single measures of covariance with the market index. This has important implications for those who attempt to use the modern investment technology in practical problems of portfolio selection. One such suggestion, which had attracted a considerable following in the investment community by the 1980s, was the proposal for a yield-tilted index fund.

The reasoning behind the yield-tilted index fund seems appealingly plausible. Since dividends are generally taxed more highly than capital gains and since the market equilibrium is presumably achieved on the

basis of after-tax returns, the equilibrium pretax returns for stocks that pay high dividends ought to be higher than for securities that produce lower dividends and correspondingly higher capital gains. Hence the tax-exempt investor is advised to buy a diversified portfolio of high-dividend-paying stocks. In order to avoid the assumption of any greater risk than is involved in buying the market index, the tax-exempt investor is also advised to purchase a yield-tilted index fund, that is, a very broadly diversified portfolio of high-dividend-paying stocks that mirrors the market index in the sense that it has a beta coefficient β_M precisely equal to unity.

Even on a priori grounds one might question the logic of the yield-tilted index fund. Many of the largest investors in the market are tax-exempt (such as pension and endowment funds) and others (such as corporations) actually pay a lower tax on capital gains than on dividend income.[12] Thus it is far from clear that the marginal investor in the stock market prefers to receive income through capital gains rather than through dividend payments. Our theoretical arguments in chapter 3 also indicated that great care must be taken with arguments involving "marginal" investors and pointed out that the diversification theory gives no presumption that dividends and capital gains will be valued differently. But apart from these a priori arguments, our empirical results can be interpreted as providing another argument against the yield-tilted index fund.

If the traditional beta calculation (β_M) does not provide a full description of systematic risk, the yield-tilted index fund may well fail to mirror the market index. Specifically, during periods when inflation and interest rates rise, it may well be the case that high-dividend stocks are particularly vulnerable; that is, they have high δ_p and δ_r coefficients. Public-utility common stocks are a good example. While they are known as "low-beta" stocks, they are likely to have high systematic risk with respect to interest rates and inflation. This is so not only because they are good substitutes for fixed-income securities, but also because public utilities are vulnerable to a profits squeeze during periods of rising inflation because of regulatory lags and increased borrowing costs. Hence the yield-tilted index fund with $\beta_M = 1$ may not mirror the market index when inflation accelerates.

The actual experience of yield-tilted index funds during the 1979–80 period shows that these funds did not live up to expectations and their performance was significantly worse than the market. Of course, we should not reject a model simply because of its failure over any specific short-term period. Nevertheless, we believe that an understanding of the wider aspects of systematic risk, such as those analyzed here, would have

12. For corporate investors, 85 percent of dividend income is excluded from taxable income while capital gains are taxed at normal gains rates.

helped prevent what turned out to be (at least over the short term) some serious investment errors.

Our findings on systematic risk still leave some major and intriguing perplexities. We found in both versions of the valuation model that the most important aspect of risk for valuation was that represented by the extent to which forecasters were not in agreement about the future growth of the company. Exactly what is the basis for this finding is not clear.

It might be quite reasonable to interpret s_g^2 as representing specific risk. In that case, the findings go against most recent models of valuation including both the CAPM and the APT. On the other hand, it may indirectly measure sensitivity to underlying common factors and thus serve as a very effective proxy for a variety of systematic risks. Finally, it may arise from technical difficulties having to do with undetected biases in our data. It seems unlikely that this would fully account for the strength we found for this variable, but it cannot be ruled out. Further investigation probably requires a data set less beset by problems of missing observations and an adequately specified model of earnings. Overall, our results do suggest that risk undoubtedly has dimensions not fully captured by the covariances with market indexes or other variables that have dominated recent work on valuation. They also suggest that the variance of analysts' forecasts may represent the most effective risk proxy available.

4.6.3 Efficient Markets

We find it encouraging that we were unable to use the expectations data to select securities with subsequent above- or below-average performance characteristics. We would not expect that analysts' forecasts would be sounder than those apparently used by the market or that they would be irrelevant to market valuations. Apparently, the expectations formed by Wall Street professionals get quickly and thoroughly impounded into the prices of securities. Implicitly, we have found that the evaluations of companies that analysts make are the sorts of ones on which market valuation is based. Thus, while our work raises questions about some currently popular valuation theories, it strongly supports the view that the market is reasonably efficient in incorporating into present prices whatever information there is about the future.

Third Edition

STOCKS FOR THE LONG RUN

The Definitive Guide to Financial Market Returns and Long-Term Investment Strategies

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whereas investors regarded stocks as the best investment to protect against the eroding value of money. As early as September 1958, *BusinessWeek* noted that "the relationship between stock and bond yields was clearly posting a warning signal, but investors still believe inflation is inevitable and stocks are the only hedge against it."[3]

Yet many on Wall Street were still puzzled by the "great yield reversal." Nicholas Molodovsky, vice president of White, Weld & Co. and editor of the *Financial Analysts Journal*, observed:

> Some financial analysts called . . . [the reversal of bond and stock yields] a financial revolution brought about by many complex causes. Others, on the contrary, made no attempt to explain the unexplainable. They showed readiness to accept it as a manifestation of providence in the financial universe.[4]

Imagine value-oriented investors who pulled all their money out of the stock market in August of 1958 and put it into bonds, vowing never to buy stocks again unless dividend yields rose above those on high-quality bonds. Such investors would still be waiting to get back into stocks. After 1958, stock dividend yields never again exceeded those of bonds. Yet, from August 1958 onward, overall stock returns overwhelmed the returns on fixed-income securities over any long-term period.

Benchmarks for valuation are valid only as long as economic institutions do not change. The chronic postwar inflation, resulting from the switch to a paper money standard, changed forever the way investors judged the yields on stocks and bonds. Investors who clung to the old ways of valuing equity never participated in the greatest bull market for stocks in history.

VALUATION OF CASH FLOWS FROM STOCKS

The fundamental sources of stock valuation are the dividends and earnings of firms. In contrast to a work of art—which can be bought both for an investment and for its viewing pleasure—stocks have value only because of the potential cash flows that investors receive. These cash flows can come from any distribution (such as dividends or capital gains realized on sale) that stockholders expect to receive from their share of ownership of the firm, and it is by forecasting and valuing

[3] "In the Markets," *BusinessWeek*, September 13, 1958, p. 91.
[4] "The Many Aspects of Yields," *Financial Analysts Journal* 18(2)(March–April 1962):49–62.

these expected future cash flows that one can judge the investment value of shares.[5]

The value of any asset is determined by the discounted value of all expected future cash flows. Future cash flows from assets are *discounted* because cash received in the future is not worth as much as cash received in the present. The reasons for discounting are (1) the innate *time preferences* of most individuals to enjoy their consumption today rather than wait for tomorrow, (2) *productivity,* which allows funds invested today to yield a higher return tomorrow, and (3) *inflation,* which reduces the future purchasing power of cash received in the future. These factors also apply to both stocks and bonds and are the foundation of the theory of interest rates. A fourth reason, which applies primarily to the cash flows from equities, is the *uncertainty* associated with the magnitude of future cash flows.

SOURCES OF SHAREHOLDER VALUE

For the equity holder, the source of future cash flows is the earnings of firms. Earnings are the cash flows that remain after the costs of production are subtracted from the sales revenues of the firm. The costs of production include labor and material costs, interest on debt, corporate taxes, and allowance for depreciation.

Earnings create value for shareholders by the:

- Payment of cash dividends
- Repurchase of shares
- Retirement of debt
- Investment in securities, capital projects, or other firms

If a firm repurchases its shares (known as *buybacks*), it reduces the number of shares outstanding and thus increases future *per-share* earnings. If a firm retires its debt, it reduces its interest expense and therefore increases the cash flow available to shareholders. Finally, earnings that are not used for dividends, share repurchases, or debt retirement are referred to as *retained earnings.* Retained earnings may increase future cash flows to shareholders if they are invested productively in securities, capital projects, or other firms.

[5] There might be some psychic value to holding a controlling interest above and beyond the returns accrued. In such a case, the owner values the stock more than minority shareholders.

Some people argue that shareholders most value stocks' cash dividends. But this is not necessarily true. In fact, from a tax standpoint, share repurchases are superior to dividends. Cash dividends are taxed at the highest marginal tax rate to the investor; share repurchases, however, generate capital gains that can be realized at the shareholder's discretion and at a lower capital gains tax rate. Recently, there have been an increasing number of firms who engage in share repurchases. As will be discussed in the next chapter, the shift from dividends to share repurchases is one factor that has raised the valuation of some equities.

Others might argue that debt repayment lowers shareholder value because the interest saved on the debt retired generally is less than the rate of return earned on equity capital. They also might claim that by retiring debt, they lose the ability to deduct the interest paid as an expense (the interest tax shield).[6] However, debt entails a fixed commitment that must be met in good or bad times and, as such, increases the volatility of earnings that go to the shareholder. Reducing debt therefore lowers the volatility of future earnings and may not diminish shareholder value.[7]

Many investors claim that the fourth factor, the reinvestment of earnings, is the most important source of value, but this is not always the case. If retained earnings are reinvested profitably, value surely will be created. However, retained earnings may tempt managers to pursue other goals, such as overbidding to acquire other firms or spending on perquisites that do not increase the value to shareholders. Therefore, the market often views the buildup of cash reserves and marketable securities with suspicion and frequently discounts their value.

If the fear of misusing retained earnings is particularly strong, it is possible that the market will value the firm at less than the value of its reserves. Great investors, such as Benjamin Graham, made some of their most profitable trades by purchasing shares in such companies and then convincing management (sometimes tactfully, sometimes with a threat of takeover) to disgorge their liquid assets.[8]

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[6]Whether debt is a valuable tax shield depends on whether interest rates are bid up enough to offset that shield. See Merton H. Miller, "Debt and Taxes," Papers and Proceedings of the Thirty-Fifth Annual Meeting of the American Finance Association, Atlantic City, NJ, September 16–18, 1977, *The Journal of Finance* 32(2)(May, 1977):261–275.

[7]Meeting interest payments also may be a good discipline for management and reduce the tendency to waste excess profits. See Michael Jensen, "The Takeover Controversy: Analysis and Evidence." In John Coffee, Louis Lowenstein, and Susan Rose-Ackerman (eds.), *Takeovers and Contests for Corporate Control* (New York: Oxford University Press, 1987).

[8]Benjamin Graham, *The Memoirs of the Dean of Wall Street* (New York: McGraw-Hill, 1946), Chap. 11.

One might question why management would not employ assets in a way to maximize shareholder value, since managers often hold a large equity stake in the firm. The reason is that there may exist a conflict between the goal of the shareholders, which is solely to increase the return on the company's shares, and the goals of management, which may include prestige, control of markets, and other objectives. Economists recognize the conflict between the goals of managers and shareholders as *agency costs*, and these costs are inherent in every corporate structure where ownership is separated from management. Payment of cash dividends or committed share repurchases often lowers management's temptation to pursue goals that do not maximize shareholder value.

In recent years dividend yields have fallen to 1½ percent, less than one-third of their historic average. The major reasons for this are the tax disadvantage of dividends and the increase in employee stock options, where capital gains and not dividends figure into option value. Nevertheless, dividends historically have served the function of showing investors that the firms' earnings were indeed real. Recent concerns about aggressive accounting policies and the integrity of earnings following the Enron debacle may bring back this once-favored way of delivering investor value.[9]

DOES THE VALUE OF STOCKS DEPEND ON DIVIDENDS OR EARNINGS?

Management determines its dividend policy—the fraction of earnings it will pay out to shareholders—by evaluating many factors, including the tax differences between dividend income and capital gains, the need to generate internal funds to retire debt or invest, and the desire to keep dividends relatively constant in the face of fluctuating earnings. Since the price of a stock depends primarily on the present discounted value of all expected future dividends, it appears that dividend policy is crucial to determining the value of the stock.

However, this is not generally true. It does not matter how much is paid as dividends and how much is reinvested *as long as* the firm earns the same return on its retained earnings that shareholders demand on its stock.[10] The reason for this is that dividends not paid today are reinvested by the firm and paid as even larger dividends in the future.

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[9]Jeremy J. Siegel, "The Dividend Deficit," *Wall Street Journal*, February 13, 2002, p. A20.

[10]This ignores differential taxation between capital gains and dividend income that favors reinvestment. This is explored in Chapter 4.

Of course, management's choice of dividend payout ratio, which is the ratio of cash dividends to total earnings, does influence the timing of the dividend payments. The lower the dividend payout ratio, the smaller the dividends will be in the near future. Over time, however, dividends will rise and eventually will exceed the dividend path associated with a higher payout ratio. Moreover, assuming that the firm earns the same return on investment as the investors require from its equity, the present value of these dividend streams will be identical no matter what payout ratio is chosen.

Note that the price of the stock is always equal to the present value of all future *dividends* and not the present value of future earnings. Earnings not paid to investors can have value only if they are paid as dividends or other cash disbursements at a later date. Valuing stock as the present discounted value of future earnings is manifestly wrong and greatly overstates the value of a firm.[11]

John Burr Williams, one of the greatest investment analysts of the early part of last century and author of the classic *The Theory of Investment Value*, argued this point persuasively in 1938. He wrote:

> Most people will object at once to the foregoing formula for valuing stocks by saying that it should use the present worth of future earnings, not future dividends. But should not earnings and dividends both give the same answer under the implicit assumptions of our critics? If earnings not paid out in dividends are all successfully reinvested at compound interest for the benefit of the stockholder, as the critics imply, then these earnings should produce dividends later; if not, then they are money lost. Earnings are only a means to an end, and the means should not be mistaken for the end.[12]

LONG-TERM EARNINGS GROWTH AND ECONOMIC GROWTH

Since stock prices are the present value of future dividends, it would seem natural to assume that economic growth would be an important factor influencing future dividends and hence stock prices. However, this is not necessarily so. The determinants of stock prices are earnings and dividends on a *per-share* basis. Although economic growth may influence *aggregate* earnings and dividends favorably, economic growth does not necessarily increase the growth of per-share earnings or dividends. It is earnings per share (EPS) that is important to Wall Street be-

[11]Firms that pay no dividends, such as Warren Buffett's Berkshire Hathaway, have value because their assets, which earn cash returns, can be liquidated and disbursed to shareholders in the future.
[12]John Burr Williams, *The Theory of Investment Value* (Cambridge, MA: Harvard University Press, 1938), p. 30.

cause per-share data, not aggregate earnings or dividends, are the basis of investor returns.

The reason that economic growth does not necessarily increase EPS is because economic growth requires increased capital expenditures and this capital does not come freely. Implementing and upgrading technology requires substantial firm investment. These expenditures must be funded either by borrowing in the debt market (through banks or trade credit or by selling bonds) or by floating new shares. The added interest costs and the dilution of profits that this funding involves place a burden on the firm's bottom line.

Can earnings increase without increasing capital expenditures? In the short run, this may occur, but the long-run historical evidence suggests that it will not. One of the signal characteristics of long-term historical data is that the level of the capital stock—the total value of all physical capital such as factories and equipment, as well as intellectual capital, that has accumulated over time—has grown in proportion to the level of aggregate output. In other words, a 10 percent increase in output requires a 10 percent increase in the capital stock.

Many investors believe that investment in productivity-enhancing technology can spur earnings growth to permanently higher levels. However, "cost-saving investments," frequently touted as a source of increasing profit margins, only temporarily affect bottom-line earnings. As long as these investments are available to other firms, competition will force management to reduce product prices by the amount of the cost savings, and extra profits will quickly be competed away. In fact, capital expenditures often are undertaken not necessarily to *enhance* profits but rather to *preserve* profits when other firms have adopted competitive cost-saving measures.

Table 6-1 shows the summary statistics for dividends per share, earnings per share (EPS), and stock returns from 1871 through Septem-

TABLE 6–1

Long-Term Growth of GDP, Earnings, and Dividends, 1871–2001

	Real GDP Growth	Real Per-Share Earnings Growth	Real Per-Share Dividend Growth	Dividend Yield*	Payout Ratio*
1871-2001	3.91%	1.25%	1.09%	4.54%	58.75%
1871-1945	4.51%	0.66%	0.74%	5.07%	66.78%
1946-2001	3.11%	2.05%	1.56%	3.53%	51.91%

* Denotes median.

Do Analyst Conflicts Matter? Evidence from Stock Recommendations

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Abstract

We examine whether conflicts of interest with investment banking and brokerage businesses induce sell-side analysts to issue optimistic stock recommendations and, if so, whether investors are misled by such biases. Using quantitative measures of potential conflicts constructed from a novel data set containing revenue breakdowns of analyst employers, we find that recommendation levels are indeed positively related to conflict magnitudes. The optimistic bias stemming from investment banking conflicts was especially pronounced during the late-1990s stock market bubble. However, evidence from the response of stock prices and trading volumes to upgrades and downgrades suggests that the market recognizes analysts' conflicts and properly discounts analysts' opinions. This pattern persists even during the bubble period. Moreover, the 1-year stock performance following revised recommendations is unrelated to the magnitude of conflicts. Overall, our findings do not support the view that conflicted analysts are able to systematically mislead investors with optimistic stock recommendations.

1. Introduction

In April 2003, 10 of the largest Wall Street firms reached a landmark settlement with state and federal securities regulators on the issue of conflicts of interest

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faced by stock analysts.[1] The settlement requires the firms to pay a record $1.4 billion in compensation and penalties in response to government charges that the firms issued optimistic stock research to win favor with potential investment banking (IB) clients. Part of the settlement funds are earmarked for investor education and for provision of research from independent firms. In addition to requiring large monetary payments, the settlement mandates structural changes in the firms' research operations and requires the firms to disclose conflicts of interest in analysts' research reports.

The notion that investors are victims of biased stock research presumes that (1) analysts respond to the conflicts by inflating their stock recommendations and (2) investors take analysts' recommendations at face value. Even if analysts are biased, it is possible that investors understand the conflicts of interest inherent in stock research and rationally discount analysts' opinions. This alternative viewpoint, if accurate, would lead to very different conclusions about the consequences of analysts' research. Indeed, investors' rationality and self-interested behavior imply that stock prices should accurately reflect a consensus about the informational quality of public announcements (Grossman 1976; Grossman and Stiglitz 1980). Rational investors would recognize and adjust for analysts' potential conflicts of interest and thereby largely avoid the adverse consequences of biased stock recommendations.

In this article, we provide evidence on the extent to which analysts and investors respond to conflicts of interest in stock research. We address four questions. First, is the extent of optimism in stock recommendations related to the magnitudes of analysts' conflicts of interest? Second, to what extent do investors discount the opinions of more conflicted analysts? In particular, do stock prices and trading volumes react to recommendation revisions in a manner that rationally reflects the degree of analysts' conflicts? Third, is the medium-term (that is, 3- to 12-month) performance of recommendation revisions related to conflict severity? And, finally, did conflicts of interest affect analysts or investors differently during the late-1990s stock bubble than during the postbubble period? The answers to these questions are clearly of relevance to stock market participants, public policy makers, regulators, and the academic profession.

We use a unique, hand-collected data set that contains the annual revenue breakdown for 232 public and private analyst employers. This information allows us to construct quantitative measures of the magnitude of potential conflicts not only from IB business but also from brokerage business. We analyze a sample of over 110,000 stock recommendations issued by over 4,000 analysts during the 1994–2003 time period. Using univariate tests as well as cross-sectional regressions that control for the size of the company followed and individual analysts' experience, resources, workloads, and reputations, we attempt to shed

[1] Two more securities firms (Deutsche Bank Securities Inc. and Thomas Weisel Partners LLC) were added to the formal settlement in August 2004.

light both on how analysts respond to pressures from IB and brokerage businesses and on how investors compensate for the existence of such conflicts of interest.

A number of studies (for example, Dugar and Nathan 1995; Lin and McNichols 1998; Michaely and Womack 1999; Dechow, Hutton, and Sloan 2000; Bradley, Jordan, and Ritter 2008) focus on conflicts faced by analysts in the context of existing underwriting relationships (see also Malmendier and Shanthikumar 2007; Cliff 2007).[2] Our article complements this literature in several ways. First, we take into account the pressure to generate underwriting business from both current and potential client companies. Even if an analyst's firm does not currently do IB business with a company that the analyst tracks, it might like to do so in the future. Second, we examine the conflict between research and all IB services (including advice on mergers, restructuring, and corporate control), rather than just underwriting. Third, we examine conflicts arising from brokerage business in addition to those from IB.[3]

Fourth, the prior empirical finding that underwriter analysts tend to be more optimistic than other analysts is consistent with two alternative interpretations: (*a*) an optimistic report on a company by an underwriter analyst is a reward for past IB business or an attempt to win future IB business by currying favor with the company or (*b*) a company chooses an underwriter whose analyst already likes the stock. The second interpretation implies that underwriter choice is endogenous and does not necessarily imply a conflict of interest. We sidestep this issue of endogeneity by not focusing on underwriting relations between an analyst's firm and the company followed. Instead, our conflict measures focus on the importance to the analyst's firm of IB and brokerage businesses, as measured by the percentage of its annual revenue derived from IB business and from brokerage commissions. Unlike underwriting relations between an analyst's firm and the company followed, the proportions of the entire firm's revenues from each of these businesses can reasonably be viewed as given, exogenous variables from the viewpoint of an individual analyst. Finally, our approach yields substantially larger sample sizes than those used in prior research, and it therefore leads to greater statistical reliability of the results.

Several articles adopt an approach that is similar in spirit to ours. For example, Barber, Lehavy, and Trueman (2007) find that recommendation upgrades (downgrades) by investment banks—which typically also have brokerage businesses—

[2] Bolton, Freixas, and Shapiro (2007) theoretically analyze a different type of conflict of interest in financial intermediation, one faced by a financial advisor whose firm also produces financial products (such as in-house mutual funds). Mehran and Stulz (2007) provide an excellent review of the literature on conflicts of interest in financial institutions.

[3] Hayes (1998) analyzes how pressure on analysts to generate brokerage commissions affects the availability and accuracy of earnings forecasts. Both Irvine (2004) and Jackson (2005) find that analysts' optimism increases a brokerage firm's share of the trading volume. Ljungqvist et al. (2007) find that analysts employed by larger brokerage houses issue more optimistic recommendations and more accurate earnings forecasts. However, none of these articles examines how investors' responses to analysts' recommendations and the investment performance of recommendations vary with the severity of brokerage conflicts, issues that we investigate here.

underperform (outperform) similar recommendations by non-IB brokerages and independent research firms. Cowen, Groysberg, and Healy (2006) find that full-service securities firms—which have both IB and brokerage businesses—issue less optimistic forecasts and recommendations than do non-IB brokerage houses. Finally, Jacob, Rock, and Weber (2008) find that short-term earnings forecasts made by investment banks are more accurate and less optimistic than those made by independent research firms. We extend this line of research by quantifying the reliance of a securities firm on IB and brokerage businesses. This is an important feature of our article for at least two reasons. First, given that many securities firms operate in multiple lines of business, it is difficult to classify them by business lines. By separately measuring the magnitudes of both IB and brokerage conflicts in each firm, our approach avoids the need to rely on a classification scheme. Second, since the focus of this research is on the consequences of analysts' conflicts, the measurement of those conflicts is important. Our conclusions sometimes differ from those in classification-based studies.

We find that analysts do indeed seem to respond to pressures from IB and brokerage businesses: larger potential conflicts of interest from these businesses are associated with more positive stock recommendations. We also document that the distortive effects of IB conflicts were larger during the late-1990s stock bubble than during the postbubble period. Nonetheless, the empirical analysis yields several pieces of evidence to suggest that investors are sophisticated enough to adjust for these biases. First, the short-term reactions of both stock prices and trading volumes to recommendation upgrades are negatively and statistically significantly related to the magnitudes of potential IB or brokerage conflicts. For downgrades, the corresponding relation is negative for stock prices but positive for trading volumes. Second, the 1-year investment performance after recommendation revisions bears no systematic relation to the magnitude of conflicts. Finally, investors continued to discount conflicted analysts' opinions during the bubble period, even amid the euphoria prevailing in the market at the time. Together these results strongly support the idea that the marginal investor, taking analysts' conflicts into account, rationally discounts optimistic stock recommendations.[4]

The remainder of the article is organized as follows. We discuss the issues in Section 2 and describe our sample and data in Section 3. Section 4 examines the relation between recommendation levels and the degree of IB or brokerage conflict faced by analysts. Section 5 analyzes how conflicts are related to the response of stock prices or trading volumes to recommendation revisions. Section

[4] In a companion paper (Agrawal and Chen 2005), we find that analysts appear to respond to conflicts when making long-term earnings growth projections but not short-term earnings forecasts. This finding is consistent with the idea that, with short-term forecasts, analysts worry about their deception being revealed with the next quarterly earnings release, but they have greater leeway with long-term forecasts. We also find that the frequency of forecast revisions is positively related to the magnitude of brokerage conflicts, and several tests suggest that analysts' trade generation incentives impair the quality of stock research.

6 investigates the relation between conflicts and the investment performance of recommendation revisions. Section 7 presents our results for the late-1990s stock bubble and postbubble periods, and Section 8 concludes.

2. Issues and Hypotheses

Investment banking activity is a potential source of analyst conflict that has received widespread attention in the financial media (for example, Gasparino 2002; Maremont and Bray 2004) as well as the academic literature (for example, Lin and McNichols 1998; Michaely and Womack 1999). When IB business is an important source of revenue for a securities firm, a stock analyst employed by the firm often faces pressure to inflate his or her recommendations. This pressure is due to the fact that the firm would like to sell IB services to a company that the analyst tracks.[5] The company, in turn, would like the analyst to support its stock with a favorable opinion. Thus, we expect that the more critical is IB revenue to an analyst's employer, the greater the incentives an analyst faces to issue optimistic recommendations.[6]

Analysts also face a potential conflict with their employers' brokerage businesses. Here, the pressure on analysts originates not from the companies that they follow but from within their employing firms. Brokerage business generates a large portion of most securities firms' revenues, and analyst compensation schemes are typically related explicitly or implicitly to trading commissions. Thus, analysts have incentives to increase trading volumes in both directions (that is, buys and sells). Given the many institutional constraints that make short sales relatively costly, many more investors participate in stock purchases than in stock sales.[7] Indeed, it is mostly existing shareholders of a stock who sell. This asymmetry between purchases and sales implies that the more important brokerage business is to an analyst's employer, the more pressure the analyst faces to be bullish when issuing recommendations.

Analysts who respond to the conflicts they face by issuing blatantly misleading stock recommendations can develop bad reputations that reduce their labor income and hurt their careers.[8] Stock recommendations, however, are not as easily evaluated as other outputs of analysts' research, such as 12-month price targets or quarterly earnings forecasts, which can be judged against public, near-

[5] Throughout this article, we refer to an analyst's employer as a "firm" and a company followed by an analyst as a "company."

[6] Ljungqvist, Marston, and Wilhelm (2006, forthcoming) find that, while optimistic recommendations do not help the analyst's firm win the lead underwriter or comanager positions in general, they help the firm win the comanager position in deals in which the lead underwriter is a commercial bank.

[7] Numerous regulations in the United States increase the cost of selling shares short (see, for example, Dechow et al. 2001). Therefore, the vast majority of stock sales are regular sales rather than short sales. For example, over the 1994–2001 period, short sales comprised only about 10 percent of the annual New York Stock Exchange trading volume (New York Stock Exchange 2002).

[8] See Jackson (2005) for a theoretical model showing that analysts' concerns about their reputations can reduce optimistic biases arising from brokerage business.

term realizations. So it is not clear whether analysts' career concerns can completely prevent them from responding to pressures to generate IB or brokerage business.

The relation between conflict severity and the short-term (2- or 3-day) stock price impact of a recommendation should depend on whether investors react to the opinion rationally or naively.[9] Under the rational discounting hypothesis, the relation should be asymmetric for upgrades and downgrades. For upgrades, the stock price response should be negatively related to the degree of conflict. This implication arises because analysts who face greater pressure from IB or brokerage business are likely to be more bullish in their recommendations, and rational investors should discount an analyst's optimism more heavily. For downgrades, however, the story is different. When an analyst downgrades a stock despite facing large conflicts, rational investors should find the negative opinion more convincing and should be more likely to revalue the stock accordingly. This implies that the short-term stock price response to a downgrade should be negatively related to the degree of conflict.

The rational discounting hypothesis also predicts cross-sectional relations between conflict severity and the short-term trading volume responses to recommendations. As Kim and Verrecchia (1991) demonstrate in a rational expectations model of trading, the more precise a piece of news, the more individuals will revise their prior beliefs and, hence, the more trading that will result. In the present context, investor rationality implies that an upgrade by a highly conflicted analyst represents less precise news to investors, and so such a revision should be followed by a relatively small abnormal volume. But when an analyst downgrades a stock despite a substantial conflict, the signal is regarded as being more precise, and thus the downgrade should lead to relatively large abnormal trading.

By contrast, under the naive investor hypothesis, investors are largely ignorant of the distortive pressures that analysts face and accept analysts' recommendations at face value. This implies that there should be no relation between conflict severity and the short-term response of either stock prices or trading volume to recommendation revisions. Furthermore, the absence of a systematic relation should hold true for both upgrades and downgrades.

What are the implications of the two hypotheses for the medium-term (3- to 12-month) investment performance of analysts' recommendations? Under the rational discounting hypothesis, there should be no systematic relation between the magnitude of conflicts faced by an analyst and the performance of his or her stock recommendations: the market correctly anticipates the potential distortions up front and accordingly adjusts its response. But the naive investor hypothesis predicts that performance should be negatively related to conflict

[9] This framework follows Kroszner and Rajan (1994) and Gompers and Lerner (1999), who analyze the conflicts that a bank faces in underwriting securities of a company when the bank owns a (debt or equity) stake in it.

severity for both upgrades and downgrades. That is, investors ignore analysts' conflicts up front and pay for their ignorance later.

3. Sample and Data

3.1. Sample

Our sample of stock recommendations comes from the Institutional Brokers Estimate System (I/B/E/S) U.S. Detail Recommendations History file. This file contains data on newly issued recommendations as well as revisions and reiterations of existing recommendations made by individual analysts over the period 1993–2003. Although the exact wording of recommendations can vary considerably across brokerage houses, I/B/E/S classifies all recommendations into five categories ranging from strong buy to strong sell. We rely on the I/B/E/S classification and encode recommendations on a numerical scale from 5 (strong buy) to 1 (strong sell).

Since we are primarily interested in examining how the nature and consequences of analysts' recommendations are related to IB or brokerage business, we require measures of the importance of these business lines to analysts' employers. Under U.S. law, all registered broker-dealer firms must file audited annual financial statements with the Securities and Exchange Commission (SEC) in x-17a-5 filings.[10] These filings contain information on broker-dealer firms' principal sources of revenue, broken down into revenue from IB, brokerage commissions, and all other businesses (such as asset management and proprietary trading). We use these filings to obtain various financial data, including data on our key explanatory variables: the fractions of total brokerage house revenues from IB and from brokerage commissions. Beginning with the names of analyst employers contained in the I/B/E/S Broker Translation file,[11] we search for all available revenue information in x-17a-5 filings from 1994 to 2003.[12] For publicly traded broker-dealer firms, we also use 10-K annual report filings over the sample period to gather information on revenue breakdowns, if necessary. We thus obtain annual data from 1994 to 2003 on IB revenue, brokerage revenue, and other revenue for 188 privately held and 44 publicly traded brokerage houses.[13] For each brokerage house, we match recommendations to the latest broker-year revenue data preceding the recommendation date. Over the sample period, we

[10] The Securities Exchange Act, sections 17(a)–17(e), requires these filings. We accessed them from Thomson Financial's Global Access database and the Securities and Exchange Commission's (SEC's) public reading room in Washington, D.C.

[11] We use the file supplied directly by the Institutional Brokers Estimate System (I/B/E/S) on CD-ROM. This file does not recode the name of an acquired brokerage firm to that of its acquirer for years before the merger.

[12] The electronic availability of x-17a-5 filings is very limited prior to 1994, the year the SEC first mandated electronic form filing. Hence, we do not search for revenue information prior to 1994.

[13] We exclude a small number of firm-years in which the total revenue is negative (for example, because of losses from proprietary trading).

are able to match in this fashion 110,493 I/B/E/S recommendations issued by 4,089 analysts.

All broker-dealer firms are required to publicly disclose their balance sheets as part of their x-17a-5 filings. But a private broker-dealer firm can withhold the public disclosure of its income statement, which contains the revenue breakdown information needed for this study, if the SEC deems that such disclosure would harm the firm's competitive position. Thus, our sample of private securities firms is limited to broker-dealers that disclose their revenue breakdowns in x-17a-5 filings. We examine whether this selection bias affects our main results by separately analyzing the subsample of publicly traded securities firms, for which public disclosure of annual revenue information is mandatory. Our findings do not appear to be affected by this selection bias. All of our results for the subsample of publicly traded securities firms are qualitatively similar to the results for the full sample reported in the article. In the Appendix, we describe the characteristics of disclosing and nondisclosing private securities firms, shed some light on the firms' income statement disclosure decisions, and use a selectivity-corrected probit model to examine whether the resulting selection bias can explain analysts' response to conflicts in these private firms. We find no evidence that selection bias affects our results for these firms.

3.2. Characteristics of Analysts, Their Employers, and Companies Followed

We next measure characteristics of analysts, their employers, and the companies they cover. Prior research (for example, Clement 1999; Jacob, Lys, and Neale 1999) finds that analysts' experience and workloads affect the accuracy and credibility of their research. Using the I/B/E/S Detail History files, we measure an analyst's experience and workloads in terms of all research activity reported in I/B/E/S, including stock recommendations, quarterly and annual earnings-per-share forecasts, and long-term earnings growth forecasts. We measure general research experience as the number of days since an analyst first issued research on any company in the I/B/E/S database and company-specific research experience as the number of days since an analyst first issued research on a particular company. We measure an analyst's workload as the number of different companies or the number of different four-digit I/B/E/S sector industry groups (S/I/Gs)[14] for which the analyst issued research in a given calendar year.

The amount of resources devoted to investment research within brokerage houses also affects the quality of analysts' research (Clement 1999). Larger houses have access to better technology, information, and support staff. Accordingly, we use three measures of brokerage house size: the number of analysts issuing stock recommendations for a brokerage house over the course of a calendar year, book value of total assets, and net sales. All of our subsequent results are qual-

[14] The I/B/E/S sector industry group numbers are six-digit codes that provide information on the industry sectors and subsectors for companies in the I/B/E/S database. We use the first four digits, which correspond to broad industry groupings.

Table 1
Revenue Sources (%) of Analysts' Employers

Recommendation Level	Investment Banking		Brokerage Commission		Sample Size
	Mean	Median	Mean	Median	
5 (Strong buy)	13.94	11.81	29.87	24.09	28,901
4 (Buy)	13.81	11.21	26.68	17.22	37,478
3 (Hold)	12.68	11.13	28.44	24.07	37,883
2 (Sell)	11.61	10.55	23.13	16.12	4,875
1 (Strong sell)	16.27	14.90	33.44	24.95	1,356
p-Value (4 and 5) versus (1 and 2)	.0000	.0000	.0000	.0023	

Note. Shown are the percentages of analyst employer revenues from investment banking and brokerage commissions, by recommendation level. Data are for 110,493 stock recommendations and are drawn from the Institutional Brokers Estimate System U.S. Detail Recommendations History file for 1994–2003.

itatively similar under each of the three size measures. To save space, we report results only of tests based on the first size measure.

To capture the degree to which investors believe that individual analysts have skill in providing timely and accurate research, we use two measures of analysts' reputation. The first is based on *Institutional Investor* (*II*) magazine's All-America Research Team designation. Each year around October 15, *II* mails an issue to subscribers that lists the names of analysts who receive the most votes in a poll of institutional money managers. About 300–400 analysts are identified. We construct a variable that indicates, for each recommendation revision, whether the recommending analyst was named to the first, second, third, or honorable mention team in the latest annual survey. As a complementary, objective measure of analysts' reputation, we use a variable based on the *Wall Street Journal*'s (*WSJ*'s) annual All-Star Analysts Survey. The *WSJ* All-Star Analysts are determined by an explicit set of criteria relating to past stock-picking performance and forecasting accuracy.[15] The survey covers about 50 industries annually and names the top five stock pickers and top five earnings forecasters in each industry.[16]

Tables 1 and 2 report summary data on the characteristics of our sample. In Table 1, both the mean and the median percentages of analyst employer revenues derived from IB decline monotonically over the first four recommendation levels, but these values are the highest for strong sell recommendations. Similarly, it is the brokerage firms issuing strong sell recommendations that generally derive

[15] We recognize that the performance metrics used in the *Wall Street Journal* (*WSJ*) All-Star Analysts Survey are public information and can, in principle, be replicated by investors. However, to the extent that computing and evaluating analysts' performance is a costly activity, being named an All-Star Analyst can still affect an analyst's reputation and credibility.

[16] Since the I/B/E/S Broker Translation File provides only analysts' last names and first initials, in some instances it is not possible to ascertain from the I/B/E/S data alone whether an analyst in our sample was named to the *Institutional Investor* (*II*) or *WSJ* team. For these cases, we determine team membership of analysts from NASD BrokerCheck, an online database (http://www.nasd.com, accessed October 2004) that provides the full names of registered securities professionals as well as their employment and registration histories for the past 10 years. The database also keeps track of analysts' name changes (such as those resulting from marriage).

Table 2
Characteristics of Analysts, Firms, and Companies Followed

Characteristic	Mean	Median	SD	Sample Size
Investment banking revenue (%)	13.60	11.25	11.93	94,892
Brokerage commission revenue (%)	28.74	24.07	24.75	94,892
Analyst's company-specific experience (years)	2.42	1.20	3.29	85,531
Analyst's general experience (years)	6.41	4.90	5.32	85,531
Analysts employed by a firm	86.34	60	79.73	94,618
Companies followed by an analyst	17.24	15	12.93	84,016
Four-digit I/B/E/S S/I/Gs followed by an analyst	3.05	3	1.90	84,014
Institutional Investor All-America stock picker	.005	0	.07	85,531
Institutional Investor All-America Research Team member	.035	0	.18	85,531
Wall Street Journal All-Star stock picker	.018	0	.13	85,531
Wall Street Journal All-Star Analyst	.136	0	.34	85,531
Market capitalization ($ millions)	8,804.46	1,367.22	27,758.81	81,333
Analyst following	9.14	7	6.88	92,869

Note. Data are for 94,892 recommendation revisions and are drawn from the Institutional Brokers Estimate System (I/B/E/S) U.S. Detail Recommendations History file for 1994–2003. Recommendation revisions include recommendation changes as well as initiations, resumptions, and discontinuations of coverage. Analysts' experience is measured from all analyst research activity reported in I/B/E/S, including earnings-per-share forecasts, long-term earnings growth forecasts, and stock recommendations. An analyst is considered to be a top stock picker or team member if he or she appeared in the relevant portion of the most recent analyst survey by *Institutional Investor* or the *Wall Street Journal* at the time of a recommendation revision. Market capitalization is measured 12 months before the end of the current month, and analyst following is measured on the basis of stock recommendation coverage. Market capitalization values are inflation adjusted (with Consumer Price Index numbers and with 2003 as the base year). S/I/G = sector industry group.

the highest percentage of their total revenues from brokerage commissions. Notably, in each of the five categories, the mean percentage of revenue from commissions is about twice as large as the mean percentage of revenue from IB. This fact underscores the importance of trading commissions as a source of revenue for many securities firms. The last column shows that about 95 percent of the recommendations in the sample are at levels 5 (strong buy), 4 (buy), or 3 (hold). Levels 1 (strong sell) and 2 (sell) represent only about 1 percent and 4 percent of all recommendations, respectively.

The data in Table 2 provide a flavor of our sample of analysts and their employers. As noted by Hong, Kubik, and Solomon (2000), careers as analysts tend to be relatively short. The median recommendation is made by an analyst with under 5 years of experience, of which just over a year was spent following a given stock. Stock analysts tend to be highly specialized, following a handful of companies in a few industries. The median recommendation is made by an analyst following 15 companies in three industries who works for a securities firm employing 60 analysts. Being named as an All-America Research Team member by *II* is a rare honor, received by under 5 percent of all analysts in our sample. Finally, the typical company followed is large, with mean (median) market capitalization of about $8.8 billion ($1.4 billion) in inflation-adjusted

2003 dollars. Over the time span of a year, a company is tracked by a mean (median) of 9.1 (7) analysts.

4. Conflicts and the Levels of Analyst Recommendations Net of the Consensus

In this section, we examine whether the level of an analyst's stock recommendation net of the consensus (that is, median) recommendation level is related to the conflicts that he or she faces. We start by ascertaining the level of the outstanding recommendation on each stock by each analyst following it at the end of each quarter (March, June, September, December) from 1995 through 2003. An analyst's recommendation on a stock is included only if it is newly issued, reiterated, or revised in the preceding 12 months.

We estimate a regression explaining individual analysts' net stock recommendation levels at the end of a quarter (which is the recommendation level minus the median recommendation level across all analysts following a stock during the quarter).[17] The regression pools observations across analysts, stocks, and quarters and includes our two main explanatory variables: the percentage of an analyst employer's total revenues from IB and the percentage from brokerage commissions. Following Jegadeesh et al. (2004) and Kadan et al. (forthcoming), who find that momentum is an important determinant of analysts' recommendations, we control for the prior 6-month stock return.

The regression also controls for other factors that can affect the degree of analysts' optimism, such as the size of the company followed and the resources, reputation, experience, and workload of an analyst. As a measure of the resources available to an analyst, a dummy variable is used for a large brokerage house, and it equals one if the firm ranks in the top quartile of all houses in terms of the number of analysts employed during the year. The size of the company followed is measured by the natural logarithm of its market capitalization, measured 12 months before the end of the month. We measure an analyst's reputation by dummy variables that equal one if the recommending analyst was named in the most recent year as an All-America Research Team member by *II* or as an All-Star Analyst by the *WSJ*. An analyst's company-specific research experience is measured by the natural logarithm of one plus the number of days an analyst has been producing research (including earnings-per-share forecasts, long-term growth forecasts, or stock recommendations) on the company. We measure an analyst's workload by the natural logarithm of one plus the number of companies for which he or she produces forecasts or recommendations in the current year.

Finally, we control for industry and time period effects by adding dummy variables for I/B/E/S two-digit S/I/G industries and for each calendar quarter (March 1995, June 1995, and so forth). Since net recommendation levels can

[17] To ensure meaningful variation in the dependent variable, we omit stocks followed by only one analyst in a quarter.

Table 3
Ordered Probit Analysis of Recommendation Levels Net of the Consensus

Explanatory Variable	Coefficient	*z*-Statistic
Investment banking revenue (%)	.4167	17.35
Brokerage commission revenue (%)	.0363	3.00
Prior 6-month stock return	−.0068	−2.89
Large brokerage house dummy	−.0639	−8.60
Company size	.0038	2.89
Institutional Investor All-America Research Team dummy	.0032	.15
Wall Street Journal All-Star Analyst dummy	−.0196	−2.23
Company-specific research experience	.0012	1.42
Number of companies followed	.0070	4.64

Note. The results are from ordered probit regressions explaining individual analysts' stock recommendation levels net of the consensus (that is, median) recommendation level at the end of each quarter (March, June, September, December) for 1995–2003. Observations are excluded if the analyst issued no new or revised recommendation in the preceding 12 months. The regression includes observations pooled across analysts, stocks, and quarters. Data on recommendations are drawn from the Institutional Brokers Estimate System (I/B/E/S) U.S. Detail Recommendations History file for 1994–2003. Investment banking or brokerage commission revenue refer to the percentage of the brokerage firm's total revenues derived from investment banking or brokerage commissions. The large brokerage house dummy is an indicator variable that equals one if a brokerage house is in the top quartile of all houses, based on the number of analysts issuing stock recommendations listed in I/B/E/S in a given calendar year. Company size is the natural logarithm of the market capitalization of the company followed, measured 12 months prior to the end of the current month. The *Institutional Investor* All-America Research Team and *Wall Street Journal* All-Star Analyst dummies are indicator variables that equal one if the recommending analyst was listed as an All-America Research Team member or All-Star Analyst in the most recent analyst ranking. Company-specific research experience is the natural log of one plus the number of days that an analyst has been issuing I/B/E/S research on a company. Number of companies followed equals the natural log of one plus the number of companies followed by an analyst in the current calendar year. The regression includes dummy variables for two-digit I/B/E/S sector industry group industries and for calendar quarters. Test statistics are based on a robust variance estimator. The number of observations is 213,011; the *p*-value of the χ^2 test is <.0001.

take ordered values from −4 (strongly pessimistic) to 4 (strongly optimistic) in increments of .5, we estimate the regression as an ordered probit model.[18] The *Z*-statistics are based on a robust (Huber-White sandwich) variance estimator.

Table 3 shows the regression estimate. The coefficients of IB revenue percentage and commission revenue percentage are both positive. This finding implies that greater conflicts with IB and brokerage businesses lead an analyst to issue a higher recommendation on a stock relative to the consensus. Stocks followed by busier analysts and stocks of larger companies receive higher recommendations relative to the consensus. Stocks that experience a price run-up over the prior 6 months, stocks followed by analysts at large brokerage houses, and stocks followed by *WSJ* All-Star Analysts all receive lower recommendations relative to the consensus. All of these relations are highly statistically significant.

To provide a sense of the magnitude of the main effects of interest, we show in Table 4 the derivatives of the probability of each net recommendation level

[18] Notice that recommendation levels can take integer values from 1 to 5, and the median recommendation can take values from 1 to 5 in increments of .5. See Greene (2003) for a detailed exposition of the ordered probit model.

Table 4

Marginal Effects and Sample Distribution for the Ordered Probit Regression in Table 3

	Recommendation Level Net of the Consensus														
	−4	−3.5	−3	−2.5	−2	−1.5	−1	−.5	0	.5	1	1.5	2	2.5	3
Investment banking revenue (%)	−.00031	−.0002	−.0026	−.0010	−.0199	−.0086	−.0744	−.0321	.0123	.0325	.0671	.0077	.0188	.0002	.0003
Brokerage commission revenue (%)	−.00003	−.00001	−.0002	−.00009	−.0017	−.0008	−.0065	−.0028	.0011	.0028	.0059	.0007	.0016	.00002	.00003
Observed frequency	.0001	.0001	.0016	.0007	.0176	.0094	.1241	.0948	.4940	.0937	.1289	.0111	.0233	.0002	.0003

Note. Shown is the derivative of the probability of each net recommendation level with respect to investment banking or brokerage revenue percentage, estimated from the ordered probit regression in Table 3. Investment banking and brokerage commission revenue refer to the percentage of the brokerage firm's total revenues derived from investment banking and brokerage commissions. The last row shows observed frequency of each net recommendation level as a proportion of the sample of 213,011 observations.

with respect to IB revenue and commission revenue percentages.[19] Thus, for example, a 1-standard-deviation increase in IB revenue percentage increases the probability of an optimistic recommendation (that is, a net recommendation level greater than zero) by .1193 × (.0325 + .0671 + . . . + .0003) = .0151. Compared to the unconditional probability of an optimistic recommendation by an analyst, this represents an increase of about 5.9 percent (.0151/.2575). The effect of a change in commission revenue percentage is much smaller. A 1-standard-deviation increase in commission revenue percentage increases the probability of an optimistic recommendation by .2475 × .01105 = .0027, or about 1 percent (.0027/.2575) of the unconditional probability. Thus, despite possible concerns about a loss of reputation, analysts seem to respond to conflicts of interest, particularly those stemming from IB.

5. Conflicts and Investor Response to Recommendation Revisions

5.1 Stock Price Response

This section examines whether an analyst's credibility with investors is related to the degree of conflict faced. We interpret the reaction of stock prices to a recommendation revision as an indication of an analyst's credibility. Our analysis focuses on revisions in recommendation levels, rather than on recommendation levels per se, because revisions are discrete events that are likely to be salient for investors, and previous research finds that revisions have significant information content (see, for example, Womack 1996; Jegadeesh et al. 2004). To capture the effects of the most commonly observed and economically important types of revisions, we structure our tests around four basic categories: added to strong buy, added to buy or strong buy, dropped from strong buy, and dropped from buy or strong buy.[20] These four categories are defined to include initiations, resumptions, and discontinuations of coverage because such events also reflect analysts' positive or negative views about a company.[21] Thus, for example, we consider a stock to be added to strong buy under two scenarios: (*a*) the recommendation level is raised to strong buy from a lower level or (*b*) coverage is

[19] Notice that, for each explanatory variable, these derivatives sum to zero across all the net recommendation levels.

[20] Our analysis focuses on these four types of revisions instead of the other four (added to strong sell, and so forth) because, as shown in Table 1, sell and strong sell recommendations are quite rare. But note that dropped-from-buy and dropped-from-buy-or-strong-buy revisions can entail movement to the sell or strong sell category.

[21] We use the I/B/E/S Stopped Recommendations file to determine instances in which a brokerage firm discontinued coverage of a company. This file contains numerous cases in which an analyst stops coverage of a stock only to issue a new recommendation a month or two later. Conversations with I/B/E/S representatives indicate that such events likely represent pauses in coverage due to company quiet periods or analysts' reassignments within a brokerage house. We define a stopped coverage event to be a true stoppage only if the analyst does not issue a recommendation on the stock over the subsequent 6 months.

initiated or resumed at the level of strong buy.[22] Defining revisions in this fashion yields a sample of 94,892 recommendation revisions made over the 1994–2003 period.

5.1.1. Average Response

We compute the abnormal return on an upgraded or downgraded stock over day t as the return (including dividends) on the stock minus the return on the Center for Research in Security Prices equal-weighted market portfolio of New York Stock Exchange (NYSE), American Stock Exchange, and NASDAQ stocks. The cumulative abnormal return (CAR) on the stock over days t_1 to t_2 relative to the revision date (day 0) is measured as the sum of the abnormal returns over those days. Table 5 shows mean and median CARs for three windows: days -1 to 0, -1 to 1, and -5 to 5. The t-statistics for the difference of the mean abnormal returns from zero are computed as in Brown and Warner (1985) and are shown in parentheses. The p-values for the Wilcoxon test are reported in parentheses with the medians.

It is clear from Table 5 that recommendation revisions have large effects on stock prices. For example, when a stock is added to the strong-buy list, it experiences a mean abnormal return of about 2 percent over the 2-day revision period. Downgrades have even larger effects on stock prices than do upgrades. Strikingly, the 2-day mean abnormal return around the dropped-from-strong-buy list is -4 percent. Median values are consistently smaller in magnitude than are means, and this finding indicates that some revisions lead to price reactions of a very large magnitude. Mean and median 2-day abnormal returns are statistically different from zero for all four groups of forecast revisions. The magnitudes of abnormal returns are somewhat larger over the 3-day and 11-day windows than over the 2-day window. Overall, these returns are consistent with those found by prior research that examines the average stock price impact of recommendation revisions (for example, Womack 1996; Jegadeesh et al. 2004).

5.1.2. Cross-Sectional Analysis

Table 6 contains cross-sectional regressions of stock price reactions to recommendation revisions over days -1 to 1. The main explanatory variables of interest in these regressions are our revenue-based measures of the magnitudes of IB and brokerage conflicts. We include controls for the size of an analyst's employer, the size of the company followed, and measures of an analyst's reputation, experience, and workload.[23] We estimate a separate regression for each

[22] Note that the definitions of our four recommendation revision groups imply that stocks can be added to a group more than once on a given day. Nonetheless, excluding days on which a stock experiences multiple revisions does not change any of our qualitative results.

[23] Prior research finds that analysts who have more experience, carry lower workloads, or are employed by larger firms tend to generate more precise research (see, for example, Clement 1999; Jacob, Lys, and Neale 1999; Mikhail, Walther, and Willis 1997). In addition, more reputed analysts tend to generate timelier and more accurate research (see, for example, Stickel 1992; Hong and Kubik 2003). We expect such analysts to be more influential with investors.

Table 5
Cumulative Abnormal Returns surrounding Revisions in Analyst Stock Recommendations

	Days −1 to 0			Days −1 to 1			Days −5 to 5		
Recommendation Revision	Mean (*t*-Statistic)	Median (*p*-Value)	*N*	Mean (*t*-Statistic)	Median (*p*-Value)	*N*	Mean (*t*-Statistic)	Median (*p*-Value)	*N*
Upgrades:									
Added to strong buy	.0207	.0109	24,560	.0240	.0130	24,556	.0263	.0187	24,499
	(49.53)*	(.000)		(46.89)*	(.000)		(26.84)*	(.000)	
Added to buy or strong buy	.0149	.0071	36,879	.0165	.0085	36,875	.0207	.0128	36,780
	(46.47)*	(.000)		(42.01)*	(.000)		(27.53)*	(.000)	
Downgrades:									
Dropped from buy or strong buy	−.0337	−.0126	33,322	−.0358	−.0155	33,262	−.0491	−.0287	33,197
	(−56.21)*	(.000)		(−48.75)*	(.000)		(−34.92)*	(.000)	
Dropped from strong buy	−.0399	−.0153	22,825	−.0427	−.0183	22,795	−.0570	−.0326	22,767
	(−49.88)*	(.000)		(−43.58)*	(.000)		(−30.38)*	(.000)	

Note. The sample of recommendation revisions is drawn from the Institutional Brokers Estimate System (I/B/E/S) U.S. Detail Recommendations History file for 1994–2003. Recommendation revisions include recommendation changes and initiations, resumptions, and discontinuations in coverage. Day 0 is the revision date. Recommendation revisions are classified according to the level of any existing recommendation and whether coverage is being initiated or dropped. For example, a revision by an analyst is classified as added to strong buy if the new recommendation is strong buy and (*a*) the previous recommendation was lower than strong buy or (*b*) analyst coverage by the brokerage house is resumed or initiated. A recommendation is classified as dropped from strong buy if the previous recommendation was strong buy and (*a*) the new recommendation is lower than strong buy or (*b*) research coverage on the company is stopped. The *t*-statistics for the difference from zero are computed as in Brown and Warner (1985). The *p*-values for the difference from zero are from a Wilcoxon test.

*Statistically significant at the 1% level in two-tailed tests.

Table 6

Cross-Sectional Regressions of Cumulative Abnormal Returns over Days −1 to +1 surrounding Recommendation Revisions

Explanatory Variable	Added to Strong Buy	Added to Buy or Strong Buy	Dropped from Buy or Strong Buy	Dropped from Strong Buy
Intercept	.0369	.0412	−.2294	−.2224
	(7.66)**	(11.21)**	(−31.31)**	(−29.25)**
Investment banking revenue (%)	−.0262	−.0139	−.0200	−.0354
	(−5.65)**	(−3.57)**	(−2.74)**	(−3.92)**
Brokerage commission revenue (%)	−.0187	−.0148	−.0089	−.0013
	(−6.51)**	(−6.43)**	(−2.39)*	(−.29)
Large brokerage house dummy	.0116	.0088	−.0242	−.0220
	(7.46)**	(6.88)**	(−12.79)**	(−10.25)**
Company size	−.0056	−.0041	−.0004	.0018
	(−16.13)**	(−15.40)**	(−.97)	(3.77)**
Institutional Investor All-America Research Team dummy	.0159	.0122	−.0148	−.0207
	(4.11)**	(3.82)**	(−2.93)**	(−3.28)**
Wall Street Journal All-Star Analyst dummy	.0015	.0013	−.0011	.0045
	(.81)	(.84)	(−.48)	(1.78)
Company-specific research experience	.0017	.0019	.0039	.0018
	(8.42)**	(12.49)**	(7.37)**	(3.21)**
Number of companies followed	−.0012	−.0016	.0007	.0008
	(−2.97)**	(−5.37)**	(1.49)	(1.31)
Observations	19,440	28,665	28,618	19,632
Adjusted R^2	.038	.0240	.028	.035
P-Value of *F*-test	<.0001	<.0001	<.0001	<.0001

Note. Shown are coefficient estimates and (in parentheses) *t*-statistics from ordinary least squares regressions. Day 0 is the recommendation revision date. Data on recommendations are drawn from the Institutional Brokers Estimate System (I/B/E/S) U.S. Detail Recommendations History file for 1994–2003. Investment banking and brokerage commission revenue refer to the percentages of a brokerage firm's total revenues derived from investment banking and brokerage commissions. The large brokerage house dummy is an indicator variable that equals one if a brokerage house is in the top quartile of all houses, based on the number of analysts issuing stock recommendations listed in I/B/E/S in a given calendar year. Company size is the natural logarithm of the market capitalization of the company followed, measured 12 months prior to the end of the current month. The *Institutional Investor* All-America Research Team and *Wall Street Journal* All-Star Analyst dummies are indicator variables that equal one if the recommending analyst was listed as an All-America Research Team member or All-Star Analyst in the most recent analyst ranking. Company-specific research experience is the natural log of one plus the number of days that an analyst has been issuing I/B/E/S research on a company. Number of companies followed equals the natural log of one plus the number of companies followed by an analyst in the current calendar year. All regressions include dummy variables for calendar-year and two-digit I/B/E/S sector industry group industries (not reported). The *t*-statistics are based on a robust variance estimator.

* Statistically significant at the 5% level in two-tailed tests.

** Statistically significant at the 1% level in two-tailed tests.

of the four groups of recommendation revisions. The *t*-statistics based on a robust variance estimator are reported in parentheses.

The coefficient on IB revenue percentage is statistically significantly negative for both upgrades and downgrades. The coefficient on brokerage commission revenue percentage is also negative in all four regressions; it is statistically significant in all cases, except for the dropped-from-strong-buy revisions.[24] Collectively, these results favor the rational discounting hypothesis over the naive investor hypothesis. The magnitudes of these effects are nontrivial. For instance, a 1-standard-deviation increase in IB revenue percentage leads to a change of about −.31 (−.42) percentage points in the 3-day abnormal return around the move to (from) a strong buy recommendation. Similarly, a 1-standard-deviation increase in brokerage commission revenue percentage leads to a change of about −.37 (−.22) percentage points in the corresponding abnormal return around the move to (from) a buy or strong buy recommendation.[25]

The results for control variables are also noteworthy. The dummy variable for a large analyst employer is positively (negatively) related to the market reaction to upgrades (downgrades). This finding is consistent with the idea that revisions by analysts employed at larger brokerage houses (which tend to be more reputable) have more credibility with investors. The size of the company followed is negatively (positively) related to the market reaction to upgrades (downgrades), which is consistent with the notion that, for larger companies, an analyst's recommendation competes with more alternative sources of information and advice.

Revisions by *II* All-America Research Team analysts are positively (negatively) related to the stock price reaction to upgrades (downgrades), which suggests that they wield more influence with investors. This is a notable finding; we are unaware of previous work documenting a relation between an analyst's reputation and the stock price reaction to both upgrades and downgrades. As the coefficient on the *WSJ* All-Star Analyst dummy indicates, however, being designated as a *WSJ* All-Star Analyst does not seem to enhance the credibility of an analyst's recommendations.[26] The absence of an effect here is somewhat

[24] These and all subsequent regression results in this article are qualitatively similar when we winsorize the dependent variable at the first and ninety-ninth percentiles of its distribution.

[25] For each group of revisions (such as added to strong buy), we also estimate the regression after excluding similar revision events that a stock experiences within 3 days of a given revision event. These results are qualitatively similar to those reported in Tables 6 and 8. We also examine the possibility that investors perceived the conflicts to be more severe, and hence discounted them more, in securities firms that were charged by regulators (that is, the 10 firms that were part of the global analyst settlement) than in other firms. We do this by interacting both investment banking (IB) revenue percentage and brokerage commission revenue percentage variables in the regression with binary (0, 1) dummy variables for securities firms that are part of the global analyst settlement and firms that are not. We find no significant differences between the two groups of firms in their coefficients on IB revenue percentage and commission revenue percentage.

[26] Although *II* All-America Research Team and *WSJ* All-Star Analyst dummies both measure aspects of an analyst's reputation, they are not highly correlated. The correlation coefficient is .14 across all upgrades and .13 across all downgrades.

surprising given that the *WSJ* has a much broader readership base than that of *II*. One explanation is that *II* analyst rankings are based on an opinion poll of money managers, who control substantial assets and therefore directly affect stock prices, while *WSJ* rankings are based on strictly quantitative measures of analysts' past stock-picking or forecasting performance.

The market reaction to upgrades is positively related to an analyst's company-specific research experience. This finding suggests that more experienced analysts tend to be more influential with investors. But the reaction to downgrades is also positively related to analysts' experience. Finally, the stock price reaction to upgrades is negatively related to analysts' workload. This finding suggests that busier analysts' opinions tend to get discounted by the market. All of these relations are statistically significant.

5.2. Response of Trading Volume

In this section, we measure analysts' credibility via changes in the volume of trade around recommendation revisions.[27] Revisions of analysts' recommendations can affect trading volumes by inducing investors to rebalance their portfolios to reflect updated beliefs.

5.2.1. Average Response

We compute the abnormal volume for a trading day t as the mean-adjusted share turnover for stock i:[28]

$$e_{it} = v_{it} - v_i, \tag{1}$$

where v_{it} is the trading volume of stock i over day t divided by common shares outstanding on day t and v_i is the mean of v_{it} over days -35 to -6.

The cumulative abnormal volume (CAV) for stock i over days t_1 to t_2 is measured in the following way:

$$\mathrm{CAV}^i t_1, t_2 = \sum_{t=t_1}^{t_2} e_{it}. \tag{2}$$

Table 7 shows mean and median CAV values over three windows surrounding revisions in analyst stock recommendations. Over the 2-day revision period, the mean abnormal volume is positive for both upgrades and downgrades, but its magnitude is substantially larger for downgrades. The move to (from) the strong-buy list increases a stock's trading volume by a mean of about .9 percent (2.6 percent) of the outstanding shares, compared to a normal day's volume. For longer windows, the mean abnormal volumes are substantially higher for down-

[27] Many prior studies have used trading volume to examine investors' response to informational events (see, for example, Shleifer 1986; Jain 1988; Jarrell and Poulsen 1989; Meulbroek 1992; Sanders and Zdanowicz 1992).

[28] This approach has been used in a number of prior studies (for example, Shleifer 1986; Vijh 1994; Michaely and Vila 1996).

Table 7

Cumulative Abnormal Trading Volumes surrounding Announcements of Revisions in Stock Recommendations by Analysts

	Days −1 to 0			Days −1 to 1			Days −5 to 5		
Recommendation revision	Mean (*t*-Statistic)	Median (*p*-Value)	*N*	Mean (*t*-Statistic)	Median (*p*-Value)	*N*	Mean (*t*-Statistic)	Median (*p*-Value)	*N*
Upgrades:									
Added to strong buy	.0086	.0011		.0097	.0015		.0071	.0030	
	(8.89)*	(.000)	24,506	(8.18)*	(.000)	24,502	(3.13)*	(.000)	24,488
Added to buy or strong buy	.0053	.0002		.0058	.0004		.0020	.0008	
	(5.08)*	(.000)	36,800	(4.54)*	(.000)	36,796	(.818)	(.000)	36,766
Downgrades:									
Dropped from buy or strong buy	.0217	.0010		.0265	.0014		.0381	.0039	
	(114.47)*	(.000)	33,291	(114.14)*	(.000)	33,232	(85.70)*	(.000)	33,175
Dropped from strong buy	.0259	.0017		.0315	.0025		.0453	.0057	
	(128.76)*	(.000)	22,808	(127.86)*	(.000)	22,779	(96.03)*	(.000)	22,756

Note. The abnormal volume for stock i on day t is computed from daily Center for Research in Security Prices data as $e_{it} = v_{it} - v_i$, where v_{it} is the volume on day t and v_i is the average volume over days −35 to −6 relative to the recommendation revision date (day 0). All share volumes are normalized by dividing by common shares outstanding on the same day. The *p*-values are from a Wilcoxon test.

*Statistically significant at the 1% level in two-tailed tests.

grades. The median values are lower than the mean values. Each mean and median abnormal volume is statistically greater than zero, with a *p*-value below .01. Clearly, revisions of stock recommendations by analysts generate trading.

5.2.2. Cross-Sectional Analysis

Table 8 presents cross-sectional regressions explaining CAVs over days −1 to 1 surrounding the recommendation revisions. The explanatory variables in the regressions are the same as in regressions of CARs in Section 5.1.2. The results provide strong support for the rational discounting hypothesis. The coefficients on both the IB revenue percentage and commission revenue percentage variables are generally statistically significant and negative (positive) for both groups of upgrades (downgrades). The magnitudes of these effects are nontrivial. For example, a 1-standard-deviation increase in IB revenue percentage leads to a change in the 3-day abnormal volume around the addition (omission) of a stock to (from) the strong-buy list of about −.12 percent (.36 percent) of the outstanding shares; a corresponding change in the commission revenue percentage results in a change in the abnormal volume of about −.15 percent (.22 percent).

Recommendation revisions by larger brokerage houses generate more trading. The abnormal volume is also larger for revisions involving smaller companies. Revisions by *II* All-America Research Team members generate statistically significantly more abnormal volume for the dropped from buy or strong-buy group. Upgrades (downgrades) by more experienced analysts result in larger (smaller) abnormal volumes, and upgrades by busier analysts are less credible.

6. Conflicts and the Performance of Recommendation Revisions

We next consider the investment performance of analysts' recommendation revisions over periods of up to 12 months. Here, the choice of the benchmark used to compute abnormal returns is somewhat more important than it is in Section 5.1, where we measure abnormal returns over a few days around the revision. But the results here are likely to be less sensitive to the benchmark employed than are those in studies of long-run stock performance, where the time period of interest can be as long as 5–10 years (see, for example, Agrawal, Jaffe, and Mandelker 1992; Agrawal and Jaffe 2003).

6.1. Average Performance

We use an approach similar to Barber, Lehavy, and Trueman (2007). To evaluate the performance of stocks over a given window, say, months 1–12 following the month of their inclusion (month 0) in a given group of revisions such as the added-to-strong-buy list, we form a portfolio *p* that initially invests $1 in each recommendation. Each recommended stock remains in the portfolio until month 12 or the month that the stock is either downgraded or dropped from coverage by the securities firm, whichever is earlier. If multiple securities firms recommend a stock in a given month, the stock appears multiple times in the

Table 8

Cross-Sectional Regressions of Cumulative Abnormal Trading Volumes over Days −1 to +1 surrounding Recommendation Revisions

Explanatory Variable	Added to Strong Buy	Added to Buy or Strong Buy	Dropped from Buy or Strong Buy	Dropped from Strong Buy
Intercept	.0083	.0042	.0946	.0828
	(2.65)**	(1.90)	(13.72)**	(15.01)**
Investment banking revenue (%)	−.0100	−.0085	.0140	.0304
	(−3.31)**	(−2.26)*	(2.18)*	(3.63)**
Brokerage commission revenue (%)	−.0057	−.0059	.0087	.0055
	(−1.76)	(−4.13)**	(2.76)**	(1.45)
Large brokerage house dummy	.0058	.0038	.0168	.0171
	(3.72)**	(4.50)**	(11.12)**	(9.48)**
Company size	−.0031	−.0018	−.0023	−.0041
	(−9.54)**	(−12.30)**	(−7.60)**	(−11.40)**
Institutional Investor All-America Research Team dummy	.0035	.0033	.0084	.0046
	(1.74)	(1.88)	(2.32)*	(1.21)
Wall Street Journal All-Star Analyst dummy	.0008	.0013	.0023	−.0006
	(.74)	(1.42)	(1.36)	(−.29)
Company-specific research experience	.0010	.0010	−.0041	−.0019
	(8.39)**	(11.19)**	(−6.18)**	(−4.11)**
Number of companies followed	−.0009	−.0013	−.0001	−.0005
	(−3.49)**	(−6.23)**	(−.38)	(−.99)
Observations	19,431	28,653	28,594	19,619
Adjusted R^2	.025	.019	.030	.042
p-Value of *F*-test	<.0001	<.0001	<.0001	<.0001

Note. Shown are coefficient estimates and (in parentheses) *t*-statistics from ordinary least squares regressions. Day 0 is the recommendation revision date. Data on recommendations are drawn from the Institutional Brokers Estimate System (I/B/E/S) U.S. Detail Recommendations History file for 1994–2003. Investment banking and brokerage commission revenue refer to the percentage of brokerage firm's total revenues derived from investment banking and brokerage commissions. The large brokerage house dummy is an indicator variable that equals one if a brokerage house is in the top quartile of all houses, based on the number of analysts issuing stock recommendations listed in I/B/E/S in a given calendar year. Company size is the natural logarithm of the market capitalization of the company followed, measured 12 months prior to the end of the current month. The *Institutional Investor* All-America Research Team and *Wall Street Journal* All-Star Analyst dummies are indicator variables that equal one if the recommending analyst was listed as an All-America Research Team member or All-Star Analyst in the most recent analyst ranking. Company-specific research experience is the natural log of one plus the number of days that an analyst has been issuing I/B/E/S research on a company. Number of companies followed equals the natural log of one plus the number of companies followed by an analyst in the current calendar year. All regressions include dummy variables for calendar-year and two-digit I/B/E/S sector industry group industries (not reported). The *t*-statistics are based on a robust variance estimator.

*Statistically significant at the 5% level in two-tailed tests.

**Statistically significant at the 1% level in two-tailed tests.

portfolio that month, once for each securities firm with a strong buy recommendation. The portfolio return for calendar month t is given by

$$R_{pt} = \sum_{i=1}^{n_t} x_{it} \times R_{it} \Big/ \sum_{i=1}^{n_t} x_{it}, \tag{3}$$

where R_{it} is the month t return on recommendation i, x_{it} is one plus the compound return on the recommendation from month 1 to month $t-1$ (that is, x_{it} equals one for a stock that was recommended in month t), and n_t is the number of recommendations in the portfolio. This calculation yields a time series of monthly returns for portfolio p.

We compute the abnormal performance of portfolio p as the estimate of the intercept term α_p from the Fama and French (1993) three-factor model. Accordingly, we estimate the following time-series regression for portfolio p:

$$R_{pt} - R_{ft} = \alpha_p + \beta_{1p}(R_{mt} - R_{ft}) + \beta_{2p}\text{SMB}_t + \beta_{3p}\text{HML}_t + \varepsilon_{pt},$$
$$t = \text{January 1994 to December 2003}, \tag{4}$$

where R_f is the risk-free rate, R_m is the return on the value-weighted market index, SMB equals the monthly return on a portfolio of small firms minus the return on a portfolio of big firms, and HML is the monthly return on a portfolio of firms with high book-to-market ratio minus the return on a portfolio of firms with low book-to-market ratio. The error term in the regression is denoted ε. The time series of monthly returns on $R_m - R_f$, SMB, and HML are obtained from Kenneth French's Web site.[29] We repeat this procedure for each time window of interest, such as months 1–3, and for each group of revisions, such as the dropped-from-strong-buy list.

Table 9 shows the performance of analysts' recommendation revisions. Over the period of 3 months following the month of recommendation revision, the average abnormal returns for upgrades are positive, and the returns for downgrades are negative. The magnitudes of these returns are nontrivial. For example, the addition of a stock to the strong-buy list has an abnormal monthly return of about .875 percent, or about 2.62 percent over the 3-month period. The pattern is generally similar over longer windows. For example, over months 1–12, the abnormal monthly return for the added-to-strong-buy list is .679 percent, or about 8.15 percent over the 12-month period. The abnormal returns are significantly different from zero for upgrades in all cases; they are statistically insignificant for downgrades in all cases except one.

[29] Kenneth R. French, Fama/French Factors (file F-F_Research_Data_Factors.zip at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html).

Table 9
Medium-Term Investment Performance of Recommendation Revisions

	Months 1–3		Months 1–6		Months 1–12	
Portfolio	Abnormal Monthly Return (%)	*t*-Statistic	Abnormal Monthly Return (%)	*t*-Statistic	Abnormal Monthly Return (%)	*t*-Statistic
Added to strong buy	.875	6.12**	.758	6.12**	.679	5.70**
Added to buy or strong buy	.586	4.49**	.511	4.82**	.503	5.38**
Dropped from buy or strong buy	−.361	−1.60	−.260	−1.28	−.072	−.44
Dropped from strong buy	−.367	−1.58	−.395	−2.00*	−.231	−1.49

Note. Abnormal returns are reported for three event windows relative to the month of revision (month 0) and are computed using an approach similar to that in Barber, Lehavy, and Trueman (2007). The abnormal return is the estimated intercept from a time-series regression of 114 monthly portfolio returns using the Fama and French (1993) three-factor model.
* Statistically significant at the 5% level in two-tailed tests.
** Statistically significant at the 1% level in two-tailed tests.

6.2. Cross-Sectional Analysis

Table 10 shows the results of a regression similar to that in Section 5.1.2, except that the dependent variable here is the average monthly abnormal return for a firm over months 1–12 following the month of a recommendation revision. We compute this abnormal return by estimating a time-series regression similar to that in equation (4) over months 1–12 for each stock in a sample of recommendation revisions. The intercept from this regression is our estimate of the performance of the recommendation revision. Observations involving recommendation revisions on a stock that occur within 12 months of an earlier revision are omitted from each regression.[30]

In each regression result reported in Table 10, the coefficients of IB revenue percentage and commission revenue percentage are not statistically significantly different from zero. These results favor the rational discounting hypothesis, at least for the marginal investor. The performance of both groups of recommendation upgrades is negatively related to company size; the performance of one group of downgrades is positively related to the dummy variable for *WSJ* All-Star Analysts. None of the other variables is statistically significant.

7. Bubble versus Postbubble Periods

We next exploit the fact that our sample spans both the late-1990s U.S. stock bubble and a postbubble period. During the bubble period, initial public offerings, merger activities, and stock prices were near record highs, and media attention was focused on analysts' pronouncements. We therefore examine whether analysts' behavior and investors' responses to analysts' recommendations differed during the bubble and postbubble periods. Given the euphoria on Wall

[30] The results are qualitatively similar when we include these observations.

Table 10

Cross-Sectional Regressions of Average Monthly Abnormal Returns following Recommendation Revisions over Months 1–12

Explanatory Variable	Added to Strong Buy	Added to Buy or Strong Buy	Dropped from Buy or Strong Buy	Dropped from Strong Buy
Intercept	.0523	.0089	−.0646	−.0821
	(1.81)	(.49)	(−6.81)**	(−6.55)**
Investment banking revenue (%)	−.0089	−.0018	.0042	−.0068
	(−1.23)	(−.29)	(.64)	(−.87)
Brokerage commission revenue (%)	.0064	.0059	.0057	.0031
	(1.32)	(1.54)	(1.21)	(.75)
Large brokerage house dummy	.0009	−.0027	.0016	.0015
	(.38)	(−1.32)	(.72)	(.77)
Company size	−.0013	−.0017	−.0007	−.0007
	(−2.74)**	(−4.18)**	(−1.71)	(−1.54)
Institutional Investor All-America analyst dummy	−.0029	.0001	−.0016	−.0009
	(−.58)	(.01)	(−.44)	(−.23)
Wall Street Journal All-Star Analyst dummy	.0031	.0002	−.0029	.0056
	(1.24)	(.12)	(−1.42)	(2.29)*
Company-specific research experience	.0004	.0004	.0004	.0004
	(1.08)	(1.80)	(.76)	(.92)
Number of companies followed	−.0011	−.0008	−.0002	−.0002
	(−1.61)	(−1.79)	(−.45)	(−.47)
Observations	6,411	8,851	10,644	8,368
Adjusted R^2	.026	.023	.019	.020
p-Value of *F*-test	<.0001	<.0001	<.0001	<.0001

Note. Shown are the coefficient estimates and (in parentheses) *t*-statistics from ordinary least squares regressions. Month 0 is the month of recommendation revision. The abnormal return is the estimated intercept from a time-series regression of monthly portfolio returns in accordance with the Fama and French (1993) three-factor model. Data on recommendations are drawn from the Institutional Brokers Estimate System (I/B/E/S) U.S. Detail Recommendations History file for 1994–2003. Investment banking and brokerage commission revenue data refer to the percentage of the brokerage firm's total revenues derived from investment banking and brokerage commissions. The large brokerage house dummy is an indicator variable that equals one if a brokerage house is in the top quartile of all houses, based on the number of analysts issuing stock recommendations on I/B/E/S in a given calendar year. Company size is the natural logarithm of the market capitalization of the company followed, measured 12 months prior to the end of the current month. The *Institutional Investor* All-America Research Team and *Wall Street Journal* All-Star Analyst dummies are indicator variables that equal one if the recommending analyst was listed as an All-America Research Team member or All-Star Analyst in the most recent analyst ranking. Company-specific research experience is the natural log of one plus the number of days that an analyst has been issuing I/B/E/S research on a company. Number of companies followed equals the natural log of one plus the number of companies followed by an analyst in the current calendar year. All regressions include dummy variables for calendar-year and two-digit I/B/E/S sector industry group industries (not reported). The *t*-statistics are based on a robust variance estimator.

* Statistically significant at the 5% level in two-tailed tests.

** Statistically significant at the 1% level in two-tailed tests.

Table 11
Ordered Probit Regression of Recommendation Levels Net of the Consensus for Bubble versus Postbubble Periods

	Bubble	Postbubble	*p*-Value
Investment banking revenue (%)	.5103*	.3089*	<.001
Brokerage revenue (%)	−.1868*	.2286*	<.001

Note. The explanatory variables are as in Table 3, except that (*a*) the investment banking revenue and brokerage commission revenue percentage variables are interacted with dummy variables for the bubble or postbubble period and (*b*) calendar-quarter dummies are replaced with a postregulation indicator (which is equal to one for quarters after May 2002). Shown are the coefficient estimates of investment banking and brokerage revenue percentage variables for the bubble and postbubble periods and the *p*-value for the difference in the coefficient estimate between the two periods. All test statistics use robust variance estimators.
* Statistically significant at the 1% level in two-tailed tests.

Street and among investors during the bubble, analysts appear to have been under acute pressure to generate IB fees and brokerage commissions. As for the response of investors, the rational discounting hypothesis predicts greater discounting of analysts' opinions during this period in response to heightened conflicts, while the naive investor hypothesis predicts less discounting.

We estimate regressions similar to those for relative recommendation levels (Table 3), those for announcement abnormal returns (Table 6), those for announcement abnormal volumes (Table 8), and those for 12-month investment performance of recommendation revisions (Table 10), except that we now interact IB revenue percentage and commission revenue percentage with dummy variables for the bubble (January 1996–March 2000) and postbubble (April 2000–December 2003) periods. Accordingly, we restrict the sample period for these regressions to January 1996–December 2003. For regressions corresponding to those with results shown in Table 3, we also replace the calendar-quarter dummies with a postregulation indicator (equal to one for quarters ending after May 2002). In May 2002, both the NYSE and the National Association of Securities Dealers considerably tightened the regulations on the production and dissemination of sell-side analyst research.[31] The findings of Barber et al. (2006) and Kadan et al. (forthcoming) suggest that these regulations exerted a downward pressure on recommendation levels. The regression results are presented in Tables 11 and 12. To save space, we report only the coefficient estimates for IB revenue percentage and commission revenue percentage.

The results in Table 11 show that analysts appear to have inflated their recommendations in response to IB conflicts during both the bubble and postbubble periods. But the magnitude of this effect is substantially greater during the bubble period than during the postbubble period. This difference is statistically significant. The magnitude of the effect is smaller for brokerage conflicts than for IB conflicts during both periods. In fact, the effect for brokerage conflicts is negative

[31] See NYSE Amended Rule 472, "Communications with the Public," and National Association of Securities Dealers Rule 2711, "Research Analysts and Research Reports."

Table 12

Ordinary Least Squares Regressions of Abnormal Returns, Abnormal Volumes, and Abnormal Stock Performance for Bubble and Postbubble Periods

	Added to Strong Buy			Added to Buy or Strong Buy			Dropped from Buy or Strong Buy			Dropped from Strong Buy		
	Bubble	Postbubble	*p*-Value	Bubble	Postbubble	*p*-Value	Bubble	Postbubble	*p*-Value	Bubble	Postbubble	*p*-Value
CARs, days −1 to 1:												
Investment banking revenue (%)	−.0248**	−.0120	.083	−.0121**	−.0080	.517	−.0125	−.0379**	.027	−.0361**	−.0345**	.908
Brokerage revenue (%)	−.0114**	−.0105**	.827	−.0099**	−.0110**	.720	−.0063	−.0208**	.003	.0017	−.0114*	.024
CAVs, days −1 to 1:												
Investment banking revenue (%)	−.0076	−.0052	.655	−.0065	−.0082*	.699	.0257**	.0130	.214	.0555**	.0153	.002
Brokerage revenue (%)	−.0042	−.0008	.376	−.0054**	−.0031	.179	.0106*	.0139**	.521	.0046	.0141**	.056
Average monthly CARs, months 1–12:												
Investment banking revenue (%)	−.0016	−.0151	.273	.00001	.0083	.420	−.0085	.0223**	.003	−.0123	−.0051	.564
Brokerage revenue (%)	.0069	.0108	.511	.0086	.0096	.842	.0035	.0136	.101	−.0036	.0091	.019

Note. The explanatory variables are as in Tables 6, 8, and 10, except that the investment banking revenue and brokerage commission revenue percentage variables are interacted with dummy variables for the bubble or postbubble period. Shown are the coefficient estimates of the investment banking and brokerage revenue percentage variables for the bubble and postbubble periods and the *p*-value for the difference in the coefficient estimate between the two periods. Day (month) 0 is the recommendation revision date. All test statistics use robust variance estimators. CAR = cumulative abnormal return; CAV = cumulative abnormal volume.

*Statistically significant at the 5% level in two-tailed tests.

**Statistically significant at the 1% level in two-tailed tests.

during the bubble; it is positive and statistically significantly higher during the postbubble period.

Table 12 shows that, in regressions of 3-day abnormal returns, the coefficients of both IB revenue percentage and commission revenue percentage are negative and statistically significant during the bubble period for both groups of upgrades. For the added-to-strong-buy group, the coefficient of IB revenue percentage is significantly lower during the bubble period than during the postbubble period. For downgrades, the coefficients of both variables are generally negative in both periods, and they are statistically significantly lower during the postbubble period.

In regressions of 3-day abnormal volumes, the coefficients of IB revenue percentage and commission revenue percentage are negative for upgrades and positive for downgrades in all cases, both during and after the bubble. These coefficients are not statistically significantly different between the bubble and postbubble periods for both groups of upgrades and one group of downgrades. For the dropped-from-strong-buy group, the coefficient of IB revenue percentage is statistically significantly larger during the bubble period than during the postbubble period, but the coefficient of the commission revenue percentage is statistically significantly smaller. In regressions of 12-month postrecommendation stock performance, the coefficients of both variables are statistically insignificant both during and after the bubble period in nearly all cases, and this finding is consistent with the results shown in Table 10 for the full sample period.

Overall, analysts appear to respond to IB conflicts both during and after the bubble, but the magnitude of their response declines during the postbubble period. Perversely, while analysts do not seem to respond to brokerage conflicts during the bubble, they appear to do so after the bubble. Perhaps the intense regulatory and media focus on IB conflicts has led analysts to look for alternative avenues. Did investors discount conflicted analysts' opinions more during the bubble than in the postbubble period? The answer to this question is unclear. However, our evidence does not support the notion that investors threw caution to the wind during the bubble.

8. Summary and Conclusions

Following the collapse of the late-1990s U.S. stock market bubble, there has been a widespread hue and cry from investors and regulators over the conflicts of interest faced by Wall Street stock analysts. The discovery of e-mail messages, in which analysts were privately disparaging stocks that they were touting publicly, led to the landmark $1.4 billion settlement between a number of leading Wall Street firms and securities regulators in April 2003. The settlement requires the firms to disclose IB conflicts in analyst reports and imposes a variety of restrictions designed to strengthen the firewalls that separate research from IB. Part of the settlement funds are set aside for investor education and for research produced by independent firms. The settlement basically presumes that analysts

respond to the conflicts by inflating their stock recommendations and that investors take analysts' recommendations at face value.

Consistent with the view of the media and regulators, we find that optimism in stock recommendations is positively related to the importance of both IB and brokerage businesses to an analyst's employer. This pattern is more pronounced during the late-1990s stock market bubble with respect to IB conflicts. However, we provide several pieces of empirical evidence that suggest that investors are sophisticated enough to adjust for this bias. First, the short-term reactions of both stock prices and trading volumes to recommendation upgrades vary negatively with the magnitude of potential IB or brokerage conflicts faced by analysts. For instance, over the 3 days surrounding an upgrade to strong buy, a 1-standard-deviation increase in the proportion of revenue from IB is associated with a .31 percentage point decrease in abnormal returns and a .12 percentage point decrease in abnormal volume. These results suggest that investors ascribe lower credibility to an analyst's upgrade when the analyst is subject to greater pressures to issue an optimistic view. For downgrades, conflict severity varies negatively with the short-term stock price reaction and positively with the short-term trading volume impact. This pattern is consistent with the idea that investors perceive an analyst to be more credible if he or she is willing to voice an unfavorable opinion on a stock despite greater pressures to be optimistic.

Second, we find no evidence that the 1-year investment performance of recommendation revisions is related to the magnitude of analysts' conflicts, either for upgrades or for downgrades. This finding suggests that, on average, investors properly discount an analyst's opinions for potential conflicts at the time the opinion is issued. Finally, investors discounted conflicted analysts' opinions during the late-1990s stock bubble, even in the face of the prevailing market euphoria. This evidence does not support the popular view that recommendations of sell-side analysts led investors to throw caution to the wind during the bubble period.

Overall, our empirical findings suggest that while analysts do respond to IB and brokerage conflicts by inflating their stock recommendations, the market discounts these recommendations after taking analysts' conflicts into account. These findings are reminiscent of the story of the nail soup told by Brealey and Myers (1991), except that here analysts (rather than accountants) are the ones who put the nail in the soup and investors (rather than analysts) are the ones to take it out. Our finding that the market is not fooled by biases stemming from conflicts of interest echoes similar findings in the literature on conflicts of interest in universal banking (for example, Kroszner and Rajan 1994, 1997; Gompers and Lerner 1999) and on bias in the financial media (for example, Bhattacharya et al., forthcoming; Reuter and Zitzewitz 2006). Finally, while we cannot rule out the possibility that some investors may have been naive, our findings do not support the notion that the marginal investor was systematically misled over the last decade by analysts' recommendations.

Appendix

This Appendix describes the characteristics of disclosing and nondisclosing private securities firms, sheds some light on their decisions to publicly disclose their income statements, and examines whether the resulting selection bias affects our main results in Table 3. Table A1 provides summary statistics of recommendation levels and characteristics of disclosing and nondisclosing private securities firms. Compared with nondisclosing firms, disclosing firms tend to be smaller and more liquid and issue somewhat more optimistic stock recommendations. The mean recommendation level is slightly higher for disclosing firms than for nondisclosing firms. The median disclosing firm is smaller and holds more liquid assets than the median nondisclosing firm. All these differences are statistically significant. The two groups of firms have similar financial leverage ratios and 2-year growth rates in total assets.

We next examine cross-sectional determinants of a private securities firm's decision to disclose its income statement. In an excellent review of the corporate disclosure literature, Healy and Palepu (2001) point out that a firm is more willing to voluntarily disclose financial information when it needs to raise external financing and when it is less concerned that the disclosure would damage its competitive position in product markets. Ceteris paribus, firms with greater growth opportunities, higher financial leverage, and less liquid resources are more likely to need external financing. They are more likely to be open with potential investors by disclosing financial information, including their income statements. Similarly, smaller firms are likely to have greater need for external financing as they try to grow. In addition, given the intense competition in the securities business, smaller private firms are also likely to be more willing to disclose their profits and profitability because they have less business at stake. For both reasons, smaller firms are likely to be more willing to disclose financial information. We control for firm size by the natural logarithm of one plus total assets in millions of dollars, for growth opportunities by the 2-year growth rate of total assets, for financial leverage by the ratio of long-term debt to total assets, and for liquidity by the ratio of cash and equivalents to total assets. We estimate a probit regression of DISCLOSER, which equals one for a disclosing firm and is zero otherwise.

In accordance with the predictions of corporate disclosure theory, the coefficients on firm size and liquidity are negative, and the coefficient on growth is positive. Contrary to the prediction, however, the coefficient on leverage is negative. All of these coefficients are highly statistically significant. The pseudo-R^2-value of this model is .08. To save space, these results are not shown in a table.

Finally, we examine whether the selection bias caused by a private securities firm's disclosure choice (and, consequently, the availability of data on IB revenue percentage and commission revenue percentage) affects our main results in Table 3. While there is no Heckman selectivity correction for the ordered probit model, there is one for the regular probit model. So we define a binary variable to

Table A1
Summary Statistics for Disclosing and Nondisclosing Private Securities Firms

	Mean			Median			Sample Size	
Variable	Disclosers	Nondisclosers	*P*-Value of *t*-Test	Disclosers	Nondisclosers	*p*-Value of Rank Sum Test	Disclosers	Nondisclosers
Recommendation level:								
Level	3.902	3.810	<.001	4	4	<.001	62,417	181,068
Level minus median level	.036	.010	<.001	0	0	<.001	62,417	181,068
Firm size:								
Total assets ($ millions)	383.37	1,863.52	<.001	4.05	28.43	<.001	365	615
Book equity ($ millions)	26.40	68.98	<.001	1.97	10.56	<.001	365	615
Financial leverage:								
Long-term debt to total assets	.0539	.0653	.253	0	.002	.004	365	615
Total debt to total assets	.0685	.1823	.295	0	.018	<.001	365	615
Liquidity: cash and equivalents to total assets	.2392	.1816	.001	.101	.052	.0001	365	615
2-Year growth rate	.0849	.0697	.440	.052	.020	.099	246	541

Note. Disclosers are brokers that publicly disclose their income statements, while nondisclosers are brokers that do not disclose them. The statistics for recommendation level are computed from individual analysts' recommendation levels at the end of each quarter in the sample. The median recommendation level is computed at the end of each quarter and is based on all analysts recommending a stock. The statistics for broker characteristics are computed across broker years. The firm size statistics are inflation adjusted (with Consumer Price Index numbers and with 2003 as the base year). The 2-year growth rate is $(\text{Total assets}_t / \text{Total assets}_{t-2})^{1/2} - 1$.

measure an optimistic recommendation that equals one if an analyst's recommendation level on a stock exceeds the consensus level and equals zero otherwise. We then replace the dependent variable in the regression in Section 4 with this optimistic recommendation dummy. Using the subsample of private securities firms, we estimate the resulting equation in two ways: (*a*) with a regular probit model and (*b*) with a Heckman selectivity-corrected probit model, where we use the equation described in the second paragraph of this Appendix as the selection equation. When we use approach *b,* the coefficient of the selection term (that is, the inverse Mills ratio) is statistically significant in the second-stage probit regression. What is more important for our purposes is that the sign, magnitude, and statistical significance of our main explanatory variables, the IB revenue percentage and the commission revenue percentage, are similar in the regular probit and the Heckman-corrected probit regressions. These results do not support the idea that our main findings are driven by the selection bias caused by a private securities firm's decision to disclose its revenue breakdown. To save space, these results are not shown in a table.

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Investor growth expectations: Analysts vs. history

Analysts' growth forecasts dominate past trends in predicting stock prices.

James H. Vander Weide and Willard T. Carleton

For the purposes of implementing the Discounted Cash Flow (DCF) cost of equity model, the analyst must know which growth estimate is embodied in the firm's stock price. A study by Cragg and Malkiel (1982) suggests that the stock valuation process embodies analysts' forecasts rather than historically based growth figures such as the ten-year historical growth in dividends per share or the five-year growth in book value per share. The Cragg and Malkiel study is based on data for the 1960s, however, a decade that was considerably more stable than the recent past.

As the issue of which growth rate to use in implementing the DCF model is so important to applications of the model, we decided to investigate whether the Cragg and Malkiel conclusions continue to hold in more recent periods. This paper describes the results of our study.

STATISTICAL MODEL

The DCF model suggests that the firm's stock price is equal to the present value of the stream of dividends that investors expect to receive from owning the firm's shares. Under the assumption that investors expect dividends to grow at a constant rate, g, in perpetuity, the stock price is given by the following simple expression:

$$P_s = \frac{D(1+g)}{k-g} \quad (1)$$

where:

P_s = current price per share of the firm's stock;

D = current annual dividend per share;

g = expected constant dividend growth rate; and

k = required return on the firm's stock.

Dividing both sides of Equation (1) by the firm's current earnings, E, we obtain:

$$\frac{P_s}{E} = \frac{D}{E} \cdot \frac{(1+g)}{k-g} \quad (2)$$

Thus, the firm's price/earnings (P/E) ratio is a nonlinear function of the firm's dividend payout ratio (D/E), the expected growth in dividends (g), and the required rate of return.

To investigate what growth expectation is embodied in the firm's current stock price, it is more convenient to work with a linear approximation to Equation (2). Thus, we will assume that:

$$P/E = a_0(D/E) + a_1 g + a_2 k. \quad (3)$$

(Cragg and Malkiel found this assumption to be reasonable throughout their investigation.)

Furthermore, we will assume that the required

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rate of return, k, in Equation (3) depends on the values of the risk variables B, Cov, Rsq, and Sa, where B is the firm's Value Line beta; Cov is the firm's pretax interest coverage ratio; Rsq is a measure of the stability of the firm's five-year historical EPS; and Sa is the standard deviation of the consensus analysts' five-year EPS growth forecast for the firm. Finally, as the linear form of the P/E equation is only an approximation to the true P/E equation, and B, Cov, Rsq, and Sa are only proxies for k, we will add an error term, e, that represents the degree of approximation to the true relationship.

With these assumptions, the final form of our P/E equation is as follows:

$$P/E = a_0(D/E) + a_1 g + a_2 B + a_3 Cov + a_4 Rsq + a_5 Sa + e. \quad (4)$$

The purpose of our study is to use more recent data to determine which of the popular approaches for estimating future growth in the Discounted Cash Flow model is embodied in the market price of the firm's shares.

We estimated Equation (4) to determine which estimate of future growth, g, when combined with the payout ratio, D/E, and risk variables B, Cov, Rsq, and Sa, provides the best predictor of the firm's P/E ratio. To paraphrase Cragg and Malkiel, we would expect that growth estimates found in the best-fitting equation more closely approximate the expectation used by investors than those found in poorer-fitting equations.

DESCRIPTION OF DATA

Our data sets include both historically based measures of future growth and the consensus analysts' forecasts of five-year earnings growth supplied by the Institutional Brokers Estimate System of Lynch, Jones & Ryan (IBES). The data also include the firm's dividend payout ratio and various measures of the firm's risk. We include the latter items in the regression, along with earnings growth, to account for other variables that may affect the firm's stock price.

The data include:

Earnings Per Share. Because our goal is to determine which earnings variable is embodied in the firm's market price, we need to define this variable with care. Financial analysts who study a firm's financial results in detail generally prefer to "normalize" the firm's reported earnings for the effect of extraordinary items, such as write-offs of discontinued operations, or mergers and acquisitions. They also attempt, to the extent possible, to state earnings for different firms using a common set of accounting conventions.

We have defined "earnings" as the consensus analyst estimate (as reported by IBES) of the firm's earnings for the forthcoming year.[1] This definition approximates the normalized earnings that investors most likely have in mind when they make stock purchase and sell decisions. It implicitly incorporates the analysts' adjustments for differences in accounting treatment among firms and the effects of the business cycle on each firm's results of operations. Although we thought at first that this earnings estimate might be highly correlated with the analysts' five-year earnings growth forecasts, that was not the case. Thus, we avoided a potential spurious correlation problem.

Price/Earnings Ratio. Corresponding to our definition of "earnings," the price/earnings ratio (P/E) is calculated as the closing stock price for the year divided by the consensus analyst earnings forecast for the forthcoming fiscal year.

Dividends. Dividends per share represent the common dividends declared per share during the calendar year, after adjustment for all stock splits and stock dividends). The firm's dividend payout ratio is then defined as common dividends per share divided by the consensus analyst estimate of the earnings per share for the forthcoming calendar year (D/E). Although this definition has the deficiency that it is obviously biased downward — it divides this year's dividend by next year's earnings — it has the advantage that it implicitly uses a "normalized" figure for earnings. We believe that this advantage outweighs the deficiency, especially when one considers the flaws of the apparent alternatives. Furthermore, we have verified that the results are insensitive to reasonable alternative definitions (see footnote 1).

Growth. In comparing historically based and consensus analysts' forecasts, we calculated forty-one different historical growth measures. These included the following: 1) the past growth rate in EPS as determined by a log-linear least squares regression for the latest year,[2] two years, three years, . . ., and ten years; 2) the past growth rate in DPS for the latest year, two years, three years, . . ., and ten years; 3) the past growth rate in book value per share (computed as the ratio of common equity to the outstanding common equity shares) for the latest year, two years, three years, . . ., and ten years; 4) the past growth rate in cash flow per share (computed as the ratio of pretax income, depreciation, and deferred taxes to the outstanding common equity shares) for the latest year, two years, three years, . . ., and ten years; and 5) plowback growth (computed as the firm's retention ratio for the current year times the firm's latest annual return on common equity).

We also used the five-year forecast of earnings

per share growth compiled by IBES and reported in mid-January of each year. This number represents the consensus (i.e., mean) forecast produced by analysts from the research departments of leading Wall Street and regional brokerage firms over the preceding three months. IBES selects the contributing brokers "because of the superior quality of their research, professional reputation, and client demand" (IBES *Monthly Summary Book*).

Risk Variables. Although many risk factors could potentially affect the firm's stock price, most of these factors are highly correlated with one another. As shown above in Equation (4), we decided to restrict our attention to four risk measures that have intuitive appeal and are followed by many financial analysts: 1) B, the firm's beta as published by Value Line; 2) Cov, the firm's pretax interest coverage ratio (obtained from Standard & Poor's Compustat); 3) Rsq, the stability of the firm's five-year historical EPS (measured by the R^2 from a log-linear least squares regression); and 4) Sa, the standard deviation of the consensus analysts' five-year EPS growth forecast (mean forecast) as computed by IBES.

After careful analysis of the data used in our study, we felt that we could obtain more meaningful results by imposing six restrictions on the companies included in our study:

1. Because of the need to calculate ten-year historical growth rates, and because we studied three different time periods, 1981, 1982, and 1983, our study requires data for the thirteen-year period 1971-1983. We included only companies with at least a thirteen-year operating history in our study.
2. As our historical growth rate calculations were based on log-linear regressions, and the logarithm of a negative number is not defined, we excluded all companies that experienced negative EPS during any of the years 1971-1983.
3. For similar reasons, we also eliminated companies that did not pay a dividend during any one of the years 1971-1983.
4. To insure comparability of time periods covered by each consensus earnings figure in the P/E ratios, we eliminated all companies that did not have a December 31 fiscal year-end.
5. To eliminate distortions caused by highly unusual events that distort current earnings but not expected future earnings, and thus the firm's price/earnings ratio, we eliminated any firm with a price/earnings ratio greater than 50.
6. As the evaluation of analysts' forecasts is a major part of this study, we eliminated all firms that IBES did not follow.

Our final sample consisted of approximately sixty-five utility firms.[3]

RESULTS

To keep the number of calculations in our study to a reasonable level, we performed the study in two stages. In Stage 1, all forty-one historically oriented approaches for estimating future growth were correlated with each firm's P/E ratio. In Stage 2, the historical growth rate with the highest correlation to the P/E ratio was compared to the consensus analyst growth rate in the multiple regression model described by Equation (4) above. We performed our regressions for each of three recent time periods, because we felt the results of our study might vary over time.

First-Stage Correlation Study

Table 1 gives the results of our first-stage correlation study for each group of companies in each of the years 1981, 1982, and 1983. The values in this table measure the correlation between the historically oriented growth rates for the various time periods and the firm's end-of-year P/E ratio.

The four variables for which historical growth rates were calculated are shown in the left-hand column: EPS indicates historical earnings per share growth, DPS indicates historical dividend per share growth, BVPS indicates historical book value per share growth, and CFPS indicates historical cash flow per share growth. The term "plowback" refers to the product of the firm's retention ratio in the currennt year and its return on book equity for that year. In all, we calculated forty-one historically oriented growth rates for each group of firms in each study period.

The goal of the first-stage correlation analysis was to determine which historically oriented growth rate is most highly correlated with each group's year-end P/E ratio. Eight-year growth in CFPS has the highest correlation with P/E in 1981 and 1982, and ten-year growth in CFPS has the highest correlation with year-end P/E in 1983. In all cases, the plowback estimate of future growth performed poorly, indicating that — contrary to generally held views — plowback is not a factor in investor expectations of future growth.

Second-Stage Regression Study

In the second stage of our regression study, we ran the regression in Equation (4) using two different measures of future growth, g: 1) the best historically oriented growth rate (g_h) from the first-stage correlation study, and 2) the consensus analysts' forecast (g_a) of five-year EPS growth. The regression results, which are shown in Table 2, support at least

TABLE 1

Correlation Coefficients of All Historically Based Growth Estimates by Group and by Year with P/E

Historical Growth Rate Period in Years

Current Year	1	2	3	4	5	6	7	8	9	10
1981										
EPS	−0.02	0.07	0.03	0.01	0.03	0.12	0.08	0.09	0.09	0.09
DPS	0.05	0.18	0.14	0.15	0.14	0.15	0.19	0.23	0.23	0.23
BVPS	0.01	0.11	0.13	0.13	0.16	0.18	0.15	0.15	0.15	0.15
CFPS	−0.05	0.04	0.13	0.22	0.28	0.31	0.30	0.31	−0.57	−0.54
Plowback	0.19									
1982										
EPS	−0.10	−0.13	−0.06	−0.02	−0.02	−0.01	−0.03	−0.03	0.00	0.00
DPS	−0.19	−0.10	0.03	0.05	0.07	0.08	0.09	0.11	0.13	0.13
BVPS	0.07	0.08	0.11	0.11	0.09	0.10	0.11	0.11	0.09	0.09
CFPS	−0.02	−0.08	0.00	0.10	0.16	0.19	0.23	0.25	0.24	0.07
Plowback	0.04									
1983										
EPS	−0.06	−0.25	−0.25	−0.24	−0.16	−0.11	−0.05	0.00	0.02	0.02
DPS	0.03	−0.10	−0.03	0.08	0.15	0.21	0.21	0.21	0.22	0.24
BVPS	0.03	0.10	0.04	0.09	0.15	0.16	0.19	0.21	0.22	0.21
CFPS	−0.08	0.01	0.02	0.08	0.20	0.29	0.35	0.38	0.40	0.42
Plowback	−0.08									

two general conclusions regarding the pricing of equity securities.

First, we found overwhelming evidence that the consensus analysts' forecast of future growth is superior to historically oriented growth measures in predicting the firm's stock price. In every case, the R^2 in the regression containing the consensus analysts' forecast is higher than the R^2 in the regression containing the historical growth measure. The regression coefficients in the equation containing the consensus analysts' forecast also are considerably more significant than they are in the alternative regression. These results are consistent with those found by Cragg and Malkiel for data covering the period 1961-1968. Our results also are consistent with the hypothesis that investors use analysts' forecasts, rather than historically oriented growth calculations, in making stock buy–and–sell decisions.

TABLE 2

Regression Results
Model I

Part A: *Historical*

$P/E = a_0 + a_1 D/E + a_2 g_h + a_3 B + a_4 Cov + a_5 Rsq + a_6 Sa$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	$\hat{a}_3$	$\hat{a}_4$	$\hat{a}_5$	$\hat{a}_6$	R^2	F Ratio
1981	−6.42*	10.31*	7.67*	3.24	0.54*	1.42*	57.43	0.83	46.49
	(5.50)	(14.79)	(2.20)	(2.86)	(2.50)	(2.85)	(4.07)		
1982	−2.90*	9.32*	8.49*	2.85	0.45*	−0.42	3.63	0.86	65.53
	(2.75)	(18.52)	(4.18)	(2.83)	(2.60)	(0.05)	(0.26)		
1983	−5.96*	10.20*	19.78*	4.85	0.44*	0.33	32.49	0.82	45.26
	(3.70)	(12.20)	(4.83)	(2.95)	(1.89)	(0.50)	(1.29)		

Part B: *Analysis*

$P/E = a_0 + a_1 D/E + a_2 g_a + a_3 B + a_4 Cov + a_5 Rsq + a_6 Sa$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	$\hat{a}_3$	$\hat{a}_4$	$\hat{a}_5$	$\hat{a}_6$	R^2	F Ratio
1981	−4.97*	10.62*	54.85*	−0.61	0.33*	0.63*	4.34	0.91	103.10
	(6.23)	(21.57)	(8.56)	(0.68)	(2.28)	(1.74)	(0.37)		
1982	−2.16*	9.47*	50.71*	−1.07	0.36*	−0.31	119.05*	0.90	97.62
	(2.59)	(22.46)	(9.31)	(1.14)	(2.53)	(1.09)	(1.60)		
1983	−8.47*	11.96*	79.05*	2.16	0.56*	0.20	−34.43	0.87	69.81
	(7.07)	(16.48)	(7.84)	(1.55)	(3.08)	(0.38)	(1.44)		

Notes:

* Coefficient is significant at the 5% level (using a one-tailed test) and has the correct sign. T-statistic in parentheses.

Second, there is some evidence that investors tend to view risk in traditional terms. The interest coverage variable is statistically significant in all but one of our samples, and the stability of the operating income variable is statistically significant in six of the twelve samples we studied. On the other hand, the beta is never statistically significant, and the standard deviation of the analysts' five-year growth forecasts is statistically significant in only two of our twelve samples. This evidence is far from conclusive, however, because, as we demonstrate later, a significant degree of cross-correlation among our four risk variables makes any general inference about risk extremely hazardous.

Possible Misspecification of Risk

The stock valuation theory says nothing about which risk variables are most important to investors. Therefore, we need to consider the possibility that the risk variables of our study are only proxies for the "true" risk variables used by investors. The inclusion of proxy variables may increase the variance of the parameters of most concern, which in this case are the coefficients of the growth variables.[4]

To allow for the possibility that the use of risk proxies has caused us to draw incorrect conclusions concerning the relative importance of analysts' growth forecasts and historical growth extrapolations, we have also estimated Equation (4) with the risk variables excluded. The results of these regressions are shown in Table 3.

Again, there is overwhelming evidence that the consensus analysts' growth forecast is superior to the historically oriented growth measures in predicting the firm's stock price. The R^2 and t-statistics are higher in every case.

CONCLUSION

The relationship between growth expectations and share prices is important in several major areas of finance. The data base of analysts' growth forecasts collected by Lynch, Jones & Ryan provides a unique opportunity to test the hypothesis that investors rely more heavily on analysts' growth forecasts than on historical growth extrapolations in making security buy–and–sell decisions. With the help of this data base, our studies affirm the superiority of analysts' forecasts over simple historical growth extrapolations in the stock price formation process. Indirectly, this finding lends support to the use of valuation models whose input includes expected growth rates.

TABLE 3

Regression Results
Model II

Part A: *Historical*

$P/E = a_0 + a_1 D/E + a_2 g_h$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	R^2	F Ratio
1981	−1.05	9.59	21.20	0.73	82.95
	(1.61)	(12.13)	(7.05)		
1982	0.54	8.92	12.18	0.83	167.97
	(1.38)	(17.73)	(6.95)		
1983	−0.75	8.92	12.18	0.77	107.82
	(1.13)	(12.38)	(7.94)		

Part B: *Analysis*

$P/E + a_0 + a_1 D/E + a_2 g_a$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	R^2	F Ratio
1981	3.96	10.07	60.53	0.90	274.16
	(8.31)	(8.31)	(20.91)	(15.79)	
1982	−1.75	9.19	44.92	0.88	246.36
	(4.00)	(4.00)	(21.35)	(11.06)	
1983	−4.97	10.95	82.02	0.83	168.28
	(6.93)	(6.93)	(15.93)	(11.02)	

Notes:
* Coefficient is significant at the 5% level (using a one-tailed test) and has the correct sign. T-statistic in parentheses.

[1] We also tried several other definitions of "earnings," including the firm's most recent primary earnings per share prior to any extraordinary items or discontinued operations. As our results were insensitive to reasonable alternative definitions of "earnings" we report only the results for the IBES consensus.

[2] For the latest year, we actually employed a point-to-point growth calculation because there were only two available observations.

[3] We use the word "approximately," because the set of available firms varied each year. In any case, the number varied only from zero to three firms on either side of the figures cited here.

[4] See Maddala (1977).

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INTERMEDIATE FINANCIAL MANAGEMENT

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Self-Test Questions

What inputs are required for the DCF method?
What are the ways to estimate the dividend growth rate?
Which of these methods provides the best estimate?

BOND-YIELD-PLUS-RISK-PREMIUM APPROACH

Some analysts use a subjective, ad hoc procedure to estimate a firm's cost of common equity: They simply add a judgmental risk premium of 3 to 5 percentage points to the interest rate on the firm's own long-term debt. It is logical to think that firms with risky, low-rated, and consequently high-interest-rate debt will also have risky, high-cost equity, and the procedure of basing the cost of equity on a readily observable debt cost utilizes this logic. In this approach,

$$r_s = \text{Bond yield} + \text{Bond risk premium}$$

The bonds of NCC have a yield of 11.0 percent. If its bond risk premium is 3.7 percent, its estimated cost of equity is 14.7 percent:

$$r_s = 11.0\% + 3.7\% = 14.7\%$$

Because the 3.7 percent risk premium is a judgmental estimate, the estimated value of r_s is also judgmental. Empirical work suggests that the risk premium over a firm's own bond yield has generally ranged from 3 to 5 percentage points, with recent values close to 3 percent. With such a large range, this method is not likely to produce a precise cost of equity. However, it can get us "into the right ballpark."

Self-Test Question

What is the reasoning behind the bond-yield-plus-risk-premium approach?

COMPARISON OF THE CAPM, DCF, AND BOND-YIELD-PLUS-RISK-PREMIUM METHODS

We have discussed three methods for estimating the required return on common stock. For NCC, the CAPM estimate is 14.6 percent, the DCF constant growth estimate is 14.5 percent, and the bond-yield-plus-risk-premium is 14.7 percent. The overall average of these three methods is (14.6% + 14.5% + 14.7%)/3 = 14.6%. These results are unusually consistent, so it would make little difference which one we used. However, if the methods produced widely varied estimates, then a financial analyst would have to use his or her judgment as to the relative merits of each estimate and then choose the estimate that seemed most reasonable under the circumstances.

Recent surveys found that the CAPM approach is by far the most widely used method. Although most firms use more than one method, almost 74 percent of respondents in one survey, and 85 percent in the other, used the CAPM.[12] This is in sharp contrast to a 1982 survey, which found that only 30 percent of respon-

[12]See John R. Graham and Campbell Harvey, "The Theory and Practice of Corporate Finance: Evidence from the Field," *Journal of Financial Economics*, Vol. 60, nos. 2–3 (2001), pp. 187–243, and the paper cited in Footnote 6. Interestingly, a growing number of firms (about 34 percent) also are using CAPM-type models with more than one factor. Of these firms, over 40 percent include factors for interest-rate risk, foreign exchange risk, and business cycle risk (proxied by gross domestic product). More than 20 percent of these firms include a factor for inflation, size, and exposure to particular commodity prices. Less than 20 percent of these firms make adjustments due to distress factors, book-to-market ratios, or momentum factors.

dents used the CAPM.[13] Approximately 16 percent now use the DCF approach, down from 31 percent in 1982. The bond-yield-plus-risk-premium is used primarily by companies that are not publicly traded.

People experienced in estimating the cost of equity recognize that both careful analysis and sound judgment are required. It would be nice to pretend that judgment is unnecessary and to specify an easy, precise way of determining the exact cost of equity capital. Unfortunately, this is not possible—finance is in large part a matter of judgment, and we simply must face that fact.

Self-Test Question Which approach for estimating the required return on common stock is used most often by businesses today?

COMPOSITE, OR WEIGHTED AVERAGE, COST OF CAPITAL, WACC

As we see in Chapter 15, each firm has an optimal capital structure, defined as that mix of debt, preferred, and common equity that causes its stock price to be maximized. Therefore, a value-maximizing firm will establish a *target (optimal) capital structure* and then raise new capital in a manner that will keep the actual capital structure on target over time. In this chapter, we assume that the firm has identified its optimal capital structure, that it uses this optimum as the target, and that it finances so as to remain constantly on target. How the target is established is examined in Chapter 15.

The target proportions of debt, preferred stock, and common equity, along with the component costs of capital, are used to calculate the firm's WACC. To illustrate, suppose NCC has a target capital structure calling for 30 percent debt, 10 percent preferred stock, and 60 percent common equity. Its before-tax cost of debt, r_d, is 11 percent; its after-tax cost of debt is $r_d(1 - T) = 11\%(0.6) = 6.6\%$; its cost of preferred stock, r_{ps}, is 10.3 percent; its cost of common equity, r_s, is 14.6 percent; its marginal tax rate is 40 percent; and all of its new equity will come from retained earnings. We can calculate NCC's weighted average cost of capital, WACC, as follows:

$$WACC = w_d r_d(1 - T) + w_{ps} r_{ps} + w_{ce} r_s \qquad [10\text{-}7]$$

$$= 0.3(11.0\%)(0.6) + 0.1(10.3\%) + 0.6(14.6\%)$$
$$= 11.76\% \approx 11.8\%$$

Here w_d, w_{ps}, and w_{ce} are the weights used for debt, preferred, and common equity, respectively.

Every dollar of new capital that NCC obtains will on average consist of 30 cents of debt with an after-tax cost of 6.6 percent, 10 cents of preferred stock with a cost of 10.3 percent, and 60 cents of common equity with a cost of 14.6 percent. The average cost of each whole dollar, the WACC, is 11.8 percent.

[13] See Lawrence J. Gitman and Vincent Mecurio, "Cost of Capital Techniques Used by Major U.S. Firms: Survey Analysis of *Fortune's* 1000," *Financial Management*, Vol. 14 (1982), pp. 21–29.

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Chapter 5

The Equity Risk Premium

The expected equity risk premium can be defined as the additional return an investor expects to receive to compensate for the additional risk associated with investing in equities as opposed to investing in riskless assets. It is an essential component in several cost of equity estimation models, including the buildup method, the capital asset pricing model (CAPM), and the Fama-French three factor model. It is important to note that the expected equity risk premium, as it is used in discount rates and cost of capital analysis, is a forward-looking concept. That is, the equity risk premium that is used in the discount rate should be reflective of what investors think the risk premium will be going forward.

Unfortunately, the expected equity risk premium is unobservable in the market and therefore must be estimated. Typically, this estimation is arrived at through the use of historical data. The historical equity risk premium can be calculated by subtracting the long-term average of the income return on the riskless asset (Treasuries) from the long-term average stock market return (measured over the same period as that of the riskless asset). In using a historical measure of the equity risk premium, one assumes that what has happened in the past is representative of what might be expected in the future. In other words, the assumption one makes when using historical data to measure the expected equity risk premium is that the relationship between the returns of the risky asset (equities) and the riskless asset (Treasuries) is stable. The stability of this relationship will be examined later in this chapter.

Since the expected equity risk premium must be estimated, there is much controversy regarding how the estimation should be conducted. A variety of different approaches to calculating the equity risk premium have been utilized over the years. Such studies can be categorized into four groups based on the approaches they have taken. The first group of studies tries to derive the equity risk premium from historical returns between stocks and bonds as was mentioned above. The second group, embracing a supply side model, uses fundamental information such as earnings, dividends, or overall economic productivity to measure the expected equity risk premium. A third group adopts demand side models that derive the expected returns of equities through the payoff demanded by investors for bearing the risk of equity investments.[1] The opinions of financial professionals through broad surveys are relied upon by the fourth and final group.

The range of equity risk premium estimates used in practice is surprisingly large. Using a low equity risk premium estimate as opposed to a high estimate can have a significant impact on the estimated value of a stream of cash flows. This chapter addresses many of the controversies surrounding estimation of the equity risk premium and focuses primarily on the historical calculation but also discusses the supply side model.

Calculating the Historical Equity Risk Premium

In measuring the historical equity risk premium one must make a number of decisions that can impact the resulting figure; some decisions have a greater impact than others. These decisions include selecting the stock market benchmark, the risk-free asset, either an arithmetic or a geometric average, and the time period for measurement. Each of these factors has an impact on the resulting equity risk premium estimate.

The Stock Market Benchmark

The stock market benchmark chosen should be a broad index that reflects the behavior of the market as a whole. Two examples of commonly used indexes are the S&P 500® and the New York Stock Exchange Composite Index. Although the Dow Jones Industrial Average is a popular index, it would be inappropriate for calculating the equity risk premium because it is too narrow.

We use the total return of our large company stock index (currently represented by the S&P 500) as our market benchmark when calculating the equity risk premium. The S&P 500 was selected as the appropriate market benchmark because it is representative of a large sample of companies across a large number of industries. The S&P 500 is also one of the most widely accepted market benchmarks. In short, the S&P 500 is a good measure of the equity market as a

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earnings and there is no reason to believe, at this time, that the market will change its mind. Using this top-down approach, the geometric supply-side equity risk premium is 4.07%, which equates to an arithmetic supply-side equity risk premium of 6.00%.

Another approach in calculating the premium would be to add up the components that constitute the supply of equity return, excluding the P/E component. Thus, the supply of equity return only includes inflation, the growth in real earnings per share, and income return. This forward-looking earnings model calculates the long-term supply of U.S. equity returns to be 9.18%:

$$SR = \left[(1+CPI)\times(1+g_{REPS})+Inc+Rinv\right]$$

$$9.18\% = \left[(1+2.86\%)\times(1+2.14\%)-1\right]+3.90\%+0.22\%$$

Where:

SR	=	The supply of the equity return
CPI	=	Consumer Price Index (inflation)
g_{REPS}	=	The growth in real earning per share
Inc	=	The income return
$Rinv$	=	The reinvestment return

The equity risk premium, based on the supply-side earnings model, is calculated to be 4.22% on a geometric basis

$$SERP = \frac{(1+SR)}{(1+CPI)\times(1+RRf)}-1$$

$$4.07\%^{*} = \frac{1+9.18\%}{(1+2.86\%)\times(1+1.96\%)}-1$$

* difference due to rounding

Where:

$SERP$	=	The supply-side equity risk premium
SR	=	The supply of the equity return
CPI	=	Consumer Price Index (inflation)
RRf	=	The real risk-free rate

Converting the geometric average into an arithmetic average results in an equity risk premium of 6.00%.[10.15]

$$R_A = R_G + \frac{\sigma^2}{2}$$

$$6.00\% = 4.07\% + \frac{19.67\%^2}{2}$$

* difference due to rounding

Where:

R_A = The arithmetic average

R_G = The geometric average

σ = The standard deviation of equity returns

Exhibit 10.14 presents the supply-side equity risk premium, on an arithmetic basis, beginning in 1926 and ending in each of the years from 2003 through 2020.[10.16]

10.15 The 1926–2020 supply-side equity risk premia estimate (6.00%) is calculated by Duff & Phelps for the *2021 SBBI® Yearbook* using (i) the same methodologies and (ii) the same data sources as were used in previous editions of this book, based upon the work by Roger G. Ibbotson and Peng Chen; see: Ibbotson, R.G., & Chen, P. 2003. "Long-Run Stock Returns: Participating in the Real Economy". *Financial Analysts Journal*, Vol. 59, No. 1, P. 88. An update of this work has been published that considers stock buybacks in addition to dividends; see: Philip U. Straehl and Roger G. Ibbotson, "The Long-Run Drivers of Stock Returns: Total Payouts and the Real Economy", *Financial Analysts Journal*, Third Quarter 2017, Volume 73 Number 3. The Financial Analysts Journal is a publication of CFA Institute. For more information, visit www.CFAPUBS.org.

10.16 In the *2016 SBBI® Yearbook*, Exhibit 10.15 included supply-side ERP estimates for the most recent 25 years, estimated using *refreshed* data inputs over the entire 1926–2015 time horizon. Starting with the *2017 SBBI® Yearbook*, this exhibit includes the years for which supply-side ERP values were actually published in a hardcover book (instead of the most recent 25 years). As such, this exhibit will be made to match (i) the "as published" supply-side ERP values from the *2004–2013 SBBI® Valuation Yearbooks* (see "Appendix C-1" in those books), (ii) the "as published" values from the 2014–2017 *Valuation Handbook – U.S. Guide to Cost of Capital* (see "Appendix 3" in those books), and (iii) the Cost of Capital Navigator at dpcostofcapital.com beginning in 2018.

plex than the single-period models. They include another asset in addition to the two used in the CAPM (the risk-free asset and the market portfolio). However, these models continue to see risk and return as the only important characteristics of an asset. Other characteristics are believed to be completely summed up in the measures of risk and return.[9]

We can use the single-period model to approximate multiperiod investor behavior, but only if the following conditions are true:

1. Returns are independent over time. For the stock market, this is equivalent to saying that the weak form of the efficient market hypothesis holds.[10]
2. Expectations are independent of past or current information. For instance, we must be able to say that the returns from a retail food chain are independent of such things as past and current inflation and past food prices.[11]

To the investment practitioner, these two conditions are clearly not realistic. Thus, continuous-time adaptations are intriguing, but complex.

One last assumption is needed to complete the underpinning of efficient-market theory and thus of these models.

5. Information Is Freely Available.

Market efficiency also rests on this assumption. If groups of investors were privy to special, not widely available, information on which they could make superior decisions, markets would not be efficient and MPT and the CAPM would be affected. Without a set of common forecasts, a single efficient frontier could not exist.

Is this assumption realistic? Intelligent people can of course disagree. Still, most of the market value of the stock market consists of stocks of the most carefully analyzed firms. And this information is broadly available to managers of large portfolios. For other assets, such as the stocks and bonds of smaller firms, information is not widely available.

What can we conclude about the reality of the efficient-market assumptions? The validity of the first four assumptions will depend on whether they are important to the way that investors' expectations are formed. If investors price assets as if they are true, then they are true. If, however, any of the assumptions is sufficiently unrealistic, there may be no unique parameters to the model. In other words, the model's results could be different for each in-

[9] Other continuous-time models rely on such things as hedging changes in the risk-free rate over time.

[10] For a description of the weak form of the efficient-market hypothesis, see footnote 5 in this chapter.

[11] For more detail regarding these propositions, see Eugene F. Fama and J. MacBeth, "Tests of the Multiperiod Two Parameter Model," *Journal of Financial Economics*, 1 (1974), 43–66.

vestor or group of investors. There may be multiple efficient frontiers, depending on the investor's tax bracket or time horizon, and the optimal portfolio for each investor would depend on that investor's estimates of risk and return. A model reflecting these diverse factors would be much more complex and virtually impossible to test.[12]

Do not despair. Although these assumptions and those that we are about to discuss are clearly not realistic, we must remember our criterion for a good model—Does it explain or forecast or both? If it does either or both, we can use it to make better decisions. In the ensuing chapters we will see that, despite its flaws, the CAPM has positive and exciting uses. But first we need to make several additional assumptions to create the CAPM.

II. THE CAPM ASSUMPTIONS

1. There Is a Risk-Free Asset, and Investors Can Borrow and Lend at the Risk-Free Rate.

This may be the most crucial assumption for the CAPM. The risk-free asset is needed to simplify the complex pairwise covariances of Markowitz's theory. The risk-free asset simplifies the curved efficient frontier of MPT to the linear efficient frontier of the CAPM. The investor has ceased to be concerned with the characteristics of individual assets. Instead, the investor can create a portfolio from his or her own risk-preferred combination of R_f and R_m.[13] Risk is decreased or increased by adding a portion of the risk-free asset or by borrowing at the risk-free rate to invest additional funds in the market portfolio.

This assumption raises two questions. First, is there such a thing as a risk-free asset? And second, can all investors both borrow and lend at the risk-free rate?

In the next chapter we will look at some CAPM tests that use the rate of return on a 90-day Treasury bill as the proxy for the risk-free rate, and in Chapter 5 we will discuss alternative proxies. Note that the R_f of the CAPM is not the Treasury bill rate but the rate of return on a theoretical zero-risk asset or portfolio. This theoretical asset has no risk—that is, it has no covariance with the market.

Does the risk-free security exist?

Several researchers have questioned the very existence of a truly risk-free asset, and they have developed models that do not depend on the existence of a risk-free security. Black (1972) suggested that the *minimum*-risk asset is not in

[12] See ibid.

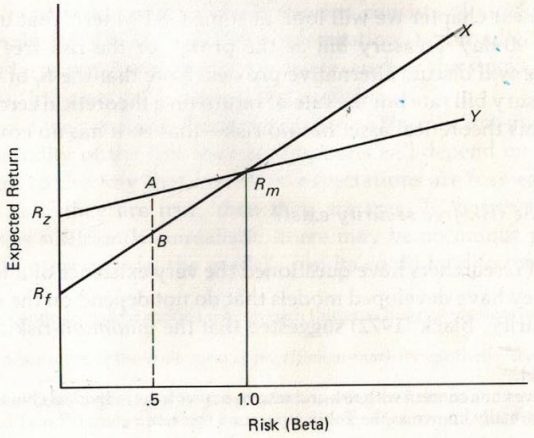
[13] The investor's concern with risk and return, not with the individual characteristics of each asset, is more formally known as the Tobin separation theorem.

fact risk-free because it is subject to the buffeting of inflation. Black created an alternative CAPM using short selling as a proxy for the risk-free asset. To short-sell, the investor borrows securities and sells those securities in anticipation of replacing them later at a lower price. Black assumed that short selling was the means that allowed market prices to be in equilibrium—that is, to be balanced between market pessimists and market optimists. Short selling would be similar to issuing securities at an uncertain rate. Because short selling could occur at any time, it could be used as a proxy for the risk-free asset. Black assumed that all investors could participate in the short-selling of risky securities, which is not actually true. Many large portfolios are restricted from short-selling. However, Black's model retained the CAPM's linear relationship between risk and return. The method of combining two portfolios, the risk-free asset and the market portfolio, still worked.

Black's replacement for the risk-free asset was a portfolio that had no covariability with the market portfolio. Because the relevant risk in the CAPM is systematic risk, a risk-free asset would be one with no volatility relative to the market—that is, a portfolio with a beta of zero. All investor-preferred levels of risk could be obtained from various linear combinations of Black's zero-beta portfolio and the market portfolio. Exhibit 2–2 graphs the traditional CAPM and Black's version of it. Since R_z (the rate of return on the zero-beta asset) and R_m are uncorrelated (as R_f and R_m were assumed to be in the simple CAPM), the investor can choose from various combinations of R_z and R_m. On segment $R_m Y$, R_z is sold short and the proceeds are invested in R_m. On segment $R_z R_m$, portions

Exhibit 2–2

Zero-Beta CAPM and R_f CAPM



of the zero-beta portfolio are purchased. At R_m the investor is fully invested in the market portfolio.

The equilibrium CAPM was rewritten by Black as follows:

$$E(R_i) = (1-\beta_i)E(R_z) + \beta_i E(R_m)$$

where

E indicates expected,
$E(R_z)$ is less than $E(R_m)$, and
R_z holdings over the whole market must be in equilibrium. That is, the number of short sellers and lenders of securities must be equal.

Black's adaptation is intriguing. The result of using this model is a capital market line that has a less-steep slope and a higher intercept than those of the simple CAPM. If Black's model is more correct in its description of investor behavior in the marketplace, then the use of the simple model would produce equity return predictions that would be too low for stocks with betas greater than one and too high for stocks with betas of less than one. Exhibit 2–2 shows the difference between the two models' predictions for a stock with a beta of less than one. The difference between the prediction from the simple model and that from Black's is the difference between B and A.

Unfortunately, we do not have, and neither did Black, an explanation of just what the zero-beta portfolio or asset might be. Nor do we know how restrictions on short-selling would affect the Black adaptation. Certainly there are substantial real-world restrictions against short-selling, as well as significant investor aversion to short-selling.

Do R_f or R_z even exist? We don't know. We do know that to use either model, R_f or R_z must be independent of the rate of return from the market (zero covariance). Is it likely that R_f and Black's R_z are independent of the market's returns—that they have betas of zero? If these returns are not independent, special statistical problems occur.[14] R_f and R_m must be independent. If they are not, investors cannot separate their risk preferences from specific asset choices. The ability to make choices on the basis of risk and return alone, without other information about the individual asset, is essential to the CAPM. If this separation were not possible, we could not use the CAPM.

Because inflation affects both risky and riskless assets, inflation alone could cause the interdependence of R_m and R_f (or R_m and R_z). Because there was considerable inflation in the 1970s, let us examine its effect. Is the resulting in-

[14] For a discussion of this problem, see, for example, R. M. Hagerman and E. H. Kim, "Capital Asset Pricing with Price Level Changes," *Journal of Finance and Quantitative Analysis*, 11 (September 1976), 381–92.

terdependence of R_f and R_m the only problem for the CAPM that inflation introduces?

Frankly, our understanding of the relationship between market returns and investors' expectations of inflation is limited. For some time it was believed that stocks acted as an inflation hedge; market returns were positively correlated with inflation. Lintner (1975) pointed out how little we understand about the impact of inflation. He suggested a negative relationship between returns and inflation. During outbursts of inflation, the firm's rate of return and equity value are reduced because of the firm's increased dependence on outside financing. The need for additional financing, Lintner suggested, is caused by accounting practices that are insensitive to inflation. His is one recent explanation of the effects of inflation on returns. Our question is, How would inflation affect the basic CAPM?

The CAPM has been adapted to deal with inflation. Biger (1975) came to the conclusion that uncertain inflation would change the composition of the optimal portfolio. He suggested that a more accurate model might be

$$R_j = \text{real } R_f + \text{inflation} + \beta_j(R_m - R_f)$$

Yet this model may be far too simplistic.

Hagerman and Kim (1976) suggested a more complex adaptation to account for inflation:

$$E(\tilde{R}_j) = E(\tilde{R}_f) + \frac{\overbrace{\text{covariance}\,(R_j, R_m - R_f)}}{\text{covariance}\,(R_m, R_m - R_f)}[E(\tilde{R}_m) - E(\tilde{R}_f)]$$

Their change is in the second term, the beta term outlined by a bracket. In the simple model, this term is

$$\frac{\overbrace{\text{covariance}\,R_j, R_m}}{\text{variance}\,R_m}$$

indicating that Hagerman and Kim expected an interrelationship among the returns of the market, the returns of the stock, and inflation.

Theirs is not the only version of inflation-adjusted CAPM. Friend, Landskroner, and Losq (1976) provided another CAPM adapted for inflation. All of their factors are expressed in nominal terms:

$$E(R_j) = R_f + \text{cov}(R_j, R_p) + \frac{E(R_m - R_f) - \text{cov}(R_m, R_p)}{\alpha\sigma_m^2 - \text{cov}\,(R_m, R_p)}\,\text{cov}(R_j, R_m) - \text{cov}(R_m, R_p)$$

where

R_p = expected inflation rate

α = percentage of total investors' capital in risky investments

When the correlation between an asset's return and the rate of inflation is positive, their model yields a lower cost of equity than would the simple CAPM. If inflation rises, so do returns. This finding is important. In times of uncertain inflation, the size of errors from the simple, but erroneous, CAPM would be magnified. The real cost of equity could well be misestimated—and we have no way of knowing by how much.

Our presentation of these adaptations is not meant to demonstrate practical and usable inflation-adapted CAPMs. Rather, we want to demonstrate the diversity of the adaptations and to show the increased complexity that results. Unfortunately, we do not know which, if any, of these models is most accurate. Our understanding of inflation and our ability to adapt the model for the complex impacts of inflation are primitive.

Still, we are sure that the simple model does not properly represent even our limited understanding of inflation. The simple CAPM relies on the existence of a risk-free asset that does not covary with the market. Inflation alone makes the existence of a truly risk-free asset unlikely and makes the covariance of the least-risk asset with other assets very likely. The result of these inaccuracies is a model that incorrectly describes the world, and we must be suspicious of the simple CAPM.

Can all investors borrow and lend at the risk-free rate?

The second problem in using the risk-free security as one of the two factors in the CAPM is that we assume that this security is available to all investors. The theory suggests that investors must be able to lend and borrow at the risk-free rate. A risk taker creates a portfolio that is riskier than the market portfolio by borrowing at the risk-free rate to invest in the market portfolio. This borrowing and lending at the risk-free rate results in the single straight line R_fR_mX shown in Exhibit 2–2. Obviously, few investors can borrow at the risk-free rate. They can lend, but not borrow.

Several researchers have attempted to make the model more realistic with regard to the borrowing and lending assumption. For example, assume that all investors can lend at a nominally risk-free rate (for example, they can buy Treasury securities), but few investors, if any, can borrow at that rate. If we set the borrowing rate higher, at, say, R_z, the relationship would change from the traditional straight line of the CAPM. That is, line R_fR_mX shown in Exhibit 2–2 would become line R_fR_mY. Line R_fR_mY is a broken line, which would seem to reflect reality better. In fact, the R_fR_mY line could really be a number of lines, each dependent on the borrowing rate available to a different group of investors.

The assumption regarding the equality of borrowing and lending rates and the free access to the risk-free security is clearly an inaccurate description of the world. Relaxing the assumption leads at best to a broken capital market line, and at worst to an investor-specific fan of lines. In short, relaxing this assumption changes the model in ways that affect the slope, intercept, and

customers at a level that will cover all the costs of providing the electricity, gas, or telephone service—including the costs of capital. Thus, the commission needs an estimate of the firm's cost of equity. Because utilities typically have betas of less than 1, the effect of a misspecified market line is to underestimate the cost of equity. (Of course, for stocks with betas exceeding the market's, the effect is the opposite—an overestimation.) For the utility in question, the allowed rate of return would be lower than the true cost of equity for the firm.

Let us look at the effect of misspecification from another viewpoint. If you are a portfolio manager in an investment management organization and are attempting to keep or lure clients over the long term, where should you position your portfolio regarding risk? What if you know that theory incorrectly draws the capital market line, as shown in Exhibit 3–1? If your clients will eventually be evaluating your performance against this incorrect, theoretical capital market line, would you choose to position your portfolio with a low beta or a high beta? If your portfolio were low risk, the simple CAPM would forecast a return lower than that forecast by the respecified model. If your return were exactly like the return forecast by the respecified model, on the line R_zY, you would appear to have outperformed the average. This superior performance is not a sleight of hand but simply the result of comparing actual results with a forecast made from the wrong model. Conversely, the risk-taking portfolio manager would consistently look bad when evaluated against the CAPM's capital market line.

There are other possible market lines, curves, slopes, and intercepts. Exhibit 3–1 merely demonstrates the practical problems that can result from a model that is wrong. An erroneous model can lead investors, and those evaluating performance, to wrong conclusions and wrong decisions.

Is the capital asset pricing model misspecified or inadequate? And if it is, what is the real relationship among the factors affecting stock prices? Recall that to be useful, a model does not have to be an exactly accurate representation of the system it seeks to describe. We would like it to be, because a model that adequately describes a system as complex as investors' behavior would be most useful. We would, however, be satisfied if the model could be used to make predictions. We are all familiar with correlated factors that do not describe an underlying relationship but are useful in making predictions—high hemlines and high stock prices, large hips and high IQ. Such correlations often work, although we are not sure why.

The problem with a predictive but nondescriptive model is that if any of the underlying causal factors changes in importance, we cannot examine the change nor can we predict its resulting effect on the underlying relationship. For instance, what would happen to the hemline–stock price model if the real determinants of stock prices changed?

Our question is, What is the CAPM? Is it a useful predictor, a good descriptor, both, or neither? Let us look at what researchers have found. We will discuss only a small sample of the flood of work that has been done and published. Other writers might choose to report different research. What we will report here are the results of major works that provide new insights. There are two reasons for reporting these works: First, we want to clarify what is already known. Second, we want to describe research that has real and practical implications. All too often these practical implications are described in academic jargon and published in infrequently read journals. Both advocates and detractors of the CAPM can find support in the literature. After we look at a summary of more than fifteen years of inquiry, we can decide for ourselves.

I. MISSPECIFICATION

There are two basic tests of the reliability of the model. To determine whether the model explains past behavior, researchers have studied past market activity (ex post data) to find out whether the relationships were the same as those predicted by the model. To determine whether the model predicts future behavior, past data has been used to form forecasts for R_m, R_f, and beta, and these forecasts have then been tested against more recent history.

Using history for either purpose creates some problems. First, investors' expectations or beliefs are not really being tested; rather, it is what actually occurred that is under study. The problem is that there is no reason to believe that realized, or ex post, results will be anything like the predictions that investors made at the beginning of the period. By using history, we are mixing two sets of data: We are mixing expectations and realizations. This data mixing is an inherent difficulty in testing an expectational model. Only recently have we begun to see some work that looks specifically at the expectations, the ex ante data.[1] The results are still entirely too tentative to rely on, however. Until more is done in creating and testing ex ante data, it is important to keep in mind that we do have data problems. As we recount the history of CAPM testing, we will try to interpret the results as well as their implications, given the data problem.

1. Slope and Intercept: Does the Model Describe the Real World?

So far we have learned some very interesting things about the CAPM and reality. Some of the earliest work tested realized data (history) against data generated from simulated portfolios. Early studies by Douglas (1969) and Lintner (Douglas [1969]) showed discrepancies between what was expected on the basis of the CAPM and the actual relationships that were apparent in the capital markets. Theoretically, the minimal rate of return from the portfolios

[1] See, for example, W. Lewellen, R. Lease, and G. Schlarbaum, "Patterns of Investment Strategy and Behavior among Individual Investors," *Journal of Business*, May 1977, pp. 296–333; or R. F. Vandell and J. Stevens, "Personal Taxes and Security Pricing," Darden School Working Paper #80-15 (Charlottesville, Va.: Darden Graduate School of Business Administration, 1980).

(the intercept) and the actual risk-free rate for the period should have been equal. They were not.

These early results caused some concern. Many analysts suggested that the tests were faulty and were thus not giving accurate results.[2] However, the Douglas and Lintner results could have been caused by either of two things—the CAPM could have been wrong or the test procedure could have been faulty. Other researchers reformulated the test procedures, and these new procedures were tested on different data in the hope that more accurate results would follow. One retest hypothesized that the proxies used for R_m and R_f (the CAPM gives us no direction as to which real-world figures to use) are correlated. Thus, these proxies would produce a higher intercept and lower slope than would be realistic—the precise results that Douglas and Lintner had obtained. These retests did not find that this problem caused the results. The conclusion was that the Douglas and Lintner findings could be caused by a faulty model. The simple CAPM might be wrong.

Miller and Scholes (1972) reformulated the test procedures to deal with other problems. They asked, Was the form of the model accurate (that is, were risk and return linearly related)? Was beta the best risk measure? Could the choice of the index change the results? Was beta correlated with unsystematic risk? Could the returns be nonnormal? Any of these problems might have caused Lintner's results. In typically academic jargon, Miller and Scholes reported that they did not find good reason to reject Lintner's results. Lintner's results could have been accurate reflections of the world—in other words, the model could be wrong. Although not able to discredit Lintner's results, the Miller-Scholes study did provide solid footing on which to begin the design of future studies.

Another study, now more famous than Lintner's, was done by Black, Jensen, and Scholes (1972). Lintner had used what is called a cross-sectional method (looking at a number of stock returns during one time period), whereas Black, Jensen, and Scholes used a time-series method (using returns for a number of stocks over several time periods). To make their test, Black, Jensen, and Scholes assumed that what had happened in the past was a good proxy for investor expectations (a frequent assumption in CAPM tests). Using historical data, they generated estimates using what we call the market model:

$$R_{jt} = \alpha_j + \beta_j (R_{mt}) + \epsilon_j$$

where

R = total returns

β = the slope of the line (the incremental return for risk)

[2] See Merton Miller and M. Scholes, "Rate of Return in Relation to Risk: A Reexamination of Some Recent Findings," in *Studies in the Theory of Capital Markets*, ed. M. Jensen (New York: Praeger, 1972), pp. 47–78.

α = the intercept or a constant (expected to be 0 over time and across all firms)

ϵ = an error term (expected to be random, without information)

m = the market proxy

j = the firm or portfolio

t = the time period

Instead of using single stocks, they formed portfolios in an effort to wash out one source of error; because betas of single firms are quite unstable.

On the basis of the CAPM, they expected to find

1. That the intercept was equal to the risk-free rate (their proxy was the Treasury bill rate)
2. That the capital market line had a positive slope and that riskier (higher beta) securities provided higher return

Instead, they found

1. That the intercept was different from the risk-free rate
2. That high-risk securities earned less and low-risk securities earned more than predicted by the model
3. That the intercept seemed to depend on the beta of any asset: high-beta stocks had a different intercept than low-beta stocks

Their results are shown in Exhibit 3–2. The dashed lines represent the theoretical market line. The Black, Jensen, and Scholes results, the solid line, are not what the simple CAPM would predict, but the results are just what some of the theoretical adaptations suggested we might find. They are similar to the controversial Lintner results. Because these results are important, many researchers felt it was important to verify them.

Fama and MacBeth (1974) criticized the Black, Jensen, and Scholes study (hereafter called BJS). In a reformulation of the study, they supported the first of the BJS findings. They found that the intercept exceeded the risk-free proxy, but they did not find evidence to support the other BJS conclusions.

Controversial or contrary findings are not uncommon in the testing of this model. With each new piece of research, we gain insight into the approaches we must take to test the model. However, by 1974 most researchers agreed that the intercept exceeded the CAPM-predicted R_f, proxied by Treasury bill rates of return.

One other study sheds further light on these findings. Fama and MacBeth (1973) calculated the actual risk premium and the predicted intercept from 1935 to 1968 and over a variety of subperiods. They too used a technique that settled down the beta instability from individual security errors. They formed port-

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On the CAPM Approach to the Estimation of A Public Utility's Cost of Equity Capital

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I. Introduction

IN RECENT YEARS the Capital Asset Pricing Model (CAPM) has been used in several public utility rate cases to measure the cost of equity capital. In actual application, the cost of equity capital is frequently estimated as the annualized 90 day Treasury Bill rate plus a risk premium. The risk premium is obtained as the product of the average annual excess rate of return on a value weighted index of NYSE stocks (where the average is taken over a long period of time) and an estimate of the utility's NYSE beta.

Underlying this procedure is the assumption that risk premiums are *strictly* proportional to NYSE betas. However, this assumption is inconsistent with the academic empirical literature on CAPM. This literature supports a (non-proportional) linear relationship between risk premiums and NYSE betas with a positive intercept. Other empirical studies suggest that, in addition to betas, risk premiums are influenced by dividend yields and systematic skewness. Evidence presented in this literature is consistent with the predictions of CAPM models that account for margin restrictions on the borrowing of investors, divergent borrowing and lending rates, the existence of risky assets (such as bonds, residential real estate, unincorporated businesses, and human capital) that are not included in the value weighted NYSE stock index, taxes and skewness preference.

The version of the CAPM that should be employed in estimating a public utility's cost of equity capital cannot be conclusively demonstrated by theoretical arguments. A positive theory of the valuation of risking assets should not be judged upon the realism of its assumptions but rather on the accuracy of its predictions. The relationship between risk premiums and betas that is used to estimate the cost of equity capital should therefore be estimated econometrically rather than specified *a priori.*

Section 2 compares the predictions of alternative versions of the CAPM. The assertion that risk premiums are proportional to NYSE betas is shown to result in a downward (upward) biased prediction of the cost of equity capital for a public utility having a NYSE beta that is less (greater) than unity, a dividend yield higher (lower) than the yield on the value weighted NYSE stock index, and/or a systematic skewness that exceeds (is less than) its beta.

Section 3 discusses problems that arise in implementing CAPM approaches and presents possible solutions. Section 4 describes econometric procedures for

* Stanford University, Columbia University, and Bell Laboratories and Columbia University, respectively.

estimating the relationship between risk premiums and NYSE betas. Section 5 presents estimates of CAPM parameters, and, Section 6, using two utilities as examples, illustrates how these estimates can be used to measure the cost of equity capital.

II. Alternative versions of the CAPM: Theory and Evidence

The versions of the CAPM discussed below all assume that investors are risk averse and have homogeneous beliefs. They also assume that a riskless asset exists, that all assets are marketable, and that there are no transactions costs or indivisibilities. The mean-variance versions assume that expected utility is completely defined over the first two moments of the rate of return on investors portfolios. The three moment CAPM assumes that investors have utility functions displaying non-increasing absolute risk aversion and that expected utility is defined over the first three moments of the rate of return on investors portfolios. The before-tax versions ignore taxes while the after-tax versions account for the differential taxation of dividends and capital gains. The constrained borrowing versions allow unlimited short selling of risky securities while the unconstrained borrowing versions allow unlimited short selling of the riskless security (i.e., unlimited borrowing).

The Traditional Version of the CAPM

The traditional version of the CAPM developed by Sharpe [1964] and Lintner [1965] predicts the following relationship between risk premiums and betas,

$$E(\tilde{r}_i) = E(\tilde{r}_m)\beta_i, \tag{1}$$

where:

$E(\tilde{r}_i)$ = the risk premium, or expected excess rate of return above the riskless rate of interest, on the i-th security,
$E(\tilde{r}_m)$ = the risk premium on the market portfolio of all assets, and
$\beta_i = \text{Cov}(\tilde{r}_i, \tilde{r}_m)/\text{Var}(\tilde{r}_m)$, the beta of the i-th security measured against the true market portfolio of all assets.

Before-Tax Constrained Borrowing Versions of the CAPM

Constrained borrowing versions of the CAPM have been developed by Lintner [1969], Vasicek [1971], Black [1972], Brennan [1972], and Fama [1976]. They predict the following relationship between risk premiums and betas,

$$E(\tilde{r}_i) = E(\tilde{r}_m)\beta_i + E(\tilde{r}_z)(1 - \beta_i), \tag{2}$$

$$\text{or} \quad E(\tilde{r}_i) = E(\tilde{r}_z) + \beta_i(E(\tilde{r}_m) - E(\tilde{r}_z)) \tag{2A}$$

where:

$E(\tilde{r}_z)$ = the risk premium on the minimum variance zero beta portfolio.

With diverse investor preferences and no borrowing (Vasicek [1972] and Black

[1972]), divergent borrowing and lending rates (Brennan [1972]), or margin restrictions (Fama [1976]), the risk premium on the zero beta portfolio is positive (i.e., $E(\tilde{r}_z) > 0$). The first term on the RHS of relation (2) is the risk premium on security i that is predicted by the traditional CAPM. The second term is the bias inherent in that prediction when investor borrowing is constrained. Because $E(\tilde{r}_z) > 0$, the traditional CAPM's prediction of the risk premium would be biased downward (upward) for a public utility having a beta less (greater) than unity.

After-Tax Versions of the CAPM

After-tax versions of the CAPM have been developed by Brennan [1973] under the assumption of unlimited borrowing and lending and by Litzenberger and Ramaswamy [1979] under constrained borrowing. They predict the following relationship between risk premiums, betas and dividend yields,

$$E(\tilde{r}_i) = E(\tilde{r}_m)\beta_i + E(\tilde{r}'_z)(1 - \beta_i) + E(\tilde{r}_h)(d_i - \beta_i d_m), \tag{3}$$

where:

$E(\tilde{r}'_z)$ = the risk premium on a portfolio having a zero beta and zero dividend yield,
$E(\tilde{r}_h)$ = the expected rate of return on a hedge portfolio having a zero beta and a dividend yield of unity,
d_i = the dividend yield on stock i, and
d_m = the dividend yield on the market portfolio.

The first term on the RHS of relation (3) is once again the prediction of the traditional CAPM. The sum of the second and third terms indicates the bias inherent in this prediction. With constrained borrowing, the sign of $E(\tilde{r}'_z)$ cannot be determined theoretically; however, econometric estimates indicate that $E(\tilde{r}'_z) > 0$. This result implies that the second term on the RHS of relation (3) is positive (negative) for public utilities having betas less (greater) than unity. With the taxation of corporate dividends and the preferential taxation of capital gains, $E(\tilde{r}_h) > 0$. Therefore, the third term on the RHS of relation (3) would be positive (negative) for a public utility having a beta less (greater) than unity and a dividend yield that is higher (lower) than the dividend yield on the market portfolio. Thus, the sum of the second and third terms is positive (negative) for public utilities having betas less (greater) than unity and higher (lower) than average dividend yields, indicating that the prediction of the traditional version of the CAPM would be downward (upward) biased.

The Three Moment Version of the CAPM

The three moment CAPM, developed by Rubinstein [1973] and Kraus and Litzenberger [1976], predicts the following relationship between risk premiums, betas, and gammas (systematic skewness),

$$E(\tilde{r}_i) = E(\tilde{r}_m)\beta_i + E(\tilde{r}_w)(\gamma_i - \beta_i), \tag{4}$$

where:

$$\gamma_i = \frac{E[(\tilde{r}_i - E(r_i))(\tilde{r}_m - E(r_m))^2]}{E[(\tilde{r}_m - E(\tilde{r}_m))^3]}, \text{ the systematic skewness of security } i$$

$E(\tilde{r}_w)$ = the expected risk premium on a security having a zero beta and a gamma of unity.

With non-increasing absolute risk aversion, $E(\tilde{r}_w) > 0$. The second term on the RHS of relation (4) is the bias inherent in the traditional version of the CAPM. For a public utility whose future profitability is constrained by the regulatory process, gamma may be less than beta and, the risk premium predicted by the traditional version of the CAPM may be downward biased.

Missing Asset Version of the CAPM

Many classes of assets such as human capital, residential real estate, unincorporated business, and bonds are not included in the value weighted index of NYSE stocks. This "missing assets" problem has been analyzed by Mayers [1972], Sharpe [1977] and Roll [1977]. If the traditional version of the CAPM were valid (i.e., if risk premiums were proportional to true betas) it can be shown that,[1]

$$E(\tilde{r}_i) = E(\tilde{r}_s)\beta_{i,s} + E(\tilde{r}_{zs})(1 - \beta_{i,s}) + u_i \tag{5}$$

where:

$$u_i = E(\tilde{r}_m)\beta_{e_i,zs} - E(\tilde{r}_{zs})\{\beta_{i,zs} - (1 - \beta_{i,s})\}$$

and:

$\beta_{i,s}$ = the beta of security i w.r.t. the NYSE index,
$E(\tilde{r}_{zs})$ = the risk premium on the minimum variance zero NYSE beta portfolio,

[1] To obtain relation (5) note that without loss of generality the return on any security i may be expressed as,

$$\tilde{r}_i - E(\tilde{r}_i) = \beta_{i,s}[\tilde{r}_s - E(r_s)] + \beta_{i,zs}[\tilde{r}_{zs} - E(\tilde{r}_{zs})] + \tilde{e}_i$$

where:

$$E(e_i) = \text{Cov}(e_i, r_s) = \text{Cov}(e_i, r_{zs}) = 0$$

Multiplying both sides by $\tilde{r}_m$, taking expectations and dividing by the variance of $\tilde{r}_m$ yields.

$$\beta_i = \beta_{i,s}\beta_s + \beta_{i,zs}\beta_{zs} + \beta_{e_i},$$

where z is used here to refer to the zero beta portfolio related to NYSE index.

Substituting the RHS of the above relation for β_i in relation (1) yields

$$E(\tilde{r}_i) = [E(\tilde{r}_m)\beta_s]\beta_{i,s} + [E(r_m)\beta_{zs}]\beta_{i,zs} + E(r_m)\beta_{e_i}$$

Using the traditional CAPM to evaluate the terms in [·]'s yields

$$E(\tilde{r}_i) = E(\tilde{r}_s)\beta_{i,s} + E(r_s)\beta_{i,zs} + E(\tilde{r}_m)\beta_{e_i}$$

which, when rearranged, is relation (5) in text.

$\beta_{e_i,zs}$ = the beta of the residual of security i measured using a two factor model where the factors are the value weighted NYSE index and the minimum variance zero NYSE beta portfolio.

The first term on the RHS of relation (5) is the predicted return on security i obtained by naively assuming that the NYSE portfolio is the true market portfolio. If the NYSE portfolio were on the efficient frontier then the third term, u_i, would be zero for all i and the second term would be the bias inherent in this naive application of the traditional model. Thus, even if the NYSE portfolio were efficient and risk premiums were proportional to true market betas, risk premiums would not in general be proportional to NYSE betas. For example, if the NYSE portfolio was efficient, but riskier than the true market portfolio, there would be an *ex-ante* linear relationship between risk premiums and NYSE betas with a positive intercept (i.e., $E(\tilde{r}_i) = E(\tilde{r}_{zs}) + \beta_{i,s}(E(\tilde{r}_s) - E(\tilde{r}_{zs}))$).

However, there is no reason to believe that the NYSE portfolio is on the efficient frontier. Here the error term on the RHS of relation (5) would no longer be identically zero for all securities. However, the value weighted average of the error term on the RHS of relation (5) is zero.[2] Thus, for a randomly selected NYSE stock (i) where its probability of selection is proportional to its weight in the NYSE index, the expectation of u_i would be zero. Thus, when the NYSE portfolio is not efficient, *ex-ante* risk premiums would be linear functions of NYSE betas plus an error term. If the minimum variance zero-NYSE beta portfolio had a positive beta with respect to the true market, then its risk premium would be positive (i.e., $E(\tilde{r}_{zs} > 0)$). This would imply the existence of a (non-proportional) linear relationship between risk premiums and NYSE betas (with a positive intercept) plus an error term.

Other Versions of the CAPM

Other versions of the CAPM have been developed. Merton [1971], Cox, Ingersoll and Ross [1978], Breeden and Litzenberger [1978] and Breeden [1980] have derived intertemporal CAPM's that account for shifts in the investment opportunity set. The Merton and the Cox, Ingersoll and Ross studies present multi-beta equilibrium models. The Breeden and Litzenberger, and the Breeden studies, respectively, indicate that the relevant measure of risk is covariance with the marginal utility of consumption and a beta measured relative to aggregate consumption.

While the CAPM theories previously discussed were developed in terms of a single good model, they have been implemented using nominal rates of return. Gonzalez-Gaverra [1973] developed a model that accounts for unanticipated inflation. It suggests that *nominal* risk premiums are linearly related to *real* betas rather than nominal betas.

[2] This follows because for the value weighted index of NYSE stocks $\beta_{es,zs} = \beta_{sz} = (1 - \beta_{ss}) = 0$ by construction.

Implications of Empirical Evidence

Empirical studies by Black, Jensen and Scholes [1972], Fama and MacBeth [1973] and Friend and Blume [1973] find that the relationship between average excess rates of return and NYSE betas is linear, with a positive intercept, rather than proportional. There are at least three possible explanations for these results:

1. Constraints on investor borrowing;
2. Misspecification caused by the exclusion of classes of assets such as bonds, residential real estate, unincorporated business, and human capital from the index; and/or,
3. Misspecification caused by exclusion of other independent variables such as systematic skewness and/or dividend yield from the model.

Each of these explanations yields predictions that are inconsistent with the proportional relationship between risk premiums and NYSE betas that has been asserted in several recent rate cases that use CAPM. To the extent that the NYSE index is a good surrogate for the true market index, the first explanation suggests that a linear relationship between NYSE betas and risk premiums should be estimated and used to calculate the cost of equity capital. The second explanation suggests that a broadly based index should be used to calculate betas. Unfortunately, rate of return data do not exist for some classes of assets and are difficult to obtain for other classes of assets. This suggests that an exact linear relationship between risk premiums and NYSE betas does not exist. However, the NYSE betas of common stocks may be highly correlated with the true unknown betas (measured relative to the true market index). This suggests that the empirical relationship between risk premiums and NYSE betas should be estimated empirically rather than asserted *a priori.*

The third explanation suggests that the effect of other independent variables on risk premiums should be estimated and used in calculating the cost of equity capital. Empirical studies by Rosenberg and Marathé [1979], Litzenberger and Ramaswamy, and Blume [1979] find that, in addition to beta, dividend yield has a significant positive association with average excess rates of return. This result is consistent with the after-tax version of the CAPM and suggests that the relationship between risk premiums, NYSE betas, and dividend yields should be estimated and used to calculate the cost of equity capital. However, Litzenberger and Ramaswamy also present preliminary evidence indicating that the relationship between risk premiums, NYSE betas and yields is non-linear. This result is inconsistent with the Brennan, and Litzenberger and Ramaswamy versions of after-tax CAPM and therefore the use of a linear relationship between risk premiums, betas and dividend yield to calculate the cost of equity capital should be viewed as an approximation to a more complex non-linear relationship.

An empirical study by Kraus and Litzenberger [1976] found that, in addition to beta, systematic skewness (gamma) has a significant negative association with average excess rates of return. However, estimates of gamma are not stable over time and therefore it is not possible to obtain accurate *ex-ante* estimates of the systematic skewness of individual securities. Betas and gammas have a strong

positive association, and, therefore, the use of a linear relationship between risk premiums and betas may again be viewed as approximation to a more complex relationship.

III. Implementing the CAPM Approach

This section discusses econometric problems that are associated with implementing the CAPM approach and presents possible solutions.

Measuring Expectations

The alternative versions of the CAPM discussed above are positive theories of the relationship between *ex-ante* risk premiums and betas.

Ex-ante risk premiums are not, however, directly observable. To handle this problem it is assumed that investors have rational expectations, that the excess rate of return (realized rate of return less the riskless rate of interest) on any portfolio or security in a given month is an unbiased estimate of its risk premium, and that the excess rates of return on each portfolio are independently and identically distributed over time.

Computing Beta

Estimates of the unadjusted betas for each security are obtained from an OLS regression of its excess rate of return on the value weighted NYSE index over a 60 month period. An advantage of using monthly data is that it mitigates the effect of the nonsimultaneity of closing prices. Recently Scholes and Williams [1978] have suggested the use of lagged rates of return as an instrumental variable for the errors in variables problem. Unfortunately, the CRSP daily data file is not available over a sufficiently long time period to be useful in estimating the parameters of the relationship between risk premiums and NYSE betas. Beaver, Kettler and Scholes [1970] and Rosenberg and McKibben [1973] have shown that accounting measures of risk are useful in predicting future betas. However, the Compustat data file, which would be necessary to estimate betas using either of their procedures, does not cover the 1926 to 1947 period.

It has been observed by Blume [1971] that historical betas which are adjusted towards unity are better predictors of future betas (in a mean square forecast error sense) than are unadjusted betas. One explanation of this phenomenon is that the true underlying betas follow a mean reverting process where the mean is unity. Another is that the true underlying beta is constant, the historical beta is a sample estimate of the true underlying beta, and the prior of the beta is unity. These explanations are not mutually exclusive and Blume [1975] has presented preliminary empirical evidence that the true underlying betas display reversion towards the population mean of unity.

Regardless of the cause of the phenomenon, the existence of reversion towards unity suggests that "adjusted" betas, computed as convex combinations of the historical beta and unity, are better predictors than are unadjusted betas. A possible approach is to assume that the same weight ω, $(0 < \omega < 1)$ is applicable

to all securities such that,

$$\beta_i(\text{predicted}) = \omega\beta_{i(\text{historical})} + (1 - \omega)1.$$

This is the procedure used by Blume [1971] and by Merrill Lynch and is called a global adjustment approach. This approach implies a linear relationship between future betas and historical betas and suggests that unadjusted betas may be used to predict risk premiums. For example, consider the following relationship between excess rates of returns and globally adjusted betas,

$$\tilde{r}_i = a + b[\omega\beta_{i(\text{historical})} + (1 - \omega)1] + \tilde{e}_i.$$

This relationship reduces to the following relationship between excess rates of return and historical betas,

$$\tilde{r}_i = a' + b'\beta_{i(\text{historical})} + \tilde{e}_i$$

where

$$a' = a + b(1 - \omega), \quad \text{and}$$

$$b' = b\omega.$$

Note that for predictive purposes, a' and b' may be estimated directly; knowledge of ω is not required. If the ω used were constant over time, then the cost of equity capital estimates obtained using CAPM parameters measured using this global procedure would be identical to those obtained using unadjusted betas. This global adjustment procedure has the advantage of not depending on the exact cause or combination of causes for the empirical tendency of beta estimates to revert towards unity.

Another approach to adjusting betas is to use an individual Bayesian-adjustment procedure. This approach recognizes that the variances of sample betas (obtained from an OLS time series regression of stock returns on the NYSE index) are not identical. This approach is, however, based on the assumption that the true underlying beta is stationary which is inconsistent with Blume's preliminary empirical evidence. Under this approach, the probability of selecting a given stock is assumed to be proportional to its weight in the value weighted portfolio. Therefore, the diffuse prior estimate of its beta is unity. The variance of this prior is computed as

$$\text{Var}(\beta_{i,\text{prior}}) = \sum_{i=1}^{N_t}[[V_i/\sum_{i=1}^{N_t} V_i](\beta_{i,\text{sample}} - 1.0)^2] \tag{6}$$

where V_i is the value of firm i. Thus, the variance of the prior is the cross-sectional variation in sample betas around the value weighted mean of unity. It differs from the Vasicek [1971] adjustment, which computes the prior variance as,

$$\text{Var}(\beta_{i,\text{prior}}) = \sum_{i=1}^{N}(\beta_{i,\text{sample}} - 1.0)^2/N$$

thus giving equal weight to each security. With either the global adjustment or the individual adjustment, the posterior estimate of beta has variance given by

$$\text{Var}(\beta_{i,\text{prior}}) = \omega_i \text{ Var}(\beta_{i,\text{sample}}) + (1 - \omega_i)^2 \text{ Var}(\beta_{i,\text{prior}}) \quad (7)$$

This information is useful in estimating the model coefficients.

Knowing the variance of the measurement error allows implementation of the classical approach to errors in variables and therefore yields a consistent estimator of $\hat{a}_2 = [E(\tilde{R}_{zs}) - R_f]$ (see the next section).

Computing the Risk-Free Rate

In choosing the appropriate proxy for the riskless rate of interest, explicit cognizance should be taken of the fact that the fair rate of return determined in a rate case is applicable throughout a future period. Therefore, the risk-free rate that is chosen should correspond to a risk free return that would be expected to prevail during the period that the pending rate order is expected to be in force.

One simple procedure is to compute the risk free rate as a simple average of monthly forward Treasury Bill rates for the period the pending rate order is expected to be in effect. The Treasury-Bill futures market or McCulloch's [1971] procedure of computing forward rates from the yield curve can be used to obtain the needed forward rates.

Data

The raw data for this study consisted of monthly rates of returns for all NYSE securities and monthly measures of the risk-free rate of interest.

Monthly data on security returns are obtained from the Center for Research in Security Prices (CRSP) at the University of Chicago. The same service also provides the return on a value weighted index of all the NYSE stocks.

Monthly returns on high grade commercial paper from 1926 to 1951 were used as a proxy for the return on a riskless asset. From 1952 to 1978, the return on a Treasury Bill with 30 days to maturity was used for this purpose.

IV. Estimating the Relationship between Risk Premiums and NYSE Betas

The structural econometric model that is estimated in a given cross section is,[3]

$$\tilde{r}_{it} = a + b\beta_{ist} + \tilde{e}_{it}.$$

Any linear estimator of this relationship is obviously a linear combination of the dependent variable. Since the dependent variable is a rate of return, any linear estimator is a rate of return on a portfolio. The unbiasedness condition for an estimator is a set of constraints on this portfolio that assures that the expected rate of return on the portfolio is the coefficient that we are estimating. Once a set

[3] Procedures specific to the implementation of the three moment CAPM, the multiperiod CAPM, and the unanticipated inflation CAPM are not discussed because of unresolved issues relating to the estimation or *ex-ante* systematic skewness, *ex-ante* consumption betas and real betas. The after-tax version of the CAPM and its refinements are considered in Litzenberger and Ramaswamy (1979, 1980).

of portfolio weights $\{h_{it}, i = 1, 2, \cdots, N_t\}$ is chosen, the resulting portfolio rate of return is,

$$\sum_{i=1}^{N_t} h_{it} r_{it} = a \sum_{i=1}^{N_t} h_{it} + b[\sum_{i=1}^{N_t} h_{it}\beta_{ist}] + \sum_{i=1}^{N_t} h_{it} e_{it}. \quad (8)$$

The unbiasedness condition for an estimator of $(a + b)$ requires the following portfolio constraints,

$$\sum_{i=1}^{N_t} h_{it} = 1, \quad \text{and} \quad \sum_{i=1}^{N_t} h_{it}\beta_{ist} = 1.$$

That is, for any normal portfolio (i.e. portfolio weights summing to unity) having a beta of unity, equation (8) reduces to,

$$\sum_{i=1}^{N_t} h_{it} r_{it} = a + b + \sum_{i=1}^{N_t} h_{it} e_{it}.$$

Since the $E(\tilde{e}_{it}) = 0$, $\forall\, i$, it follows that such a portfolio is an unbiased estimator. The best linear unbiased estimator of $a + b$ would be the rate of return on the minimum variance normal portfolio having a beta of unity.

Without loss of generality the variance of any portfolio having a NYSE beta of unity may be expressed as

$$\text{Var}[\sum_{i=1}^{N_t} h_{it}\tilde{r}_{it}] = \text{Var}(\tilde{r}_{st}) + \text{Var}[\sum_{i=1}^{N_t} h_{it}\tilde{e}_{it}],$$

where:

$\tilde{r}_{st}$ = the excess rate of return on the value weighted NYSE portfolio

Note that $\text{Var}(\sum_{i=1} h_{it}\tilde{e}_{it}) = 0$ if and only if the h_{it} for each security corresponds to its weight in the NYSE value weighted index. Thus, the *best* unbiased estimator of $a_t + b_t$ is the excess rate of return on the value weighted NYSE portfolio itself, r_{st}. Assuming that observations of r_{st} are i.i.d., the BLUE estimation of $a + b$ is the average over time of the excess rate of return on the NYSE portfolio.

The unbiasedness conditions for a linear estimator of 'a' are,

$$\sum_{i=1}^{N_t} h_{it} = 1 \quad \text{and} \quad \sum_{i}^{N_t} h_{it}\beta_{ist} = 0.$$

Thus, the rate of return on any normal portfolio that has a zero (true) NYSE beta is an unbiased estimator of 'a'. In any cross-sectional month the best linear unbiased estimator of 'a' would be the rate of return on the minimum variance zero NYSE beta portfolio, r_{zst}.

Without loss of generality the variance of any portfolio having a zero NYSE beta may be expressed as

$$\text{Var}(\sum_{i}^{N_t} h_{it}\tilde{r}_{it}) = \text{Var}(\sum_{i}^{N_t} h_{it} e_{it})$$

Assume momentarily that the true NYSE betas are known. Using the single index model, which assumes that $\text{Cov}(e_{it}, e_{jt}) = 0\ \forall\ i, j \neq i$, the variance of a normal portfolio having a zero NYSE beta is,

$$\text{Var}(\sum_{i=1}^{N_t} h_{it} r_{it}) = \sum_{i=1}^{N_t} h_{it}^2 S_{it}^2$$

where:

S_{it}^2 = the residual risk for security i.

The BLUE estimator of 'a' for a given cross-section month 'a_t' is, therefore, the minimum variance rate of return zero NYSE beta portfolio. The rate of return on this portfolio in month t may be obtained by solving the above described portfolio problem for the h_{it}'s and then calculating $\sum_{i=1}^{N_t} h_{it} r_{it}$. The resulting r_{zst} is

$$r_{zst} = \left[m_{pp} - \frac{m_{p\beta}^2}{m_{\beta\beta}} \right]^{-1} \cdot \left[m_{pr} - \frac{m_{p\beta} m_{\beta r}}{m_{\beta\beta}} \right] \tag{10}$$

where:

$$m_{pp} = \frac{1}{N_t} \sum_{i=1}^{N_t} \frac{1}{S_{it}^2} \qquad m_{p\beta} = \frac{1}{N_t} \sum_{i=1}^{N_t} \frac{\beta_{it}}{S_{it}^2} \qquad m_{pr} = \frac{1}{N_t} \sum_{i=1}^{N_t} \frac{r_{it}}{S_{it}^2}$$

$$m_{\beta\beta} = \frac{1}{N_t} \sum_{i=1}^{N_t} \frac{\beta_{it}^2}{S_{it}^2} \qquad m_{\beta r} = \frac{1}{N_t} \sum_{i=1}^{N_t} \frac{r_{it} \beta_{it}}{S_{it}^2}$$

In the absence of measurement errors in betas, if r_{zst}'s were i.i.d. then a simple average of this would yield the BLUE estimator of 'a', the risk premium on the minimum variance NYSE portfolio.

Errors in the Measurement of Betas

The true NYSE betas are unobservable. If the previously described procedures were used with estimated betas, the cross sectional variance in the estimated betas $m_{\hat{\beta}\hat{\beta}}$ would be an upward biased and inconsistent estimator of the cross sectional variance in the true betas. This would give h_{it}'s that results in portfolio that has positive true NYSE beta for large samples and hence an upward biased estimator of 'a' the risk premium on a portfolio having a zero NYSE beta. To obtain a consistent estimator of 'a', a classical errors in variables approach is undertaken. In this approach, the 'normal' equations for estimation are adjusted as follows: The cross sectional variation in the true NYSE betas, that are unobserved, is replaced by the cross sectional variation in observed NYSE betas less the (sum) of the variances of the measurement errors of the NYSE betas, which has been computed above as $\mathrm{Var}(\hat{\beta}_{it})$. When solved, the resulting estimator is,

$$r_{zt} = \left[m_{pp} - \frac{m_{p\hat{\beta}}^2}{m_{\hat{\beta}\hat{\beta}} - Q} \right]^{-1} \cdot \left[m_{pr} - \frac{m_{\hat{p}\hat{\beta}} m_{\hat{\beta}r}}{m_{\hat{\beta}\hat{\beta}} - Q} \right] \tag{11}$$

where

$$Q = \frac{1}{N_t} \sum_{i=1}^{N_t} \frac{\mathrm{Var}(\hat{\beta}_{it})}{\hat{S}_{it}^2}.$$

Comparing relation (10) with relation (11) indicates that they are identical except for the Q term which is the adjustment due to the variability in the estimator of beta. Under the assumption that the error term is normally distributed and that the true variances of the measurement errors are known, $m_{\hat{\beta}\hat{\beta}} - Q$ is the maximum

likelihood estimator of $m_{\beta\beta}$, the cross sectional variation in the unobservable true NYSE betas. It also follows that $m_{p\hat{\beta}}$ and $m_{\hat{\beta}r}$ are maximum likelihood estimators of $m_{p\beta}$ and $m_{\beta r}$. Since the above described estimator of 'a' is a function of a maximum likelihood estimator, it is also a maximum likelihood estimator (see Kendall and Stuart [1973]).

V. Estimates of CAPM Parameters

The consistent estimators (as described in the previous section) of the parameters of the relationship between *ex-ante* premiums and NYSE betas are given in Table 1. Results for individually Bayesian adjusted and raw betas are presented.

Since the raw betas are not adjusted towards unity, the a_t's calculated each month would be expected to have a positive beta. Regressing the a_t's that were calculated using raw NYSE betas on the r_{st}'s gives a slope coefficient of 0.109 and an R^2 of 0.039. This suggests that the true NYSE beta on this portfolio is positive.

The standard deviation of the r_{zt}'s is less than the standard deviation of the $(r_{st} - r_{zt})$'s as the mathematics of the efficient frontier would suggest. Since individually Bayesian adjusted betas are adjusted towards unity, the r_{zt}'s calculated using the Bayesian adjusted betas would be expected to have a zero NYSE beta. However, regressing the r_{zt}'s that were calculated using Bayesian adjusted NYSE betas (the r_{zt}'s) on the r_{st}'s gives a slope of -0.144 and an R^2 of 0.0327. This suggests that the NYSE beta of this portfolio is negative. Unfortunately, an econometric rationale for a negative beta is not readily apparent. Again the standard deviation of the r_{zt}'s is lower than the standard deviation of the $(r_{st} - r_{zt})$'s as would be expected from the mathematics of the efficient frontier. The $\bar{r}$ calculated using Bayesian adjusted betas is lower than the $\bar{r}_z$ calculated using raw betas as would be expected given the correlation of these portfolios with the NYSE index. Note that the consistent estimators of 'a' and a' reported in TABLE 1 are lower than the corresponding inconsistent estimators obtained using gen-

Table 1

CAPM Parameters

Bayesian Betas

$$r_{it} = r_{zst} + [r_{st} - r_{zst}]\beta_{is(\mathrm{ADJ})} + \epsilon_{it}$$

$$\hat{a} = \bar{r}_s = 0.136 \qquad \hat{b} = \bar{r}_s - \bar{r}_{zs} = 0.519$$

$$\sigma(r_{zst}) = 4.73 \qquad \sigma(r_{st} - r_{zst}) = 8.14$$

Raw Betas

$$r_{it} = [r_{zst} + (r_{st} - r_{zst})(1 - \omega)] + [(r_{st} - r_{zst})\omega]\beta_{is(\mathrm{raw})} + \epsilon_{it}$$

$$\hat{a}' = 0.326, \qquad \hat{b}'_t = 0.330$$

$$\sigma(a_t) = 3.23 \qquad \sigma(b_t) = 6.14$$

where

$$a'_t = [r_{zst} + (r_{st} - r_{zst})(1 - \omega)], \qquad b'_t = [(r_{st} - r_{zst})\omega]$$

eralized least squares as would be expected from the econometric theory. GLS parameters are reported in TABLE 2.

VI. Examples and Conclusions

To illustrate the biases that arise by naively assuming a proportional relationship between NYSE betas and risk premiums, the parameters from Table 1 along with estimates of the risk free rate of interest and betas were used to estimate the cost of equity capital for two utilities: one with a beta substantially less than unity, Pacific Gas and Electric (PGE), and one with a beta close to unity, Consolidated Edison (Con Ed).

The relevant unadjusted and Bayesians betas are presented in Table 3 along with cost of equity capital estimates made by naively assuming a proportional relationship, and by using the estimated linear relationship in all of the calculations.

A risk free rate of interest of 9.29% per annum was used. This was obtained by averaging forward interest rates implied by Treasury Bill futures settlement prices on the International Monetary Market for October 1, 1979 (the assumed date of the rate case). Assuming a nine month lag between the rate case and its implementation, Treasury Bill futures contracts for delivery in June 1980 and thereafter were used in the average. For the main model the same estimates of the risk premium on the NYSE index was used (i.e., $a + b$). The monthly cost of equity capital estimates were compounded to obtain annual estimates.

The differences in the cost of equity capital estimates, which illustrate the so called "zero beta effect", are substantial for PG&E since its NYSE beta estimates are less than unity. The zero beta effect is negligible for Con Ed since its beta is close to unity.

Table 2

Bayesian Betas	
$\hat{a} = 0.321$	$\hat{b} = 0.335$
$\sigma(\hat{a}_t) = 3.26$	$\sigma(\hat{b}_t) = 6.23$
Raw Betas	
$\hat{a} = 0.420$	$\hat{b}' = 0.236$
$\sigma(\hat{a}'_t) = 3.04$	$\sigma(\hat{b}'_t) = 5.19$

Table 3

Maximum Likelihood Estimates of the Cost of Equal Capital

	Unadjusted/Global adjusted betas			Individually Adjusted Bayesian betas		
Company	Raw beta	Proportional	Linear	Beta	Proportional	Linear
PGE	0.48	13.49	15.78	0.53	13.87	14.74
Con Ed	1.06	18.68	18.42	1.05	18.61	18.50

These two companies, as well as utilities in general, have residual standard deviations that are smaller than those of most industrial firms. Hence the individual Bayesian adjustment procedure did not adjust the betas of the sample companies as much towards unity as a global procedure would have. The effect of the individual Bayesian adjustment procedure on the estimated parameters presented in Table 2 can be loosely viewed as reflecting the average adjustment towards unity. Therefore, for a utility such as PG&E having a NYSE beta less than unity and having a lower than average residual risk and the cost of capital estimates obtained using a linear relationship between risk premiums and betas estimated with individually adjusted Bayesian betas would be lower than that obtained using a linear relationship estimated with unadjusted or globally adjusted betas. The difference between the estimates obtained using the individually Bayesian adjusted estimates and the raw betas is negligible for Con Ed since its beta is close to unity. The difference between the estimates for PG&E are substantial and indicate the importance of future research on the revision of betas towards unity.

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DISCUSSION

RICHARD S. BOWER*: As a regulator I find the three papers stimulating and helpful. Each is reassuring because it supports some aspect of regulatory practice, rewarding because it suggests an opportunity to improve practice and less than totally satisfying because it does not provide all the answers.

Bruce Greenwald's paper on admissable rate bases may be too rich to digest at a single sitting. Greenwald starts conventionally by stating that the Hope decision criteria for fairness to investors and capital attraction are met by any rate base valuation formula which permits market value to equal rate base and which causes rate base to increase dollar for dollar with new investment. He then argues, less conventionally, that to be admissable a formula must allow regulators to establish cash revenue requirements and rate base appreciation through time and

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RISK AND RETURN FOR REGULATED INDUSTRIES

THE Brattle GROUP

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144. Much of the academic literature estimating alpha dates back to the 1980s and prior to that. Academic attention in this area has since largely turned to multifactor models, such as the Fama–French model, discussed in Chapter 6.
145. Eugene F. Fama and Kenneth R. French, "The Capital Asset Pricing Model: Theory and Evidence," *Journal of Economic Perspectives* 18(3) (2004): 25–46 ("Fama and French, 2004").
146. Fama and French (2004), 33.
147. Note that the ECAPM and the Blume adjustment are attempting to correct for different empirical phenomena and therefore both may be applicable. It is not inconsistent to use both, as illustrated by the fact that the Litzenberger et al. (1980) study relied on Blume-adjusted betas and estimated an alpha of 2% points in a short-term version of the ECAPM. This issue sometimes arises in regulatory proceedings.
148. *See* Eugene F. Fama and Kenneth R. French, "Industry Costs of Equity," *Journal of Financial Economics* 43 (1997): 153–193.
149. To the extent that an analyst takes betas from a source such as *value line*, the direct calculations are not public. But public data can be used to see if the *value line* beta in question exhibits any anomalies.
150. See endnote 147.

As noted, it is possible to try to interpret an ECAPM in terms of various elaborations of the basic CAPM theory. However, the ECAPM can also be viewed as a practical adjustment that can be made when the estimation is intended for forecasting or measurement of cost of capital. It can be applied without knowing the "cause" of the increased intercept and decreased slope of the CAPM, but with the assurance that the cost of equity estimates will be closer to the empirically observed results than those from the theoretical version of the model.[147]

Beyond the Capital Asset Pricing Model

There are many alternative models that attempt to account for the empirical regularity. Lizenberger et al. (1980) summarizes the early CAPM variants. Another approach is to postulate multiple risk factors of concern to investors and then to evaluate the sensitivity of each stock to each factor. Such models, the most famous of which is known as the Fama–French model, are covered in Chapter 6.[148]

SUMMING UP THE CAPITAL ASSET PRICING MODEL

The CAPM has a strong theoretical foundation and fits with the intuition of a risk–return trade-off. It does attempt to estimate the cost of capital, although empirical tests show that it underestimates the cost for low-beta stocks and overestimates the cost for high-beta stocks. It can readily be used to prepare both nominal and real estimates of the cost of capital. The data necessary for its implementation are widely available at low cost, and its calculations are relatively simple. These calculations usually can readily be verified by others,[149] although some ways of determining the MRP rely on data that cannot readily be checked. In the model, the risk-free interest rate reflects current market conditions, but the estimated beta relies on historical data, so the model is neither fully forward-looking nor completely backward-looking. The model is transparent and, to the extent we can determine, generally robust to violations of its underlying assumptions (the results of the empirical tests aside), but not necessarily to changes in economic conditions. For example, it is hard to know the best way to adapt the MRP and/or the interest rate to the effects of the 2008–09 financial crisis, suggesting sensitivity tests are needed for such efforts.

As was revealed in the above discussion, the primary source of debate for the CAPM is estimating parameters, particularly the MRP, but the appropriate method to estimate beta and deciding on the appropriate measure of the risk-free interest rate are often controversial as well. It is important to recognize this lack of consensus in the academic literature and among practitioners when employing the CAPM in a regulatory setting. Although perhaps more well rooted in economic theory than other methodologies, it is also more subject to technical debate and disagreement. In general, the choice of risk-free rate is not controversial and most

NOTE: This section is from the *2017 Valuation Handbook – U.S. Guide to Cost of Capital* (data through December 31, 2016). All of the data used in this section in the examples is from the same book.

These examples are intended to be *generic*. In other words, the *methodologies and frameworks* described in this section can be applied when using valuation data from different data-years, but the valuation *data* itself used in this section is applicable *only* to the 2017 data-year.

Risk Premium Report Study – Examples

In this chapter, we first discuss concepts that are specific to each of the four Risk Premium Report studies (Size Study, Risk Study, High-Financial-Risk Study, Comparative Risk Study), and then provide detailed examples for using the data in each to estimate the cost of equity capital.

Size Study

The size of a company is one of the most important risk elements to consider when developing cost of equity estimates for use in valuing a firm. Traditionally, researchers have used market value of equity (i.e., "market capitalization" or simply "market cap") as a measure of size in conducting historical rate of return research. For example, the Center for Research in Security Prices (CRSP) "deciles" are developed by sorting U.S. companies by market capitalization. Another example is the Fama-French "Small minus Big" (SMB) series, which is the difference in return of "small" stocks minus "big" (i.e., large) stocks, as defined by market capitalization.[10.1, 10.2]

Reasons for Using Additional Measures of Size

There are several reasons for using other measures of size in *addition* to the traditional measure of size, market value of equity.

First, financial literature indicates a bias may be introduced when ranking companies by market value of equity because a company's market value of equity may be affected by characteristics of the company other than size.[10.3] In other words, some companies might be small because they are risky (high discount rate), rather than risky because they are small (low market capitalization). One simple example could be a company with a large asset base, but a small market capitalization as a result of high leverage or depressed earnings. Another example could be a company with large sales or operating income, but a small market capitalization due to being highly leveraged.

Second, market capitalization may be an imperfect measure of the risk of a company's operations.

Third, using alternative measures of size may have the practical benefit of removing the need to first make a "guesstimate" of size in order to know which portfolio's premium to use (this issue is commonly referred to as the "circularity" issue). When you are valuing a closely held company, you are trying to determine market value of equity. If you need to make a guesstimate of the subject

[10.1] To learn more about the Center for Research in Security Prices (CRSP) at the University of Chicago Booth School of Business, visit www.CRSP.com.

[10.2] Eugene Fama, 2013 Nobel laureate in economic sciences, is the Robert R. McCormick Distinguished Service Professor of Finance at the University of Chicago, and Ken French is the Roth Family Distinguished Professor of Finance at the Tuck School of Business at Dartmouth College. Fama and French are prolific researchers and authors who have contributed greatly to the field of modern finance. Fama and French's paper "The Cross-Section of Expected Stock Returns" was the winner of the 1992 Smith Breeden Prize for the best paper in the *Journal of Finance*. Fama is also chairman of the Center for Research in Security Prices (CRSP) at the University of Chicago Booth School of Business.

[10.3] "A Critique of Size Related Anomalies", Jonathan Berk, *Review of Financial Studies*, vol. 8, no. 2 (1995).

company's market value of equity first in order to know which size premium to use, the "circularity" problem is introduced. While market capitalization, at least for a closely held firm, is *not* generally available, other size measures, such as total assets or net income, *are* generally available.[10.4]

Finally, when doing analysis of any kind it is generally prudent to approach things from multiple directions if at all possible. This is good practice for several reasons, with the most important being that it has the potential of strengthening the conclusions of the analysis.

The Difference Between the Size Study's A Exhibits and the B Exhibits

The results of the Size Study are presented in Exhibits A-1 through A-8 and Exhibits B-1 through B-8. The main difference between the A and B exhibits is how they are used. The A exhibits are used if you are using a "build-up" method to develop cost of equity capital estimates, and the B exhibits are used if you are using the capital asset pricing model (CAPM) to develop cost of equity capital estimates. This difference in usage is a function of the type of "risk premia" presented in each of the exhibits:

The A exhibits provide "risk premia over the risk-free rate" (RP_{m+s}) in terms of the combined effect of *market* risk and *size* risk for 25 portfolios ranked by eight alternative measures of size. These premia can be added to a risk-free rate (R_f) to estimate cost of equity capital in a build-up model.

The B exhibits provide "risk premia over CAPM" (i.e., size premia) (RP_s) in terms of size risk for 25 portfolios ranked by eight alternative measures of size. These premia are commonly known as beta-adjusted size premia, or simply size premia. These premia can be added as a size adjustment to a basic CAPM to estimate cost of equity capital.[10.5]

The Difference Between "Risk Premia Over the Risk-free Rate" and "Risk Premia Over CAPM"

Risk Premium Over Risk-Free Rate (RP_{m+s})

"Risk premia over the risk-free rate" represent the difference between the historical (observed) total return of equities over the risk-free rate.[10.6] A long-run average historical risk premium is often used as an indicator of the expected risk premium of a typical equity investor. Total returns are based on dividend income plus capital appreciation and represent returns after corporate taxes (but before owner-level taxes). To estimate the historical risk premia in the *2017 Valuation Handbook – U.S. Guide to Cost of Capital*, the average total return for each of the 25 size-ranked portfolios is calculated over the sample period, and then the average income return of long-term U.S. government bonds (using SBBI data) over the same period is subtracted.

10.4 For further discussion of the history of the size premium and criticisms of the size premium, see Chapters 14 and 15 in *Cost of Capital: Applications and Examples* 5th ed. by Shannon Pratt and Roger Grabowski, Wiley (April, 2014).

10.5 The basic CAPM formula is *Cost of Equity Capital = Risk-Free Rate + (Beta x ERP)*. A "modified CAPM" usually refers to the common modification to the CAPM formula that is used to incorporate an adjustment for size: *Cost of Equity Capital = Risk-Free Rate + (Beta x ERP) + Size Premium*. Please note that the modified CAPM as presented is after addition of a size premium and prior to the addition of any "company-specific" risk premia that the individual valuation analyst may deem appropriate.

10.6 Risk premia over the risk-free rate and size premia are presented in the Risk Premium Report Exhibits. The CRSP Deciles Size Premia exhibits present size premia, but do not include risk premia over the risk-free rate.

For example, the average annual arithmetic return for portfolio 25 in Exhibit A-3 (size measure: 5-year average net income) over the time period 1963–2016 is 21.44%, and the average annual income return of long-term U.S. government bonds over the same period is 6.46%. This implies that the "risk premium over the risk-free rate" is 14.98% (21.44% – 6.46%) for this portfolio. This difference is a measure of risk in terms of the combined effect of *market* risk and *size* risk.

As of December 31, 2016, the average risk premium over the risk-free rate for portfolio 1 (comprised of the largest companies) for all *eight* of the size measures analyzed in the Size Study was 5.97%, and the average risk premium over the risk-free rate for portfolio 25 (comprised of the smallest companies) for all *eight* of the size measures was 14.97%, a difference of 9.0% (14.97% – 5.97%). There is a clear negative relationship between "size" and premium over long-term bonds (i.e., as size decreases, the return over the risk-free rate increases).

Because risk premia over the risk-free rate have an embedded measure of market (i.e., "beta") risk, these premia *are* appropriate for use in "build-up" methods that do *not* already include a measure of market risk, but are *not* appropriate for use in models (e.g., CAPM) that already have a measure of market risk.

Risk premia over the risk-free rate (RP_{m+s}) are presented in Exhibits A-1 through A-8. In the *2017 Valuation Handbook – U.S. Guide to Cost of Capital*, these risk premia are calculated over the period 1963 (the year that the *Compustat* database was inaugurated) through December 2016.

Both risk premia over the risk-free rate *and* size premia are presented in the Risk Premium Report Exhibits. The CRSP Deciles Size Premia exhibits present size premia, but do not include risk premia over the risk-free rate.

Size Premia (RP_s)

"Risk Premia over CAPM" represent the difference between historical (observed) excess return and the excess return predicted by CAPM. Years ago, the "small stock premium" was calculated as the simple difference in small company returns versus large company returns.[10.7] However, an examination of the betas of large stocks versus small stocks revealed that within the context of the capital asset pricing model (CAPM), beta (a measure of market risk) did not fully explain all of the difference between large company returns and small company returns. The observed (i.e., historical) excess return of portfolios comprised of smaller stocks tended to be greater than the excess return predicted by the CAPM. What followed from this observation is what is now commonly referred to as the "size premium". To learn more about the size effect, see Chapter 4.

Size premia are presented in both the Risk Premium Report Exhibits and the CRSP Deciles Size Premia exhibits. The methodology employed to calculate the size premia in both data sets is very similar, and distills down to measuring the difference in historical excess returns (i.e., "what actually happened"), and the excess returns that CAPM would have predicted. Detailed examples of the

[10.7] For example, in early versions of what would evolve into the *SBBI Classic Yearbook* (Morningstar, Chicago 2015) the "small stock premium" was calculated as the simple difference between a "small company stock" series and the Standard & Poor's (S&P) Composite Index (i.e., the S&P 500 Index). Starting in 2016, the *SBBI "Classic" Yearbook*" is updated annually by Duff & Phelps and is renamed "SBBI Yearbook" (the word "Classic" has been removed).

derivation of size premia for both data sets are provided in Chapter 7, "The CRSP Deciles Size Premia Studies and the Risk Premium Report Studies – A Comparison".

The "A" and "B" Exhibits: Summary of Data Presented

While the A and B exhibits present different types of risk premia, both the A and B exhibits' 25 portfolios are ranked by the same eight alternative measures of size, which are described in Exhibit 10.1.[10.8] Each of the exhibits A-1 through A-8 and B-1 through B-8 displays one line of data for each of the 25 size-ranked portfolios.

Exhibit 10.1: Eight Alternative Measures of Size

Exhibits A-1 and B-1
Market value of common equity (common stock price times number of common shares outstanding).

Exhibit A-2 and B-2
Book value of common equity (does not add back the deferred tax balance)

Exhibit A-3 and B-3
5-year average net income for previous five fiscal years (net income before extraordinary items).

Exhibit A-4 and B-4
Market value of invested capital (MVIC) (market value of common equity plus carrying value of preferred stock plus long-term debt (including current portion) and notes payable).

Exhibit A-5 and B-5
Total Assets (as reported on the balance sheet).

Exhibit A-6 and B-6
5-year average earnings before interest, income taxes, depreciation and amortization (EBITDA) for the previous five fiscal years (operating income before depreciation plus non-operating income).

Exhibit A-7 and B-7
Sales (net).

Exhibit A-8 and B-8
Number of employees (number of employees, either at year-end or yearly average, including part-time and seasonal workers and employees of consolidated subsidiaries; excludes contract workers and unconsolidated subsidiaries).

The A and B exhibits include the statistics outlined in Exhibit 10.2 for each of the size measures outlined in Exhibit 10.1.

[10.8] For a detailed description of the Standard & Poor's *Compustat* data items used in the Risk Premium Report exhibits, please see Appendix 1.

Principles of Corporate Finance

THIRD EDITION

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9 Capital Budgeting and the Capital Asset Pricing Model

Long before the development of capital asset pricing theory, smart financial managers adjusted for risk in capital budgeting. They realized intuitively that, if other things are equal, risky projects are less desirable than safe ones. Therefore they demanded a higher rate of return from risky projects or they based their decisions on conservative estimates of the cash flows.

Various rules of thumb are often used to make these risk adjustments. For example, many companies estimate the rate of return required by investors in their securities and use this **company cost of capital** to discount the cash flows on all new projects. Since investors require a higher rate of return from a very risky company, such a firm will have a higher company cost of capital and will set a higher discount rate for its new investment opportunities.

You can use the capital asset pricing model as a rule of thumb for estimating the company cost of capital. For instance, we showed in Table 7-5 that the stock of Digital Equipment Corporation (DEC) had a beta of 1.21 at the end of 1986. The corresponding expected rate of return was .158, or about 16 percent. Therefore, according to the company cost of capital rule, DEC should have been using a 16 percent discount rate to compute project net present values.[1]

This is a step in the right direction. Even though we can't measure betas or the market risk premium with absolute precision, it is still reasonable to assert that DEC faced more risk than the average firm and, therefore, should have demanded a higher rate of return from its capital investments.

But the company cost of capital rule can also get a firm into trouble if the new projects are more or less risky than its existing business. Each project should be evaluated at *its own* opportunity cost of capital. This is a clear implication of the value-additivity principle introduced in Chapter 7. For a firm composed of assets A and B, firm value is

$$\text{Firm value} = PV(AB) = PV(A) + PV(B) = \text{sum of separate asset values}$$

Here PV(A) and PV(B) are valued just as if they were mini-firms in which stockholders could invest directly. Note: Investors would value A by discounting its forecasted cash flows at a rate reflecting the risk of A. They would value B by discounting at a rate reflecting the risk of B. The two discount rates will, in general, be different.

If the firm considers investing in a third project C, it should also value C as if it were a mini-firm. That is, it should discount the cash flows of C at the expected rate of return investors would demand to make a separate investment in C. *The true cost of capital depends on the use to which the capital is put.*

[1] DEC did not use any significant amount of debt financing. Thus its cost of capital is the rate of return investors expect on its common stock. The complications caused by debt are discussed later in this chapter.

Each project should be evaluated at its own opportunity cost of capital; the true cost of capital depends on the use to which the capital is put.

This follows from value additivity. The capital asset pricing model implies value additivity, but value additivity holds as well under other theories of asset valuation.

APPENDIX USING THE CAPITAL ASSET PRICING MODEL TO CALCULATE CERTAINTY EQUIVALENTS

When calculating present value you can take account of risk in either of two ways. You can discount the expected cash flow C_1 by the risk-adjusted discount rate r:

$$PV = \frac{C_1}{1 + r}$$

Alternatively, you can discount the certainty equivalent cash flow CEQ_1 by the risk-free rate of interest r_f:

$$PV = \frac{CEQ_1}{1 + r_f}$$

In this appendix we show how you can derive CEQ_1 from the capital asset pricing model.

We know from our present value formula that $1 + r$ equals the expected dollar payoff on the asset divided by its present value:

$$1 + r = \frac{C_1}{PV}$$

The capital asset pricing model also tells us that $1 + r$ equals

$$1 + r = 1 + r_f + \beta(r_m - r_f)$$

Therefore,

$$\frac{C_1}{PV} = 1 + r_f + \beta(r_m - r_f)$$

In order to find beta, we calculate the covariance between the asset return and the market return and divide by the market variance:

$$\beta = \frac{\text{cov}\,(\tilde{r}, \tilde{r}_m)}{\sigma_m^2} = \frac{\text{cov}\,[(\tilde{C}_1/PV - 1, \tilde{r}_m)]}{\sigma_m^2}$$

The quantity $\tilde{C}_1$ is the future cash flow and is, therefore, uncertain. But PV is the asset's present value: It is *not* unknown and, therefore, does not "covary" with $\tilde{r}_m$. Therefore, we can rewrite the expression for beta as

$$\beta = \frac{\text{cov}\,(\tilde{C}_1, \tilde{r}_m)}{PV\,\sigma_m^2}$$

Substituting this expression back into our equation for C_1/PV gives

$$\frac{C_1}{PV} = 1 + r_f + \frac{\text{cov}\,(\tilde{C}_1, \tilde{r}_m)}{PV} \cdot \frac{r_m - r_f}{\sigma_m^2}$$

The expression $(r_m - r_f)/\sigma_m^2$ is the expected risk premium on the market per unit of variance. It is often known as the *market price of risk* and is written as λ (lambda).

Capital Investment and Financial Decisions

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Defining the Cost of Capital

In the preceding chapter we concluded that, up to a limit, the use of financial leverage can potentially increase the value of the firm. If we denote the proportions of debt and equity which correspond to this limit by the letter L^*, the latter represents the firm's *optimal* capital structure. And as we have assumed that the goal of the firm is to maximize its market value (thereby maximizing the market value of the stockholders' equity as well), it follows that the firm should strive to achieve that financing mix which it believes to be optimal in the long run.

In this chapter we turn our attention to the problem of defining the cost of capital, that is a firm's minimum required rate of return on new investment. Initially we shall set out the theoretical arguments supporting the use of a *weighted average* of the various sources of financing as the measure of the cost of capital, the weights being determined by the proportion of each source in the optimal capital structure, L^*. In the following chapter we shall discuss the ways in which each individual type of financing (debt, preferred stock, common stock, retained earnings, etc.), can be measured, and conclude the discussion by setting out a practical method for calculating the cost of capital using General Motors Corporation and IBM as examples.

We concentrate in this chapter and in the next one on defining and measuring the cost of equity, debt and preferred stocks. The analysis of cost of other sources of funds (e.g., accounts payable) is left to the end-of-chapter problems.

FIRM'S COST OF CAPITAL VS INDIVIDUAL PROJECT'S COST OF CAPITAL

The cost of capital and the discount rate are two concepts which are used throughout the book interchangeably. However, there is a distinction between the *firm's* cost of capital and *specific project's* cost of capital. Let us elaborate:

Firm's Cost of Capital

The firm's cost of capital is the discount rate employed to discount the firm's average cash flow, hence obtaining the value of the firm. It is also the weighted average cost of capital, as we shall see below. The weighted average cost of capital should be employed for project evaluation (i.e., calculating the *NPV*) only in cases where the risk profile of the new project is a "carbon copy" of the risk profile of the firm.

Specific Project's Cost of Capital

In any case where the risk profile of the individual projects differ from that of the firm, an adjustment should be made in the required discount rate, to reflect this deviation in the risk profile. To illustrate, suppose that the firm's weighted average cost of capital is 20% and the risk-free interest rate is 10%. The firm should discount the project's average cash flows, in general, at the 20% discount rate. However, consider a case where the firm faces a project whose cash flow is certain. What is the minimum required rate of return on this certain project? In this case it is clearly the 10% rate which reflects the opportunity cost that the firm could earn by investing its money in other safe assets. Similarly, if the project under consideration is characterized by a very high risk, the 20% discount rate may be insufficient and a higher discount rate should be employed.

A Formal Analysis

For simplicity we assume a perpetual cash flow stream and no taxes. However, the same results can be obtained for a non-perpetual cash flow stream and when taxes exist. Let the firm's average cash flow be $\bar{X}$ and its market value be V. Hence there is some discount rate k which fulfills the following equality

$$V = \frac{\bar{X}}{k}$$

Suppose now that the firm is considering a new investment whose initial outlay is I. Should the firm accept the new project? The decision is, of course, dependent on the average additional cash flow $\Delta\bar{X}$ due to the new project as well as its risk profile. Suppose that as a result of accepting the new project, we obtain a new value for the firm V_1 given by,

$$V_1 = \frac{\bar{X}_1}{k_1} = \frac{\bar{X} + \Delta\bar{X}}{k + \Delta k}$$

where $\bar{X}_1 = \bar{X} + \Delta\bar{X}$ and $k_1 = k + \Delta k$ is the appropriate new average cash flow of the firm and its new discount rate.

43 S.Ct. 675 Page 1
P.U.R. 1923D 11, 262 U.S. 679, 43 S.Ct. 675, 67 L.Ed. 1176
(Cite as: P.U.R. 1923D 11, 43 S.Ct. 675)

Supreme Court of the United States
BLUEFIELD WATERWORKS & IMPROVEMENT CO.
v.
PUBLIC SERVICE COMMISSION OF WEST VIRGINIA et al.
No. 256.

Argued January 22, 1923.
Decided June 11, 1923.

In Error to the Supreme Court of Appeals of West Virginia.

Proceedings by the Bluefield Waterworks & Improvement Company against the Public Service Commission of the State of West Virginia and others to suspend and set aside an order of the Commission fixing rates. From a judgment of the Supreme Court of West Virginia, dismissing the petition, and denying the relief (89 W. Va. 736, 110 S. E. 205), the Waterworks Company bring error. Reversed.

West Headnotes

Constitutional Law 92 298(1.5)

92 Constitutional Law
92XII Due Process of Law
92k298 Regulation of Charges and Prices
92k298(1.5) k. Public Utilities in General. Most Cited Cases
Rates which are not sufficient to yield a reasonable return on the value of the property used in public service at the time it is being so used to render the service are unjust, unreasonable, and confiscatory, and their enforcement deprives the public utility company of its property, in violation of the Fourteenth Amendment of the Constitution.

Constitutional Law 92 298(3)

92 Constitutional Law
92XII Due Process of Law
92k298 Regulation of Charges and Prices
92k298(3) k. Water and Irrigation Companies. Most Cited Cases
Under the due process clause of the Fourteenth Amendment of the Constitution, U.S.C.A., a waterworks company is entitled to the independent judgment of the court as to both law and facts, where the question is whether the rates fixed by a public service commission are confiscatory.

Waters and Water Courses 405 203(10)

405 Waters and Water Courses
405IX Public Water Supply
405IX(A) Domestic and Municipal Purposes
405k203 Water Rents and Other Charges
405k203(10) k. Reasonableness of Charges. Most Cited Cases
It was error for a state public service commission, in arriving at the value of the property used in public service, for the purpose of fixing the rates, to fail to give proper weight to the greatly increased cost of construction since the war.

Waters and Water Courses 405 203(10)

405 Waters and Water Courses
405IX Public Water Supply
405IX(A) Domestic and Municipal Purposes
405k203 Water Rents and Other Charges
405k203(10) k. Reasonableness of Charges. Most Cited Cases
A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties, but it has no constitutional right to such profits as are realized or anticipated in highly profitable enterprises or speculative ventures.

Waters and Water Courses 405 203(10)

405 Waters and Water Courses
405IX Public Water Supply
405IX(A) Domestic and Municipal Purposes
405k203 Water Rents and Other Charges
405k203(10) k. Reasonableness

(Cite as: P.U.R. 1923D 11, 43 S.Ct. 675)

of Charges. Most Cited Cases
Since the investors take into account the result of past operations as well as present rates in determining whether they will invest, a waterworks company which had been earning a low rate of returns through a long period up to the time of the inquiry is entitled to return of more than 6 per cent. on the value of its property used in the public service, in order to justly compensate it for the use of its property.

Federal Courts 170B 504.1

170B Federal Courts
170BVII Supreme Court
170BVII(E) Review of Decisions of State Courts
170Bk504 Nature of Decisions or Questions Involved
170Bk504.1 k. In General. Most Cited Cases
(Formerly 106k394(6))
A proceeding in a state court attacking an order of a public service commission fixing rates, on the ground that the rates were confiscatory and the order void under the federal Constitution, is one where there is drawn in question the validity of authority exercised under the state, on the ground of repugnancy to the federal Constitution, and therefore is reviewable by writ of error.

****675 *680** Messrs. Alfred G. Fox and Jos. M. Sanders, both of Bluefield, W. Va., for plaintiff in error.
Mr. Russell S. Ritz, of Bluefield, W. Va., for defendants in error.

***683** Mr. Justice BUTLER delivered the opinion of the Court.
Plaintiff in error is a corporation furnishing water to the city of Bluefield, W. Va., ****676** and its inhabitants. September 27, 1920, the Public Service Commission of the state, being authorized by statute to fix just and reasonable rates, made its order prescribing rates. In accordance with the laws of the state (section 16, c. 15-O, Code of West Virginia [sec. 651]), the company instituted proceedings in the Supreme Court of Appeals to suspend and set aside the order. The petition alleges that the order is repugnant to the Fourteenth Amendment, and deprives the company of its property without just compensation and without due process of law, and denies it equal protection of the laws. A final judgment was entered, denying the company relief and dismissing its petition. The case is here on writ of error.

[1] 1. The city moves to dismiss the writ of error for the reason, as it asserts, that there was not drawn in question the validity of a statute or an authority exercised under the state, on the ground of repugnancy to the federal Constitution.

The validity of the order prescribing the rates was directly challenged on constitutional grounds, and it was held valid by the highest court of the state. The prescribing of rates is a legislative act. The commission is an instrumentality of the state, exercising delegated powers. Its order is of the same force as would be a like enactment by the Legislature. If, as alleged, the prescribed rates are confiscatory, the order is void. Plaintiff in error is entitled to bring the case here on writ of error and to have that question decided by this court. The motion to dismiss will be denied. See ***684**Oklahoma Natural Gas Co. v. Russell, 261 U. S. 290, 43 Sup. Ct. 353, 67 L. Ed. 659, decided March 5, 1923, and cases cited; also Ohio Valley Co. v. Ben Avon Borough, 253 U. S. 287, 40 Sup. Ct. 527, 64 L. Ed. 908.

2. The commission fixed $460,000 as the amount on which the company is entitled to a return. It found that under existing rates, assuming some increase of business, gross earnings for 1921 would be $80,000 and operating expenses $53,000 leaving $27,000, the equivalent of 5.87 per cent., or 3.87 per cent. after deducting 2 per cent. allowed for depreciation. It held existing rates insufficient to the extent of 10,000. Its order allowed the company to add 16 per cent. to all bills, excepting those for public and private fire protection. The total of the bills so to be increased amounted to $64,000; that is, 80 per cent. of the revenue was authorized to be increased 16 per cent., equal to an increase of 12.8 per cent. on the total, amounting to $10,240.

As to value: The company claims that the value of the property is greatly in excess of $460,000. Reference to the evidence is necessary. There was submitted to the commission evidence of value which it summarized substantially as follows:

a. Estimate by company's engineer

(Cite as: P.U.R. 1923D 11, 43 S.Ct. 675)

	on. basis of reproduction new, less. depreciation, at prewar prices.	$ 624,548 00
b.	Estimate by company's engineer on. basis of reproduction new, less. depreciation, at 1920 prices.	1,194,663 00
c.	Testimony of company's engineer. fixing present fair value for rate. making purposes.	900,000 00
d.	Estimate by commissioner's engineer on. basis of reproduction new, less. depreciation at 1915 prices, plus. additions since December 31, 1915, at. actual cost, excluding Bluefield. Valley waterworks, water rights,. and going value.	397,964 38
e.	Report of commission's statistician. showing investment cost less. depreciation.	365,445 13
f.	Commission's valuation, as fixed in. case No. 368 ($360,000), plus gross. additions to capital since made. ($92,520.53).	452,520 53

***685** It was shown that the prices prevailing in 1920 were nearly double those in 1915 and pre-war time. The company did not claim value as high as its estimate of cost of construction in 1920. Its valuation engineer testified that in his opinion the value of the property was $900,000-a figure between the cost of construction in 1920, less depreciation, and the cost of construction in 1915 and before the war, less depreciation.

The commission's application of the evidence may be stated briefly as follows:

As to 'a,' supra: The commission deducted $204,000 from the estimate (details printed in the margin), [FN1] leaving approximately $421,000, which it contrasted with the estimate of its own engineer, $397,964.38 (see 'd,' supra). It found that there should be included $25,000 for the Bluefield Valley waterworks plant in Virginia, 10 per cent. for going value, and $10,000 for working capital. If these be added to $421,000, there results $500,600. This may be compared with the commission's final figure, $460,000.

FN1

Difference in depreciation allowed.	$ 49,000
Preliminary organization and development. cost.	14,500
Bluefield Valley waterworks plant.	25,000
Water rights.	50,000
Excess overhead costs.	39,000
Paving over mains.	28,500
	$204,000

(Cite as: P.U.R. 1923D 11, 43 S.Ct. 675)

***686** As to 'b' and 'c,' supra: These were given no weight by the commission in arriving at its final figure, $460,000. It said:
'Applicant's plant was originally constructed more than twenty years ago, and has been added to from time to time as the progress and development of the community required. For this reason, it would be unfair to its consumers to use as a basis for present fair value the abnormal prices prevailing during the recent war period; but, when, as in this case, a part of the plant has been constructed or added to during that period, in fairness to the applicant, consideration must be given to the cost of such expenditures made to meet the demands of the public.'

****677** As to 'd,' supra: The commission, taking $400,000 (round figures), added $25,000 for Bluefield Valley waterworks plant in Virginia, 10 per cent. for going value, and $10,000 for working capital, making $477,500. This may be compared with its final figure, $460,000.

As to 'e,' supra: The commission, on the report of its statistician, found gross investment to be $500,402.53. Its engineer, applying the straight line method, found 19 per cent. depreciation. It applied 81 per cent. to gross investment and added 10 per cent. for going value and $10,000 for working capital, producing $455,500. FN2 This may be compared with its final figure, $460,000.

'The books of the company show a total gross investment,

FN2 As to 'e': $365,445.13 represents investment cost less depreciation. The gross investment was found to be $500,402.53, indicating a deduction on account of depreciation of $134,957.40, about 27 per cent., as against 19 per cent. found by the commission's engineer.

As to 'f,' supra: It is necessary briefly to explain how this figure, $452,520.53, was arrived at. Case No. 368 was a proceeding initiated by the application of the company for higher rates, April 24, 1915. The commission made a valuation as of January 1, 1915. There were presented two estimates of reproduction cost less depreciation, one by a valuation engineer engaged by the company, ***687** and the other by a valuation engineer engaged by the city, both 'using the same method.' An inventory made by the company's engineer was accepted as correct by the city and by the commission. The method 'was that generally employed by courts and commissions in arriving at the value of public utility properties under this method.' and in both estimates 'five year average unit prices' were applied. The estimate of the company's engineer was $540,000 and of the city's engineer, $392,000. The principal differences as given by the commission are shown in the margin. FN3 The commission disregarded both estimates and arrived at $360,000. It held that the best basis of valuation was the net investment, i. e., the total cost of the property less depreciation. It said:

FN3

		Company Engineer.	City Engineer.
1.	Preliminary costs.	$14,455	$1,000
2.	Water rights.	50,000	Nothing
3.	Cutting pavements over mains.	27,744	233
4.	Pipe lines from gravity springs.	22,072	15,442
5.	Laying cast iron street mains.	19,252	15,212
6.	Reproducing Ada springs.	18,558	13,027
7.	Superintendence and engineering.	20,515	13,621
8.	General contingent cost.	16,415	5,448
		$189,011	$63,983

since its organization, of $407,882, and that there has been charged off for depreciation from year to year the total sum of $83,445, leaving a net investment of

(Cite as: P.U.R. 1923D 11, 43 S.Ct. 675)

$324,427. * * * From an examination of the books * * * it appears that the records of the company have been remarkably well kept and preserved. It therefore seems that, when a plant is developed under these conditions, the net investment, which, of course, means the total gross investment less depreciation, is the very best basis of valuation for rate making purposes and that the other methods above referred to should ***688** be used only when it is impossible to arrive at the true investment. Therefore, after making due allowance for capital necessary for the conduct of the business and considering the plant as a going concern, it is the opinion of the commission that the fair value for the purpose of determining reasonable and just rates in this case of the property of the applicant company, used by it in the public service of supplying water to the city of Bluefield and its citizens, is the sum of $360,000, which sum is hereby fixed and determined by the commission to be the fair present value for the said purpose of determining the reasonable and just rates in this case.'

In its report in No. 368, the commission did not indicate the amounts respectively allowed for going value or working capital. If 10 per cent. be added for the former, and $10,000 for the latter (as fixed by the commission in the present case), there is produced $366,870, to be compared with $360,000, found by the commission in its valuation as of January 1, 1915. To this it added $92,520.53, expended since, producing $452,520.53. This may be compared with its final figure, $460,000.

The state Supreme Court of Appeals holds that the valuing of the property of a public utility corporation and prescribing rates are purely legislative acts, not subject to judicial review, except in so far as may be necessary to determine whether such rates are void on constitutional or other grounds, and that findings of fact by the commission based on evidence to support them will not be reviewed by the court. City of Bluefield v. Waterworks, 81 W. Va. 201, 204, 94 S. E. 121; Coal & Coke Co. v. Public Service Commission, 84 W. Va. 662, 678, 100 S. E. 557, 7 A. L. R. 108; Charleston v. Public Service Commission, 86 W. Va. 536, 103 S. E. 673.

In this case (89 W. Va. 736, 738, 110 S. E. 205, 206) it said:
'From the written opinion of the commission we find that it ascertained the value of the petitioner's property for rate making [then quoting the commission] 'after ***689** maturely and carefully considering the various methods presented for the ascertainment of fair value and giving such weight as seems proper to every element involved and all the facts and circumstances disclosed by the record.''

[2] [3] The record clearly shows that the commission, in arriving at its final figure, did not accord proper, if any, weight to the greatly enhanced costs of construction in 1920 over those prevailing about 1915 and before the war, as established by uncontradicted ****678** evidence; and the company's detailed estimated cost of reproduction new, less depreciation, at 1920 prices, appears to have been wholly disregarded. This was erroneous. Missouri ex rel. Southwestern Bell Telephone Co. v. Public Service Commission of Missouri, 262 U. S. 276, 43 Sup. Ct. 544, 67 L. Ed. 981, decided May 21, 1923. Plaintiff in error is entitled under the due process clause of the Fourteenth Amendment to the independent judgment of the court as to both law and facts. Ohio Valley Co. v. Ben Avon Borough, 253 U. S. 287, 289, 40 Sup. Ct. 527, 64 L. Ed. 908, and cases cited.

We quote further from the court's opinion (89 W. Va. 739, 740, 110 S. E. 206):
'In our opinion the commission was justified by the law and by the facts in finding as a basis for rate making the sum of $460,000.00. * * * In our case of Coal & Coke Ry. Co. v. Conley, 67 W. Va. 129, it is said: 'It seems to be generally held that, in the absence of peculiar and extraordinary conditions, such as a more costly plant than the public service of the community requires, or the erection of a plant at an actual, though extravagant, cost, or the purchase of one at an exorbitant or inflated price, the actual amount of money invested is to be taken as the basis, and upon this a return must be allowed equivalent to that which is ordinarily received in the locality in which the business is done, upon capital invested in similar enterprises. In addition to this, consideration must be given to the nature of the investment, a higher rate ***690** being regarded as justified by the risk incident to a hazardous investment.'
'That the original cost considered in connection with the history and growth of the utility and the value of the services rendered constitute the principal elements to be considered in connection with rate making, seems to be supported by nearly all the authorities.'

[4] The question in the case is whether the rates prescribed in the commission's order are confiscatory and therefore beyond legislative power. Rates which are not sufficient to yield a reasonable return on the value of the property used at the time it is being used to render the service are unjust, unreasonable and confiscatory, and their enforcement deprives the public utility company of its property in violation of the Fourteenth Amendment. This is so well settled by numerous decisions of this court that citation of the cases is scarcely necessary:

(Cite as: P.U.R. 1923D 11, 43 S.Ct. 675)

'What the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience.' Smyth v. Ames (1898) 169 U. S. 467, 547, 18 Sup. Ct. 418, 434 (42 L. Ed. 819).
'There must be a fair return upon the reasonable value of the property at the time it is being used for the public. * * * And we concur with the court below in holding that the value of the property is to be determined as of the time when the inquiry is made regarding the rates. If the property, which legally enters into the consideration of the question of rates, has increased in value since it was acquired, the company is entitled to the benefit of such increase.' Willcox v. Consolidated Gas Co. (1909) 212 U. S. 19, 41, 52, 29 Sup. Ct. 192, 200 (53 L. Ed. 382, 15 Ann. Cas. 1034, 48 L. R. A. [N. S.] 1134).
'The ascertainment of that value is not controlled by artificial rules. It is not a matter of formulas, but there must be a reasonable judgment having its basis in a proper consideration of all relevant facts.' Minnesota Rate Cases (1913) 230 U. S. 352, 434, 33 Sup. Ct. 729, 754 (57 L. Ed. 1511, 48 L. R. A. [N. S.] 1151, Ann. Cas. 1916A, 18).
***691** 'And in order to ascertain that value, the original cost of construction, the amount expended in permanent improvements, the amount and market value of its bonds and stock, the present as compared with the original cost of construction, the probable earning capacity of the property under particular rates prescribed by statute, and the sum required to meet operating expenses, are all matters for consideration, and are to be given such weight as may be just and right in each case. We do not say that there may not be other matters to be regarded in estimating the value of the property.' Smyth v. Ames, 169 U. S., 546, 547, 18 Sup. Ct. 434, 42 L. Ed. 819.
'* * * The making of a just return for the use of the property involves the recognition of its fair value if it be more than its cost. The property is held in private ownership and it is that property, and not the original cost of it, of which the owner may not be deprived without due process of law.'

Minnesota Rate Cases, 230 U. S. 454, 33 Sup. Ct. 762, 57 L. Ed. 1511, 48 L. R. A. (N. S.) 1151, Ann. Cas. 1916A, 18.

In Missouri ex rel. Southwestern Bell Telephone Co., v. Public Service Commission of Missouri, supra, applying the principles of the cases above cited and others, this court said:
'Obviously, the commission undertook to value the property without according any weight to the greatly enhanced costs of material, labor, supplies, etc., over those prevailing in 1913, 1914, and 1916. As matter of common knowledge, these increases were large. Competent witnesses estimated them as 45 to 50 per centum. * * * It is impossible to ascertain what will amount to a fair return upon properties devoted to public service, without giving consideration to the cost of labor, supplies, etc., at the time the investigation is made. An honest and intelligent forecast of probable future values, made upon a view of all the relevant circumstances, is essential. If the highly important element of present costs is wholly disregarded, such a forecast becomes impossible. Estimates for to-morrow cannot ignore prices of to-day.'

[5] ***692** It is clear that the court also failed to give proper consideration to the higher cost of construction in 1920 over that in 1915 and before the war, and failed to give weight to cost of reproduction less depreciation on the basis of 1920 prices, or to the testimony of the company's valuation engineer, based on present and past costs of construction, that the property in his opinion, was worth $900,000. The final figure, $460,000, was arrived ****679** at substantially on the basis of actual cost, less depreciation, plus 10 per cent. for going value and $10,000 for working capital. This resulted in a valuation considerably and materially less than would have been reached by a fair and just consideration of all the facts. The valuation cannot be sustained. Other objections to the valuation need not be considered.

3. Rate of return: The state commission found that the company's net annual income should be approximately $37,000, in order to enable it to earn 8 per cent. for return and depreciation upon the value of its property as fixed by it. Deducting 2 per cent. for depreciation, there remains 6 per cent. on $460,000, amounting to $27,600 for return. This was approved by the state court.

[6] The company contends that the rate of return is too low and confiscatory. What annual rate will constitute just compensation depeds upon many circumstances, and must be determined by the exercise of a fair and enlightened judgment, having regard to all relevant facts. A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding, risks and uncertainties; but it has no constitutional right to profits such as are realized or anticipated in ***693** highly profitable enterprises or speculative ventures. The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties. A

rate of return may be reasonable at one time and become too high or too low by changes affecting opportunities for investment, the money market and business conditions generally.

In 1909, this court, in Willcox v. Consolidated Gas Co., 212 U. S. 19, 48-50, 29 Sup. Ct. 192, 53 L. Ed. 382, 15 Ann. Cas. 1034, 48 L. R. A. (N. S.) 1134, held that the question whether a rate yields such a return as not to be confiscatory depends upon circumstances, locality and risk, and that no proper rate can be established for all cases; and that, under the circumstances of that case, 6 per cent. was a fair return on the value of the property employed in supplying gas to the city of New York, and that a rate yielding that return was not confiscatory. In that case the investment was held to be safe, returns certain and risk reduced almost to a minimum-as nearly a safe and secure investment as could be imagined in regard to any private manufacturing enterprise.

In 1912, in Cedar Rapids Gas Co. v. Cedar Rapids, 223 U. S. 655, 670, 32 Sup. Ct. 389, 56 L. Ed. 594, this court declined to reverse the state court where the value of the plant considerably exceeded its cost, and the estimated return was over 6 per cent.

In 1915, in Des Moines Gas Co. v. Des Moines, 238 U. S. 153, 172, 35 Sup. Ct. 811, 59 L. Ed. 1244, this court declined to reverse the United States District Court in refusing an injunction upon the conclusion reached that a return of 6 per cent. per annum upon the value would not be confiscatory.

In 1919, this court in Lincoln Gas Co. v. Lincoln, 250 U. S. 256, 268, 39 Sup. Ct. 454, 458 (63 L. Ed. 968), declined on the facts of that case to approve a finding that no rate yielding as much as 6 per cent. ***694** on the invested capital could be regarded as confiscatory. Speaking for the court, Mr. Justice Pitney said:
'It is a matter of common knowledge that, owing principally to the World War, the costs of labor and supplies of every kind have greatly advanced since the ordinance was adopted, and largely since this cause was last heard in the court below. And it is equally well known that annual returns upon capital and enterprise the world over have materially increased, so that what would have been a proper rate of return for capital invested in gas plants and similar public utilities a few years ago furnishes no safe criterion for the present or for the future.'

In 1921, in Brush Electric Co. v. Galveston, the United States District Court held 8 per cent. a fair rate of return. FN4

FN4 This case was affirmed by this court June 4, 1923, 262 U. S. 443, 43 Sup. Ct. 606, 67 L. Ed. 1076.

In January, 1923, in City of Minneapolis v. Rand, the Circuit Court of Appeals of the Eighth Circuit (285 Fed. 818, 830) sustained, as against the attack of the city on the ground that it was excessive, 7 1/2 per cent., found by a special master and approved by the District Court as a fair and reasonable return on the capital investment-the value of the property.

[7] Investors take into account the result of past operations, especially in recent years, when determining the terms upon which they will invest in such an undertaking. Low, uncertain, or irregular income makes for low prices for the securities of the utility and higher rates of interest to be demanded by investors. The fact that the company may not insist as a matter of constitutional right that past losses be made up by rates to be applied in the present and future tends to weaken credit, and the fact that the utility is protected against being compelled to serve for confiscatory rates tends to support it. In ***695** this case the record shows that the rate of return has been low through a long period up to the time of the inquiry by the commission here involved. For example, the average rate of return on the total cost of the property from 1895 to 1915, inclusive, was less than 5 per cent.; from 1911 to 1915, inclusive, about 4.4 per cent., without allowance for depreciation. In 1919 the net operating income was approximately $24,700, leaving $15,500, approximately, or 3.4 per cent. on $460,000 fixed by the commission, after deducting 2 per cent. for depreciation. In 1920, the net operating income was approximately $25,465, leaving $16,265 for return, after allowing for depreciation. Under the facts and circumstances indicated by the record, we think that a rate of return of 6 per cent. upon the value of the property is substantially too low to constitute just compensation for the use of the property employed to render the service.

The judgment of the Supreme Court of Appeals of West Virginia is reversed.

Mr. Justice BRANDEIS concurs in the judgment of reversal, for the reasons stated by him in Missouri ex rel. Southwestern Bell Telephone Co. v. Public Service Commission of Missouri, supra.
U.S. 1923
Bluefield Waterworks & Imp. Co. v. Public Service Commission of W. Va.
P.U.R. 1923D 11, 262 U.S. 679, 43 S.Ct. 675, 67 L.Ed. 1176

P.U.R. 1923D 11, 262 U.S. 679, 43 S.Ct. 675, 67 L.Ed. 1176
(Cite as: P.U.R. 1923D 11, 43 S.Ct. 675)

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8 October 2003

The Royal Swedish Academy of Sciences has decided that the Bank of Sweden Prize in Economic Sciences in Memory of Alfred Nobel, 2003, is to be shared between

Robert F. Engle
New York University, USA

"for methods of analyzing economic time series with time-varying volatility (ARCH)"

and

Clive W. J. Granger
University of California at San Diego, USA

"for methods of analyzing economic time series with common trends (cointegration)".

Statistical Methods for Economic Time Series

Researchers use data in the form of time series, i.e., chronological sequences of observations, when estimating relationships and testing hypotheses from economic theory. Such time series show the development of GDP, prices, interest rates, stock prices, etc. During the 1980s, this year's Laureates devised new statistical methods for dealing with two key properties of many economic time series: *time-varying volatility and nonstationarity.*

On financial markets, random fluctuations over time – volatility – are particularly significant because the value of shares, options and other financial instruments depends on their risk. Fluctuations can vary considerably over time; turbulent periods with large fluctuations are followed by calmer periods with small fluctuations. Despite such time-varying volatility, in want of a better alternative, researchers used to work with statistical methods that presuppose constant volatility. **Robert Engle's** discovery was therefore a major breakthrough. He found that the concept of *autoregressive conditional heteroskedasticity (ARCH)* accurately captures the properties of many time series and developed methods for statistical modeling of time-varying volatility. His ARCH models have become indispensable tools not only for researchers, but also for analysts on financial markets, who use them in asset pricing and in evaluating portfolio risk.

Most macroeconomic time series follow a stochastic trend, so that a temporary disturbance in, say, GDP has a long-lasting effect. These time series are called nonstationary; they differ from stationary series which do not grow over time, but fluctuate around a given value. **Clive Granger** demonstrated that the statistical methods used for stationary time series could yield wholly misleading results when applied to the analysis of nonstationary data. His significant discovery was that specific combinations of nonstationary time series may exhibit stationarity, thereby allowing for correct statistical inference. Granger called this phenomenon *cointegration.* He developed methods that have become invaluable in systems where short-run dynamics are affected by large random disturbances and long-run dynamics are restricted by economic

equilibrium relationships. Examples include the relations between wealth and consumption, exchange rates and price levels, and short and long-term interest rates.

Read more about this year's prize

Information for the Public
Scientific Background (pdf)
Links and Further Reading

Robert F. Engle, born in 1942 (60 years), in Syracuse, NY, USA (American citizen); Ph.D. from Cornell University in 1969; Michael Armellino Professor of Management of Financial Services at New York University, NY, USA.

Clive W. J. Granger, born 1934 (69 years), in Swansea, Wales (British citizen); Ph.D. from University of Nottingham in 1959; emeritus Professor of Economics at University of California at San Diego, USA.

The Prize amount: SEK 10 million, will be shared equally among the Laureates.

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The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2003

Robert F. Engle III
Clive W.J. Granger

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Journal of Economic Perspectives—Volume 15, Number 4—Fall 2001—Pages 157–168

GARCH 101: The Use of ARCH/GARCH Models in Applied Econometrics

Robert Engle

The great workhorse of applied econometrics is the least squares model. This is a natural choice, because applied econometricians are typically called upon to determine how much one variable will change in response to a change in some other variable. Increasingly however, econometricians are being asked to forecast and analyze the size of the errors of the model. In this case, the questions are about volatility, and the standard tools have become the ARCH/GARCH models.

The basic version of the least squares model assumes that the expected value of all error terms, when squared, is the same at any given point. This assumption is called homoskedasticity, and it is this assumption that is the focus of ARCH/GARCH models. Data in which the variances of the error terms are not equal, in which the error terms may reasonably be expected to be larger for some points or ranges of the data than for others, are said to suffer from heteroskedasticity. The standard warning is that in the presence of heteroskedasticity, the regression coefficients for an ordinary least squares regression are still unbiased, but the standard errors and confidence intervals estimated by conventional procedures will be too narrow, giving a false sense of precision. Instead of considering this as a problem to be corrected, ARCH and GARCH models treat heteroskedasticity as a variance to be modeled. As a result, not only are the deficiencies of least squares corrected, but a prediction is computed for the variance of each error term. This prediction turns out often to be of interest, particularly in applications in finance.

The warnings about heteroskedasticity have usually been applied only to cross-section models, not to time series models. For example, if one looked at the

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cross-section relationship between income and consumption in household data, one might expect to find that the consumption of low-income households is more closely tied to income than that of high-income households, because the dollars of savings or deficit by poor households are likely to be much smaller in absolute value than high income households. In a cross-section regression of household consumption on income, the error terms seem likely to be systematically larger in absolute value for high-income than for low-income households, and the assumption of homoskedasticity seems implausible. In contrast, if one looked at an aggregate time series consumption function, comparing national income to consumption, it seems more plausible to assume that the variance of the error terms doesn't change much over time.

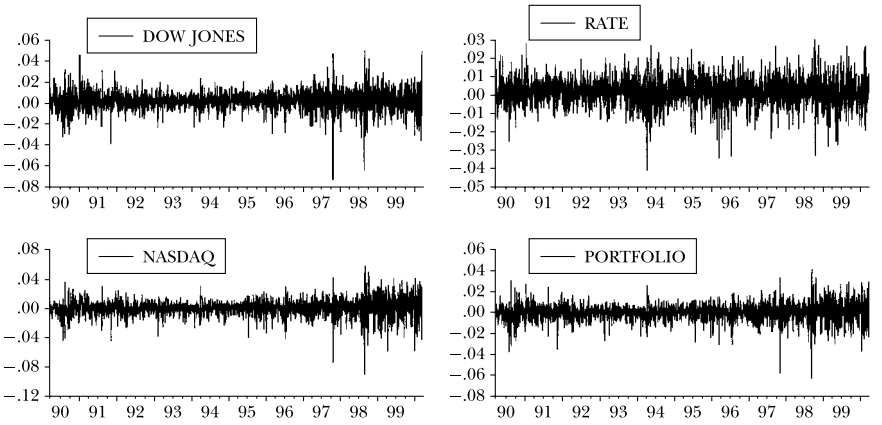
A recent development in estimation of standard errors, known as "robust standard errors," has also reduced the concern over heteroskedasticity. If the sample size is large, then robust standard errors give quite a good estimate of standard errors even with heteroskedasticity. If the sample is small, the need for a heteroskedasticity correction that does not affect the coefficients, and only asymptotically corrects the standard errors, can be debated.

However, sometimes the natural question facing the applied econometrician is the accuracy of the predictions of the model. In this case, the key issue is the variance of the error terms and what makes them large. This question often arises in financial applications where the dependent variable is the return on an asset or portfolio and the variance of the return represents the risk level of those returns. These are time series applications, but it is nonetheless likely that heteroskedasticity is an issue. Even a cursory look at financial data suggests that some time periods are riskier than others; that is, the expected value of the magnitude of error terms at some times is greater than at others. Moreover, these risky times are not scattered randomly across quarterly or annual data. Instead, there is a degree of autocorrelation in the riskiness of financial returns. Financial analysts, looking at plots of daily returns such as in Figure 1, notice that the amplitude of the returns varies over time and describe this as "volatility clustering." The ARCH and GARCH models, which stand for autoregressive conditional heteroskedasticity and *generalized* autoregressive conditional heteroskedasticity, are designed to deal with just this set of issues. They have become widespread tools for dealing with time series heteroskedastic models. The goal of such models is to provide a volatility measure—like a standard deviation—that can be used in financial decisions concerning risk analysis, portfolio selection and derivative pricing.

ARCH/GARCH Models

Because this paper will focus on financial applications, we will use financial notation. Let the dependent variable be labeled r_t, which could be the return on an asset or portfolio. The mean value m and the variance h will be defined relative to a past information set. Then, the return r in the present will be equal to the mean

Figure 1
Nasdaq, Dow Jones and Bond Returns



value of r (that is, the expected value of r based on past information) plus the standard deviation of r (that is, the square root of the variance) times the error term for the present period.

The econometric challenge is to specify how the information is used to forecast the mean and variance of the return, conditional on the past information. While many specifications have been considered for the mean return and have been used in efforts to forecast future returns, virtually no methods were available for the variance before the introduction of ARCH models. The primary descriptive tool was the rolling standard deviation. This is the standard deviation calculated using a fixed number of the most recent observations. For example, this could be calculated every day using the most recent month (22 business days) of data. It is convenient to think of this formulation as the first ARCH model; it assumes that the variance of tomorrow's return is an equally weighted average of the squared residuals from the last 22 days. The assumption of equal weights seems unattractive, as one would think that the more recent events would be more relevant and therefore should have higher weights. Furthermore the assumption of zero weights for observations more than one month old is also unattractive. The ARCH model proposed by Engle (1982) let these weights be parameters to be estimated. Thus, the model allowed the data to determine the best weights to use in forecasting the variance.

A useful generalization of this model is the GARCH parameterization introduced by Bollerslev (1986). This model is also a weighted average of past squared residuals, but it has declining weights that never go completely to zero. It gives parsimonious models that are easy to estimate and, even in its simplest form, has proven surprisingly successful in predicting conditional variances. The most widely used GARCH specification asserts that the best predictor of the variance in the next period is a weighted average of the long-run average variance, the variance

predicted for this period, and the new information in this period that is captured by the most recent squared residual. Such an updating rule is a simple description of adaptive or learning behavior and can be thought of as Bayesian updating.

Consider the trader who knows that the long-run average daily standard deviation of the Standard and Poor's 500 is 1 percent, that the forecast he made yesterday was 2 percent and the unexpected return observed today is 3 percent. Obviously, this is a high volatility period, and today is especially volatile, which suggests that the forecast for tomorrow could be even higher. However, the fact that the long-term average is only 1 percent might lead the forecaster to lower the forecast. The best strategy depends upon the dependence between days. If these three numbers are each squared and weighted equally, then the new forecast would be $2.16 = \sqrt{(1 + 4 + 9)/3}$. However, rather than weighting these equally, it is generally found for daily data that weights such as those in the empirical example of (.02, .9, .08) are much more accurate. Hence the forecast is $2.08 = \sqrt{.02*1 + .9*4 + .08*9}$.

To be precise, we can use h_t to define the variance of the residuals of a regression $r_t = m_t + \sqrt{h_t}\varepsilon_t$. In this definition, the variance of ε is one. The GARCH model for variance looks like this:

$$h_{t+1} = \omega + \alpha(r_t - m_t)^2 + \beta h_t = \omega + \alpha h_t \varepsilon_t^2 + \beta h_t.$$

The econometrician must estimate the constants ω, α, β; updating simply requires knowing the previous forecast h and residual. The weights are $(1 - \alpha - \beta, \beta, \alpha)$, and the long-run average variance is $\sqrt{\omega/(1 - \alpha - \beta)}$. It should be noted that this only works if $\alpha + \beta < 1$, and it only really makes sense if the weights are positive, requiring $\alpha > 0$, $\beta > 0$, $\omega > 0$.

The GARCH model that has been described is typically called the GARCH(1,1) model. The (1,1) in parentheses is a standard notation in which the first number refers to how many autoregressive lags, or ARCH terms, appear in the equation, while the second number refers to how many moving average lags are specified, which here is often called the number of GARCH terms. Sometimes models with more than one lag are needed to find good variance forecasts.

Although this model is directly set up to forecast for just one period, it turns out that based on the one-period forecast, a two-period forecast can be made. Ultimately, by repeating this step, long-horizon forecasts can be constructed. For the GARCH(1,1), the two-step forecast is a little closer to the long-run average variance than is the one-step forecast, and, ultimately, the distant-horizon forecast is the same for all time periods as long as $\alpha + \beta < 1$. This is just the unconditional variance. Thus, the GARCH models are mean reverting and conditionally heteroskedastic, but have a constant unconditional variance.

I turn now to the question of how the econometrician can possibly estimate an equation like the GARCH(1,1) when the only variable on which there are data is r_t. The simple answer is to use maximum likelihood by substituting h_t for σ^2 in the normal likelihood and then maximizing with respect to the parameters. An even

simpler answer is to use software such as EViews, SAS, GAUSS, TSP, Matlab, RATS and many others where there exist already packaged programs to do this.

But the process is not really mysterious. For any set of parameters ω, α, β and a starting estimate for the variance of the first observation, which is often taken to be the observed variance of the residuals, it is easy to calculate the variance forecast for the second observation. The GARCH updating formula takes the weighted average of the unconditional variance, the squared residual for the first observation and the starting variance and estimates the variance of the second observation. This is input into the forecast of the third variance, and so forth. Eventually, an entire time series of variance forecasts is constructed. Ideally, this series is large when the residuals are large and small when they are small. The likelihood function provides a systematic way to adjust the parameters ω, α, β to give the best fit.

Of course, it is entirely possible that the true variance process is different from the one specified by the econometrician. In order to detect this, a variety of diagnostic tests are available. The simplest is to construct the series of $\{\varepsilon_t\}$, which are supposed to have constant mean and variance if the model is correctly specified. Various tests such as tests for autocorrelation in the squares are able to detect model failures. Often a "Ljung box test" with 15 lagged autocorrelations is used.

A Value-at-Risk Example

Applications of the ARCH/GARCH approach are widespread in situations where the volatility of returns is a central issue. Many banks and other financial institutions use the concept of "value at risk" as a way to measure the risks faced by their portfolios. The 1 percent value at risk is defined as the number of dollars that one can be 99 percent certain exceeds any losses for the next day. Statisticians call this a 1 percent quantile, because 1 percent of the outcomes are worse and 99 percent are better. Let's use the GARCH(1,1) tools to estimate the 1 percent value at risk of a $1,000,000 portfolio on March 23, 2000. This portfolio consists of 50 percent Nasdaq, 30 percent Dow Jones and 20 percent long bonds. The long bond is a ten-year constant maturity Treasury bond.[1] This date is chosen to be just before the big market slide at the end of March and April. It is a time of high volatility and great anxiety.

First, we construct the hypothetical historical portfolio. (All calculations in this example were done with the EViews software program.) Figure 1 shows the pattern of returns of the Nasdaq, Dow Jones, bonds and the composite portfolio leading up to the terminal date. Each of these series appears to show the signs of ARCH effects in that the amplitude of the returns varies over time. In the case of the equities, it is clear that this has increased substantially in the latter part of the sample period. Visually, Nasdaq is even more extreme. In Table 1, we present some illustrative

[1] The portfolio has constant proportions of wealth in each asset that would entail some rebalancing over time.

Table 1
Portfolio Data

	NASDAQ	*Dow Jones*	*Rate*	*Portfolio*
Mean	0.0009	0.0005	0.0001	0.0007
Std. Dev.	0.0115	0.0090	0.0073	0.0083
Skewness	−0.5310	−0.3593	−0.2031	−0.4738
Kurtosis	7.4936	8.3288	4.9579	7.0026

Sample: March 23, 1990 to March 23, 2000.

statistics for each of these three investments separately and for the portfolio as a whole in the final column. From the daily standard deviation, we see that the Nasdaq is the most volatile and interest rates the least volatile of the assets. The portfolio is less volatile than either of the equity series even though it is 80 percent equity—yet another illustration of the benefits of diversification. All the assets show evidence of fat tails, since the kurtosis exceeds 3, which is the normal value, and evidence of negative skewness, which means that the left tail is particularly extreme.

The portfolio shows substantial evidence of ARCH effects as judged by the autocorrelations of the squared residuals in Table 2. The first order autocorrelation is .210, and they gradually decline to .083 after 15 lags. These autocorrelations are not large, but they are very significant. They are also all positive, which is uncommon in most economic time series and yet is an implication of the GARCH(1,1) model. Standard software allows a test of the hypothesis that there is no autocorrelation (and hence no ARCH). The test *p*-values shown in the last column are all zero to four places, resoundingly rejecting the "no ARCH" hypothesis.

Then we forecast the standard deviation of the portfolio and its 1 percent quantile. We carry out this calculation over several different time frames: the entire ten years of the sample up to March 23, 2000; the year before March 23, 2000; and from January 1, 2000, to March 23, 2000.

Consider first the quantiles of the historical portfolio at these three different time horizons. To do this calculation, one simply sorts the returns and finds the 1 percent worst case. Over the full ten-year sample, the 1 percent quantile times $1,000,000 produces a value at risk of $22,477. Over the last year, the calculation produces a value at risk of $24,653—somewhat higher, but not enormously so. However, if the 1 percent quantile is calculated based on the data from January 1, 2000, to March 23, 2000, the value at risk is $35,159. Thus, the level of risk apparently has increased dramatically over the last quarter of the sample. Each of these numbers is the appropriate value at risk if the next day is equally likely to be the same as the days in the given sample period. This assumption is more likely to be true for the shorter period than for the long one.

The basic GARCH(1,1) results are given in Table 3. Under this table it lists the dependent variable, PORT, and the sample period, indicates that it took the algorithm 16 iterations to maximize the likelihood function and computed stan-

Table 2
Autocorrelations of Squared Portfolio Returns

	AC	*Q-Stat*	*Prob*
1	0.210	115.07	0.000
2	0.183	202.64	0.000
3	0.116	237.59	0.000
4	0.082	255.13	0.000
5	0.122	294.11	0.000
6	0.163	363.85	0.000
7	0.090	384.95	0.000
8	0.099	410.77	0.000
9	0.081	427.88	0.000
10	0.081	445.03	0.000
11	0.069	457.68	0.000
12	0.080	474.29	0.000
13	0.076	489.42	0.000
14	0.074	503.99	0.000
15	0.083	521.98	0.000

Sample: March 23, 1990 to March 23, 2000.

Table 3
GARCH(1,1)

	Variance Equation			
Variable	*Coef*	*St. Err*	*Z-Stat*	*P-Value*
C	1.40E-06	4.48E-07	3.1210	0.0018
ARCH(1)	0.0772	0.0179	4.3046	0.0000
GARCH(1)	0.9046	0.0196	46.1474	0.0000

Notes: Dependent Variable: PORT.
Sample (adjusted): March 23, 1990 to March 23, 2000.
Convergence achieved after 16 iterations.
Bollerslev-Woodridge robust standard errors and covariance.

dard errors using the robust method of Bollerslev-Wooldridge. The three coefficients in the variance equation are listed as C, the intercept; ARCH(1), the first lag of the squared return; and GARCH(1), the first lag of the conditional variance. Notice that the coefficients sum up to a number less than one, which is required to have a mean reverting variance process. Since the sum is very close to one, this process only mean reverts slowly. Standard errors, *Z*-statistics (which are the ratio of coefficients and standard errors) and *p*-values complete the table.

The standardized residuals are examined for autocorrelation in Table 4. Clearly, the autocorrelation is dramatically reduced from that observed in the portfolio returns themselves. Applying the same test for autocorrelation, we now

Table 4
Autocorrelations of Squared Standardized Residuals

	AC	*Q-Stat*	*Prob*
1	0.005	0.0589	0.808
2	0.039	4.0240	0.134
3	−0.011	4.3367	0.227
4	−0.017	5.0981	0.277
5	0.002	5.1046	0.403
6	0.009	5.3228	0.503
7	−0.015	5.8836	0.553
8	−0.013	6.3272	0.611
9	−0.024	7.8169	0.553
10	−0.006	7.9043	0.638
11	−0.023	9.3163	0.593
12	−0.013	9.7897	0.634
13	−0.003	9.8110	0.709
14	0.009	10.038	0.759
15	−0.012	10.444	0.791

find the *p*-values are about 0.5 or more, indicating that we can accept the hypothesis of "no residual ARCH."

The forecast standard deviation for the next day is 0.0146, which is almost double the average standard deviation of 0.0083 presented in the last column of Table 1. If the residuals were normally distributed, then this would be multiplied by 2.327, because 1 percent of a normal random variable lies 2.327 standard deviations below the mean. The estimated normal value at risk = \$33,977. As it turns out, the standardized residuals, which are the estimated values of $\{\varepsilon_t\}$, are not very close to a normal distribution. They have a 1 percent quantile of 2.844, which reflects the fat tails of the asset price distribution. Based on the actual distribution, the estimated 1 percent value at risk is \$39,996. Notice how much this value at risk has risen to reflect the increased risk in 2000.

Finally, the value at risk can be computed based solely on estimation of the quantile of the forecast distribution. This has recently been proposed by Engle and Manganelli (2001), adapting the quantile regression methods of Koenker and Basset (1978) and Koenker and Hallock in this symposium. Application of their method to this data set delivers a value at risk = \$38,228.

What actually did happen on March 24, 2000, and subsequently? The portfolio lost more than \$1000 on March 24 and more than \$3000 on March 27. The biggest hit was \$67,000 on April 14. We all know that Nasdaq declined substantially over the next year. The Dow Jones average was much less affected, and bond prices increased as the Federal Reserve lowered interest rates. Figure 2 plots the value at risk estimated each day using this methodology within the sample period and the losses that occurred the next day. There are about 1 percent of times the value at risk is exceeded, as is expected, since this is in-sample. Figure 3 plots the same graph for the next year and a quarter, during

Figure 2
Value at Risk and Portfolio Losses In-Sample

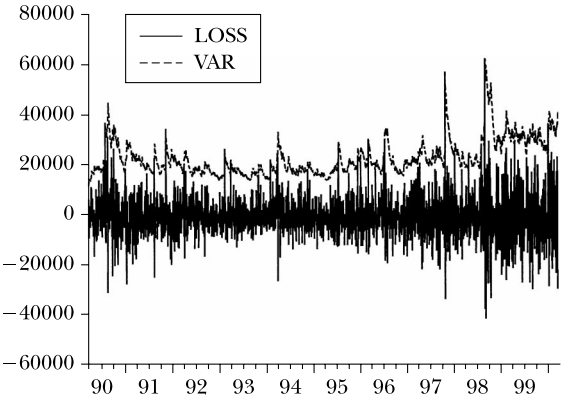
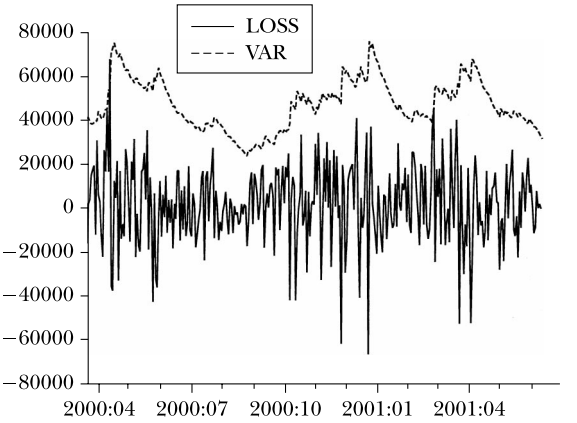


Figure 3
Value at Risk and Portfolio Losses Out of Sample



which the equity market tanks and the bond yields fall. The parameters are not reestimated, but the formula is simply updated each day. The computed value at risk rises substantially from the $40,000 initial figure as the volatility rises in April 2000. Then the losses decline, so that the value at risk is well above the realized losses. Toward the end of the period, the losses approach the value at risk again, but at a lower level. In this year and a quarter, the value at risk is exceeded only once; thus, this is actually a slightly conservative estimate of the risk. It is not easy to determine whether a particular value-at-risk number is correct, although statistical tests can be formulated for this in the same way they are formulated for volatilities. For example, Engle and Manganelli (2001) present a "dynamic quantile test."

Extensions and Modifications of GARCH

The GARCH(1,1) is the simplest and most robust of the family of volatility models. However, the model can be extended and modified in many ways. I will briefly mention three modifications, although the number of volatility models that can be found in the literature is now quite extraordinary.

The GARCH(1,1) model can be generalized to a GARCH(p,q) model—that is, a model with additional lag terms. Such higher-order models are often useful when a long span of data is used, like several decades of daily data or a year of hourly data. With additional lags, such models allow both fast and slow decay of information. A particular specification of the GARCH(2,2) by Engle and Lee (1999), sometimes called the "component model," is a useful starting point to this approach.

ARCH/GARCH models thus far have ignored information on the direction of returns; only the magnitude matters. However, there is very convincing evidence that the direction does affect volatility. Particularly for broad-based equity indices and bond market indices, it appears that market declines forecast higher volatility than comparable market increases do. There is now a variety of asymmetric GARCH models, including the EGARCH model of Nelson (1991), the TARCH model—threshold ARCH—attributed to Rabemananjara and Zakoian (1993) and Glosten, Jaganathan and Runkle (1993), and a collection and comparison by Engle and Ng (1993).

The goal of volatility analysis must ultimately be to explain the causes of volatility. While time series structure is valuable for forecasting, it does not satisfy our need to explain volatility. The estimation strategy introduced for ARCH/GARCH models can be directly applied if there are predetermined or exogenous variables. Thus, we can think of the estimation problem for the variance just as we do for the mean. We can carry out specification searches and hypothesis tests to find the best formulation. Thus far, attempts to find the ultimate cause of volatility are not very satisfactory. Obviously, volatility is a response to news, which must be a surprise. However, the timing of the news may not be a surprise and gives rise to predictable components of volatility, such as economic announcements. It is also possible to see how the amplitude of news events is influenced by other news events. For example, the amplitude of return movements on the United States stock market may respond to the volatility observed earlier in the day in Asian markets as well as to the volatility observed in the United States on the previous day. Engle, Ito and Lin (1990) call these "heat wave" and "meteor shower" effects.

A similar issue arises when examining several assets in the same market. Does the volatility of one influence the volatility of another? In particular, the volatility of an individual stock is clearly influenced by the volatility of the market as a whole. This is a natural implication of the capital asset pricing model. It also appears that there is time variation in idiosyncratic volatility (for example, Engle, Ng and Rothschild, 1992).

This discussion opens the door to multivariate modeling where not only the volatilities but also the correlations are to be investigated. There are now a large number of multivariate ARCH models to choose from. These turn out often to be difficult to estimate and to have large numbers of parameters. Research is continuing to examine new classes of multivariate models that are more convenient for fitting large covariance matrices. This is relevant for systems of equations such as vector autoregressions and for portfolio problems where possibly thousands of assets are to be analyzed.

Conclusion

ARCH and GARCH models have been applied to a wide range of time series analyses, but applications in finance have been particularly successful and have been the focus of this introduction. Financial decisions are generally based upon the tradeoff between risk and return; the econometric analysis of risk is therefore an integral part of asset pricing, portfolio optimization, option pricing and risk management. This paper has presented an example of risk measurement that could be the input to a variety of economic decisions. The analysis of ARCH and GARCH models and their many extensions provides a statistical stage on which many theories of asset pricing and portfolio analysis can be exhibited and tested.

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Treasury Bond risk and return, the implications for the hedging of consumption and lessons for asset pricing

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ABSTRACT

All consumption-based models of asset pricing imply that the relation between the conditional mean and conditional volatility of *any* asset reflects the effectiveness of holding that asset as a hedge against intertemporal variation in the marginal utility of consumption. For Treasury Bonds of various maturities, we find significant positive relations. Our empirical findings support the conclusion that investors must sell bonds short to hedge shocks to marginal utility, because realized bond returns tend to be high (low) when investors least (most) desire an additional dollar of consumption. Implications for special cases of the general consumption-based model are also discussed.

1. Introduction

All consumption-based models of asset pricing imply that the relation between the conditional mean and conditional volatility of *any* asset reflects the effectiveness of the asset as a hedge against intertemporal variation in the marginal utility of consumption. The relation is negative if a long position in an asset hedges shocks to the marginal utility of consumption. The relation is positive if a long position adds to consumption risk. We estimate the relation between the conditional mean and conditional volatility of excess returns on U.S. Treasury securities and find evidence of significant positive relations for all maturities. Our full sample results indicate that long positions in Treasury Bonds do not hedge shocks to the marginal utility of consumption. To hedge effectively against such shocks an investor must sell short or sell futures on bonds. In terms of statistical significance and robustness

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to changes in methodology, the positive relation is especially reliable for bond maturities of 5 years or less, so short positions on shorter-maturity bonds are the most statistically reliable means for an investor to hedge the marginal utility of consumption.

The general consumption-based model upon which we base our tests requires only minimal assumptions. Models such as the capital asset pricing model (CAPM), intertemporal capital asset pricing model (ICAPM) of Merton (1973), the intertemporal asset pricing model of Campbell (1993), and the habit-persistence model of Campbell and Cochrane (1999) are special cases.[1] Specializations of the general model add additional structure, but do not change the implications that are the focus of our empirical tests. The intuition of the general model is straightforward. A pure hedging asset has realized returns that are perfectly positively correlated with the marginal utility of wealth.[2] It provides high payoffs during "bad times" when the marginal utility of consuming an additional dollar of wealth is high and low payoffs during "good times" when the marginal utility of consuming an additional dollar of wealth is low. The volatility of the asset's return is desirable and investors are willing to pay more for the asset, because holding the asset decreases intertemporal variation in the holder's marginal utility. Thus, the key characteristics of a hedging asset are a negative risk premium and a perfect negative correlation between the conditionally expected excess return and conditional volatility of the asset. On the other hand, an asset that has returns that are perfectly negatively correlated with the marginal utility of wealth provides high payoffs when times are good and low payoffs when times are bad. The volatility of the asset's return is undesirable because it increases intertemporal variation in the holder's marginal utility. The expected risk premium on such an asset is positive and perfectly positively correlated with its conditional volatility. A short, rather than long, position in the asset is required to hedge consumption risk. Our empirical results for bonds are consistent with the latter case, indicating that realized returns on bonds tend to be high in good times when the marginal utility of receiving an additional dollar of wealth is low.

The beauty of the general consumption-based model is that it provides a simple and straightforward test of the hedging effectiveness of any asset that requires only modeling the first two moments of the asset's return. The test does not require consumption data, nor does it require that the researcher choose a specific model of investor preferences. The model's predictions regarding the first two moments of returns hold for any asset, for any two periods of a multi-period model, and require no assumptions regarding complete markets, return distributions, time- or state-separable utility, or the existence of labor income or human capital.

In addition to evidence of hedging effectiveness, our results provide evidence regarding which special cases of the consumption-based model capture key aspects of asset returns. Our full sample results are consistent with the conclusion that realized returns on Treasury Bonds are high when investors least value, and low when investors most value, the benefits of an additional dollar of consumption. Thus, for a special case of the consumption-based model to accurately reflect investor preferences, it must explain why investors associate bad times of high marginal utility with periods of low realized and high expected bond returns. Special cases that assume that the marginal utility of consumption is a function of at most wealth and investment opportunities, such as the ICAPM specializations of Merton (1973) and Campbell (1993), do not do so. Unless one assumes that the coefficient of relative risk aversion is very low (less than one), these specialized models associate bad times with low expected returns. Explaining why investors associate bad times with high expected returns requires a model that captures the fact that investors are concerned not only with the wealth effects of holding assets, but with the fact that assets do poorly at particular times or in particular states of nature (recessions). For example, Campbell and Cochrane (1999) do so by adding an argument to the utility function, habit that enters nonseparably over time

Turning to empirical results, we find that neither the sign nor the significance of the estimated relation between bond risk and return is sensitive to changes in methodology known to influence inferences in the literature on stock risk and return. Specifically, the results are similar whether

[1] For detailed discussion of the relation of these and other asset pricing models to the general model see Cochrane (2006, 2007).

[2] Once the consumer/investor has optimized, the marginal utility of an additional dollar of wealth is the same for all uses.

the conditional variance is modeled using only financial conditioning variables, a simple generalized autoregressive conditional heteroskedasticity in mean (GARCH-M) model, a GARCH-M model that incorporates financial conditioning variables in the estimation of the conditional variance, or GARCH-M models that allow for asymmetries in the conditional variance equation. While all of our empirical models provide evidence consistent with a positive risk–return relation for Treasury Bonds, the strongest results are for the model that incorporates both financial conditioning information and GARCH effects in estimating the conditional variance. Thus, combining alternative methods of estimating the conditional variance reinforces inferences regarding the sign of the risk–return relation.

The general consumption-based model permits the reward to bond volatility to vary over time, so we examine the linearity and stability of the relation between conditional mean and conditional variance. For each model of conditional variance and each bond maturity, regression analysis indicates that financial conditioning information explains variation in bond excess returns that is not related to changes in the conditional variance. The fact that a time invariant linear model of the bond risk–return relation is rejected suggests that the reward to bond volatility does change over time.

To provide evidence on the impact of changing reward to volatility on the stability of the risk–return relation, we examine rolling correlations between "best estimates" of the conditional mean excess return and conditional variance. The rolling correlations show substantial variation over time in the short-term relation between bond risk and return. The rolling correlations for all maturities tend to move together, but the range of variation increases with bond maturity. For each maturity there are periods during which the rolling correlations are negative, which suggests that the hedging effectiveness of bonds may have varied during our sample period.

The remainder of this paper is organized as follows. Section 2 reviews related literature. Section 3 provides theoretical context. Section 4 describes the data. Section 5 presents our empirical model of conditional mean excess returns and diagnostic tests of the stability of the model. Section 6 presents our empirical results. Section 7 evaluates the linearity and stability of the relation between the conditional mean and conditional variance. Section 8 concludes.

2. Related literature

Two studies report direct evidence regarding the intertemporal relation between the conditional mean and conditional volatility of monthly bond returns. Engle, Lilein, and Robins (1987) use an ARCH-M framework to estimate the relation between the conditional mean and conditional standard deviation of monthly excess holding period returns on two-month Treasury bills and twenty-year AAA rated corporate bonds. They find positive coefficient estimates on volatility in the expected return regressions for both return series. The coefficient for the two-month bill is significant at the 0.01 level, while that for corporate bonds is significant at the 0.10 level. Campbell (1987) estimates the conditional mean and conditional variance of monthly excess returns on two-month Treasury bills, six-month Treasury bills, and a portfolio of five-to-ten-year Treasury Bonds, where both moments are modeled as functions of financial conditioning variables. Campbell (1987) reports correlations between the fitted moments of 0.625 for the two-month bill, 0.835 for the six-month bill, and 0.029 for the long-term bond portfolio. While the evidence reported in these studies is limited in terms of the bond maturities examined, the two studies are consistent in reporting a strong positive relation between risk and return for short-term bills and a weak positive relation for long-term bonds.[3] No study presents a direct test of the stability of the relation between conditional expected excess returns and volatilities for bonds.

Contrary to the case of bonds, there are many studies that report estimates of the relation between the conditional mean and conditional volatility of monthly stock market returns. Results are very sensitive to changes in the methodology used to estimate the conditional volatility. Since studies by

[3] In related work, Fama (1976) and Klemkosky and Pilotte (1992) document positive relations between excess returns and the volatility of the one-month bill rate for a variety of bill and bond maturities. Such results imply a positive relation between a bond's excess return and own volatility when the term structure is determined by a single state variable. However, Litterman and Scheinkman (1991) find that at least three state variables are required to adequately model the term structure.

Campbell (1987), Campbell and Ammer (1993), and Fama and French (1993) find that bond and stock excess returns are related to common predictor variables, robustness may be an issue for bonds as well as stocks. On the other hand Reilly, Wright, and Chan (2000) and Jones and Wilson (2004) document differences in the time series properties of stock and bond returns, so robustness may not be an issue. As a precaution, we explore changes in methodology know to influence results in the stock literature.[4]

A review of studies of monthly stock returns such as French, Schwert, and Stambaugh (1987), Glosten, Jaganathan, and Runkle (1993), Campbell (1987), Whitelaw (1994) and Harvey (2001) indicates that results are sensitive to whether the conditional variance is modeled using only financial conditioning variables, a simple GARCH-M model, a GARCH-M model that incorporates financial conditioning variables in the estimation of the conditional variance, or GARCH-M models that allow positive and negative shocks to returns to have different impacts on the conditional variance. We also use monthly data, so we examine the robustness of our results to the aforementioned changes in methodology.[5]

3. Theoretical context

Consider the intertemporal choice problem of a representative investor who maximizes the conditional expectation of the utility of current and future consumption. In that case, assets can be priced as the conditional expected value of the product of their payoff and a stochastic discount factor,

$$P_{i,t} = E_t[M_{t+1}(P_{i,t+1} + I_{i,t+1})], \tag{1}$$

where $P_{i,t}$ is the price of asset i at time t, $I_{i,t+1}$ is the asset's income at $t+1$, and M_{t+1} is the stochastic discount factor.[6] The discount factor is the marginal rate of substitution, defined as $M_{t+1} \equiv \beta U_C(C_{t+1}, \boldsymbol{x}_{t+1})/U_C(C_t, \boldsymbol{x}_t)$, where β is the time preference parameter and $U(C_t, \boldsymbol{x}_t)$ defines utility as a function of time t consumption, C_t, and a vector, $\boldsymbol{x}_t$, of other variables that enter into the utility function. Utility is assumed to be an increasing and concave function of consumption. The additional arguments, $\boldsymbol{x}_t$, admit the possibility that utility may be a function of other variables such as state variables and may be nonseparable over time, goods, or states of nature. The C subscript denotes the first derivative of utility with respect to consumption. Eq. (1) and the equations that follow hold for both real and nominal values as long as all values, including M_{t+1}, are expressed consistently in either real terms or nominal terms. They hold for any asset for any two periods of a multi-period model and require no assumptions regarding complete markets, return distributions, time- or state-separable utility, or the existence of labor income or human capital. Making such assumptions adds additional structure to the model, but does not change any of the implications discussed here.

Defining the gross return (one plus the net return) as $R_{i,t+1} = (P_{i,t+1} + I_{i,t+1})/P_{i,t}$, Eq. (1) can be rewritten in terms of asset returns as

$$1 = E_t[M_{t+1}R_{i,t+1}], \tag{2}$$

or, equivalently, by applying the definition of covariance, as[7]

$$1 = E_t[M_{t+1}] \cdot E_t[R_{t+1}] + Cov_t[M_{t+1,}R_{t+1}] \tag{2'}$$

[4] For the 1950–1999 period Reilly et al. (2000) find that return volatility is more stable for stocks than for bonds, the ratio of stock market to bond market volatility is not stable, and the correlation between bond and stock returns varies widely. Jones and Wilson (2004) find similar results for the period 1871–2000.

[5] We limit our study to parametric methods and monthly returns to keep the scope of the analysis manageable and provide a reasonably rich baseline for future study, while supplying results comparable to key findings in the stock literature. The mixed results of studies based on monthly stock return data motivated the exploration of a variety of alternative methodologies to estimate the stock risk-return relation, including the use of daily returns to estimate monthly volatility (see Ghysels, Santa-Clara, & Valkanov, 2005), the use of regime-switching models (see Whitelaw, 2000), and the use of measures of expected rather than realized return (see Jiang & Lee, 2009; Pastor, Sinha, & Swaminathan, 2008).

[6] Eq. (1) can also be derived from the absence of arbitrage. See chapters 2 and 4 of Cochrane (2001) for a detailed discussion of the minimum requirements for Eq. (1) to hold.

[7] By definition, $Cov_t[M_{t+1}, R_{t+1}] = E_t[M_{t+1}R_{t+1}] - E_t[M_{t+1}] \cdot E_t[R_{t+1}]$.

Eq. (2) says that expected *discounted* gross returns always equal one. The expanded expression (2′) introduces the key role that the covariance between an asset's return and the discount factor plays in the risk adjustment of expected return. For a given value of $E_t[M_{t+1}]$, expected gross returns must be inversely related to covariances in any cross-section of assets.

Before discussing the hedging implications of the model in detail, it is useful to examine implications specific to the pricing of default-free bonds. We begin with the gross return to a default-free bond that has a one-period maturity. This risk-free gross return, $R_{f,t}$, is known at time t, so Eq. (2) implies that

$$R_{f,t} = E_t[M_{t+1}]^{-1}. \tag{3}$$

Substituting for future prices in Eq. (1) and using the law of iterated expectations, the price of a τ-period-to-maturity risk-free discount (zero-coupon) bond that pays \$1 at maturity is

$$P_{\tau,t} = E_t[M_{t+1,t+\tau}], \tag{4}$$

where $E_t[M_{t+1,t+\tau}] = E_t[M_{t+1}M_{t+2}\ldots M_{t+\tau}]$, and the one-period return to holding the τ-period-to-maturity discount bond is:

$$R_{\tau,t+1} = \frac{P_{\tau,t+1}}{P_{\tau,t}} = \frac{E_{t+1}[M_{t+2,t+\tau}]}{E_t[M_{t+1,t+\tau}]} \tag{5}$$

Eq. (5) shows that the holding period return on a bond is a function of changes in expectations of future values of the stochastic discount factor over the bond's life. Any news or events that cause investors to adjust their expectations of future realizations of the marginal utility of consumption during the bond's life are reflected in bond returns and their volatilities. Since the price of any coupon bond can be expressed as the sum of prices of a series of discount bonds, the intuition behind Eq. (5) holds for coupon bonds as well.

To examine interemporal hedging issues, it is useful to multiply both sides of Eq. (2′) by $E_t[M_{t+1}]^{-1}$, substitute from Eq. (3), and rearrange terms to show that the one-period risk premium to holding *any* asset i is

$$E_t[R_{i,t+1}] - R_{f,t} = -\frac{1}{E_t[M_{t+1}]} Cov_t[M_{t+1}, R_{i,t+1}], \tag{6}$$

where Cov_t is the conditional covariance at time t. According to Eq. (6), an asset will earn a positive risk premium if its realized return is inversely related to M_{t+1}, that is, if the return is high when the marginal utility of consumption is low and low when marginal utility is high. However, a negative risk premium is indicated for hedging assets, that is, assets that have high payoffs when the marginal utility of consumption is high and low payoffs when marginal utility is low. Investors pay more for hedging assets, because hedging assets provide higher payoffs when additional consumption is most desired.

As a point of clarification, it is worth noting that the above definition of a hedging asset differs from that of a "hedge portfolio" as that term is often used in extensions and empirical tests of Merton's ICAPM. In those contexts a hedge portfolio is one that hedges against deteriorations in investment opportunities (decreases in expected future returns) by providing realized returns that are inversely related to expected returns. In the ICAPM, a long position in a hedge portfolio hedges the marginal utility of wealth only if the coefficient of relative risk aversion is greater than one.[8] If risk aversion is less than one, a portfolio that has realized returns that are positively related to shifts in investment opportunities is required to hedge the marginal utility of wealth. The ICAPM specializes the general

[8] The coefficient of relative risk aversion determines whether investors will increase or decrease consumption in response to changes in expected future returns. When risk aversion is greater than one, investors are not aggressive in seeking growth in planned consumption. They increase (decrease) both current and planned future consumption in response to an increase (decrease) in investment opportunities. In the contrary case, when risk aversion is less than one, investors are aggressive in seeking growth in planned consumption. In response to an increase in expected returns, they decrease current consumption to invest more in risky assets. Only in the high risk aversion case does an ICAPM hedging asset (one that provides high realized returns when investment opportunities are poor) do so during periods when the marginal utility of consumption is high.

consumption-based model. The ICAPM is derived with the assumption that the marginal utility of consumption is described by wealth and investment opportunities alone.

Substituting Eq. (5) into Eq. (6) produces the following expression for the excess return to the τ-period discount bond:

$$E_t[R_{\tau,t+1}] - R_{f,t} = -\frac{1}{E[M_{t+1}]} Cov_t \left[M_{t+1}, \frac{E_{t+1}[M_{t+2,t+\tau}]}{E_t[M_{t+1,t+\tau}]} \right]. \tag{7}$$

Eq. (7) demonstrates that the ex ante risk premium on a bond reflects the expected time series properties of M_{t+1} during the bond's maturity. Thus, bonds of adjacent maturities are likely to have similar return characteristics. Characteristics of short and long maturity bonds could be very different.

We follow the convention of using yield spreads as a conditioning variable in our empirical tests. Eq. (4) implies that the gross yield on a τ-period discount bond is

$$Y_{\tau,t} = \left(\frac{1}{P_{\tau,t}} \right)^{1/\tau} = E_t[M_{t+1,t+\tau}]^{-1/\tau}. \tag{8}$$

A comparison of Eq. (7) to Eqs. (3) and (8) shows why a bond's own yield spread contains information that is a useful for predicting bond excess returns.

Using the relationship between correlation and covariance to expand Eq. (6) provides the relation of the ex ante risk premium on *any* asset to that asset's own volatility[9]

$$E_t[R_{i,t+1}] - R_{f,t} = -\frac{vol_t[M_{t+1}]}{E_t[M_{t+1}]} vol_t[R_{i,t+1}] corr_t[M_{t+1}, R_{i,t+1}], \tag{9}$$

where vol_t is the conditional standard deviation, the ratio $vol_t[M_{t+1}]/E_t[M_{t+1}]$ is the slope of the mean-variance frontier, and $corr_t$ is the conditional correlation. The correlation summarizes the hedging properties of an asset and determines the sign of the relation between the first and second conditional moments of the asset's excess return. Variation over time in the slope or the correlation will cause the risk–return relation to vary as well.

Summarizing, three main conclusions can be drawn from the general model of asset pricing. First, the sign of the relation between a bond's excess return and conditional volatility depends on the extent to which a long position in the bond serves as an intertemporal hedge against shocks to the marginal utility of consumption. Second, risk–return relations differ across bond maturities. The difference is likely small for adjacent maturity bonds and potentially large for short versus long-term bonds, because the holding period return for each bond depends on changes during the holding period in expected values of the stochastic discount factor over the remaining life of the bond. Third, the relation between bond risk and return may vary over time due to changes in the slope of the mean-variance frontier or changes in the correlation between the asset's return and the stochastic discount factor. In the empirical section of this paper, we focus on documenting the sign of the bond risk–return relation for the full sample period, the consistency of the relation across bond maturities, and the short-term stability of the relation.

4. Data and descriptive statistics

Data are from the *Center for Research in Security Prices* (*CRSP*). Returns are one-month holding period returns. Returns and yields on one-month and three-month to maturity Treasury bills are from the Fama Treasury Bill Term Structure Files. Returns on five Treasury Bond portfolios are from the Fama Maturity Portfolios Returns File with bonds grouped by maturities in one year intervals. Thus, the bond portfolios consist of bonds with maturities of less than 1, 1–2, 2–3, 3–4, and 4–5 years. Only non-callable, non-flower bonds and notes are included in the portfolios. Yields that correspond to the portfolio returns are from the Fama-Bliss Discount Bonds File. Each yield is for the discount bond at the upper bound of maturity allowed in a portfolio. We use returns and yields on the ten-year

[9] By definition, $corr_t[M_{t+1}, R_{i,t+1}] = cov_t[M_{t+1}, R_{i,t+1}]/(vol_t[M_{t+1}]vol_t[R_{i,t+1}])$.

Table 1
Descriptive statistics for Treasury Bond excess returns.

Panel A: Monthly Excess Return ($R_{\tau,t+1} - R_{f,t}$)

Maturity (months)	Mean (×100)	Std. Dev. (×100)	Skewness	Kurtosis	JB	$Q(12)$	ρ_1	ρ_2	ρ_3	ρ_{12}
$\tau \approx 3$	0.0521	0.0909	2.47	15.39	4357.3***	151.5***	0.32	0.10	0.06	0.02
$0 < \tau \leq 12$	0.0658	0.2591	1.49	17.91	5665.1***	79.0***	0.19	−0.04	−0.01	−0.08
$12 < \tau \leq 24$	0.1049	0.6489	0.84	15.88	4135.9***	59.4***	0.19	−0.07	−0.05	−0.01
$24 < \tau \leq 36$	0.1316	0.9890	0.63	13.47	2726.0***	41.6***	0.14	−0.06	−0.05	0.01
$36 < \tau \leq 48$	0.1476	1.2386	0.17	7.87	582.6***	31.7***	0.13	−0.05	−0.05	0.04
$48 < \tau \leq 60$	0.1432	1.4523	0.18	6.78	352.6***	30.9***	0.13	−0.07	−0.05	0.04
$\tau \approx 120$	0.1588	2.2266	0.29	4.44	58.8***	15.3	0.06	−0.06	−0.02	0.02
$\tau \approx 240$	0.1814	2.9069	0.38	5.62	182.8***	19.3*	0.04	−0.09	−0.05	−0.01

Panel B: Squared Excess Returns $(R_{\tau,t+1} - R_{f,t})^2$

Maturity (months)	Mean (×100)	Std. Dev. (×100)	$Q(12)$	ρ_1	ρ_2	ρ_3	ρ_6	ρ_{12}
$\tau \approx 3$	0.0001	0.0004	304.5***	0.52	0.15	0.07	0.10	0.08
$0 < \tau \leq 12$	0.0007	0.0029	219.4***	0.36	0.20	0.12	0.18	0.14
$12 < \tau \leq 24$	0.0043	0.0166	171.9***	0.19	0.31	0.11	0.23	0.12
$24 < \tau \leq 36$	0.0099	0.0351	151.7***	0.14	0.33	0.08	0.22	0.11
$36 < \tau \leq 48$	0.0155	0.0406	202.2***	0.17	0.32	0.14	0.26	0.14
$48 < \tau \leq 60$	0.0213	0.0511	187.7***	0.13	0.28	0.11	0.28	0.15
$\tau \approx 120$	0.0497	0.0932	160.0***	0.18	0.26	0.14	0.08	0.17
$\tau \approx 240$	0.0847	0.1837	113.2***	0.24	0.21	0.19	0.10	0.10

The time series is from January 1961 to December 2009 with 588 observations. The Jarque–Bera (JB) statistic is a goodness-of-fit measure of the departure of the distribution of a data series from normality, based on the levels of skewness and excess kurtosis. The JB statistic is χ^2 distributed with 2 degrees of freedom. The $Q(12)$ statistic tests for autocorrelation in the first 12 lags. It is χ^2 distributed with 12 degrees of freedom based on the number of lags tested. The autocorrelation coefficient is denoted by ρ_t, where t is the lag, in months. ***, **, * denote significance for the JB or $Q(12)$ test at the 0.01, 0.05, and 0.10 levels, respectively for a one-tailed test.

and twenty-year constant maturity bonds from the *CRSP* Fixed Term Indices Files to represent longer maturity bonds.[10] Where possible, *CRSP* uses a non-callable, non-flower bond in constructing the Fixed Term Indices Files. The sample period is January 1961 to December 2009. We start with January 1961, because there are often substantial gaps in prior months between the desired and available maturities for the ten- and twenty-year constant maturity bonds. Eight excess return series are calculated by subtracting the return to the one-month bill from the holding period returns on the three-month bill, each of the five bond portfolios, and the ten- and twenty-year constant maturity bonds.

We report descriptive statistics for the excess return series in Panel A of Table 1. Both the mean and standard deviation of monthly excess returns tend to increase with maturity, standard deviations rise more sharply. These results are consistent with Pilotte and Sterbenz (2006), who find that bond Sharpe ratios decline with maturity.

The Jarque–Bera (JB) statistics, a goodness-of-fit test of the departure of the distribution of a data series from the normal, reject normality at the 0.01 level for each excess return series. An examination of the skewness and kurtosis of the excess return series indicates that the rejection of normality is due predominately to excess kurtosis relative to the normal distribution. The $Q(12)$ statistics reject the null hypothesis of no autocorrelation in the first 12 lags at the 0.01 level for six of the eight series and at the 0.10 level for one series. Reported autocorrelations indicate that these rejections are due mostly to positive first order autocorrelation in the excess returns. Higher order correlations are close to zero and the pattern of autocorrelations is consistent with stationarity of all of the excess return series.

[10] We use the twenty-year and not the thirty-year bond from the Fixed Term Indices File because there are several years where both series are based on the same bond and the gap between actual and desired maturity is generally smaller for the twenty-year bond. The disadvantage of using constant maturity bonds rather than portfolios is that the realized return is more sensitive to idiosyncratic variation in the price of a single bond.

To examine aspects of the volatility of excess returns, we report descriptive statistics for squared excess returns in Panel B of Table 1. Panel B shows that both the mean and standard deviation of squared excess returns increase with maturity. The $Q(12)$ statistics and autocorrelations reported in Panel B indicate substantial positive autocorrelation in squared excess returns that is more persistent than the positive autocorrelation in excess returns. These statistics suggest the existence of autoregressive conditional heteroskedasticity in each excess return series.

5. Excess return model and model evaluation

In this section we present our empirical model of conditional mean excess returns and carry out diagnostic tests to evaluate the stability of the model. The residuals of this model are used in a later section of this paper to model conditional volatility using predetermined financial conditioning information as instrumental variables.

5.1. Estimating conditional mean excess returns

In order to estimate the conditional volatility of a bond's excess returns, it is useful to isolate the predictable and the unpredictable components of those returns. To do so, we model the conditional mean excess return by regressing excess returns on predetermined conditioning variables. An obvious choice for a conditioning variable is a bond's own yield spread, defined as the beginning of period difference between the bond's yield to maturity and the one-month T-bill rate. The yield spread has been shown to have predictive power for bond excess returns in prior studies by Campbell (1987), Fama (1990), and Pilotte and Sterbenz (2006).[11] Based on the positive first order autocorrelations in excess returns reported in Table 1, we also include the one-month lag of each bond's excess return as a conditioning variable. Thus, our model of excess returns is:

$$R_{\tau,t+1} - R_{f,t} = \alpha_{\tau,0} + \alpha_{\tau,1}(Y_{\tau,t} - R_{f,t}) + \alpha_{\tau,2}(R_{\tau,t} - R_{f,t-1}) + \varepsilon_{\tau,t+1} \tag{10}$$

where t subscripts denote when a variable is observed, $R_{\tau,t+1}$ is the uncertain return from holding from time t to t+1 a bond of maturity τ, $R_{f,t}$ is the risk-free return known at time t and earned by holding a one-month bill from t to t+1, $Y_{\tau,t}$ is the yield-to-maturity observed at time t on a bond of maturity τ, and $\varepsilon_{\tau,t+1}$ is the error term.

Stambaugh (1999) shows that the conventional t-test of return predictability is biased when a regressor is highly persistent and its changes are highly correlated with subsequent returns. Since yield spreads are both highly persistent and their innovations are likely correlated with subsequent returns, we implement the pretest procedure developed by Campbell and Yogo (2005) and Campbell and Yogo (2006) to check on the validity of the t-statistics associated with the yield spreads in our regressions. Results of these pretests (not shown) indicate that the conventional t-test leads to valid inference in all of our regressions of bond excess returns on yield spreads. Because our excess return series are clearly stationary, as indicated by the autocorrelations reported in Table 1, conventional t-tests are valid for the lagged excess returns as well.

The results of ordinary least squares (OLS) estimation of regression Eq. (10) are reported in Table 2. The standard errors are adjusted for autocorrelation and heteroskedasticity. The yield spread is significant at the 0.01 level for three, at the 0.05 level for four, and at the 0.10 level for one of the eight bond maturities. The lagged excess return is significant at the 0.01 level for six bond maturities and the 0.10 level for one maturity. The regression R-square ranges from a low of 0.02 for the twenty-year bond to a high of 0.11 for the three-month bill. These results document predictable variation in bond excess returns for all maturities.

Table 2 also contains test statistics that examine aspects of the regression errors. The JB statistics reject normality of the residuals at the 0.01 level for every regression. The White statistics reject the

[11] Fama (1990) shows that the yield spread contains the market's estimate of the ex ante risk premium and should reflect variation in that premium. The idea that a bond's own term spread contains information that is useful for predicting bond excess returns also is supported by a comparison of our Eq. (7), to Eqs. (3) and (8).

Table 2
Ordinary least squares regressions of excess returns on conditioning variables.

Maturity	Constant	$Y_{\tau,t} - R_{f,t}$	$R_\tau - R_{f,t-1}$	R^2	JB	White-Hetero.	LM-Serial Corr.	LM-ARCH
$\tau \approx 3$	0.000**	0.278***	0.270***	0.11	4300.5***	97.1***	35.6***	112.6***
	(0.000)	(0.210)	(0.090)					
$0 < \tau \leq 12$	0.000	0.5759*	0.245***	0.05	8047.5***	49.4***	64.3***	94.2***
	(0.000)	(0.299)	(0.059)					
$12 < \tau \leq 24$	−0.000	1.178**	0.229***	0.05	5454.4***	10.1**	41.7***	88.4***
	(0.000)	(0.527)	(0.047)					
$24 < \tau \leq 36$	−0.000	1.476**	0.174***	0.04	3572.7***	9.2*	30.0***	85.4***
	(0.001)	(0.728)	(0.043)					
$36 < \tau \leq 48$	−0.001	1.852**	0.158***	0.04	661.2***	22.6***	20.1*	101.2***
	(0.001)	(0.827)	(0.045)					
$48 < \tau \leq 60$	−0.001	1.946***	0.149***	0.03	435.9***	14.3***	19.9*	90.6***
	(0.001)	(0.862)	(0.041)					
$\tau \approx 120$	−0.002	2.617**	0.074*	0.02	48.2***	33.4***	16.1	85.5***
	(0.002)	(1.057)	(0.041)					
$\tau \approx 240$	−0.003*	3.111***	0.038	0.02	215.9***	35.4***	21.9**	58.3***
	(0.002)	(1.115)	(0.045)					

The time series is from January 1961 to December 2009. Regressions of the monthly excess return ($R_{\tau,t+1} - R_{f,t}$) on the beginning-of-period yield spread ($Y_{\tau,t} - R_{f,t}$), and, the one-month lag of the excess return ($R_{\tau,t} - R_{f,t-1}$). The Jarque–Bera (JB) statistic is a goodness-of-fit measure of the departure of the distribution of the regression residuals from normality. The JB statistic is χ^2 distributed with 2 degrees of freedom. The White statistic is a test for heteroskedasticity that is χ^2 distributed with 6 degrees of freedom. The Breusch–Godfrey Lagrange Multiplier (LM-Serial-Corr.) statistic is a test for serial correlation that is χ^2 distributed with 12 degrees of freedom due to the test for serial correlation for up to 12 lags. Engle's Lagrange Multiplier ARCH statistic (LM-ARCH) is a test for ARCH effects in the residuals. It is χ^2 distributed with 12 degrees of freedom due to the test for ARCH effects for 12 lags. Newey–West autocorrelation and heteroskedasticity consistent standard errors are in parentheses. ***, **, * denote significance at 0.01, 0.05, and 0.10 levels, respectively for a two-tailed test; one-tailed test for JB, White, and LM tests.

null hypothesis of no heteroskedasticity at the 0.01 level for six maturities, the 0.05 level for one maturity, and at the 0.10 level for the remaining maturity. The Breusch–Godfrey Lagrange Multiplier statistics reject the null hypothesis of no serial correlation at the 0.01 level in four regressions, at the 0.05 level in one regression, and at the 0.10 level in two regressions. Engle's Lagrange Multiplier ARCH statistics reject the null hypothesis of no autoregressive conditional heteroskedasticity in the residuals at the 0.01 level in every regression. In brief, the regression residuals are non-normally distributed, heteroskedastic, autocorrelated, and show strong evidence of ARCH effects. We consider these aspects of shocks to bond excess returns in the models of the risk–return relation that appear later in this paper.

5.2. Evaluation of excess return model

Klemkosky and Pilotte (1992) present evidence of shifts in the stochastic process that generates Treasury Bond risk premiums around October 1979 and October 1982 changes in monetary policy.[12] Thus, we conduct a variety of diagnostic tests to check the specification of our model of excess returns.[13] Due to the large quantity of diagnostic test results, we discuss them but do not report them in tabular form.

Our first set of diagnostic tests is based on recursive least squares estimation of Eq. (10) for each bond maturity. We examine plots against time of the recursive coefficients and two standard error bands around the coefficients for each bond maturity. These plots suggest that the regression coefficients are stable over time. We also apply the CUSUM and CUSUM of squares tests (see Brown, Durbin, & Evans, 1975) that are based on plots against time of the cumulative sums of the recursive residuals and their squared values, respectively. Using the 0.05 significance level, the CUSUM

[12] These dates reflect changes in the Federal Reserve's focus on targeting interest rates and monetary aggregates. Specifically, during 1979–1982 the Fed experimented with using non-borrowed reserves as a target for monetary policy.

[13] Klemkosky and Pilotte (1992) reject the stability of a model of the relation between bond excess returns and short-rate volatility.

tests suggest model stability while the CUSUM of squares tests suggest instability. Overall, the results based on recursive estimation suggest parameter stability but changing variance over the full sample period.

Our second set of diagnostic tests is Wald tests of structural change. Model stability is tested for each bond for each of the five possible monetary regime pairs. The results of tests that assume unequal subperiod variances never reject coefficient stability at the 0.05 level and reject it at the 0.10 level in only one instance. The results of tests that assume equal subperiod variances consistently reject model stability. The Wald test results are consistent with the recursive least squares results in suggesting coefficient stability but changing variance across monetary regimes.

Overall, our specification tests support two conclusions. First, the assumption of coefficient stability over the full sample period is a reasonable one, so our method of estimating conditional mean excess returns appears adequate. Second, the volatility of return shocks varies over time, suggesting that an examination of the relation between excess returns and conditional volatility is well motivated. In the next section, we use models of conditional volatility to examine the relation between bond risk and return.

6. The relation between excess returns and conditional volatility

In this section, we estimate the empirical relation between bond risk and return. Since the method chosen to model conditional volatility is critical to the results of estimating the monthly risk–return relation in the stock literature, we test three specifications of the conditional variance of bond excess returns.[14] We pay special attention to the decision to include or exclude financial conditioning information in the model of conditional variance, because it determines the sign of the estimated risk–return relation for stocks. Our first model estimates conditional variances using predetermined financial conditioning information. Given the strong evidence of ARCH effects in excess returns reported in Table 2, our second model is a simple GARCH-M model. Our third model incorporates both financial conditioning variables and GARCH effects.

6.1. Instrumental variables estimation using financial conditioning information

For each bond maturity, τ, we estimate the following instrumental variables regression:

$$R_{\tau,t+1} - R_{f,t} = \alpha_{\tau,0} + \alpha_{\tau,1}\varepsilon^2 + \mu_{\tau,t+1}, \tag{11}$$

where the $\varepsilon_{\tau,t+1}$ are the residuals from the estimation of Eq. (10) model of excess returns, the slope coefficient $\alpha_{\tau,1}$ is the estimate of the relation between the bond's expected excess return and conditional volatility, and $\mu_{\tau,t+1}$ is the error term. The intercept, $\alpha_{\tau,0}$, provides a check on the empirical specification of the risk–return model, because Eq. (9) indicates that the intercept will equal zero if the model specification is adequate. For instruments we consider lags of the squared residuals, the conditioning variables used to estimate the excess return model, and the one-month Treasury bill return. We include the one-month T-bill rate because of the historically positive relation between interest rate volatility and the level of interest rates, and because of the common use of the short-term interest rate to model volatility in term structure models.[15] An initial examination of the relations between the squared residuals and the candidate instruments indicates that the one-month bill rate and six lags of the squared residuals encompass the candidates that are most useful in modeling conditional volatility. We expect shocks to bond excess returns to be correlated across maturities, so we improve the efficiency of our estimates by choosing an estimation method that takes into account the cross-equation correlations in the error terms. We use the Generalized Method of Moments (GMM) to estimate Eq. (11) simultaneously for all bond maturities. Standard errors are Newey–West heteroskedasticity and autocorrelation consistent.

[14] We repeat each test using the standard deviation and log of conditional variance as the volatility measures. Results for these alternative specifications are discussed in the robustness section that appears later in the paper.

[15] Because of concerns regarding the possible non-stationarity of the one-month rate, we repeat the estimation excluding it from the list of instruments. Results are qualitatively the same.

Table 3
Instrumental variables estimation of risk-return relation for Treasury Bonds.

Maturity	Constant ($\times 10^4$)	Slope	LM-ARCH	LM-Serial Corr.	JB	AR(1) for predicted $\varepsilon^2_{\tau,t+1}$
$\tau \approx 3$	3.350***	284.423***	52.3***	54.3***	17,660.1***	0.881***
	(0.289)	(14.182)				(0.021)
$0 < \tau \leq 12$	5.280***	24.131***	96.7***	55.0***	2451.4***	0.981***
	(0.633)	(3.208)				(0.009)
$12 < \tau \leq 24$	8.010***	8.391***	78.5***	47.1***	3023.1***	0.538***
	(1.670)	(1.270)				(0.051)
$24 < \tau \leq 36$	10.090***	4.857***	75.2***	29.3***	1867.9***	0.553***
	(2.590)	(0.915)				(0.037)
$36 < \tau \leq 48$	11.320***	3.840***	95.1***	24.5***	708.7***	0.714***
	(3.460)	(0.944)				(0.032)
$48 < \tau \leq 60$	13.990***	0.782	85.1***	23.6***	286.6***	0.639***
	(4.350)	(0.994)				(0.035)
$\tau \approx 120$	2.810	3.813***	64.2***	16.1	68.6***	0.953***
	(8.950)	(1.148)				(0.013)
$\tau \approx 240$	17.970*	0.232	49.7***	18.5*	149.2***	0.666***
	(10.330)	(0.800)				(0.034)

Generalized method of moments (GMM) system estimation incorporates the use of instrumental variables and considers the cross-equation correlations in the error terms. The following system of equations is estimated:

$$R_{\tau,t+1} - R_{f,t} = \alpha_{\tau,0} + \alpha_{\tau,1}\varepsilon^2_{\tau,t+1} + \mu_{\tau,t+1},$$

where, τ is the number of months of bond maturity: $\tau \approx 3$, $0 < \tau \leq 12$, $0 < \tau \leq 24$, $0 < \tau \leq 36$, $0 < \tau \leq 48$, $0 < \tau \leq 60$, $\tau \approx 120$, and $\tau \approx 240$, time $t = 1, 588$ represents the beginning of months from January 1961 to December 2009, ε_{t+1} is the residual from the OLS regressions in Table 2, and μ_{t+1} is the error term. The instrumental variables are the one-month return on the one month T-Bill ($R_{f,t}$) and the first six monthly lags of the squared residuals. Engle's Lagrange Multiplier ARCH statistic (LM-ARCH) is a test for ARCH effects in the residuals. It is χ^2 distributed with 12 degrees of freedom due to the test for ARCH effects for 12 lags. The Breusch–Godfrey Lagrange Multiplier (LM-Serial-Corr.) statistic is a test for serial correlation that is χ^2 distributed with 12 degrees of freedom due to the test for serial correlation for up to 12 lags. The Jarque–Bera (JB) statistic is a goodness-of-fit measure of the departure of the distribution of the regression residuals from normality. The JB statistic is χ^2 distributed with 2 degrees of freedom. The AR(1) coefficient is the first order autoregressive coefficient for the fitted values of $\varepsilon^2_{\tau,t+1}$. Newey–West heteroskedasticity and autocorrelation consistent standard errors are in parentheses. ***, **, * denote significance at the 0.01, 0.05, and 0.10 levels respectively; two-tailed test for regression parameters, one-tail test for Q and JB statistics.

Results of the system estimation of Eq. (11) are reported in Table 3. The slope coefficient is significant at the 0.01 level for the 3 month bill, the four bond portfolios of maturities less than or equal to 48 months, and the 120-month bond. The slope coefficient is statistically insignificant for the 48–60-month portfolio and the 240-month bond. Thus, six of our eight maturities produce evidence of a significant positive relation between bond risk and return. In terms of statistical significance, the positive relation tends to be more reliable the shorter the bond maturity.

The intercepts reported in Table 3 are significant at the 0.01 level in six regressions and at the 0.10 level in one regression. The prevalence of significant nonzero intercepts suggests that the IV approach is not adequate for modeling the risk–return relation, as Eq. (9) predicts a zero intercept for a well specified model.

To facilitate comparison of the persistence of the conditional variance estimates across differently parameterized models, we follow Glosten et al. (1993) who regress the conditional variance estimate for each model on a constant and the lagged value of the estimate. These first order autoregressive coefficients are reported for each model that we estimate. For the results of instrumental variables estimation reported in Table 3, the first order autoregressive coefficient is estimated for the predicted values of the $\varepsilon^2_{\tau,t+1}$ from the system estimation of Eq. (11). These AR(1) coefficients indicate that there is substantial persistence in the conditional variance estimates.

The LM-ARCH statistics reported in Table 3 reject, at the 0.01 level, the null hypothesis of no ARCH effects in the first 12 lags of the residuals of each equation. The LM-Serial Correlation and JB statistics are consistent with results reported in Table 2, rejecting the nulls of no auto-correlation and the normality of the residuals. Since GMM requires no distributional assumption, parameter estimates are consistent despite the lack of normally distributed residuals. Because the

IV approach to estimating conditional volatility does a poor job of capturing the ARCH effects in our excess return data, GARCH estimation may provide more accurate estimates of conditional volatility and improve the efficiency of estimates. We use GARCH estimation in the models that follow.

6.2. GARCH-M estimation

A natural way to estimate the relation between bond risk and return is with the following simple GARCH-M model of conditional variance:

$$R_{\tau,t+1} - R_{f,t} = \alpha_{\tau,0} + \alpha_{\tau,1}\sigma^2_{\tau,t+1} + \gamma_{\tau,t+1} \tag{12}$$

$$\sigma^2_{\tau,t+1} = \beta_{\tau,0} + \beta_{\tau,1}\sigma^2_{\tau,t} + \beta_{\tau,2}\gamma^2_{\tau,t} + \upsilon_{\tau,t+1} \tag{13}$$

Estimation is by the method of maximum likelihood. In light of the evidence in Table 1 that excess returns are not normally distributed due to excess kurtosis, we estimate the GARCH-M system assuming that the conditional distribution for the error term is the Generalized Error Distribution (GED). The GED is less restrictive than the normal as it accommodates kurtosis, although it does not accommodate skewness.[16] The GED distribution nests the Student's t-distribution and normal distribution.

Table 4 contains the results for GARCH-M estimation. For each maturity, the GED parameter differs significantly from 2, the value for the normal distribution, at either the 0.01 or 0.05 significance levels.[17] The Lagrange Multiplier ARCH statistics indicate that the model is effective at removing most of the ARCH effects from the regression residuals. The coefficient sum, $\beta_{\tau,1} + \beta_{\tau,2}$, is close to one in every variance equation. A sum of one is indicative of the integrated GARCH (IGARCH) process identified by Engle and Bollerslev (1986), which allows for shocks to have a permanent effect on the conditional variance. An IGARCH process is not covariance-stationary but is strictly stationary under conditions identified in Nelson (1990).[18] Similarly, the AR(1) coefficients for the conditional volatility estimates range from 0.93 to 0.97. This confirms the presence of substantial persistence in conditional volatility. The persistence in volatility, as measured by the AR(1) coefficient, is generally greater than that reported in Table 3 for the instrumental variables estimation.

The coefficients on conditional variance in the mean equations are all positive. They are significant at either the 0.01 or 0.05 level for all maturities less than or equal to 60 months and significant at the 0.10 level for the 240-month bond. The risk–return relation is insignificant only for the 120-month bond. Thus, the GARCH-M specification of conditional variance and the IV specification based on financial conditioning information both provide evidence that there is a positive relation between bond risk and return. In terms of statistical significance, both specifications indicate that the positive relation tends to be more reliable the shorter the bond maturity.

Contrary to the case for the IV specification, the intercepts for the GARCH-M regressions generally do not differ significantly from zero. The exceptions are the regressions for the 3-month bill and the portfolio of bonds that are very close (less than 12 months remaining) to maturity. Thus, the GARCH-M approach appears to be a superior model specification.

[16] The GED is a restricted version of the skewed generalized error distribution (SGED). Although it may seem intuitive that a less restrictive distribution is always better, since the non-normality of the error term is not driven by skewness, a loss of efficiency would obtain from over-parameterization of the distribution if specified with the more general SGED.

[17] Although not shown, χ^2 distributed goodness-of-fit log-likelihood ratio tests (one degree of freedom) comparing the fits of the GED and the normal distributions for each maturity indicate that the GED provides a statistically-significantly better fit than the normal.

[18] Nelson shows that an IGARCH(1,1) process with a positive drift is strictly stationary and ergodic. The unconditional density for such a process is the same for all t.

Table 4
GARCH-M estimation of risk-return relation for Treasury Bonds.

Maturity	Mean equation		Variance equation			GED parameter	LM-ARCH	Log-L	AR(1) coefficient for $\sigma^2_{\tau,t+1}$
	Constant ($\times 10$)	$\sigma^2_{\tau,t+1}$	Constant ($\times 10^8$)	$\gamma^2_{\tau,t}$	$\sigma^2_{\tau,t}$				
$\tau \approx 3$	0.002***	209.005***	0.511*	0.233***	0.793***	1.145***	11.0	3565.6	0.956***
	(0.000)	(39.148)	(0.267)	(0.044)	(0.027)	(0.092)			(0.012)
$0 < \tau \leq 12$	0.003***	45.948***	6.350*	0.222***	0.786***	1.425***	6.3	2922.2	0.955***
	(0.000)	(12.564)	(2.88)	(0.045)	(0.037)	(0.118)			(0.012)
$12 < \tau \leq 24$	0.002	17.014***	36.000*	0.146***	0.856***	1.436***	19.4*	2294.6	0.968***
	(0.002)	(6.201)	(18.900)	(0.031)	(0.029)	(0.112)			(0.010)
$24 < \tau \leq 36$	0.001	9.768**	57.500*	0.138***	0.871***	1.385***	18.1	2012.8	0.969***
	(0.003)	(4.231)	(31.800)	(0.028)	(0.023)	(0.102)			(0.010)
$36 < \tau \leq 48$	0.001	7.976**	74.200**	0.145***	0.869***	1.382**	14.7	1849.9	0.970***
	(0.004)	(3.564)	(37.600)	(0.030)	(0.023)	(0.102)			(0.010)
$48 < \tau \leq 60$	−0.004	6.965**	88.700**	0.126***	0.886***	1.347***	21.3**	1742.2	0.973***
	(0.005)	(3.150)	(41.600)	(0.026)	(0.020)	(0.101)			(0.010)
$\tau \approx 120$	−0.000	2.485	49.300	0.228***	0.816***	1.486***	11.6	1484.5	0.933***
	(0.006)	(1.907)	(76.800)	(0.046)	(0.030)	(0.106)			(0.015)
$\tau \approx 240$	−0.006	2.736*	216.000	0.123***	0.893**	1.425***	8.3	1322.8	0.968***
	(0.011)	(1.660)	(211.000)	(0.031)	(0.025)	(0.084)			(0.011)

The results below are the GARCH-M regressions for the monthly excess return on the T-Bond ($R_{\tau,t+1} - R_{f,t}$) with conditional variance in the mean equation. The estimated models are:

$$R_{\tau,t+1} - R_{f,t} = \alpha_{\tau,0} + \alpha_{\tau,1}\sigma^2_{\tau,t+1} + \gamma_{\tau,t+1}$$
$$\sigma^2_{\tau,t+1} = \beta_{\tau,0} + \beta_{\tau,1}\sigma^2_{\tau,t} + \beta_{\tau,2}\gamma^2_{\tau,t} + \upsilon_{\tau,t+1}$$

The time series is from January 1961 to December 2009 with 588 observations. The conditional distribution for the error term is the generalized error distribution (GED) to address non-normality of the errors, where the GED parameter (k) is the kurtosis parameter that accommodates fat tails. The GED nests the normal distribution and becomes the normal if k is equal to 2. Engle's Lagrange Multiplier ARCH statistic (LM-ARCH) is a test for ARCH effects in the residuals. It is χ^2 distributed with 12 degrees of freedom due to the test for ARCH effects for 12 lags. Log-L is the value of the log likelihood function. The AR(1) coefficient is the first order autoregressive coefficient for the fitted values of $\sigma^2_{\tau,t+1}$. Standard errors are in parentheses. ***, **, * denote significance at the 0.01, 0.05 and 0.10 levels, respectively; two-tailed test for regression and GED parameters, one-tailed test for LM-ARCH.

6.3. GARCH-M estimation with financial conditioning information

Our third model of conditional volatility incorporates both financial conditioning variables and GARCH effects:

$$R_{\tau,t+1} - R_{f,t} = \alpha_{\tau,0} + \alpha_{\tau,1}\sigma^2_{\tau,t+1} + \gamma_{\tau,t+1} \tag{14}$$

$$\sigma^2_{\tau,t+1} = \beta_{\tau,0} + \beta_{\tau,1}\sigma^2_{\tau,t} + \beta_{\tau,2}\gamma^2_{\tau,t} + \beta_{\tau,3}R_{f,t} + \beta_{\tau,4}(Y_{\tau,t} - R_{f,t}) + \beta_{\tau,5}(R_{\tau,t} - R_{f,t-1}) + \upsilon_{\tau,t+1} \tag{15}$$

Results, reported in Table 5, indicate that incorporating both financial conditioning variables and GARCH effects in the model of conditional variance provides stronger evidence of a positive relation between bond risk and return than does the simple GARCH-M estimation of Table 4. In the mean equation, the coefficient on the variance term is positive and significant at the 0.01 level for four bond maturities and at the 0.05 level for three bond maturities. Moreover, as is the case for the simple GARCH-M regressions, the intercepts for the GARCH-M regressions that incorporate financial conditioning variables in the variance equation generally do not differ significantly from zero. The model seems well specified for all but the shortest-term bonds.

An examination of the results for the variance equation indicates that the one-month rate is significant (0.05 level or lower) in explaining the conditional variance of every bond maturity. The significance of the yield spread (0.01 level) in explaining conditional variance is limited to the 3-month bill. The lagged excess return is significant (0.05 level) only for the 120-month bond.

In Table 5, the GED parameters differ significantly from the value for the normal distribution (0.01 level) in every regression. The Lagrange Multiplier ARCH statistics indicate that the model is effective at removing most of the ARCH effects from the regression residuals. For each maturity, the inclusion of financial conditioning information in the variance equation increases the value of the log-likelihood function relative to the value reported in Table 4 for simple GARCH-M estimation. The persistence in conditional volatility, as measured by the AR(1) coefficient, is usually close to that reported in Table 4 for the simple GARCH model.

6.4. Additional robustness tests

As a robustness check, all three models are estimated using the conditional standard deviation and the log of conditional variance rather than the conditional variance to estimate the risk–return relation. While these changes do not materially alter our conclusions, there are systematic effects on the *p*-values for the coefficient on the conditional volatility measure. For instrumental variables estimation using financial conditioning information, using the conditional standard deviation tends to raise *p*-values slightly. For GARCH-M estimation, both with and without conditioning variables, using the conditional standard deviation tends to lower *p*-values slightly. The preponderance of results remains consistent with a positive risk–return relation.

We also check the robustness of our results to the use of asymmetric GARCH-M models that allow positive and negative shocks to returns to have different impacts on the conditional volatility. Contrary to the existing evidence for stocks, for which asymmetries are significant determinants of conditional volatility that cause the sign of the risk–return relation to reverse, we find that these asymmetries are insignificant in determining the conditional volatilities of bonds.

We also explore the use of alternatives to the GED distribution for estimating GARCH models when regression residuals are not conditionally normally distributed. We repeat estimation of all GARCH models using the Student's *t*-distribution and using the quasi-maximum likelihood method of Bollerslev and Wooldridge (1992). Our conclusions are robust to these changes in the specification of the conditional distribution for errors.

We use GMM system estimation of Eq. (11) to produce our estimates of the risk–return relation that are based on modeling the conditional variance using only financial conditioning information. Advantages of the GMM estimator are that it takes into account the cross-equation correlations in the error terms and is robust to heteroskedasticity and autocorrelation of unknown form. As a check on the importance of these advantages we also estimate Eq. (11) using three-stage least squares (3SLS) and single-equation estimation. 3SLS accounts for the cross-equation correlations in the error term and

Table 5
GARCH-M estimation of risk-return relation with variance conditioning variables.

Maturity	Mean equation		Variance equation						GED parameter	LM-ARCH	Log-L	AR(1) coefficient for $\sigma^2_{\tau,t+1}$
	Constant ($\times 10^4$)	$\sigma^2_{\tau,t+1}$	Constant ($\times 10^6$)	$\sigma^2_{\tau,t}$	$\gamma^2_{\tau,t}$	$R_{f,t}$ ($\times 10^4$)	$Y_{\tau,t} - R_{f,t}$ ($\times 10^4$)	$R_\tau - R_{f,t-1}$ ($\times 10^4$)				
$\tau \approx 3$	1.000***	719.158***	−0.018***	0.410***	0.161***	0.240***	1.490***	1.290***	1.100***	27.9***	3592.7	0.818***
	(0.150)	(91.756)	(0.004)	(0.062)	(0.029)	(0.044)	(0.541)	(0.347)	(0.077)			(0.024)
$0 < \tau \leq 12$	2.510***	59.944***	−0.049	0.780***	0.182***	0.434***	0.562	0.255	1.464***	10.3	2928.1	0.957***
	(0.560)	(14.197)	(0.038)	(0.040)	(0.041)	(0.157)	(0.693)	(0.610)	(0.126)			(0.012)
$12 < \tau \leq 24$	1.500	21.271***	0.700*	0.871***	0.104***	3.750***	0.824	0.729	1.472***	22.3**	2301.3	0.962***
	(1.940)	(6.865)	(0.412)	(0.028)	(0.025)	(1.240)	(3.250)	(1.380)	(0.123)			(0.009)
$24 < \tau \leq 36$	0.181	12.264***	−2.910**	0.877***	0.102***	11.750***	4.470	1.740	1.446***	17.3	2020.8	0.975***
	(3.000)	(2.717)	(1.270)	(0.028)	(0.025)	(4.030)	(6.760)	(2.380)	(0.116)			(0.009)
$36 < \tau \leq 48$	−0.298	8.404**	−4.680**	0.889***	0.105***	17.730**	3.940	−2.940	1.491***	9.7	1860.8	0.982***
	(3.280)	(3.451)	(2.350)	(0.028)	(0.027)	(7.180)	(11.820)	(2.570)	(0.129)			(0.008)
$48 < \tau \leq 60$	−4.820	6.964**	−7.150*	0.904***	0.092***	25.650**	3.840	−3.100	1.447***	19.8*	1753.5	0.984***
	(3.700)	(2.938)	(3.970)	(0.027)	(0.024)	(11.510)	(18.570)	(3.250)	(0.123)			(0.007)
$\tau \approx 120$	−3.970	2.774	−23.100**	0.852***	0.146***	72.36**	51.31	−10.100**	1.574***	15.5	1495.7	0.963***
	(4.500)	(1.917)	(11.500)	(0.038)	(0.036)	(31.490)	(48.87)	(5.310)	(0.115)			(0.011)
$\tau \approx 240$	−11.140	3.061**	−42.600*	0.871***	0.112***	129.590**	137.51	−11.450	1.459***	9.3	1328.9	0.968***
	(9.53)	(1.605)	(23.200)	(0.041)	(0.033)	(70.100)	(93.12)	(8.110)	(0.088)			(0.010)

The following GARCH–M models are estimated:

$$R_{\tau,t+1} - R_{f,t} = \alpha_{\tau,0} + \alpha_{\tau,1}\sigma^2_{\tau,t+1} + \gamma_{\tau,t+1}$$
$$\sigma^2_{\tau,t+1} = \beta_{\tau,0} + \beta_{\tau,1}\sigma^2_{\tau,t} + \beta_{\tau,2}\gamma^2_{\tau,t} + \beta_{\tau,3}R_{f,t} + \beta_{\tau,4}(Y_{\tau,t} - R_{f,t}) + \beta_{\tau,5}(R_{\tau,t} - R_{f,t-1}) + \upsilon_{\tau,t+1}$$

The time series is from January 1961 to December 2009 with 588 observations. These regression models estimate the relation between the excess return ($R_{\tau,t+1} - R_{f,t}$) and its conditional variance, where the conditioning variables include the beginning of period monthly return on the 1-month T-Bill ($R_{f,t}$), the beginning of period yield spread ($Y_{\tau,t} - R_{f,t}$), and the one-month lag of excess return ($R_{\tau,t} - R_{f,t-1}$). The conditional distribution for the error term is the generalized error distribution (GED) to address non-normality of the errors, where the GED parameter (k) is the kurtosis parameter that accommodates fat tails. The GED nests the normal distribution and becomes the normal if $k = 2$. Engle's Lagrange Multiplier ARCH statistic (LM-ARCH) is a test for ARCH effects in the residuals. It is χ^2 distributed with 12 degrees of freedom due to the test for ARCH effects for 12 lags. Log-L is the value of the log likelihood function. AR(1) is the first order autoregressive coefficient for the fitted values of $\sigma^2_{\tau,t+1}$. Standard errors are in parentheses. ***, **, * denote significance at the 0.01, 0.05 and 0.10 levels, respectively. The regression and GED parameters are two-tailed tests. The LM-ARCH is a one-tail test.

heteroskedasticity, but does not account for autocorrelation in the errors. Single-equation estimation accounts for heteroskedasticity and autocorrelation of unknown form, but not the cross-equation correlations in the error terms. Results for 3SLS are similar, but slightly weaker than GMM estimation. Results for single-equation estimation are substantially weaker than both 3SLS and GMM estimation. Thus, accounting for the cross-equation correlations in the errors produces efficiency gains that have an important impact on the statistical significance of the estimated relation between bond risk and return.

6.5. Discussion of implications for asset pricing models

Our findings have implications for the modeling of investor preferences and asset returns that support the conclusions of Cochrane (2001, 2006). Our finding of a positive relation between the first two moments of bond returns is evidence that bond realized returns tend to be high during good times of low marginal utility and low during bad times of high marginal utility. The inverse relation between a fixed income security's price and discount rate, implies the opposite relation for expected bond returns and marginal utility. Thus, a challenge for asset-pricing models is to capture the fact that investors associate periods of high expected (low realized) bond returns with bad times. A well known result from the prediction literature is that expected returns on stocks and bonds are higher near the troughs of recessions than at the peaks.[19] Thus, our results support Cochrane's conclusion that theoretical models need to explain, and empirical models need to capture, the fact that investors fear recessions.

The existing ICAPM specializations of the consumption-based model are ill-suited to explain our results.[20] The ICAPM approach assumes that the marginal utility of consumption is a function only of wealth and state variables that describe the conditional distribution of expected future returns. Unless the coefficient of relative risk aversion is very low (less than one), the ICAPM associates good times with high, and bad times with low, expected returns.[21] If one believes that risk aversion is reasonably high, our results support the conclusion that investor preferences are not adequately modeled by wealth and investment opportunities alone.

Our results are consistent with Cochrane's (2001, 2006) conclusion that asset pricing models must capture the fact that investors are concerned not only with the wealth effects of holding assets, but of the fact that assets do poorly at particular times or in particular states of nature (recessions). Cochrane suggests that this can be done in a utility framework by adding arguments into the utility function that enter nonseparably either over time or over states of nature. For example, Campbell and Cochrane (1999) associate high expected returns with bad times by adding an argument, habit, that enters the utility function nonseparably over time. For the ICAPM framework, Cochrane recommends adding a recession state variable to the value function.

7. Stability of the risk–return relation

The regression models reported in Tables 3–5 assume a time invariant linear relation between the expected excess return and conditional variance. The theoretical model of Section II does not restrict

[19] Fama and French (1989) find that risk premiums on stocks and long-term corporate bonds are related to variables that track business conditions. They conclude that excess returns are high when economic conditions are weak and low when economic conditions are strong. Pilotte and Sterbenz (2006) report similar findings for Treasury bonds and stocks. They find that conditional mean excess returns on Treasury bond portfolios of maturities of one to five years peak near the troughs of recessions, while conditional means of shorter maturity bonds and bills peak during recessions prior to the trough (see their Table 5).

[20] Two excellent sources of discussion of the relation of the ICAPM to the general model are Cochrane (2006, 2007).

[21] The coefficient of relative risk aversion determines whether investors will increase or decrease consumption in response to changes in expected future returns. When risk aversion is greater than one, investors increase both current and planned future consumption in response to an increase in expected returns. When risk aversion is less than one, investors are more aggressive in seeking growth in planned consumption. In response to an increase in expected returns, they decrease current consumption to invest more in risky assets.

the risk–return relation to a stable linear relation. In this section, we evaluate the linearity and stability of the relation between bond risk and return.

7.1. Analysis of excess return model residuals

A straightforward way to check the linear restriction for any of our models is to examine the relation between the regression error and financial conditioning information. If conditioning information explains variability in excess returns that is not related to conditional volatility, a linear relation between the conditional mean and conditional variance is rejected. Such a finding suggests that the reward to volatility changes over time.

Table 6 reports the results of OLS regressions of residuals from our models on financial conditioning information. For all three models, conditioning variables have explanatory power beyond that of the conditional variance. The explanatory power is greatest for the model where the conditional variance is based only on financial conditioning information. The explanatory power is lower in models where the conditional variance estimates incorporate GARCH effects. At least one conditioning variable is significant in most of the residual regressions. Clearly, the conditioning variables capture variation in excess returns that is not related to our estimates of the conditional variance. A time invariant linear specification of the relation between the conditional mean and conditional volatility is rejected, which suggests that the reward to volatility changes over time.[22,23]

7.2. Rolling correlations between conditional means and conditional variances

To provide evidence on the impact of changing reward to volatility on the stability of the risk–return relation we examine the relation between estimates of the conditional mean and conditional variance. We calculate contemporaneous correlations between estimates of conditional means and conditional variances for each bond maturity over 17-month rolling periods.[24]

To get a time series of fitted values, we estimate final models of conditional means and variances for Treasury Bond excess returns. Our final model incorporates all aspects of our prior models. The conditional mean is modeled as a function of both the conditional variance and financial conditioning information. The conditional variance incorporates both GARCH effects and financial conditioning information. We first estimate the following GARCH-M model:

$$R_{\tau,t+1} - R_{f,t} = \alpha_{\tau,0} + \alpha_{\tau,1}\sigma^2_{\tau,t+1} + \alpha_{\tau,2}(Y_{\tau,t} - R_{f,t}) + \alpha_{\tau,3}(R_{\tau,t} - R_{f,t-1}) + \gamma_{\tau,t+1} \quad (16)$$

$$\sigma^2_{\tau,t+1} = \beta_{\tau,0} + \beta_{\tau,1}\sigma^2_{\tau,t} + \beta_{\tau,2}\gamma^2_{\tau,t} + \beta_{\tau,3}R_{f,t} + \beta_{\tau,4}(Y_{\tau,t} - R_{f,t}) + \beta_{\tau,5}(R_{\tau,t} - R_{f,t-1}) + \upsilon_{\tau,t+1} \quad (17)$$

After the initial estimation, we drop explanatory variables that are not significant at the 0.10 level and re-estimate the model. The final models with only variables that are statistically significant in explaining the conditional mean or conditional variance are reported in Table 7.

An interesting aspect of Table 7 is that the GARCH in mean term is significant for only two bond maturities. Results of omitted variable tests (not reported) confirm this conclusion. The effect of the conditional variance on the conditional mean is generally subsumed by the financial conditioning information. The yield spread is always significant in explaining the excess return and the lagged excess return is significant in explaining the excess return for all but the 240-month bond. In the variance equation, the GARCH terms and the one-month rate are always significant in explaining the

[22] Pilotte and Sterbenz (2006) find that Sharpe ratios on long-term bonds, but not short-term bonds, vary over the business cycle. Our results differ in indicating that there is time variation in the reward to volatility for all bond maturities. A potential explanation for the difference in results is that our tests are not tied to the business cycle.

[23] The results for bonds reported in Table 7 are consistent with results that Harvey (2001) reports for stocks. Harvey finds that the rejection of a linear risk-return relation for stocks is robust to changes in the method used to estimate the conditional variance. He also presents graphic evidence that the ratio of conditional mean to conditional volatility for stocks has a distinct business cycle pattern.

[24] In his examination of the stability of the risk-return relation for common stocks, Whitelaw (1994) chooses a 17-month window to balance the need for reasonably accurate estimates with the need for a period that is short enough to pick up variation over the length of a business cycle. We follow his approach to facilitate a comparison with existing results for stocks.

Table 6
Analysis of residuals from models of the bond risk-return relation.

Maturity	Residuals from risk-return model with conditional volatility estimates based on financial conditioning information				Residuals from risk-return model with conditional volatility estimates based on Simple GARCH-M model				Residuals from risk-return model with conditional volatility estimates based on GARCH-M with financial conditioning information in the variance equation			
	Constant ($\times 10^4$)	$Y_{\tau,t} - R_{f,t}$	$R_\tau - R_{f,t-1}$	R^2	Constant ($\times 10^4$)	$Y_{\tau,t} - R_{f,t}$	$R_\tau - R_{f,t-1}$	R^2	Constant ($\times 10^4$)	$Y_{\tau,t} - R_{f,t}$	$R_\tau - R_{f,t-1}$	R^2
$\tau \approx 3$	−2.720***	0.686***	0.082	0.12	−1.260***	0.653***	0.089	0.10	−1.090**	0.582***	0.052	0.06
	(0.382)	(0.144)	(0.078)		(0.471)	(0.218)	(0.064)		(0.481)	(0.199)	(0.063)	
$0 < \tau \leq 12$	6.640***	−1.261***	0.167**	0.16	9.090***	−1.559***	0.153***	0.19	8.950***	−1.570***	0.152**	0.19
	(2.040)	(0.356)	(0.079)		(0.280)	(0.464)	(0.066)		(1.380)	(0.145)	(0.067)	
$12 < \tau \leq 24$	14.910***	−2.180***	0.177***	0.11	19.290***	−2.574***	0.164***	0.12	19.180***	−2.613***	0.162***	0.13
	(5.210)	(0.675)	(0.054)		(7.040)	(0.864)	(0.046)		(7.070)	(0.863)	(0.046)	
$24 < \tau \leq 36$	20.090**	−2.450***	0.141***	0.07	26.680**	−2.878***	0.135***	0.08	26.330**	−2.924***	0.132***	0.08
	(8.030)	(0.834)	(0.048)		(10.470)	(1.050)	(0.042)		(10.500)	(1.048)	(0.041)	
$36 < \tau \leq 48$	20.110**	−2.258***	0.134***	0.05	25.470**	−2.594***	0.131***	0.06	26.320**	−2.592***	0.133***	0.06
	(9.690)	(0.850)	(0.045)		(11.200)	(0.968)	(0.043)		(11.330)	(0.970)	(0.043)	
$48 < \tau \leq 60$	22.450*	−2.218**	0.135***	0.04	28.070**	−2.443**	0.129***	0.04	28.240**	−2.418**	0.131***	0.04
	(12.590)	(0.997)	(0.042)		(13.000)	(1.023)	(0.040)		(13.100)	(1.023)	(0.040)	
$\tau \approx 120$	17.310	−1.811*	0.056	0.01	26.550*	−2.056***	0.060	0.01	28.950*	−2.002***	0.063	0.01
	(14.190)	(0.937)	(0.038)		(15.170)	(1.008)	(0.039)		(15.310)	(10.14)	(0.039)	
$\tau \approx 240$	8.510	−0.750	0.038	0.00	14.250	−1.180	0.035	0.00	16.030	−1.147	0.037	0.00
	(19.130)	(1.130)	(0.044)		(19.250)	(1.160)	(0.044)		(19.280)	(1.154)	(0.044)	

Residuals are from the excess return regressions reported in Tables 3–5, where the conditional volatility is modeled using financial conditioning information in Table 3 a simple GARCH-M model in Table 4 and a GARCH-M model with financial conditioning information included in the conditional variance equation in Table 5 The residuals from each model of the risk-return relation are regressed on the beginning-of-period yield spread ($Y_{\tau,t} - R_{f,t}$), and, the one-month lag of the excess return ($R_{\tau,t} - R_{f,t-1}$). Results are for OLS estimation with Newey–West autocorrelation and heteroskedasticity consistent standard errors reported in parentheses. ***, **, * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 7
Final models of conditional means and conditional variances for Treasury Bond returns.

Maturity	Mean equation				Variance equation					GED Parameter	LM-ARCH	Log-L	AR(1) coefficient for $\sigma^2_{\tau,t+1}$
	Constant ($\times 10^4$)	$\sigma^2_{\tau,t+1}$	$Y_{\tau,t} - R_{f,t}$	$R_\tau - R_{f,t-1}$	Constant ($\times 10^6$)	$\sigma^2_{\tau,t+1}$	$\varepsilon^2_{\tau,t-1}$	$R_{f,t}$ ($\times 10^4$)	$R_\tau - R_{f,t-1}$ ($\times 10^4$)				
$\tau \approx 3$	1.070***	223.91***	0.298***	0.192***	0.003	0.832***	0.131***	0.081***	0.401**	1.139***	15.6	3607.3	0.965***
	(0.188)	(60.45)	(0.071)	(0.040)	(0.002)	(0.026)	(0.031)	(0.013)	(0.172)	(0.094)			(0.011)
$0 < \tau \leq 12$	0.007	42.240***	0.447***	0.200***	0.034	0.812***	0.163***	0.390***		1.408***	14.9	2943.0	0.954***
	(0.784)	(16.17)	(0.103)	(0.042)	(0.029)	(0.035)	(0.036)	(0.140)		(0.124)			(0.012)
$12 < \tau \leq 24$	−2.780		1.0281***	0.204***	−0.618***	0.889***	0.096***	3.150***		1.361***	29.1***	2313.5	0.971***
	(2.310)		(0.254)	(0.041)	(0.229)	(0.024)	(0.024)	(0.784)		(0.112)			(0.010)
$24 < \tau \leq 36$	−6.470*		1.582***	0.158***	−2.270***	0.897***	0.094***	9.340***		1.348***	17.6	2031.4	0.974***
	(3.530)		(0.359)	(0.040)	(0.487)	(0.022)	(0.024)	(1.850)		(0.110)			(0.009)
$36 < \tau \leq 48$	−9.900**		1.825***	0.131***	−4.680***	0.889***	0.100***	18.770***		1.435***	11.3	1868.7	0.978***
	(4.620)		(0.438)	(0.040)	(0.855)	(0.024)	(0.026)	(3.330)		(0.125)			(0.009)
$48 < \tau \leq 60$	−14.900***		2.002***	0.138***	−7.910***	0.895***	0.094***	30.070***		1.375***	16.3	1763.0	0.980***
	(4.950)		(0.475)	(0.039)	(1.490)	(0.023)	(0.026)	(5.470)		(0.117)			(0.008)
$\tau \approx 120$	−17.790***		2.021***	0.097**	−12.400***	0.882***	0.125***	45.080***	−7.260*	1.551***	14.8	1501.1	0.973***
	(6.460)		(0.611)	(0.039)	(3.21)	(0.025)	(0.028)	(13.370)	(4.390)	(0.118)			(0.009)
$\tau \approx 240$	−30.650***		3.447***		−17.600**	0.893***	0.109***	70.520***		1.392***	10.1	1334.5	0.970***
	(10.620)		(0.734)		(6.920)	0.027	0.030	(26.530)		(0.091)			(0.010)

The initial estimated models are:

$$R_{\tau,t+1} - R_{f,t} = \alpha_{\tau,0} + \alpha_{\tau,1}\sigma^2_{\tau,t+1} + \alpha_{\tau,2}(Y_{\tau,t} - R_{f,t-1}) + \alpha_{\tau,3}(R_{\tau,t} - R_{f,t-1}) + \gamma_{\tau,t+1}$$
$$\sigma^2_{\tau,t+1} = \beta_{\tau,0} + \beta_{\tau,1}\sigma^2_{\tau,t} + \beta_{\tau,2}\gamma^2_{\tau,t} + \beta_{\tau,3}R_{f,t} + \beta_{\tau,4}(Y_{\tau,t} - R_{f,t}) + \beta_{\tau,5}(R_{\tau,t} - R_{f,t-1}) + \upsilon_{\tau,t+1}$$

The time series is from January 1961 to December 2009 with 588 observations. The insignificant explanatory variables were dropped to obtain the final estimated models reported below. The initial regression models include the conditional variance in the mean equation, and the mean and variance equations initially includes the beginning of period yield spread ($Y_{\tau,t} - R_{f,t}$), and the one-month lag of excess return ($R_{\tau,t} - R_{f,t-1}$) as conditioning variables. The conditional variance also includes the beginning of period monthly return on the 1-month T-Bill ($R_{f,t}$). The conditional distribution for the error term for the estimations is the generalized error distribution (GED) to address non-normality of the errors. The GED parameter (k) is the kurtosis parameter that accommodates fat tails and becomes the normal distribution if $k = 2$. Engle's Lagrange Multiplier ARCH statistic (LM-ARCH) is a test for ARCH effects in the residuals. It is distributed with 12 degrees of freedom due to the test for ARCH effects for 12 lags. Log-L is the value of the log likelihood function. AR(1) is the first order coefficient for the fitted values of $\sigma^2_{\tau,t+1}$. Standard errors are in parentheses. ***, **, *denote significance at the 0.01, 0.05, and 0.10 levels, respectively. The regression and GED parameters are two-tailed tests. The LM-ARCH is a one-tail test.

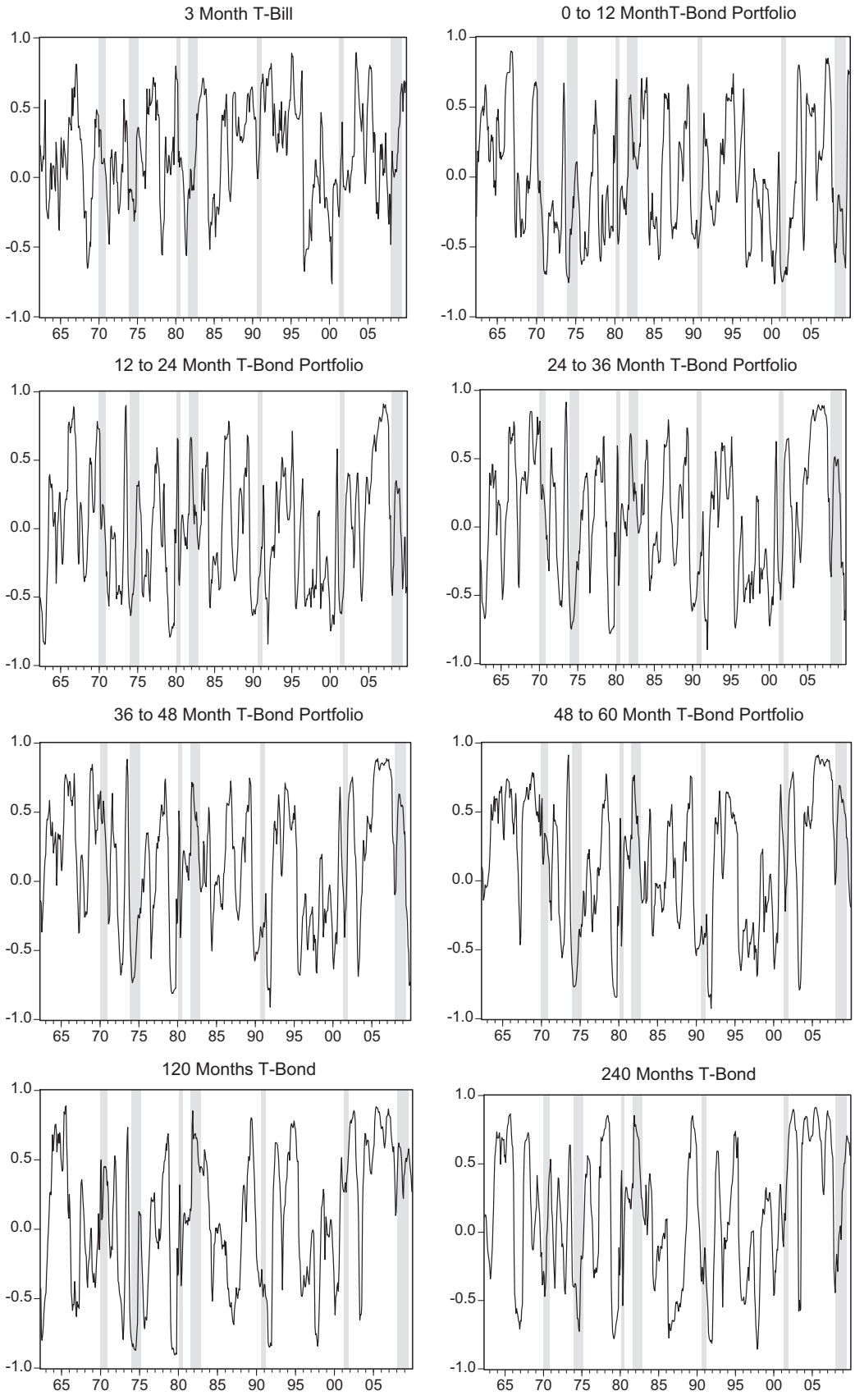

Table 8
Correlation matrix of rolling estimates of correlations between the conditional moments of bond excess returns.

Maturity	$\tau \approx 3$	$0 < \tau \leq 12$	$12 < \tau \leq 24$	$24 < \tau \leq 36$	$36 < \tau \leq 48$	$48 < \tau \leq 60$	$\tau \approx 120$	$\tau \approx 240$
$\tau \approx 3$	1.00							
$0 < \tau \leq 12$	0.47	1.00						
$12 < \tau \leq 24$	0.26	0.70	1.00					
$24 < \tau \leq 36$	0.12	0.50	0.89	1.00				
$36 < \tau \leq 48$	0.03	0.44	0.79	0.91	1.00			
$48 < \tau \leq 60$	−0.02	0.35	0.70	0.87	0.93	1.00		
$\tau \approx 120$	0.11	0.22	0.46	0.55	0.67	0.74	1.00	
$\tau \approx 240$	0.03	0.13	0.31	0.47	0.54	0.67	0.79	1.00

The following are correlations between rolling estimates of correlations between the fitted values of the conditional mean and conditional variance of excess returns on bonds of different maturities. The 17-month rolling correlation for each bond maturity is between the conditional excess return and conditional variance as shown in Fig. 1. The model used to estimate the conditional excess returns and variances is shown in Table 7 for each maturity. Using all of the time series from January 1961 to December 2009, the correlation coefficients begin in May 1962 and end in December 2009.

conditional volatility. The yield spread is never significant in the variance equation and the lagged excess return is significant only for the 3-month bill and 120 month bond. Viewed overall, the results reported in Table 7 indicate that the yield spread and lagged excess return are generally important in predicting conditional means, while the one-month rate and GARCH effects are important in predicting the conditional variances.

Fig. 1 presents graphs of the rolling estimates of correlations between the fitted series of conditional excess returns and conditional variances for each bond maturity. The graphs show substantial variation over time in the short-term relation between bond risk and return. For longer maturities, both the range of correlations and incidence of negative correlations are similar to those reported by Whitelaw (1994) for stocks. For the shortest maturities, the range of correlations is diminished somewhat, but there remains substantial variation over time and numerous negative correlations.

The graphs in Fig. 1 are shaded to show business cycle expansions and contractions. The correlations vary substantially within both expansions and contractions. The graphs show no obvious business cycle pattern in the relation between bond risk and return, though there appears to be some tendency for the estimated relation to decrease either prior to or early in recessions. Our ability to draw firm conclusions regarding business cycle patterns is limited by the fact that our sample contains only seven measured contractions.

To illustrate the co-movement in the risk–return relation across bond maturities, in Table 8 we report correlations between the rolling correlations of each maturity pair. The correlations in Table 8 indicate that time variation in the risk–return relation is similar for adjacent maturities, but differs substantially when the difference in maturity is large. Nevertheless, correlations are positive for all but one pair of bond maturities.

Overall, our examination of rolling correlations shows instability in the short-term relation between bond risk and return. The relation is often negative for each bond maturity. For longer maturities, both the range of correlations and incidence of negative correlations are similar to those reported previously for common stocks. For shorter maturities the range is diminished somewhat; however, the rolling correlations for all bond maturities do tend to move together. Negative rolling correlations suggest there may be specific time periods in which bonds were effective hedging assets. Further study is required to draw any definitive conclusions regarding this possibility.

Fig. 1. Rolling estimates of correlations between the conditional moments of bond excess returns The graphs above plot the 17-month rolling estimates of the correlation between the fitted values of the conditional mean excess return and conditional variance for each bond maturity. The models used to predict the excess returns and variances are reported in Table 7. Using all of the time series from January 1961 to December 2009, the correlation coefficients begin in May 1962 and end in December 2009. Shaded areas represent business cycle contractions as defined by the National Bureau of Economic Research with the beginning month defined as the first trough month and the ending month defined as the last trough month. Non-shaded areas are business cycle expansions.

8. Conclusions

Our full sample estimation of the linear relation between the conditional mean and conditional volatility of U.S. Treasury Bonds documents a significant positive relation between bond risk and return for maturities of 3 months to 20 years. This finding is not very sensitive to the method used to estimate conditional volatility and is especially reliable for bond maturities of 5 years or less. A positive, rather than negative, risk–return relation indicates that Treasury Bonds are not a hedging asset as that concept is defined in consumption-based models of intertemporal choice. Rather, an effective hedging asset has the return characteristics of a short position in Treasury Bonds. Short positions on shorter-maturity bonds appear to be the most statistically reliable means for an investor to hedge the marginal utility of consumption.

Our full sample results are consistent with the conclusion that realized returns on Treasury Bonds are high when investors least value, and low when investors most value, the benefits of an additional dollar of consumption. Thus, for a special case of the consumption-based model to accurately reflect investor preferences, it must explain why investors associate bad times of high marginal utility with periods of low realized and high expected bond returns. Special cases that assume that the marginal utility of consumption is a function of at most wealth and investment opportunities, such as the ICAPM specializations of Merton (1973) and Campbell (1993), do not do so. Unless one assumes that risk aversion is very low, those models associate bad times with low expected returns. Explaining why investors associate bad times with high expected returns requires a model that captures the fact that investors are concerned not only with the wealth effects of holding assets, but with the fact that assets do poorly at particular times or in particular states of nature (recessions). Campbell and Cochrane (1999) do so by adding an argument to the utility function, habit that enters nonseparably over time.

Our analysis of the linearity and stability of the risk–return relation produces evidence that the reward to volatility and the short-term relation between bond risk and return may vary over time. The fact that rolling correlations between estimates of the conditional mean and conditional volatility are often negative suggests that there may be specific time periods in which bonds were effective hedging assets. Further study is required to draw any definitive conclusions regarding this possibility.

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Empirical analysis of the generalized consumption asset pricing model: Estimating the cost of capital

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ABSTRACT

Other than the problematic discounted cash flow and capital asset pricing models that have been used for decades, no other asset pricing models have generally been adopted for estimating the cost of common equity capital. A recently developed and promising general consumption asset pricing model for estimating costs of common equity is successful in empirical tests and applied for estimating the cost of common equity. This research presents an empirical investigation of the model for application to the regulation of public utilities and stock market and compares the cost of capital results with the CAPM. The model is applicable for estimating the cost of common equity capital for any stock. The paper recommends that the GCAPM be considered as an additional asset model with the others that are typically used as additional information in estimating the cost of common equity capital.

1. Introduction

The state of cost of common equity estimation and modeling has become stale. The only asset pricing models typically used by firms for estimating their cost of common equity are mainly the

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capital asset pricing model (CAPM) with a few firms using the dividend discount cash flow (DCF) and the arbitrage pricing (APM) models, all of which were developed in the 60s and 70s. A survey conducted by the Association for Financial Professionals (2011) on the use of asset pricing models for estimating the cost of capital found that 87% of all firms and 91% of publicly traded firms use the CAPM, 3% of all firms and 2% of publicly traded firms use the DCF model and 1% for both types use the APM. Whereas most firms and much academic research[1] still use the CAPM for cost of capital estimations, the literature on the problems with the empirical evaluation and theoretical foundations of the CAPM is vast and conclusively negative. Fama and French (2004) summarize the literature and conclude that "...In the end, we argue that whether the model's problems reflect weaknesses in the theory or in its empirical implementation, the failure of the CAPM in empirical tests implies that most applications of the model are invalid." This paper does not recommend that the CAPM be discarded or substituted with the GCAPM discussed and tested in this paper. No information should be ignored for estimating the cost of common equity.

Michelfelder and Pilotte (2011) introduced a new asset pricing model for estimating the cost of common equity capital based on the intertemporal asset pricing model literature (discussed below). The generalized consumption asset pricing model requires a minimum of assumptions in its theoretical development. It also is applied with a minimum of subjectivity. Ahern, Hanley, and Michelfelder (2011) performed some cursory preliminary empirical tests and applied the GCAPM to model the risk–return relationship for stocks and estimate the cost of common equity. They used a few public utility stocks to estimate and apply the GCAPM. Public utility applications are important as public utilities are regulated primarily by the allowed rate of return which is supposed to reflect the cost of capital. It is so important to the public utility industries that the initial academic literature on cost of capital estimation and application was based to a major extent on public utility industry studies. See references in Morin (2006).

Ahern et al. (2011) found the GCAPM to be promising in cursory empirical testing and in generating reasonable, mechanically (without subjective judgment) developed estimates of the cost of common equity capital for a small sample of public utilities, consisting of a few electric, electric and gas, natural gas, and water utilities.

Although the model can be used for estimating the cost of capital for any firm, this investigation also focuses on public utility regulation and applications since it is likely to be the most contested issue in a public utility rate proceeding (see Bonbright, Danielsen, & Kamerschen, 1988; McDermott, 2012; Phillips, 1993).[2] Additionally, the practice of public utility regulation has not adopted other models other than DCF and the CAPM (Ahern et al., 2011). These models have numerous strong assumptions and require many subjective judgments in application that leads to highly contested rate of return recommendations in public utility proceedings. The application of these models is highly questionable and the estimates subject to many vagaries due to choices of inputs.

This paper performs an empirical investigation of the GCAPM for public utility cost of common equity estimation.

2. The model

The literature on the traditional CAPM and consumption asset pricing models is vast so that literature is briefly discussed that summarizes the work leading to the model used in this research.

The GCAPM has been recently derived and empirically tested for US Treasury Bonds and Bills and stock market returns in Michelfelder and Pilotte (2011) and preliminarily applied and tested for public

[1] A recent variant of the DCF model has emerged in the academic literature for estimating the cost of common equity capital for other research, the implicit cost of capital. It is essentially the expected book value of a firm plus the capitalized value of the infinite stream of the conditionally expected net income minus the required net income to earn its cost of capital equated to the current stock price. The capitalization rate is the cost of common equity and the same rate implied in the required net income. See Pastor, Sinha, and Swaminathan (2008) and Molina-Ortiz and Phillips (2014).

[2] McDermott (2012) on pp.13–14 states: "While determining the operating costs and rate base is not without controversy, the calculation of the firm's cost of capital is generally one of the most contentious issues in a rate case. ..." The cost of equity is an expectation held by the "marketplace" and is therefore not directly observable. As a result it must be estimated and the question of what is a correct assessment of the market's true value is partly what makes this issue so contentious.

utility stocks and stock markets in Ahern et al. (2011). There are many restrictive versions of the model that led to the derivation of the GCAPM. The main asset pricing models used as foundations to develop the GCAPM include the intertemporal capital asset pricing model in Merton (1973), models in Cochrane (2004), the intertemporal asset pricing model of Campbell (1993), and the habit-persistence model of Campbell and Cochrane (1999).

Some GCAPM highlights are that it (1) makes no assumptions about the efficiency of the asset market, (2) has no constraints on the investor's degree of risk aversion or limits on the magnitude of coefficient of risk aversion, (3) prices the risk that the investor is actually exposed to rather than the nonrealistic systematic risk that assumes that the investor has diversified away all nonsystematic risk. That is, the GCAPM does not assume that the investor has a perfectly diversified portfolio that eliminates all unique risk. The GCAPM even allows for the possibility of a negative relation between return and volatility where other asset pricing models do not. Investors are willing to pay (give up return or accept returns less than the risk free rate) to be exposed to patterns of volatility that hedge against downturns in business cycle levels of consumption. This property will be discussed below and considered in the empirical analysis.

Michelfelder and Pilotte (2011) specify the GCAPM as the *ex ante* risk premium of an asset *i* as a function of the volatility of the asset *i ex ante* return:

$$E_t\left[R_{i,t+1}\right] - R_{f,t} = -\frac{vol_t\left[M_{t+1}\right]}{E_t\left[M_{t+1}\right]} vol_t\left[R_{i,t+1}\right] corr_t\left[M_{t+1}, R_{i,t+1}\right], \tag{1}$$

where $R_{i,t+1}$ is the *ex ante* return on asset *i*, $R_{f,t}$ is the risk free rate of return at time *t*, M_{t+1} is the stochastic discount factor (SDF), vol_t is the volatility of the variable conditioned on information available in time *t*, E_t is the expectations operator conditional on information available in time *t*, and, $corr_t$ is the correlation conditioned on information available in time *t*. The SDF is the intertemporal marginal rate of substitution in consumption:

$$M_{t+1} = \left(\frac{1}{1+k}\right)\frac{U_{c,t+1}}{U_{c,t}}, \tag{2}$$

where the U_c's are the marginal utilities of consumption for the differing time periods and k is the discount rate for the period from t to $t+1$. The ratio of the marginal utilities of consumption for two time periods, $U_{c,t+1}/U_{c,t}$, rises if the expected future dollar value of consumption falls below current consumption. This property is due to the concave shape of the investor's utility function and diminishing marginal utility and generates the specification of the model to identify the business cycle (represented by consumption expenditures) hedging property (if any) of an asset.

The ratio, $vol_t\left[M_{t+1}\right]/E_t\left[M_{t+1}\right]$, is the slope of the mean-variance frontier and reflects the expected volatility of utility from consumption relative to expected utility, which is the conditional coefficient of variation in utility. If conditional volatility rises relative to expected value, investors require a greater risk premium as compensation. The algebraic sign of the relation (slope) between the expected risk premium and its conditional volatility is determined by the conditional correlation ($corr_t$) of the expected risk premium and the SDF. The sign of this slope has the opposite sign of the correlation of the asset return and the ratio of intertemporal marginal utilities in consumption. When the correlation is positive (negative), the asset will have a negative (positive) relation with its risk. Since a decline in consumption in an economy is a component of a business cycle contraction, assuming investors have a concave utility function of consumption, a decline in expected consumption increases marginal utility as the investor's consumption moves left on the utility function. The hedging asset generates positive changes in asset returns when the business cycle is in a contraction and therefore the asset is a business cycle and consumption hedge.

Therefore, if the estimated return/risk coefficient is negative, the asset is a business cycle/consumption hedge. Under these circumstances, it is conceivable that an investor may accept a return less than the risk-free rate as she is willing to pay (give up return) to be exposed to this specific pattern of higher volatility. This asset delivers rising returns when the investor needs it most – during a business cycle downturn. A hedging asset pays more during business cycle contractions and less during expansions and therefore plays the role of insurance, paying to avoid hardship.

The slope of the relation between the return and risk is very rich in insight and structure. The slope of the return and volatility relationship is a function of the volatility of the return, the independent variable. As the volatility changes, it affects the $corr_t$ as correlation equals covariance of the two variables divided by the product of the volatility of the two variables.

3. The data

The company stocks in the rate of return regulated electric, electric and gas distribution (combination), natural gas distribution (sometimes referred to as local distribution companies or "LDC's"), and water utility industries are defined by the AUS Utility Reports©,[3] a national public utilities financial consulting firm and database company established in 1968 (www.aus.com). These include all 77 public utility stocks that are publicly traded in the US. The monthly stock total returns for each public utility begin with the first available monthly data observation for each individual utility company stock in the University of Chicago's Booth School of Business Center for Research in Security Prices (CRSP®) database. The data available from CRSP® begins no earlier than January 1926 for stock data in general and ends for this study at December 2011. CRSP® faculty and staff determine how far back to go to obtain accurate stock price and returns data on every stock. Monthly returns observations range from the earliest available date in CRSP® for each stock to December 2011. The risk free rate is the monthly long-term US Treasury bond yields from Morningstar (2012). The US stock market data is the CRSP® Fama–French monthly returns risk premium based on the CRSP® value-weighted stock market index that includes most stocks on the NYSE, NASDAQ, and AMEX and includes approximately 11,000 stocks. This data is publicly available at no cost from Professor Kenneth French's data website (French, 2012).

Table 1 shows descriptive statistics for the monthly risk premium data for each stock and the data observation range for each stock by industry. The annualized compound annual return premia based on the monthly means range from approximately 5% to 7.5%. Standard deviations are about 10–20 times the mean risk premiums (coefficients of variation).

The greatest number of observations are obtained for each stock as more data history capture a longer period of the fundamental nature of asset pricing volatility clustering patterns, whether the patterns are recent or many years old. The nature of autoregressive conditional heteroskedasticity (ARCH) models is based on the fundamental nature of financial markets volatility clustering patterns.

4. Empirical results

An obvious method to estimate Eq. (1), the relation between risk and return, is the generalized autoregressive conditional heteroskedasticity in mean (GARCH-M) model. The GARCH-M model was developed specifically for estimating asset return and volatility relations. GARCH-M is used since it specifies the conditional expected risk premium as a linear function of its conditional volatility, which is the theoretical specification of Eq. (1). Due to the high likelihood of ARCH effects in asset returns the use of GARCH methods will improve the efficiency of the estimates if ARCH effects should be present in the data. The GARCH-M model adopted herein was initially developed and tested by Engle, Lilein, and Robins (1987) to estimate the relationship between US Treasury and corporate bond risk premiums and their expected volatilities. The GARCH-M model is specified (without an intercept in the return equation) as:

$$R_{i,t+1} - R_{f,t} = \alpha_{i,t}\sigma^2_{i,t+1} + \varepsilon_{i,t+1}, \tag{3}$$

$$\sigma^2_{i,t+1} = \beta_0 + \beta_1\sigma^2_{i,t} + \beta_2\varepsilon^2_{i,t} + \eta_{i,t+1}, \tag{4}$$

where $R_{i,t+1}$ is the expected total return on asset i, $R_{f,t}$ is the risk-free rate of return, $\sigma^2{}_{i,t+1}$ is the conditional or predicted variance of the risk premium for asset i that is conditioned on past information,

[3] AUS, Inc. is a holding company of financial consulting, database and marketing research consulting firms. AUS Consultants is a national public utilities financial consulting firm established in 1968. See www.ausconsultants.com.

Table 1
Descriptive statistics by utility industry.

Electric stock Symbols	Monthly mean RP	Std. dev.	Begin period	
AEE	0.00319	0.04812	January	1953
AVA	0.00380	0.06352	October	1952
BKH	0.00701	0.06850	January	1973
CHG	0.00375	0.04869	December	1945
CMS	0.00250	0.07378	March	1947
CNP	0.00609	0.06924	September	1943
CPK	0.00646	0.05888	January	1973
D	0.00660	0.05021	July	1983
DTE	0.00433	0.05509	January	1926
DUK	0.00374	0.05750	August	1961
ED	0.00566	0.06678	January	1926
EDE	0.00445	0.04824	November	1946
ETR	0.00537	0.06362	June	1949
EXC	0.00477	0.05263	August	1943
LNT	0.00462	0.05212	January	1973
MDU	0.00623	0.06120	October	1948
MGEE	0.00499	0.04921	January	1973
NI	0.00245	0.06306	January	1963
NU	0.00287	0.05700	March	1967
NVE	0.00303	0.07535	December	1962
OGE	0.00562	0.05579	October	1950
PCG	0.00508	0.06478	January	1926
PEG	0.00486	0.05421	April	1948
POM	0.00406	0.05045	January	1947
PPL	0.00474	0.05408	January	1946
SCG	0.00589	0.05684	December	1946
SRE	0.00510	0.06067	July	1998
TE	0.00320	0.06615	August	1962
TEG	0.00476	0.04736	June	1953
UGI	0.00527	0.06988	July	1929
UIL	0.00470	0.06512	January	1972
UNS	0.00020	0.08707	June	1969
UTL	0.00479	0.05157	April	1985
VVC	0.00544	0.05821	January	1971
WEC	0.00562	0.04747	December	1947
WR	0.00439	0.05186	August	1949
XEL	0.00513	0.05463	March	1949
Mean	0.00461	0.05889		

Electric stock symbols	Mean RP	Std. dev.	Begin period		Gas stock symbols	Mean RP	Std. dev.	Begin period	
ALE	0.00541	0.53263	April	1950	AGL	0.00592	0.05085	January	1973
AEP	0.00429	0.05421	October	1949	ATO	0.00608	0.06014	January	1984
CNL	0.00707	0.05232	December	1981	DGAS	0.00460	0.04618	May	1981
EIX	0.00559	0.06519	June	1926	EGN	0.00709	0.06478	January	1958
EE	0.00799	0.06749	March	1996	EQT	0.00708	0.06400	July	1950
FE	0.00450	0.05336	October	1946	EGAS	0.00712	0.07676	February	1986
GXP	0.00406	0.05268	October	1950	LG	0.00382	0.08632	January	1926
HE	0.00327	0.05492	November	1964	NFG	0.00562	0.05605	August	1955
IDA	0.00451	0.05363	February	1944	NJR	0.00636	0.06099	January	1973
NEE	0.00671	0.05890	March	1950	NWN	0.00491	0.05826	January	1973
OTTR	0.00449	0.06278	January	1973	OKE	0.00761	0.07400	June	1954
PNM	0.00160	0.07506	October	1972	PNY	0.00630	0.05847	March	1970
PNW	0.00244	0.08241	September	1961	RGCO	0.00490	0.04263	March	1994
SO	0.00809	0.11648	November	1929	SJI	0.00544	0.05631	October	1958
					STR	0.00733	0.07784	February	1961
Mean	0.00500	0.09872			SWX	0.00396	0.06799	January	1973
					WGL	0.00513	0.05847	Feb	1940
					WMB	0.01230	0.13432	Aug	1962
					Mean	0.00620	0.06635		

Table 1 (*Continued*)

Water stock symbols	Mean RP	Std. dev.	Begin period	
ARTNA	0.00620	0.05574	June	1996
AWR	0.00527	0.06154	January	1973
CTWS	0.00488	0.05391	July	1975
CWT	0.00550	0.05655	January	1973
MSEX	0.00558	0.05235	January	1973
SJW	0.00620	0.06565	March	1972
WTR	0.01006	0.07025	August	1971
YORW	0.00912	0.07119	February	2001
Mean	0.00660	0.06090		

The mean RP is the mean of the monthly risk premium returns data for each stock used to estimate the GCAPM with the GARCH models. The mean is calculated from the beginning period and ending in December 2011.

and, $\varepsilon_{i,t}$ and $\eta_{i,t+1}$ are the error terms for the mean and volatility equations, respectively. The parameter, α_i, or "alpha" is the return-to-risk coefficient as specified in Eq. (1) as:

$$\alpha_{i,t} = -\frac{vol_t\left[M_{t+1}\right]}{E_t\left[M_{t+1}\right]} corr_t\left[M_{t+1}, R_{i,t+1}\right] \tag{5}$$

This parameter represents the relation between risk premium and volatility and its algebraic sign indicates whether the asset is a business cycle hedge. The parameter itself is a function of the independent variable, the conditional variance, and is time varying as the conditional standard deviation of the return is included in the conditional correlation, $corr_t[M_{t+1}, R_{i,t+1}]$, of the stochastic discount factor and the return. The theoretical model, Eq. (1), is specified without an intercept, therefore it is estimated the model without the intercept, but robustness tests are done to evaluate the model with intercepts. Intuitively the intercept should be zero. Otherwise would indicate evidence of an excess return premium or payment (if negative) that is not associated with volatility. The "no-intercept" specification has been found to be robust in producing consistently positive and significant relationships between common stock risk premiums and risk in GARCH-M models. These findings are discussed in Lanne and Saikkonen (2006) and Lanne and Luoto (2007).

Table 2a–d shows the GARCH model estimates for all publicly traded US electric, electric and gas, gas, and water company stocks as well as the US stock market for comparison. The list of utility stocks and their categorization in each industry are defined by AUS Utility Reports® (2012) that is available upon request. The AUS Utility Reports® tracks all US publicly traded electric, gas and water utility stocks. The results show that the model fits almost all of the public utility stock returns and the US stock market returns well as almost all estimated parameters are significant, generally at p-values of 0.01 or less, except for water company stocks that have some p values that are generally less than 0.10, especially for the alpha slope that is used to estimate the cost of capital. Generally, water utility stocks have substantially less stock returns data for modeling.

All but seven of the Lagrange Multiplier ARCH statistics (LM-ARCH), a test for ARCH effects in the residuals, are not significant, indicating that the GARCH-M model is effective at removing most of the ARCH effects from the regression residuals. The sum of the slopes in the variance equation ($\beta_1 + \beta_2$) is close to one for all stocks and the stock market. A value of one or greater indicates the presence of an integrated GARCH process (IGARCH) (Engle & Bollerslev, 1986). Shocks in returns that have an IGARCH process have a permanent effect on the conditional variance and therefore the asset's value.

The slopes on conditional variance, the alphas, are positive and significant for most of the utility stocks (all but seven) and the US stock market. Those that are not significant have alpha estimates that are in a reasonable range of values. These results are evidence that there is a long-term positive relation between risk and return and that none of the assets in this investigation are business cycle consumption hedges as none are negative in algebraic sign. Since utility sales, especially electricity usage and therefore cash flows are generally highly correlated with GDP, positive values were expected for the alpha estimates as utility stocks are not expected to be a business cycle hedge. Fig. 1 from the US Energy Information Administration's 2013 Annual Energy Outlook shows the close association between GDP and electricity use growth rates. As the energy intensity of GDP continues to decline

Table 2a
Electric utility stocks and US stock market GARCH-M estimations of risk–return relations.

Asset	Mean equation	Variance equation			LM-ARCH
	$\sigma^2_{i,t+1}$	Constant	$\sigma^2_{i,t}$	$\varepsilon^2_{i,t}$	
US Stocks (CRSP)	2.869***	0.000***	0.841***	0.128***	0.56
Electric utility stock symbols					
ALE	2.072***	0.000**	0.851***	0.094***	0.72
AEP	2.197***	0.000**	0.789***	0.112***	1.12
CNL	2.968***	0.000**	0.685***	0.180***	0.71
EIX	1.536***	0.000***	0.873***	0.108***	1.32
EE	1.853***	0.000	0.882***	0.090	1.14
FE	2.161***	0.000**	0.755***	0.158***	0.79
GXP	2.289***	0.000***	0.812***	0.149***	0.62
HE	1.634**	0.000***	0.786***	0.144***	0.88
IDA	1.981***	0.000**	0.851***	0.097***	0.93
NEE	2.166***	0.000**	0.871***	0.082***	0.74
OTTR	1.378**	0.001***	0.489***	0.248***	0.70
PNM	0.984	0.000***	0.834***	0.116***	0.52
PNW	1.142**	0.000***	0.639***	0.260***	2.03**
SO	0.944***	0.000**	0.894***	0.103***	0.57

The results are for all publicly traded electric utility stocks. The results are the GARCH-M regressions for the monthly risk premium on the asset ($R_{i,t+1} - R_{f,t}$) with conditional variance in the mean equation. The estimated model is:
$R_{i,t+1} - R_{f,t} = \alpha_{i,t}\sigma^2_{i,t+1} + \varepsilon_{i,t+1}$, where $\alpha_{i,t} = -(vol_t[M_{t+1}]/E_t[M_{t+1}])corr_t[M_{t+1}, R_{i,t+1}]$
$\sigma^2_{i,t+1} = \beta_0 + \beta_1\sigma^2_{i,t} + \beta_2\varepsilon^2_{i,t} + \eta_{i,t+1}$
The monthly data ranges from the earliest returns data available for each asset in the CRSP database (earliest returns data available is January 1926) and ends at December 2011. The return variable for US Stocks is the monthly risk premium on the value weighted CRSP stock returns from the Fama–French CRSP database. Engle's Lagrange Multiplier ARCH statistic (LM-ARCH) is a test for ARCH effects in the residuals for 12 lags. It is χ^2 distributed with 12 degrees of freedom where the degrees of freedom are driven by the number of lags tested. Standard errors are in parentheses. ***, **, * denote p-values equal to less than 0.01, 0.05, and 0.10 levels, respectively, with two-tailed tests for regression coefficients and one-tailed test for LM-ARCH.

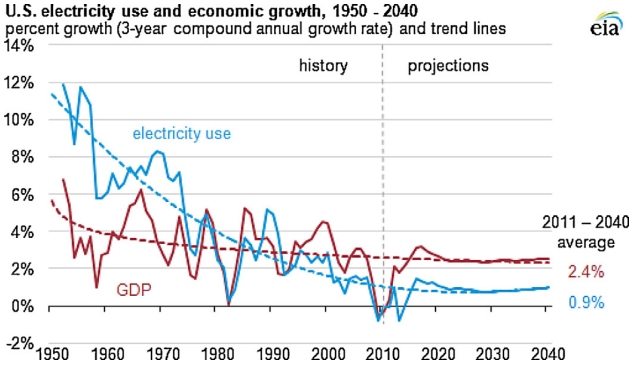

Fig. 1. Relation between GDP and electricity use.

due to the adoption of energy efficiency technologies, the growth rates of GDP and electricity use in recent years have started to moderately decouple and is expected to continue to do so.

Fig. 2 plots the average of the rolling estimated alpha for each utility industry group for each month from January 2006 to December 2011 to review the stability and trends in the alphas. Although not shown for each stock, the alphas range in value from about 0.5 to almost 3.0 and are relatively stable across all stocks used in obtaining the averages. They do not become negative (switch to temporary business cycle hedges) at any point during the study period. Note that all of the stocks' alphas in all of the industries are quite similar in pattern and stability. All of them drop as the US business cycle enters

Table 2b
Electric and gas utility stocks GARCH-M estimations of risk–return relations.

Asset	Mean equation	Variance equation			LM-ARCH
	$\sigma^2_{i,t+1}$	Constant	$\sigma^2_{i,t}$	$\varepsilon^2_{i,t}$	
Electric and gas utility stock symbols					
AEE	1.507**	0.000**	0.823***	0.106***	1.81**
AVA	0.980*	0.000***	0.863***	0.150***	0.10
BKL	1.289*	0.000**	0.838***	0.097***	0.71
CHG	2.154***	0.000***	0.823***	0.117***	0.66
CMS	1.469***	0.000***	0.817***	0.180***	1.07
CNP	1.976***	0.000***	0.732***	0.172***	1.99**
CPK	1.896**	0.000	0.961***	0.025**	0.52
D	2.406**	0.000*	0.806***	0.121***	1.08
DTE	2.201***	0.000***	0.852***	0.128***	1.75**
DUK	1.901***	0.000**	0.809***	0.137***	0.31
ED	1.151***	0.000***	0.854***	0.138***	0.49
EDE	2.248***	0.000**	0.806***	0.068***	0.98
ETR	2.273***	0.000***	0.838***	0.124***	0.99
EXC	1.975***	0.000***	0.874***	0.090***	1.05
LNT	2.302**	0.000**	0.775***	0.135***	0.38
MDU	1.642***	0.000***	0.811***	0.115***	1.12
MGEE	2.281**	0.000**	0.765***	0.057**	0.74
NI	1.604**	0.000**	0.818***	0.132***	0.99
NU	1.283*	0.000***	0.838***	0.123***	2.10**
NVE	1.228**	0.000***	0.903***	0.079***	0.35
OGE	2.266***	0.000***	0.777***	0.128***	0.67
PCG	1.836***	0.000***	0.860***	0.118***	0.84
PEG	2.304***	0.000**	0.888***	0.095***	0.72
POM	2.221***	0.000***	0.863***	0.079***	0.40
PPL	1.809***	0.000***	0.829***	0.113***	1.19
SCG	2.401***	0.000***	0.761***	0.150***	0.53
SRE	1.906	0.000	0.806***	0.132*	0.41
TE	1.418**	0.000***	0.823***	0.136***	0.47
TEG	2.856***	0.000*	0.832***	0.086***	0.21
UGI	1.400***	0.000***	0.923***	0.058***	0.37
UIL	1.665**	0.000***	0.764***	0.182***	0.94
UNS	0.764	0.000***	0.864***	0.100***	0.72
UTL	0.822	0.000**	0.715***	0.128**	0.56
VVC	1.896**	0.000***	0.869***	0.081***	0.62
WEC	2.758***	0.000*	0.844***	0.056**	1.15
WR	2.236***	0.000***	0.886***	0.072***	2.04**
XEL	2.633***	0.000***	0.756***	0.167***	0.76

See Table 2a notes.

the great recession from the December 2007 peak to the June 2009 trough and the only recession during the study period (National Bureau of Economic Research, 2015). An increasing (decreasing) alpha indicates that the price of risk has increased (decreased). These alphas are Sharpe ratios (Sharpe, 1994), the ratio of the expected risk premium to conditional volatility. Higher alphas should not be interpreted as higher risk and therefore higher expected rates of return on common equity. A higher price of risk can be associated with lower volatility and lower rather than higher costs of common equity. Alpha is inversely related to the volatility in return in the theoretical development of the model. Therefore a higher volatility is combined with a lower alpha so the overall impact of a higher alpha on the expected rate of return is not clear. It is possible that the drop in alphas approaching and during the recession may be due to investors' flight to quality to assets with lower risk and lower but acceptable return.

Fig. 3 shows the GCAPM cost of common equity results and their trends for each of the public utility industries. The alpha coefficients and predicted monthly volatilities used to estimate the cost of common equity for each public utility stock are estimated using a series of estimated GARCH models for each utility as discussed above. Consistent with Ahern et al. (2011), the *ex ante* common equity risk

Table 2c
Gas (local distribution companies or LDC) utility stocks GARCH-M estimations of risk–return relations.

Asset	Mean equation	Variance equation			LM-ARCH
	$\sigma^2_{i,t+1}$	Constant	$\sigma^2_{i,t}$	$\varepsilon^2_{i,t}$	
Gas utility stock symbols					
AGL	2.787***	0.000**	0.803***	0.096***	0.57
ATO	2.143***	0.003***	−0.081	0.261***	0.58
DGAS	2.195*	0.003*	−0.360	0.051	0.23
EGN	2.215***	0.000***	0.766***	0.171***	0.76
EQT	1.814***	0.000***	0.834***	0.131***	0.46
EGAS	1.150	0.000***	0.732***	0.197***	0.36
LG	0.855**	0.000***	0.896***	0.097***	0.66
NFG	1.596***	0.000***	0.901***	0.079***	0.86
NJR	1.944**	0.002***	0.351**	0.276***	0.11
NWN	1.604**	0.000**	0.796***	0.117***	0.92
OKE	1.569***	0.000***	0.810***	0.139***	0.80
PNY	2.287***	0.000***	0.837***	0.106***	0.98
RGCO	2.153***	0.000**	0.962***	-0.059***	0.94
SJI	1.989***	0.000***	0.755***	0.138***	0.94
STR	1.381**	0.001**	0.866***	0.036***	0.11
SWX	1.177*	0.000***	0.823***	0.087***	0.34
WGL	1.092**	0.000***	0.831***	0.170***	0.25
WMB	0.824**	0.000***	0.813***	0.131***	2.68***

See Table 2a notes.

Table 2d
Water utility stocks GARCH-M estimations of risk–return relations.

Asset	Mean equation	Variance equation			LM-ARCH
	$\sigma^2_{i,t+1}$	Constant	$\sigma^2_{i,t}$	$\varepsilon^2_{i,t}$	
Water utility stock symbols					
ARTNA	1.879	0.000**	0.838***	0.094**	0.93
AWR	1.389*	0.000*	0.873***	0.047	0.74
CTWS	1.636*	0.001**	0.529***	0.157***	0.44
CWT	1.706**	0.000**	0.793***	0.111***	0.86
MSEX	1.880**	0.000**	0.805***	0.087**	0.94
SJW	1.273*	0.000**	0.911***	0.043***	0.68
WTR	2.110***	0.000***	0.857***	0.079***	1.15
YORW	1.819	0.000	0.852***	0.029	0.63

See Table 2a notes.

premiums were calculated using the average of predicted volatilities (variances) over the entire time period for which CRSP data were available for each utility and then multiplied by α_i's. The GCAPM cost of common equity for each utility was estimated by adding the average predicted utility's common equity risk premium for each month starting in January 2006 through December 2011 to the predicted risk free rate, which is the consensus forecast of the 30 year US Treasury Bonds yield for the next 6 quarters from Blue Chip Financial Forecasts. Fig. 3 shows that the predicted cost of common equity capital results generated by the GCAPM was stable for all utility industries except for the recession and associated global financial market crisis of 2008 and 2009. During that period, predicted GCAPM costs of capital declined. This may have been due to investors' flight to quality to less risk and an acceptable lower return. The GCAPM predicted costs of capital for all of the utility industry groups follow a similar trend except for the water utilities, which had a similar path but much more volatility. Contrasting with the CAPM that uses only one estimated parameter, beta, to establish the uniqueness among each stock, the GCAPM uses two estimated parameters to predict the expected returns, the alpha and the specific stock predicted conditional volatility and three more parameters in the variance prediction model for predicting volatility. Since it is investors' behaviors that cause the level of volatility and due to the fact that the GCAPM uses predicted volatilities to predict the cost of capital, the GCAPM is more

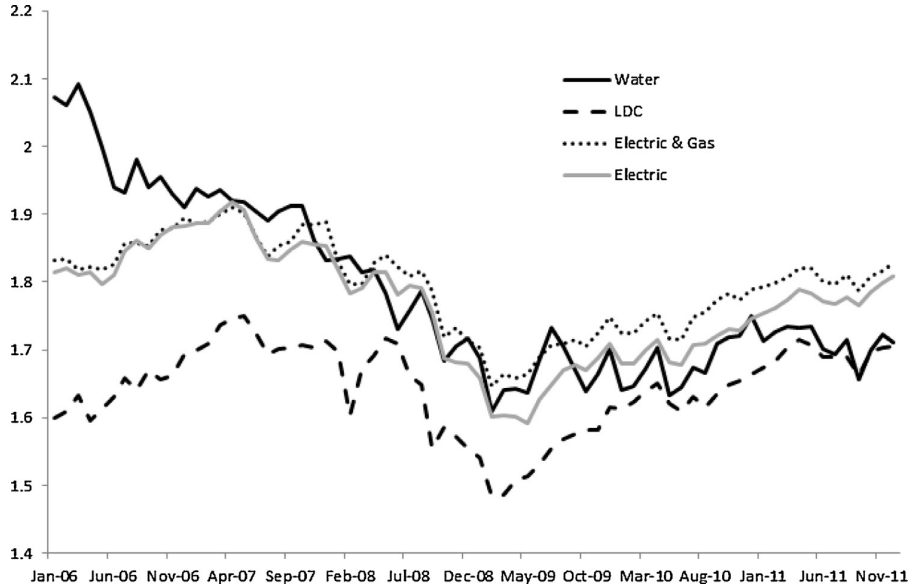

Fig. 2. Alphas (slope on $\sigma^2_{i,t+1}$) from 1/2006 to 12/2011 for electric, electric and gas, gas (local distribution companies or LDC) and water utility stocks. The stocks in each industry are those as defined by AUS Utility Reports® (AUS, 2012). See Table 1 for individual stocks.

intuitive appealing than the CAPM. The CAPM is not a forward-looking model and beta is not a pure measure of risk. It is a mixture of correlation and risk.[4]

Fig. 4 shows the plots the averages of the costs of common equity for each stock estimated with the GCAPM and the CAPM for each of the utility industries. The plots consistently show that the GCAPM generates a substantially higher cost of capital than the CAPM. This may be due to the fact that the GCAPM prices the risk which investors actually face whereas the CAPM prices systematic risk, the only risk that the investor would be exposed if they had a perfectly diversified portfolio, which does not exist in practice. Based on the well-established observation of low R^2's of CAPM regressions, a substantial majority of a stock return's volatility is not explained by the CAPM (Fama & French, 2004) and therefore not priced by the CAPM.

The only recession that occurred during the period shown on the graphs is the great recession that started with the peak at December 2007 and the trough at June 2009 (National Bureau of Economic Research, 2015) as mentioned above. As investors anticipated the future of the business cycle, both the alphas and the costs of common equity peaked as shown in Figs. 2–4 then declined and reached the trough a few months before the business cycle. Note (Fig. 4) that the GCAPM costs of capital peaks and troughs precede those of the CAPM by somewhat less than a year. This suggests that the GCAPM is a forward looking model more than the CAPM as it leads CAPM peaks and troughs in the cost of capital and is able to anticipate CAPM generated trends in the cost of capital. This evidence is not meant to conclude that the CAPM should be replaced by the GCAPM. Until one model un-equivocally produces results deemed to be closer to the true cost of common equity, no information should be ignored for consideration in estimating the cost of common equity. This investigation suggests that the GCAPM

[4] The CAPM beta is defined as $\beta_i = \rho_{i,m}\,\sigma_i\,\sigma_m/\sigma_m{}^2$ where $\rho_{i,m}$ is the correlation between the returns on stock i and the market, and the σ's are the standard deviations on stock i and market returns (m). Since the expression can be simplified to $\beta_i = \rho_{i,m}$ (σ_i/σ_m), only the ratio of standard deviation of the stock to the market return represents volatility and therefore risk. So the CAPM beta is a mixture of correlation and risk. A high ratio of volatility of a stock's return relative to the market combined with a low correlation can result in a low beta, reflecting low risk.

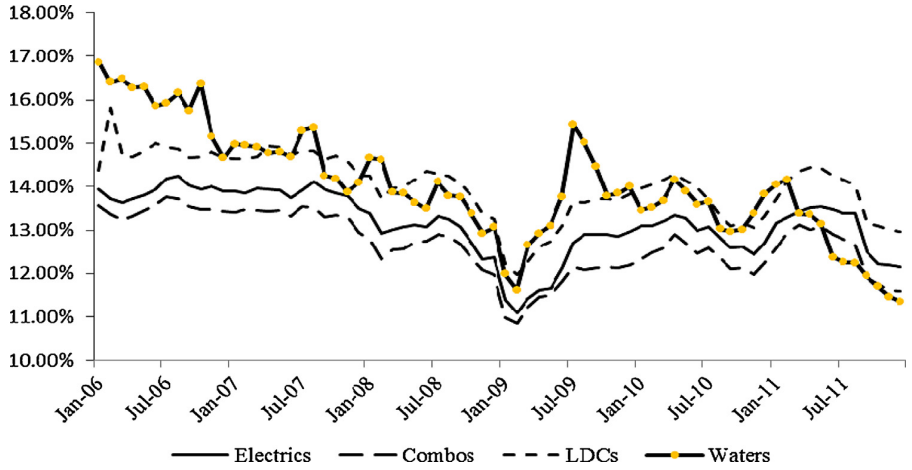

Fig. 3. GCAPM cost of common equity estimates for US publicly traded public utilities.

model contributes additional information that should be considered in the process for estimating the costs of common equity. Hopefully, additional information and technologies will diffuse into the process rather than almost sole reliance on the CAPM.

Michelfelder, Ahern, D'Ascendis, and Hanley (2013) show the trends in the cost of common equity estimates by each asset model for each industry. They perform a comparison of the results of the two typical used asset pricing models, the DCF and CAPM with the GCAPM. The GCAPM generally produces higher predicted ROE's than either the DCF or CAPM. Since the GCAPM prices the actual risk faced by the investor rather than the lower, unrealistic ideal (perfectly diversified portfolio) level assumed by the CAPM, this result is not surprising. Public utilities are not investing the level of capital investment necessary to maintain the current level of service, much lesser than the capital needed for growth in their service areas. Regulated allowed rates of return on common equity lower than the costs of common equity may be the cause of public utilities lack of investment that is expected to generate deterioration of service and inhibit economic growth if it does not change soon. For example, the Brattle Group, Fox-Penner, Chupka, and Earle (2008) estimates that the US electric power industry will have to invest $1.5 trillion to $2.0 trillion by 2030 to maintain the current level of reliability. Brennan (2008) shows that electricity transmission capacity peaked in 1982 and that both capacity and investment has been on a long-term declining trend. According to the US EPA's 2011 Drinking Water Infrastructure Needs Survey and Assessment (EPA, 2011), by 2030 the industry will require $384.2 billion in 2011 dollars in system upgrades to maintain safe drinking water service. Such a huge level of investment will cause water rates and bills to rise to levels similar to electricity bills.

5. Robustness tests

Robustness tests are performed with the inclusion of an intercept, differing specifications of conditional volatility, and the use of the Fama–French risk-free rate for generating risk premia. The estimation results are poor with the inclusion of an intercept therefore the model is well specified. All of the model estimations are robust to changes in specifications of the conditional volatility using standard deviation and the natural log of variance as other measures. Similarly, the estimations are robust to choice of risk-free rate.

One concern is the intertemporal stability of the alphas. The alpha in the model is a function of conditional variance and is time varying as the conditional standard deviation of the return is included in the conditional correlation of the stochastic discount factor and the return. The averages of the alpha estimates are plotted over time for each utility to review stability of the hedging property of the assets

Fig. 4. Plots of GCAPM and CAPM costs of common equity estimates for electric, electric and gas, gas, and water utility stocks.

over time. Fig. 2, as already discussed, plots the updated monthly alphas over 72 months (January 2006 to December 2011). The alpha values are highly stable and never get close to zero and, generally, there are no discontinuous spikes in alpha in either direction for each utility stock.

6. Conclusion

Based on the results of this empirical study, Ahern et al. (2011), Michelfelder et al. (2013), and Michelfelder and Pilotte (2011), a literature is beginning to emerge that supports the GCAPM as additional evidence for estimating the cost of common equity capital. This study found that the model fits the data well across all US publicly traded utility stocks and the US stock market as a single portfolio. The estimates are consistent, stable, and show that utility stocks are not a business cycle hedge. There would be a stability concern if some utility stocks were hedges and others were not or if stocks temporarily switched to hedging assets.

The GCAPM has been successfully empirically tested for public utilities and the US stock market in this study and preliminarily in Ahern et al. (2011), and for US Treasury Bills and Bonds in Michelfelder and Pilotte (2011). However, a comprehensive study across a spectrum of common equity assets, at least for non-public-utility individual stocks, is needed as an important next step to consider the widespread adoption of the GCAPM as a method to estimate the cost of common equity capital for stocks in general. This paper is a component of a research program toward that goal. The motivation was to empirically test and discuss the results in sufficient technical detail to assess the relevance of the model for public utility cost of common equity capital estimation and the cost of capital for any firm. Secondly, the motivation was to build a platform for further research of the GCAPM for estimating the rate of return for any stock, as stated above. Finally, the GCAPM was tested as a potential cost of capital model to help update and improve on the cost of capital technology by providing additional information. This paper does not suggest that the GCAPM supplant any other cost of capital pricing model. It does recommend that it be considered as an additional model for developing the cost of capital estimates.

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ORIGINAL ARTICLE

New approach to estimating the cost of common equity capital for public utilities

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Abstract The regulatory process for setting public utilities' allowed rate of return on common equity has generally used the Gordon DCF, CAPM and Risk Premium specifications to estimate the cost of common equity. Despite the widely known problems with these models, there has been little movement to adopt more recently developed asset pricing models to provide additional evidence for estimating the cost of capital. This paper presents, validates empirically and applies a general yet simple consumption-based asset pricing specification to model the risk-return relationship for stocks and estimate the cost of common equity for public utilities. The model is not necessarily superior to other models in its practical results, yet these results do indicate that it should be used to provide additional estimates of the cost of common equity. Additionally, the model raises doubts as to whether assets such as utility stocks are a consumption (business cycle) hedge.

Keywords Public utilities · Cost of capital · GARCH · Consumption asset pricing model

JEL Classification G12 · L94 · L95

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1 Introduction

Following electricity deregulation with the National Energy Policy Act of 1992, the estimation of the cost of common equity capital remains a critical component of the utility rate-of-return regulatory process. Since the cost of common equity is not observable in capital markets, it must be inferred from asset pricing models. The models that are commonly applied in regulatory proceedings are the Gordon (1974) Discounted Cash Flow (DCF), the Capital Asset Pricing (CAPM) and Risk Premium Models. There are other tools used to estimate the cost of common equity such as comparable earnings or earnings-to-price ratios, but they are not asset pricing models. The empirical literature on the CAPM is vast {Fama and French (2004)} and the CAPM is used by a number of US regulatory jurisdictions. The DCF model has not been empirically tested to the same extent as the CAPM, yet it is considered by many US regulatory jurisdictions.

The purpose of this paper is to present, test empirically and apply a recently developed general consumption-based asset pricing model that estimates the risk-return relationship directly from asset pricing data and, when estimated with recently developed time series methods, produces a prediction of the equity risk premium that is driven by its predicted volatility. The predicted risk premium is then added to a risk-free rate of return to provide an estimate of the cost of common equity. We predict two forms of the equity risk premium with the model, the risk premium net of the risk-free rate and the equity-to-debt risk premium (equity risk premium net of the relevant bond yield for the company's stock). Either can be applied to predict the common equity cost of capital for a public utility. Although the model is tested and applied to public utilities for rate of return regulation, it can be used to estimate the cost of capital for any stock. Section 2 reviews the asset pricing models typically used in public utility rate cases and the generalized consumption asset pricing model we propose to estimate the cost of common equity. Section 3 discusses the data and the empirical testing of the consumption asset pricing model. Section 4 reviews the application of the model and compares it with the DCF and CAPM results. Section 5 is the conclusion.

2 DCF, CAPM and consumption asset pricing model

2.1 DCF and CAPM approaches

The standard DCF model frequently used in estimative the cost rate of common equity in regulatory proceedings is defined by the following equation:

$$k = D_0 (1 + g) / P_0 + g,$$

where k is the expected return on common equity; D_0 is the current dividend per share; g is the expected dividend per share growth rate; and P_0 is the current market price.

The DCF was developed by Gordon (1974) specifically for regulatory purposes. Underlying the DCF model is the theory that the present value of an expected future stream of net cash flows during the investment holding period can be determined

by discounting those cash flows at the cost of capital, or the investors' capitalization rate. DCF theory indicates that an investor buys a stock for an expected total return rate which is derived from cash flows received in the form of dividends plus appreciation in market price (the expected growth rate) over the investment holding period. Mathematically, the expected dividend yield ($D_0(1+g)/P_0$) on market price plus an expected growth rate equals the capitalization rate, i.e., the expected return on common equity.

The standard DCF contains several restrictive assumptions, the most contentious of which during utility cost of capital proceedings is typically that dividends per share (DPS), book value per share (BVPS), earnings per share (EPS) as well as market price grow at the same rate in perpetuity. There is also considerable contention over the proper proxy for g, prospective or historical growth in DPS, BVPS, EPS and market price and over what time period. In addition, although the standard DCF described above is a single stage annual growth model, there is considerable discussion over the use of multiple stage growth models during regulatory proceedings. Some analysts use the discrete version and others use the continuous version of the DCF model. Solving these models for k, the cost of common equity, results in differing equations to solve for k. The equation above is from the discrete version. The continuous version uses the current dividend yield and is not adjusted by g, which results in a lower estimate for k. Because of these and other restrictive assumptions that require numerous subjective judgments in application, it is often difficult for regulatory commissions to reconcile the frequently large disparities in rates of return on common equity recommended by various parties in a public utility rate case.

The CAPM model is defined by the following equation:

$$k = R_f + \beta \left(R_m - R_f\right),$$

where k is the expected return on common equity; R_f is the expected risk-free rate of return; β is the expected beta; and R_m is the expected market return.

CAPM theory defines risk as the co-variability of a security's returns with the market's returns or β, also known as systematic or market risk, with the market beta being defined as 1.0. Because CAPM theory assumes that all investors hold perfectly diversified portfolios, they are presumed to be exposed only to systematic risk and the market (according to the model) will not reward them a risk premium for unsystematic or non-market risk. In other words, the CAPM presumes that investors require compensation only for systematic or market risks which are due to macroeconomic and other events that affect the returns on all assets. Mathematically, the CAPM is applied by adding a forward-looking risk-free rate of return to an expected market equity risk premium adjusted proportionately by the expected beta to reflect the systematic risk.

As with the DCF, there is considerable contention during regulatory cost of capital proceedings as to the proper proxies for all components of the CAPM: the R_f, the R_m, as well as β. In addition, the CAPM assumption that the market will only reward investors for systematic or market risk is extremely restrictive when estimating the expected return on common equity for a single asset such as a single jurisdictional regulated operating utility. Additionally, this assumption requires that the investor have a perfectly diversified portfolio, that is, one with no unsystematic risk. Since

this assumption is not applicable, estimating the cost of common equity capital for a single utility's common equity undoubtedly will not reflect the risk actually faced by the imperfectly diversified investor.

As will be discussed in the next section, our application of the risk premium approach, the consumption asset pricing model and GARCH[1] rest on minimal assumptions and restrictions and therefore requires considerably less judgment in its application.

2.2 Risk premium approach, consumption asset pricing models, and GARCH

A widely used model to estimate the cost of common equity capital for public utilities is the risk premium approach. This approach often estimates the expected rate of return as the long-term historic mean of the realized risk premium above an historic yield plus the current yield of the relevant bond applicable to a specific utility or peer group of utilities. Litigants in public utility rate proceedings debate the choice of inputs to estimate the risk premium as well as how far back to reach into history to collect data for calculating an average that is representative of a forward-looking premium.

It is surprising that, as popular as the risk premium method is in public utility rate cases, the intuitively appealing general consumption-based asset pricing model, with its minimal assumptions and strong theoretical foundation, has not been applied to estimate the cost of common equity capital for public utilities. The model provides projections of the conditional expected risk premium on an asset based on its relation to its predicted conditional volatility. This model generalizes the well known special case asset pricing models such as the Merton (1973) intertemporal capital asset pricing model, Campbell (1993) intertemporal asset pricing model, and the habit-persistence model of Campbell and Cochrane (1999), which are special cases of the general model. The relation of the model to their specialized cases can be found in Cochrane (2006) and Cochrane (2007). The approach of consumption asset pricing models is to make investment decisions that maximize investors' utility from the consumption that they ultimately desire, not returns.

Even if the model is not used to project directly the expected risk premium, it can, at a minimum, be used to verify that the risk premia data chosen for estimating the cost of capital is empirically validated by fitting the model well. The model can be used to predict the equity risk premia net of the risk-free rate (equity risk premium) or to predict the equity-to-debt risk premium for a firm. We perform both of these empirical tests in this paper. The general consumption-based asset pricing model developed in Michelfelder and Pilotte (2011) and based on Cochrane (2004) provides the relationship of the ex ante risk premium to an asset's own volatility in return:

$$E_t[R_{i,t+1}] - R_{f,t} = -\frac{vol_t[M_{t+1}]}{E_t\left[M_{t+1}\right]} vol_t[R_{i,t+1}] corr_t[M_{t+1}, R_{i,t+1}]. \quad (1)$$

[1] GARCH refers to the generalized autoregressive conditional heteroskedasticity regression model which is discussed below.

where vol_t is the conditional volatility, $corr_t$ is the conditional correlation, and M_{t+1} is the stochastic discount factor (SDF).

The SDF is the intertemporal marginal rate of substitution in consumption, or, $M_{t+1} = \beta \frac{U_{c,t+1}}{U_{c,t}}$, where the U_c's are the marginal utilities of consumption in the next period, $t+1$, and the current period, t, and β is the discount factor for period t to $t+1$. Equation 1 shows that the algebraic sign of the relation between the expected risk premium and the conditional volatility of an asset's risk premium is determined by the correlation between the asset's return and the SDF. That is, the direction of the relation between the asset return and the ratio of intertemporal marginal utilities in consumption inversely determines the relation between the expected risk premium and conditional volatility. When the correlation is equal to negative one, the asset's conditional expected risk premium is perfectly positively correlated with its conditional volatility. A positive relation between the conditionally expected risk premium and volatility obtains when $-1 < corr_t < 0$. A negative relation obtains when $0 < corr_t < 1$. For an asset that represents a perfect hedge against shocks to the marginal utility of consumption, with $corr_t = 1$, there will be a perfect negative correlation between the conditionally expected risk premium and its volatility.[2] Therefore, estimates of the relation between the first two conditional moments of a public utility stock's returns provide a direct test of the effectiveness of a public utility stock, or any asset, as a consumption hedging asset. In Eq. 1, $vol_t[M_{t+1}]/E_t[M_{t+1}]$ is the slope of the mean-variance frontier. If this slope changes over time, the estimated relation between the stock's risk and return will vary over time. This model can also be viewed simplistically as the projected expected risk premium as a function of its own projected risk, given information available at time t.

Note that the model allows for the expected risk premium to be negative if the asset hedges shocks to the marginal utility of consumption. Investors are willing to accept an expected rate of return lower than the risk-free rate of return if the pattern of volatility is such that returns are expected to rise with expected reductions in consumption. Simply, investors are willing to *pay* a premium for a higher level of returns volatility that has the desired pattern of returns. These desired returns patterns have a tendency to offset drops in consumption. Therefore, this model shows that investors may not be averse to volatility, but rather to the timing of expected changes in returns.

Summarizing, several conclusions can be drawn from the general model of asset pricing. First, the sign of the relation between a stock's risk premium and conditional volatility depends on the extent to which the stock serves as an intertemporal hedge against shocks to the marginal utility of consumption. Second, the relation between stock risk and return may be time-varying depending on changes in the slope of the mean-variance frontier. Third, hedging assets have desired patterns of volatility that result in expected rates of return that are less than the risk-free rate. We do not expect

[2] A hedging asset is one that has a positive increase in returns that is coincident with a positive shock in the ratio of intertemporal marginal utilities of consumption. Note that if we assume a concave utility function in consumption, as consumption declines, the marginal utility of consumption rises relative to last period marginal utility. If we think of a decline in consumption as a contraction in the business cycle, the hedging asset delivers positive changes in returns when the business cycle is moving into a contraction, and therefore the asset is a business cycle hedge.

that public utility stocks serve as a hedging asset as they are not viewed as defensive stocks (they do not rise in value during downturns in the stock market) due to asymmetric regulation and returns as discussed in detail in Kolbe and Tye (1990). Under asymmetric regulation, utility regulators have a tendency to allow the return on equity to fall below the allowed return during downturns in the business cycle and to reduce the return should it rise above the allowed return during expansions. Therefore we expect that the parameter estimates of the return-risk relationship to be positive as utility stocks are hypothesized to not be hedges.

We use the GARCH model to estimate the general asset pricing model since the GARCH model accommodates ARCH effects that improve the efficiency of the parameter estimates. It also provides a volatility forecasting model for the conditional volatility of the asset's risk premium. The conditional volatility projection is used, in turn to predict the expected risk premium. We also use the GARCH-in-Mean model (GARCH-M) since it specifies that the conditional expected risk premium is a linear function of its conditional volatility. There is a vast body of literature that estimates asset pricing models with the GARCH and GARCH-M methods and therefore we will not attempt to summarize them here.

The GARCH-M model was initially developed and tested by Engle et al. (1987) to estimate the relationship between US Treasury and corporate bond risk premia and their expected volatilities. The GARCH-M model is specified as:

$$R_{t+1} - R_{f,t+1} = \alpha\sigma_{t+1}^2 + \varepsilon_{t+1} \tag{2}$$

$$\sigma_{t+1}^2 = \beta_0 + \beta_1\sigma_t^2 + \beta_2\varepsilon_t^2 + \eta_{t+1} \tag{3}$$

$$\varepsilon_t \,|\psi_{t-1} \sim T(0, \sigma_t^2) \tag{4}$$

where R_{t+1} is the expected total return on the public utility stock index or individual utility stock; $R_{f,t+1}$ is the risk-free rate of return or the yield on an index of public utility bonds of a specified bond rating for the equity-to-debt premium; σ_{t+1}^2 is the conditional or predicted variance of the risk premium that is conditioned on past information (ψ_{t-1}); and ε_t is the error term that is conditional on ψ_{t-1}.

The conditional distribution of the error term is specified as the non-unitary variance T-distribution due to the thick-tailed distribution of the risk premia data. If the error distribution is thick-tailed, using an approximating distribution that accommodates thick tails improves the efficiency of the estimates. The parameter, α, is the return-to-risk coefficient as specified in Eq. 1 as:

$$\alpha = -\frac{vol_t[M_{t+1}]}{E_t\left[M_{t+1}\right]} corr_t[M_{t+1}, R_{i,t+1}] \tag{5}$$

Note that the coefficient will be positive if the conditional correlation between the SDF and the asset return is negative, indicating that the stock is not a hedging asset. Recall that the SDF is the ratio of intertemporal marginal utilities. Assuming a concave utility function, an upward shock in the ratio implies falling consumption, therefore an associated rise (positive correlation) in the return (R_i) would offset the reduction

in consumption, thereby causing the sign of α to be negative. The parameter, α, is also the ratio of risk premium to variance, or, the Sharpe ratio.

The intercept in Eq. 2 is restricted to zero as specified by the general asset pricing model specification. The restriction on the intercept equal to zero has been found to be robust in producing consistently positive and significant relationships between equity risk premia and risk in GARCH-M models. This is discussed in Lanne and Saikkonen (2006) and Lanne and Luoto (2007). We have found the same results in our modeling in this paper, although we have excluded these results for brevity (available upon request). Therefore we specify the prior assumption that the intercept or the "excess" return, i.e., the return not associated with risk to be equal to zero and drop the intercept from the model.

The consumption asset pricing model is estimated in the empirical section of the paper and applied in the applications section of the paper. The model is tested to (1) determine if equity-to-debt risk premium indices for utilities of differing risk specified by differing bond ratings are validated by the asset pricing model and therefore have some empirical support for risk premium prediction and application to utility cost of capital estimation, (2) determine whether equity risk premia can be predicted and fit the model and therefore be used to estimate the cost of common equity, (3) empirically test the consumption asset pricing model, and (4) ascertain whether utility stocks are assets that hedge shocks to the marginal utility of consumption.

If utility stocks are hedging assets then the cost of common equity should reflect a downward adjustment to a specified risk-free rate to reflect investors' preferences for a hedge and the compensation that they are willing to pay for it.

3 Data and empirical results

We use portfolios as represented by public utility stock and bond indices to estimate the conditional return-risk relationship for the equity-to-debt premium. The equity-to-debt risk premium data employed for estimating Eq. 1 with the GARCH-M conditional return-risk regressions are monthly total returns on the Standard and Poor's Public Utilities Stock Index (utility portfolio), and the monthly Moody's Public Utility Aa, A, and Baa yields for the debt cost. We also obtained equity risk premia for the utility portfolio using the Fama-French specified risk-free rate of return, which is the holding period return on a 1-month US Treasury Bill. The data range from January 1928 to December 2007 with 960 observations. The return-risk relationships for the equity-to-debt premia are risk-differentiated by their own bond rating.

As a check, we also estimate Eq. 1 with the GARCH-M for large common stock returns using the monthly Ibbotson Large Company Common Stocks Portfolio total returns and the Ibbotson US Long-Term Government income returns as the risk-free rate. Additionally, as another check, we do the same for the University of Chicago's Center for Research in Security Prices value-weighted stock index (CRSP) using the Fama-French risk-free rate. This is the Fama-French specification of the market equity risk premium. The data range from January 1926 to December 2007 with 984 observations for the Large Company Common Stock estimation and the data ranges

Table 1 Descriptive statistics: public utility and large company common stocks equity-to-debt and equity risk premia

Utility bond rating	Mean	Std. Dev.	Skewness	Kurtosis	JB
Aa	0.0037	0.0568	0.0744	10.07	2,001.2***
A	0.0035	0.0568	0.0632	10.06	1,991.8***
Baa	0.0031	0.0568	0.0375	10.02	1,973.6***
Ibbotson					
Large common stocks	0.0054	0.0554	0.4300	12.84	3,954.7***
CRSP value-weighted stock index	0.0062	0.0544	0.2309	10.92	2,519.1***

The public utility equity-to-debt risk premia monthly time series is from January 1928 to December 2007 with 960 observations. The equity risk premium monthly time series for the Large Common Stocks and the CRSP index are January 1926 to December 2007 with 984 observations, and January 1926 to December 2007 with 984 observations, respectively. The public utility stocks equity-to-debt risk premia are calculated as the total return on the S&P Public Utilities Index of stocks minus the Moody's Public Utility Aa, A, and Baa Indices yields to maturity. The Large Company Common Stock equity risk premia are the monthly total returns on the Ibbotson Large Company Common Stocks Portfolio minus the Ibbotson Long-Term US Government Bonds Portfolio income yield. The CRSP equity risk premia, or the Fama-French market risk premia are the CRSP total returns on the value-weighted equity index minus the 1-month holding period return on a 1 month Treasury Bill. The Jarque-Bera (JB) statistic is a goodness-of-fit measure of the departure of the distribution of a data series from normality, based on the levels of skewness and excess kurtosis. The JB statistic is χ^2 distributed with 2° of freedom. *** Significant at 0.01 level, one-tailed test

from January 1928 to January 2007 with 960 observations (same as the utilities) for the CRSP estimation.

Table 1 displays the descriptive statistics for these data. We have estimated the mean, standard deviation, skewness and kurtosis parameters, as well as the Jarque-Bera (JB) statistic to test the distribution of the data. The means of the utility equity-to-debt risk premia fall as the risk (bond rating) declines. This is consistent with the notion that larger yields are subtracted from stock returns the lower the bond rating. Intertemporally, there is an inverse relationship between risk premia and interest rates (See Brigham et al. (1985) and Harris et al. (2003)). The mean for risk premia will have a tendency to be larger during low interest rate periods.

Not surprisingly, large company common stocks have the highest mean risk premia as the majority of these firms are not rate-of-return regulated firms with a ceiling on their ROE's close to their cost of capital. Interestingly, the standard deviations of the utility stock returns are similar and slightly higher than large company common stocks. Skewness coefficients are small and positive except for Ibbotson large company common stock returns and CRSP returns that have large positive skewness. This suggests that large unregulated stocks have a tendency to have more and larger positive shocks in returns than do utilities that are rate of return regulated. The kurtosis values show that all of the risk premia are thick-tail distributed. This is also found in the significant JB statistics that test the null hypothesis that the data are normally distributed. The null hypothesis is rejected for all assets. The high kurtosis, low skewness, and significant JB statistics show that the risk premia data are substantially thick-tailed, except for non-utility stocks that are both skewed and thick-tailed. Therefore, robust estimation methods are required to produce efficient regression estimates with non-normal data. Additionally, although not shown but available upon request, the serial correlation and

ARCH Lagrange Multiplier tests show that residuals from OLS regressions of risk premia on volatilities follow an ARCH process. Therefore, the GARCH-M method will improve the efficiency of the estimates. We specify the regression error distribution as a non-unitary variance T-distribution so that thick-tails could be accommodated in the estimation and therefore produce increasingly efficient parameter estimates.

We used maximum likelihood estimation with the likelihood function specified with the non-unitary-variance T-distribution as the approximating distribution of the residuals to accommodate the thick-tailed nature of the error distribution. The equations are estimated as a system using the Marquardt iterative optimization algorithm. The chosen software for estimating the model was EViews© version 6.0 (2007).

Table 2 shows the GARCH-M estimations for the consumption asset pricing Eq. 1. We have estimated Eq. 1 for the utility equity risk premia using the Fama-French risk-free rate in addition to the equity-to-debt risk premia risk-differentiated by bond ratings and the two measures of the market equity risk premium. The chosen measure of volatility is the variance of risk premium (in contrast to other such measures such as the standard deviation or the log of variance. Although these results are not shown for brevity, they are robust to these other measures of volatility). The slope, which is the predicted return-to-predicted risk coefficient and Sharpe ratio, is positive and significant at the 99% level for all assets except the utility stock returns with Baa bonds, which is significant at the 95% level. Given that all slopes are positive, public utility stocks are not found to hedge shocks to the marginal utility of consumption. Note that the reward-to-risk slope rises as bond rating rises. This suggests that lower risk utility stocks provide a higher incremental risk-premium for an increase in conditional volatility. This is consistent with other studies that find that lower risk assets, such as shorter maturity bonds, have higher Sharpe Ratios than long-term bonds and stocks. See Pilotte and Sterbenz (2006) and Michelfelder and Pilotte (2011).

The variance equation shows that all GARCH coefficients (β's) are significant at the 1% level and the sums of β_1 and β_2 are close to, but less than 1.0, indicating that the residuals of the risk premium equation follow a GARCH process and that the persistence of a volatility shock on returns and stock prices for utility stocks is temporary. The estimates of the non-unitary variance T-distribution degrees of freedom parameter are low and statistically significant, indicating that the residuals are well approximated by the T. Similar values for the log-likelihood functions (Log-L) show that each of the regressions has a similar goodness-of-fit. Chi-squared distributed likelihood ratio tests (not shown but available upon request) that compare the goodness of fit among the T and normal specifications of the likelihood function of the GARCH-M regressions show that the T has a significantly better fit than the normal distribution.

The GARCH-M results for the large company common stocks portfolio are similar to those of the utility stocks. Not surprisingly, large company common stocks do not hedge shocks to the marginal utility of consumption and volatility shocks temporarily affect their valuations. The exception is that the return-risk slope is substantially higher than utility stock slopes. This is partially due to the risk-free nature of the risk-free rates used with the non-utility equity risk premia compared to the

Table 2 Estimation of return-risk relation: public utility and large company common stocks

Utility bond rating	α	β_0	β_1	β_2	Log-L	T dist. D.F.
Aa	1.5183*** (0.5308)	0.0000** (0.0000)	0.8791*** (0.0230)	0.1031*** (0.0219)	1,604.4	9.9254*** (3.0272)
A	1.4536*** (0.5308)	0.0000** (0.0000)	0.8790*** (0.0230)	0.1033*** (0.0220)	1,605.0	9.9381*** (3.0408)
Baa	1.3318** (0.5303)	0.0000** (0.0000)	0.8789*** (0.0229)	0.1040*** (0.0220)	1,605.2	10.0*** (3.0540)
Fama-French R_f	2.1428*** (0.5318)	0.0000** (0.0000)	0.8811*** (0.0232)	0.0979*** (0.0212)	1,601.0	9.8773*** (2.9700)
Ibbotson						
Large company common stocks	2.7753*** (0.5513)	0.0001*** (0.0000)	0.8381*** (0.0269)	0.1186*** (0.0332)	1,620.8	8.8457*** (2.1613)
CRSP value-weighted stock index	3.3873*** (0.5673)	0.0001*** (0.0000)	0.8330*** (0.0270)	0.1149*** (0.0358)	1,598.9	8.8571*** (1.9505)

The results below are the GARCH-in-Mean regressions for the risk premium ($R_{t+1} - R_{f,t+1}$) on the conditional variance of the risk premium (σ^2_{t+1}) in the mean equation. The intercept in the mean equation is restricted to be equal to zero. The public utility equity-to-debt risk premia monthly time series is from January 1928 to December 2007 with 960 observations. The equity risk premium monthly time series for the Large Company Common Stocks and the CRSP index are January 1926 to December 2007 with 984 observations, and January 1926 to December 2007 with 984 observations, respectively. The public utility stocks equity-to-debt risk premia are calculated as the total return on the S&P Public Utilities Index of stocks minus the Moody's Public Utility Aa, A, and Baa Indices yields to maturity. The Large Company Common Stock equity risk premia are the monthly total returns on the Ibbotson Large Company Common Stocks Portfolio minus the Ibbotson Long-Term US Government Bonds Portfolio income yield. The CRSP equity risk premia, or the Fama-French market risk premia are the CRSP total returns on the value-weighted equity index minus the 1-month holding period return on a 1 month Treasury Bill. The estimated model is:

$$R_{t+1} - R_{f,t+1} = \alpha\sigma^2_{t+1} + \varepsilon_{t+1} \text{ where } \alpha = -\frac{vol_t[M_{t+1}]}{E_t[M_{t+1}]} corr_t[M_{t+1}, R_{i,t+1}]$$

$$\sigma^2_{t+1} = \beta_0 + \beta_1\sigma^2_t + \beta_2\varepsilon^2_t + \eta_{t+1}$$

The conditional distribution of the error term is the non-unitary variance T-distribution to accommodate the kurtosis of the risk premia and error term. Standard errors are in parentheses. ***, **, * denote significance at the 0.01, 0.05, and 0.10 levels, respectively for two-tail tests

utility bond yields that reflect risk. The utility stocks slope value of 2.1428 using the Fama-French risk-free rate is closer to the higher CRSP value of 3.3873 that is also based on the Fama-French risk-free rate. This is inconsistent with previous results herein and in other papers that find that Sharpe Ratios are lower for higher risk assets unless this finding can be interpreted as utility stocks having more risk than non-regulated stocks. The standard deviations on Table 1 suggest that utility stock return volatilities are as high as the stock returns of non-regulated firms. However, similar model estimates of portfolios of common stocks yield unstable results, such as negative as well as positive return-risk slopes when the intercept is not restricted to zero. See Campbell (1987), Glosten et al. (1993), Harvey (2001), and Whitelaw (1994).

Stock market results are highly sensitive to empirical model specification. Many studies do not consider the impact of a zero-intercept prior restriction on the stability of their results. This simple innovation has led to more consistent results in modeling stock market risk-return relationships, and therefore we have included it in this paper.

The estimation of the consumption asset pricing model for utility stock equity-debt risk premia shows that the use of bond-rating risk-differentiated risk premia are validated as their risk-return relationships are well-fitted by theoretical and empirical models of risk and return. Therefore, these data impound good representations of the risk and reward relationship.

One concern is the intertemporal stability of the alphas. Figure 1 plots the utility stock portfolio alpha (using the Fama-French R_f to calculate the premium) and its standard error for 240 month rolling regressions of the model estimated with GARCH-M in the same manner as described above to review the intertemporal stability of the alpha. A 20-year period was used for each estimation to trade off timeliness with sufficient observation of up and down stock market regimes and business cycles. This resulted in 720 estimated alphas from 1947 to 2007. The results show that the utility alpha is stable to the extent that the algebraic sign is always positive and generally significant, therefore the nature of utility stocks are assets that are not and have never been hedges during the second half of the twentieth century up to the present. The value of the alpha does change substantially. The mean of the alpha is 4.40 with a range from -0.11 (insignificantly different from 0) to 11.66. As a comparison, the alpha for the CRSP value-weighted stock index was also estimated with rolling regressions in the same manner and for the same time period. Figure 2 is a plot of the CRSP alpha and standard error. Note that the general stock market alpha is similar to that of utility stocks. They are all positive and almost all statistically significant and follow a strikingly similar cycle. Figure 3 plots both the utility and stock market alphas and demonstrates the similarity. The correlation coefficient between the utility and stock market alphas is 0.88. Recalling that the alpha is a Sharpe Ratio, we see that return to risk ratio does change substantially. This is consistent with the results in Pilotte and Sterbenz (2006).

One other interesting observation is that the standard errors of the alphas are highly stable over the study period and are very similar in magnitude regardless of the size of the corresponding alpha. Whereas the alpha follows a cyclical pattern, the volatility in alpha is highly stationary around a constant, long-run mean.

The GARCH-M model estimations of the consumption asset pricing model were specified with variance as the measure of volatility. We also performed the same model estimations with alternative specifications of volatility such as the standard deviation and the log of variance and the results were not sensitive to this specification.

4 Application

We apply the model in this section to compare the cost of common equity capital estimates with the DCF and CAPM models. Using EViews© Version 6.0, we estimated the model coefficients (α, $\beta's$) over rolling 24 month periods ending December 2008.

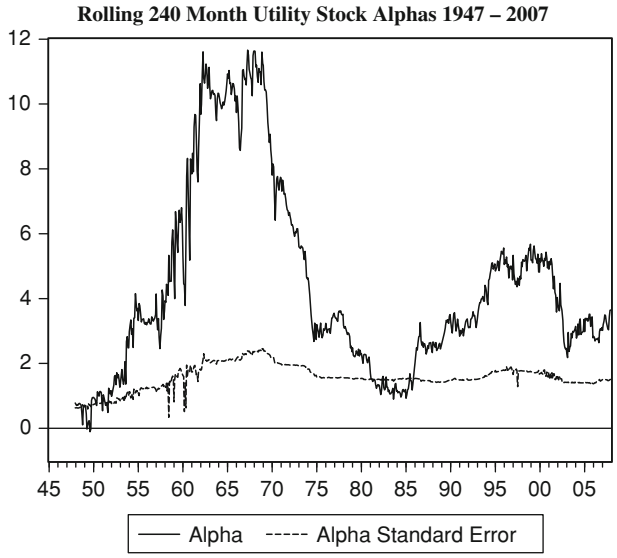


Fig. 1 Rolling 240 month utility stock alphas 1947–2007

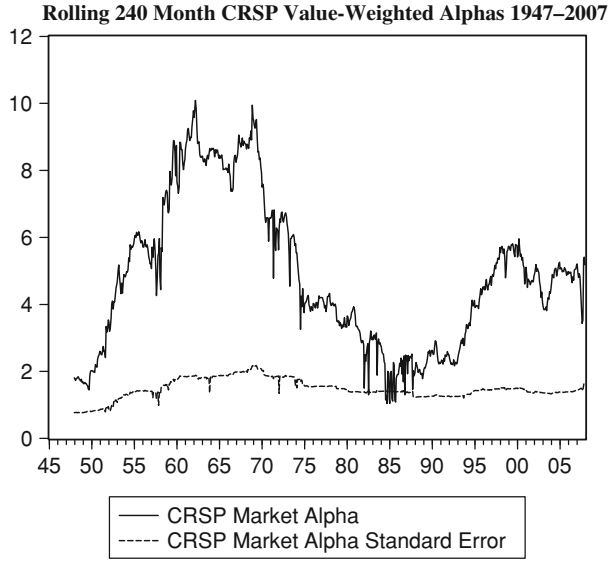


Fig. 2 Rolling 240 month CRSP value-weighted alphas 1947–2007

We repeated the estimation over 5, 10, 15, 20 and 79 year periods.[3] Predicted monthly variances (σ^2_{t+1}) were generated from these estimations to produce predicted risk premiums that were calculated by multiplying the predicted variance by the "α" slope

[3] We did not include the results of the 10 and 15 year estimations to abbreviate the amount of empirical results presented since they added no material insights beyond those already presented.

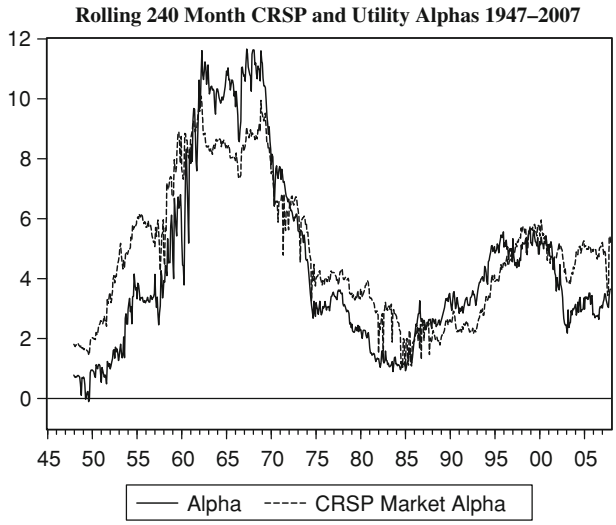


Fig. 3 Rolling 240 month CRSP and utility alphas 1947–2007

Table 3 Estimates of expected risk premia

	Mean (%)		Range (%)		Standard deviation (%)	
	Average	Spot	Average	Spot	Average	Spot
Ibbotson Associates data						
79-years	9.59	5.76	8.74–9.96	2.62–22.60	0.32	5.24
20-years	6.77	6.94	4.99–8.50	2.24–28.95	0.95	6.88
5-years	4.20	10.25	−98.49–11.62	−100.00–39.65	22.00	26.61
S&P Utility Index						
79-years	5.28	2.90	4.30–5.28	1.65–8.15	0.32	1.60
20-years	3.93	3.51	2.78–5.03	2.18–6.88	0.57	1.11
5-years	31.82	326.63	7.77–156.97	6.12–6465.74	31.47	1283.51

coefficient. To test the stability of the predicted risk premia over time, the predicted risk premia were calculated using either the predicted variance over each entire time period or the last monthly (spot) predicted variance. Table 3 presents the mean predicted risk premia, the range of predicted premia and the standard deviations for each time period. It is clear from the results that the risk premia are more stable over the rolling 24 month period when calculated using the average predicted variance compared with using the spot variance. Secondly, the 20 and 79 year means are substantially more stable and reasonable in magnitude than the 5 year means.

Next, given the lessons from the analyses above, we apply the model to mechanically[4] estimate the cost of common equity for 8 utility companies using the model and

[4] The term "mechanically" in this context means that the resulting values have been developed in a consistent manner with the same inputs across all utility stocks but no subjective judgment was used to develop final values for each specific utility stock application.

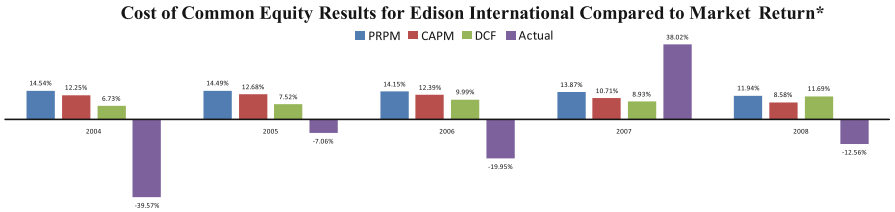
the DCF and CAPM as comparisons. We also calculated the realized market return for comparison. Two publicly-traded electric, electric and gas combination, gas, and water utilities respectively were chosen for the application. The Gordon (1974) DCF and CAPM models are used in many utility regulatory jurisdictions in the US.

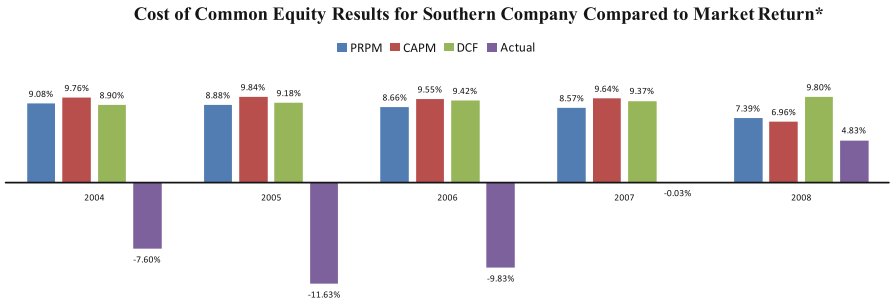
The DCF was applied using a dividend yield, D_0/P_0, derived by dividing the year-end indicated dividend per share (D_0) by the year-end spot market price (P_0). The dividend yield is grown by the year-end I/B/E/S five year projected earnings per share growth rate (g) to derive $D_0(1+g)/P_0$. The one-year predicted dividend yield is then added to the I/B/E/S five-year projected EPS growth rate to obtain the DCF estimate of the cost of common equity capital, k. This study was conducted for the 5 years ending 2008.

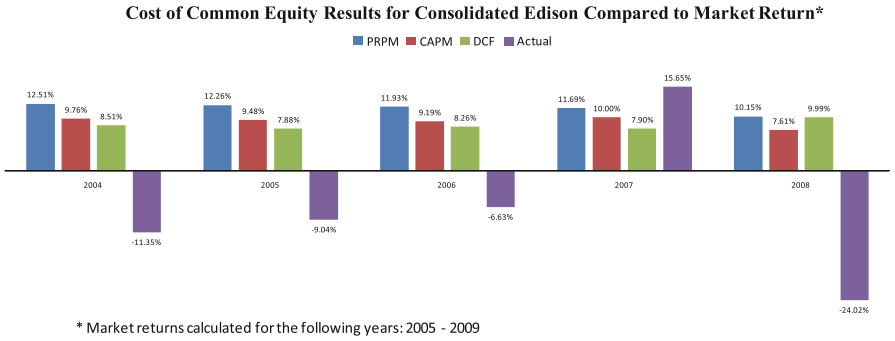
The CAPM was applied by multiplying the Value Line beta (β) available at year-end for each company by the long-term historic arithmetic mean market risk premium ($R_m - R_f$). $R_m - R_f$ is derived as the spread of the total return of large company common stocks over the income return on long-term government bonds from the Ibbotson SBBI 2009 Valuation Yearbook. The resulting company-specific market equity risk premium is then added to a projected consensus estimate of the yield on 30-year U.S. Treasury rate provided by Blue Chip Financial Forecasts as the risk-free rate (R_f) to obtain the CAPM result. This study was also conducted over the 5 years ending 2008.

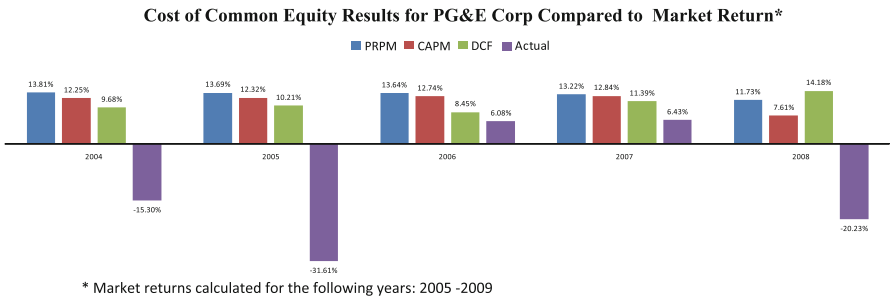
Figures 4–11 show the histograms of the cost of common equity capital estimations for each of the eight public utility stocks and the realized market returns in the forthcoming year. The consumption asset pricing model appears to track more consistently with the CAPM than with the DCF which seems to produce generally lower values than the other methods. The consumption asset pricing model results are similar to the CAPM. The model and the CAPM compete as the best predictor of the rate of return on the book value of common equity (not shown but available upon request), but none of the expected returns were good predictors of market returns. That does not infer that they were not good predictors of *expected* market returns. These results are an initial indicator that the consumption asset pricing model provides reasonable and stable results. This paper does not suggest at this early juncture that the consumption asset pricing model is superior to the CAPM or DCF, although it is based on far less restrictive assumptions than these other models. For example, both the DCF and CAPM assume that markets are efficient. Many assume that the DCF requires that the market-to-book ratio to always equal one, whereas the long-term value for the Standard and Poor's 500 is equal to 2.34. The CAPM assumes that investors demand higher returns for higher volatility and that the minimum required return is the risk-free rate, whereas the consumption asset pricing model allows for investors to require returns less than the risk-free rate for stocks that may have relatively higher volatility but are hedging assets that have desirable return fluctuation patterns that offset downturns in the business cycle. Unlike the CAPM, the model prices the risk to which investors are actually exposed, whether it's systematic risk or not. Some investors are diversified and some are not; the model prices whatever risk to which the aggregate of investors of the specific stock is exposed.

We find that the consumption asset pricing model should be used in combination with other cost of common equity pricing models as additional information in the devel-



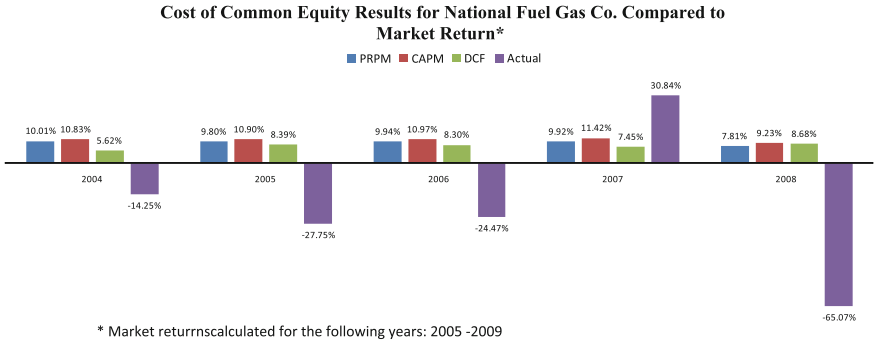


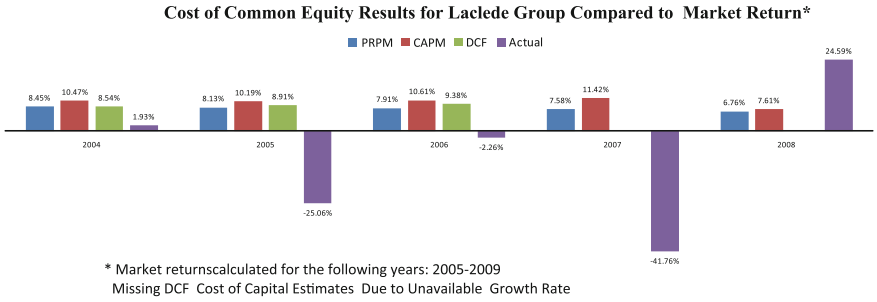


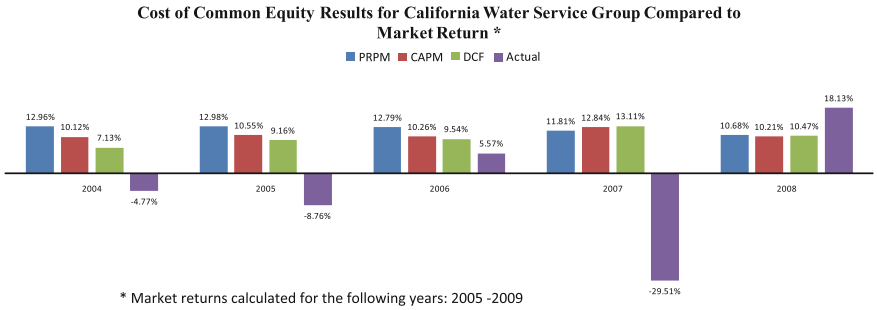


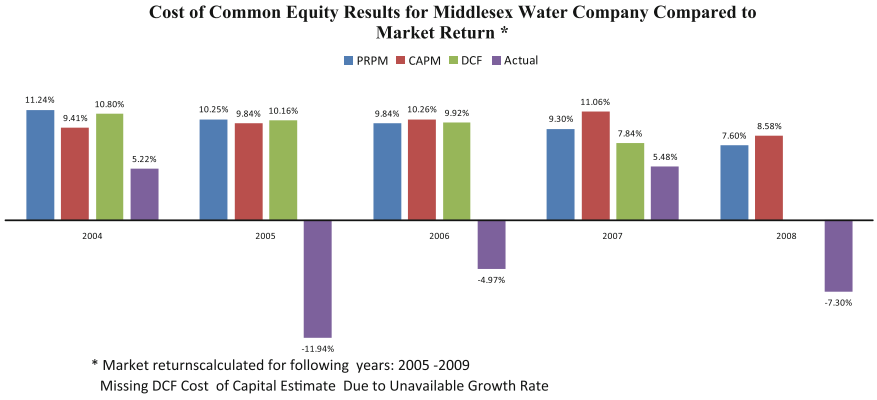
Figs. 4–11 Comparison of the cost of common equity estimates and market

opment of a cost of common equity capital recommendation. Practitioners may find the modeling methods and the use of relatively advanced econometric methods rather cumbersome. The software for performing these estimations is readily available from EViews© and SAS©; two commonly available software packages at utilities, consult-









Figs. 4–11 continued

ing firms and financial firms. Recent Ph.D. and M.S. holding members of research departments of investment and consulting firms have ready access to the model and methods discussed in this paper, although it will require years for these tools, like any "new" technology, to diffuse into standard use. Another problem is that the model requires a substantial time series history on stock returns data to develop stable estimates of risk premia This is problematic especially for the electric and gas utility industries that have consolidated with many mergers in the recent past. This problem can be addressed by developing and predicting the value-weighted risk premium of a portfolio of similar stocks such as electric utilities that have nuclear generating assets. The specific stock in question would be included in the returns index with a weight based on market capitalization that would go to 0 when the stock price history is no longer existent reaching back into the past.

5 Conclusion

The purpose of this paper is to introduce, test empirically and apply a general consumption based asset pricing model that is based on a minimum of assumptions and restrictions that can be used to predict the risk premium to be applied in estimating the cost of common equity for public utilities in regulatory proceedings. The results support the simple consumption-based asset pricing model that predicts the ex ante risk premium with a conditionally predicted volatility in risk premium. The estimates of the cost of common equity from the consumption asset pricing model compare well with rates of return on the book value of common equity and with the CAPM, although both the model and the CAPM results are substantially higher than the DCF. This is quite common in the practice of the cost of common equity in the utility industry. The results of the model are stable and consistent over time. Therefore the model should be considered as it provides additional evidence on the cost of common equity in general and specifically in public utility regulatory proceedings. Secondly, the use of bond-rated yields to predict risk differentiated equity-to-debt risk premia is supported by the empirical evidence and therefore should be applied in estimating the cost of common equity. Finally, the robust empirical evidence on the positive risk-return relationship also shows that utility stocks are not a consumption hedge and are not good hedging securities against contractions in the economy. The model and estimation methodology presented in this paper provide a relatively simple tool to determine whether any asset is a hedge to adverse changes in the business cycle through the level of consumption in the economy.

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Comparative Evaluation of the Predictive Risk Premium Model, the Discounted Cash Flow Model and the Capital Asset Pricing Model for Estimating the Cost of Common Equity

The regulatory process for setting a utility's allowed rate of return on common equity has generally relied upon the Gordon Discounted Cash Flow Model and Capital Asset Pricing Model. The Predictive Risk Premium Model, introduced a year ago, resolves several of the widely known problems with these models. Further testing since its introduction a year ago suggests that it produces stable results which are consistent over time.

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I. Introduction

The lead article in the July 2008 issue of this *Journal*, "Integrating Renewables into the US Grid: Is it Sustainable," by Professors Peter Mark Jansson and Richard A. Michelfelder,[1] called for the reregulation of the electric utility industry and putting the planning of generation assets, whether renewable or not, back in the hands of the experts and those ultimately responsible for reliability, the electric utilities. During the last 10 years or so,

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states have been backpedaling on deregulation and therefore methods for estimating the cost of common equity and the allowed rate of return have generated new interest as regulating rate of return is not going away as once thought.

The regulatory process for setting a public utility's allowed rate of return on common equity has generally relied upon the familiar Gordon Discounted Cash Flow Model (DCF) and Capital Asset Pricing Model (CAPM). Despite the widely known problems with these models, there has been little initiative to adopt more recently developed asset pricing models with fewer limiting assumptions and requiring less subjective judgment than these traditional models. In December 2011, the article "New Approach to Estimating the Cost of Common Equity Capital for Public Utilities,"[2] published in *The Journal of Regulatory Economics*, introduced the Predictive Risk Premium Model (PRPM). The PRPM trademark refers to a general, yet simple, consumption-based asset pricing model of the risk/return relationship for common stocks which can be used to estimate the cost rate of common equity (ROE). The stability and consistency of the results of PRPM and the ex ante, i.e., expectational, nature of those results indicate that the model should be used to provide additional input into the process of determining an allowed rate of return on common equity for public utilities.

Since publication, more exhaustive empirical testing of the PRPM was conducted for the four utility industry groups which comprise the AUS Utility Reports[3] universe of publicly traded utilities: an electric utility group; a combination electric and natural gas distribution utility group; a natural gas distribution utility group, and a water utility group. The empirical testing confirms the conclusion of the original *Journal of Regulatory Economics* article: the PRPM produces stable results which are consistent over time.

Despite the widely known problems with these models, there has been little initiative to adopt more recently developed asset pricing models with fewer limiting assumptions and requiring less subjective judgment.

II. Development of the PRPM

The cost rate of common equity is not directly observable in the capital markets and must be inferred using various financial models. The most commonly used cost of common equity models in the regulatory arena are the aforementioned DCF and the CAPM. Since these models are based upon many restrictive assumptions, they involve a significant amount of analyst subjectivity in their application, resulting in much debate over the application and results of these models.

The empirical approach to the PRPM is based upon the work of Robert F. Engle, Ph.D.,[4] who shared the Nobel Prize in Economics in 2003 "for methods of analyzing economic *time series* with time-varying volatility (*ARCH*),"[5] with "ARCH" standing for autoregressive conditional heteroskedasticity. In other words, volatility (variance) changes over time and is related to itself from one period to the next, especially in financial markets. Engle discovered that the volatility (usually measured by variance) in prices and returns clusters over time. Therefore, volatility is highly predictable and can be used to predict future levels of risk. The theoretical asset pricing model was recently developed in the *Journal of Economics and Business* in December 2011 by Rutgers University professors Richard Michelfelder and Eugene Pilotte.[6]

In this study, the PRPM estimates the risk/return relationship directly using the outcomes of investors' historical pricing decisions and actual long-term U.S. Treasury security yields, with the predicted equity risk premium generated by the prediction of volatility, i.e., the risk, based upon the volatility of past equity risk premiums for the AUS Utility Reports universe of companies.

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III. Estimation Method

The statistical details of the estimation method of the PRPM can be found in the original article in the *Journal of Regulatory Economics*, "New Approach to Estimating the Cost of Common Equity Capital for Public Utilities." Essentially, there are two steps to the application of the PRPM. First, predicted volatility, i.e., risk, is derived based upon previous volatility plus previous prediction error, because volatility is highly predictable and correlated over time. Second, the predicted volatility can then be used to generate the predicted equity risk premium (ERP) by multiplying it by the GARCH coefficient, i.e., the slope of the predicted volatility. A risk-free rate is then added to the ERP to estimate the ROE, i.e., the market based cost of common equity.

IV. Application of the PRPM to Publicly Traded Utility Companies

The PRPM was applied to the companies comprising the AUS Utility Reports' utility industry groups: the electric, combination electric and natural gas distribution, natural gas distribution, and water groups. The PRPM variances were calculated monthly for each individual utility beginning with the first available monthly data included for each individual utility in the University of Chicago Booth School of Business' Center for Research in Security Prices (CRSP) and corresponding monthly long-term U.S. Treasury bond yields from Morningstar's *Ibbotson SBBI – 2012 Valuation Yearbook – Market Results for Stocks, Bonds, Bills and Inflation – 1926–2011 (SBBI)* through 72-month ending periods, i.e., January 2006 through December 2011.

Using EViews Version 7.2, the PRPM coefficients and predicted monthly variances were estimated as described in the *JRE* article for each time series of equity risk premiums. Consistent with the conclusion drawn in the *JRE* article, the predicted equity risk premiums were calculated using the averaged predicted volatilities (variances) over the entire time period for which CRSP data were available for each utility, multiplied by the GARCH, or slope, coefficient generated through EViews for each time series. To calculate the PRPM cost rate of common equity for each utility, the average predicted utility specific equity risk premium through each month ending from January 2006 through December 2011 was then added to the projected consensus forecast of the expected yields on 30-year U.S. Treasury bonds for the next six quarters by the reporting economists in the concurrent *Blue Chip Financial Forecasts (Blue Chip)*.

The DCF was applied in a simple manner, using a dividend yield, D_0/P_0, derived by dividing the month-end indicated dividend per share (D_0) by the month-end closing market price (P_0) for each utility. The dividend yield was then grown by the month-end I/B/E/S consensus five-year projected earnings per share (EPS) growth rate (g) to derive $(D_0\ (1 + g)/P_0)$. The one-month predicted dividend yield was then added to the concurrent month's I/B/E/S consensus

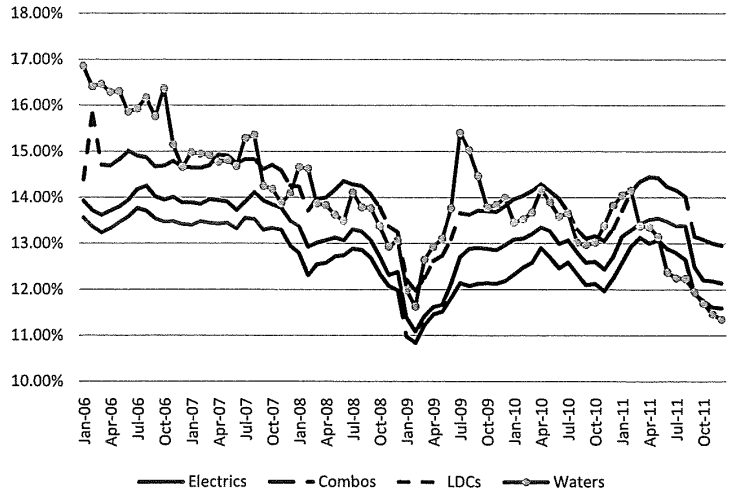

Figure 1: Indicated Return on Common Equity Based upon the PRPM for the AUS Utility Reports Companies

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five-year average projected EPS growth rate to obtain the DCF estimate of the cost of common equity capital, k. The DCF estimates were also calculated for each month from January 2006 through December 2011.

The CAPM was applied by multiplying Value Line Inc.'s beta (β),[7] for each utility, by the long-term historical arithmetic mean market equity risk premium ($R_m - R_f$) through the previous year. ($R_m - R_f$) was derived as the spread of the total return of large company common stocks over the income return on long-term government bonds from the annual *SBBI Valuation Yearbooks* for the years ending 2005 through 2010. The resulting utility-specific equity risk premium was then added to the same projected consensus forecast of the expected yields on 30-year U.S. Treasury bonds for the next six quarters by the reporting economists in the concurrent *Blue Chip* discussed above, to obtain the CAPM estimate of the cost of common equity capital, k. The CAPM estimates were also calculated for each month from January 2006 through December 2011.

Finally, the results for each of the models, the PRPM, DCF, and CAPM, were averaged for each utility group.[8] **Figure 1** presents the average PRPM results for each of the AUS Utility Reports utility groups for each month from January 2006 through December 2011.

Figure 1 shows that indicated ROEs derived from the PRPM were stable for all utility groups until the global financial crisis of 2008–2009. During 2008 and 2009, the PRPM-derived ROEs decline, which in the authors' opinion, was a result of a "flight to quality" by investors, i.e., the willingness of an investor to accept a lower, but more certain, return during financial downturns. Figure 1 also indicates that the PRPM-derived ROEs for the electric, combination electric and natural gas distribution, and natural gas distribution utility groups follow a nearly identical pattern throughout the 72-month period, with the water utility group following a similar, but more volatile pattern.

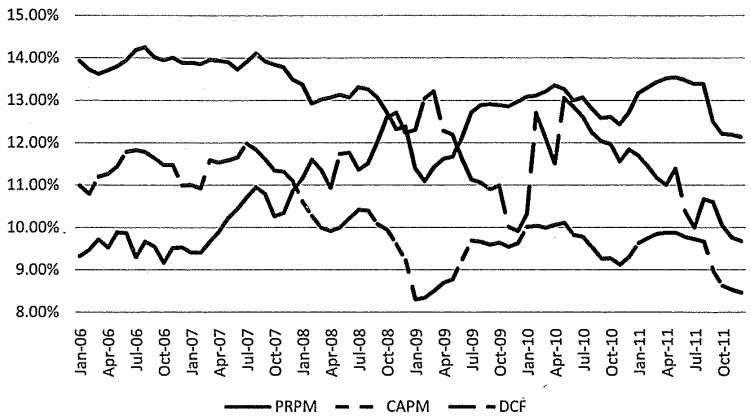

Figure 2: Indicated Return on Common Equity Based upon the PRPM, CAPM and DCF Methodologies for the AUS Utility Reports Electric Companies

Figures 2–5 present a comparison of the average PRPM, DCF, and CAPM cost of common equity estimates for each AUS

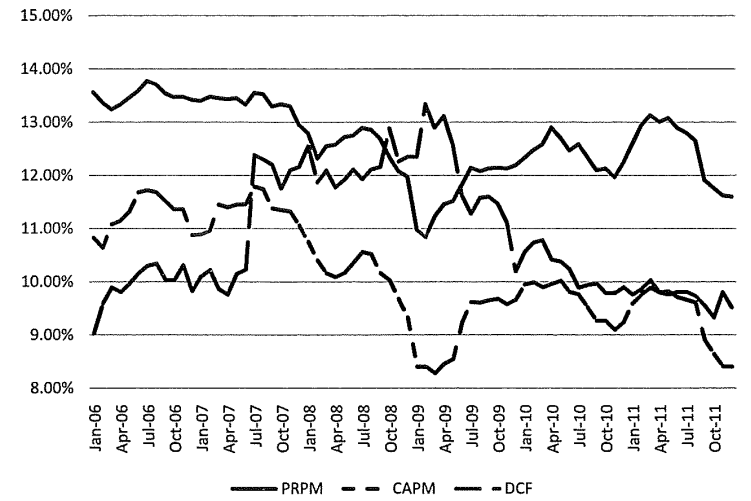

Figure 3: Indicated Return on Common Equity Based upon the PRPM, CAPM, and DCF Methodologies for the AUS Utility Reports Combination Companies

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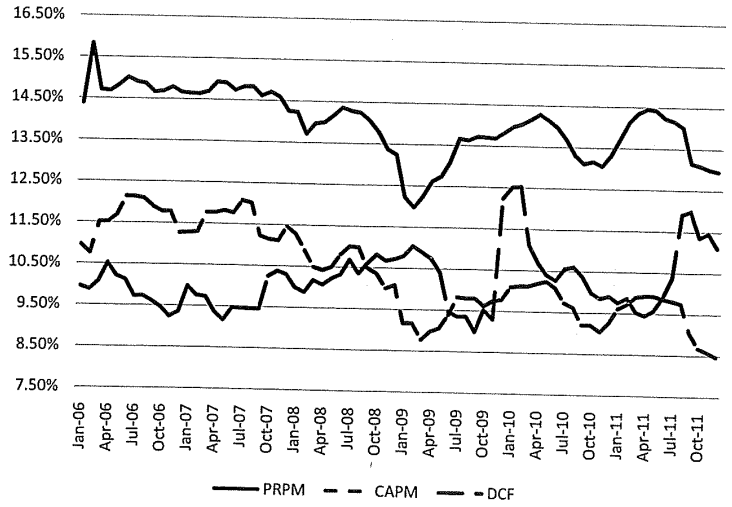

Figure 4: Indicated Return on Common Equity Based upon the PRPM, CAPM and DCF Methodologies for the AUS Utility Reports Gas Companies

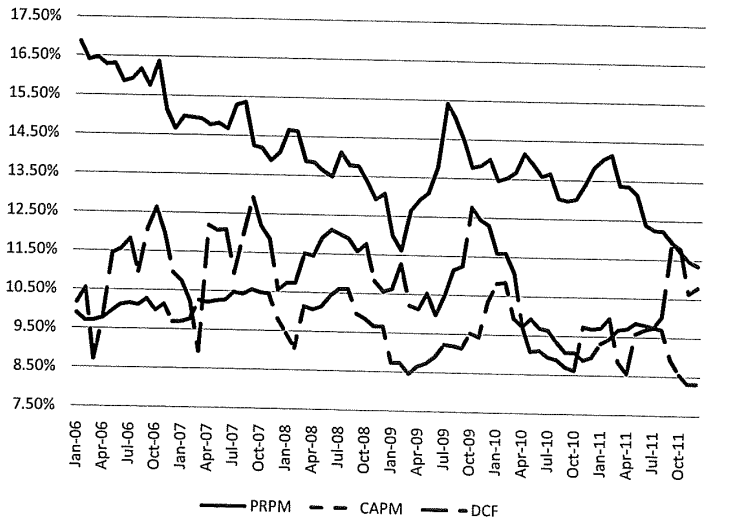

Figure 5: Indicated Return on Common Equity Based upon the PRPM, CAPM and DCF Methodologies for the AUS Utility Reports Water Companies

Utility Reports utility industry group, i.e., the electric utility group; the combination electric and natural gas distribution utility group; the natural gas distribution utility group; and, the water utility group for each month from January 2006 through December 2011.

Figures 2–5 clearly show that, for the most part, the PRPM produces a higher average indicated ROE than both the DCF and CAPM. This is due to the fact that the PRPM prices *all* of the risk that investors actually face collectively. In contrast, the CAPM prices systematic risk (that investors face only if they have a perfectly diversified portfolio, which does not exist) and the DCF uses accounting-based, not market-based, I/B/E/S consensus five-year projected EPS growth rates.

V. Conclusion

In the authors' opinion, the PRPM benefits ratemaking with an additional model to estimate ROE. To that end, the authors have been including the PRPM in their rate-of-return testimonies and the model has been presented publicly in several venues.[9]

Its results are stable and consistent over time. It is not based upon restrictive assumptions, as are the DCF and CAPM. The PRPM is also not based upon an *estimate* of investor behavior, but rather, upon a statistical analysis of *actual* investor behavior by evaluating the results of that behavior, i.e., the volatility (variance) of historical equity risk premiums. In contrast, subjective decisions surround the choice of the inputs to both the DCF and CAPM, from the choice of the time period over which to measure the dividend yield for the DCF, the choice of the DCF growth rate (e.g., historical or projected, earnings per share or dividends per share, and the like), to the selection of the appropriate beta (e.g., adjusted or unadjusted), market equity risk premium (e.g., historical or projected) and the appropriate

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risk-free rate (e.g., historical or projected and/or long vs. short term) for the CAPM. In addition, as previously discussed, the CAPM exclusively prices systematic risk. In contrast, the PRPM prices *all* of the risk actually faced collectively by investors, because the model does not assume that investors' portfolios are perfectly diversified containing no unsystematic risk.

In addition, the inputs to the PRPM are widely available. The GARCH coefficient is calculated with the relatively inexpensive EViews, or other statistical, software, based upon the realized ERP, i.e., total returns minus the risk-free rate. The only subjective decisions to be made when applying the PRPM relate to which risk-free rate to use, e.g., long-term or short-term, and over what time period to estimate the PRPM-derived ROEs.

For all of these reasons, the authors conclude that the PRPM should be considered as appropriate additional evidence to measure the cost of common equity in regulatory rate setting for public utilities.■

Endnotes:

1. Peter Mark Jansson and Richard A. Michelfelder, *Integrating Renewables into the US Grid: Is It Sustainable?* ELEC. J.,July 2008, at 9–21.

2. Pauline M. Ahern, Frank J. Hanley and Richard A. Michelfelder, *New Approach to Estimating the Cost of Common Equity Capital for Public Utilities*, J. REG. ECON.(2011) 40, at 261–78.

3. AUS Monthly Utility Reports is a monthly pocket reference book covering the electricity, combination electricity & natural gas distribution, natural gas distribution, and water companies which have publicly traded common stock. The monthly reports provide comprehensive information on key ratios and industry rankings based upon the financial statistics presented in the report.

4. Professor Emeritus, University of California, San Diego, and currently the Michael Armellino Professor in Management of Financial Services at New York University's Stern School of Business.

5. See www.nobelprize.org.

6. Richard Michelfelder and Eugene Pilotte, *Treasury Bond Risk and Return, the Implications for the Hedging of Consumption and Lessons for Asset Pricing*, J. ECON. & BUS.(2011) 63, at 605–37.

7. Using a proprietary data base available at mid-March, June, September, and December at the end of each year, from 2006–2011 from Value Line, Inc.

8. The results shown in the accompanying figures represent AUS Utility group averages of only those utilities in each group for which it was possible to estimate all three models in any given month. For example, if ABC Utility did not have the I/B/E/S consensus growth rate necessary to calculate the DCF in a given month, that utility's PRPM and CAPM were not included in the group average for that month.

9. Edison Electric Institute Cost of Capital Working Group (Webinar Oct. 2012); NARUC Staff Subcommittee on Accounting & Finance (Sept. 2012 and Mar. 2010); National Association of Water Companies Finance/ Accounting/Taxation and Rates & Regulations Committees (Mar. 2012); NARUC Water Committee (Feb. 2012); Wall St. Utility Group (Dec. 2011); IN Utility Regulatory Commission Cost of Capital Task Force (Sept. 2010); Financial Research Inst. of the Univ. of Missouri Hot Topic Hotline Webinar (Dec. 2010); and Center for Research in Regulated Industries Annual Eastern Conference (May 2010 & May 2009).

Subjective decisions surround the choice of the inputs to both the DCF and CAPM.

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Decoupling, risk impacts and the cost of capital

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ABSTRACT

Public utilities and regulators are decoupling revenues from sales to remove a disincentive for utilities to invest in end-use electricity, natural gas and water efficiency. Decoupling is primarily a US ratemaking policy for energy and water utilities as are price caps in Europe. Empirical testing consistently demonstrates that decoupling has no statistically measurable impact on risk and the cost of common equity, yet policy is moving ahead without consideration of that empirical evidence.

1. Introduction

In the late 1970s, US policymakers, legislators, regulators and public utilities began focusing on reducing consumers' demand for energy rather than increasing supply. This was mainly a reaction to the oil supply shock in the US in the early 1970s, beginning with the National Energy Conservation Act of 1978. Europe was already much more efficient in the use of energy by the 1970s as the BTU content of GDP for many European countries was a substantially small fraction relative to the US.

More recently in the US, regulatory policy has required water utilities to encourage the reduction in water use by their consumers. The US and European utility industries seem to observe each other's experiments in decoupling and price caps before adopting such alternative ratemaking policy movements. Price cap regulation, where utility prices are allowed to rise to a cap set by an inflation index minus a total productivity factor offset that reflects potential cost savings, was implemented decades ago for British utilities. Later it was adopted by many other utilities in Europe (EU). However, in the US, very few utilities are under price cap regulation except for telecommunications local exchange carriers. In contrast, decoupling, which effectively disassociates revenue levels from commodity (electric, gas or water) sales has been sweeping across the US in the last two decades for energy and water utilities, while not being adopted in Europe.

Campini and Rondi[1] show that alternative rate mechanisms in the EU have been in the form of price caps to promote efficient investment and operating expenditures without mentioning decoupling. They note that since many utilities in the EU are government owned, there has not been any major adoption of alternative regulatory rate making methods across the utility industry as EU utility rates are not regulated. Therefore, this study is limited to analyzing decoupling in the US, as it is still almost exclusively a regulatory tool implemented in the US.

The profit disincentive associated with revenue and profit reductions is a major financial impediment preventing investor-owned utilities from encouraging the conservation of energy and water usage and sales. In response, various regulatory policy mechanisms have been developed to provide utilities with a financial incentive, or, at least, remove the disincentive, to utilities to encourage energy and water efficiency. One such mechanism is the inclusion of conservation expenditures in rate base so that such expenditures earn a return. Other mechanisms allow for a profit incentive equal to a proportion of the life cycle of net benefits, as well as rate of return premiums for meeting or exceeding conservation goals. Increasingly, revenues are being decoupled from sales volumes so that reductions in sales volumes will

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[1] Campini, C., and L. Rondi. (2010). Incentive regulation and investment: Evidence from European energy utilities. Journal of Regulatory Economics, 38, 1-26.

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potentially stabilize profits rather than reduce them.[2] Decoupling revenues from sales volumes was first implemented in California and New York in the 1980s. Decoupling did not gain momentum outside of California and New York for decades and only recently implemented in various other state regulatory jurisdictions across the US for electric, natural gas, and water public utilities. Fig. 1 is a map depicting the extent of decoupling across the US developed by the National Resources Defense Council[3] . While Fig. 1 shows the extent of decoupling across the US for electricity and natural gas utility industries, it does not show the same for water / wastewater utility industries. Fig. 1 shows that as of August 2018, 26 states have adopted gas decoupling (compared with 20 in 2013) and 17 have adopted electricity decoupling (compared with 14 in 2013).

The types of decoupling generally fall into three categories: fixed and variable rate mechanisms; lost revenue recovery from commodity sales reductions due specifically to energy or water efficiency programs; and fixed revenue true-up mechanisms. Fixed and variable rate mechanisms have a high fixed rate component that may or may not include a set maximum commodity volume included in the fixed rate with the variable rate being the rate for partial or all volume use. The fixed rate is intended to cover all or most fixed costs. Fixed rates are rarely used in the electric or gas utility industries but are frequently used for water utilities. Lost revenue recovery mechanisms allow the utility to collect the revenue lost directly from specific sales reductions due to energy or water efficiency programs. True-up mechanisms set a fixed overall level of revenues with the utility allowed to recover a shortfall in revenues from the fixed level in higher rates. Nadel and Herndon[4] discuss the future of the energy utilities industries and the role that decoupling as a form of alternative ratemaking may play in that future. Also, see Carter[5], Cavanaugh[6], Eto, Stoft, and Belden[7] and the American Council for an Energy Efficient Economy and Natural Resource Defense Council websites for discussion on the trends, theory and implementation of decoupling and various decoupling mechanisms.

One key consideration in many US regulatory rate proceedings and policy discussions is the impact of decoupling on the investment risk of a public utility and, subsequently, its cost of common equity (and therefore the allowed rate of return set by regulators). Since decoupling disassociates revenues from sales volumes, the intended impact is that it generates an increasingly stable and non-declining level of revenues and net income if sales do decline. Therefore, the public utility is expected to be perceived by investors as having lower investment risk, which would lead to a lower cost of common equity capital, that is, the investor required return.

Decoupling can also be viewed as exacerbating investment risk rather than decreasing it. To the extent that investors are concerned about a changing regulatory regime, uncertainty about the measurement of the savings impacts of conservation programs may exacerbate investors' perceived risk and the cost of common equity.

Decoupling is implemented with the intention of reducing or eliminating volume risk and therefore potentially affects the cost of common equity as stated above. If the utility hedges volume risk due to weather, which is the most likely cause of demand shocks to electric, gas or water commodities, hedging derivatives[8] allow the utility to insure such risk. If the utility hedges most of the commodity demand risk while meeting demand regardless of compensation mechanisms, the risk may fall or may not fall depending on the degree of diversification in the investor portfolio. For example, weather risk may or may not affect all common stocks in an investor's portfolio. Should a utility incur costs to hedge risks that do not materialize into an adverse effect, the hedges may not payoff. Therefore, volume risk is not always alleviated with decoupling. Essentially, the question is that although the risk of the business is not changed by reward mechanisms, as demand shocks (positive or negative) still occur, do investors perceive, as do some regulators and utility management, that decoupling reduces risk? While a change in the reward structure does not change the fundamental riskiness of a firm, it is the investors' perceived risk that affects the cost of common equity. While this is not likely to occur in an efficient market, it is not so obvious that financial markets are efficient. The existence of an efficient market is one of a number of assumptions that has been relaxed in the derivation of the recently developed financial model used in this paper. It is commonly known as the predictive risk premium model and technically known as the generalized consumption asset pricing model (GCAPM).[9]

The topic of this paper has been the subject of only a few empirical investigations so far by Wharton and Vilbert[10] and Vilbert, Wharton, Zhang and Hall[11] {collectively referred to as Wharton, et al. (2015, 2016)}. Moody's[12] has estimated the change in business risk and credit metrics due to decoupling, but not the impacts on the cost of capital.

[2] In response to the challenges to achieving the allowed return on common equity due to expected significant capital expenditures to repair and replace utility infrastructure, as well as declining per capita commodity consumption, the National Association of Regulatory Utility Commissioners (NARUC) recommends that regulators carefully consider and implement appropriate ratemaking measures so that water and sewer utilities have a reasonable opportunity to earn their allowed rate of return on common equity. Decoupling, or revenue adjustment stabilization mechanisms (RAM) separate rates / revenues from electricity, gas or water volumes sold. Such mechanisms address the effects of the more efficient use of the commodity and declining per capita consumption, for water, and to a lesser extent, electricity, while maintaining the financial soundness and viability of the utilities. With RAMs, utilities are made whole for revenue shortfalls from allowed revenues used to design rates, which generally result from weather and conservation efforts by customers. RAMs allow for the recovery / crediting of differences between actual and allowed quantity charge revenues. RAMs seem to be effective in mitigating the effects of regulatory lag and improving utilities' opportunities to earn their allowed returns on common equity while upgrading infrastructure, ensuring safe and reliable service, removing the incentive to sell more commodity, and helping to protect valuable natural resources. However, in base rate cases for utilities that have such mechanisms, the question often arises as to whether and to what extent the presence of such mechanisms reduces the utility's investment risk as well and to what extent such a perceived or actual reduction in risk should be reflected in the allowed return on common equity.

[3] National Resources Defense Council. (2018). www.nrdc.org/resources/gas-and-electric-decoupling.

[4] Nadel, S., and G. Herndon. (2014). The future of the utility Industry and the role of energy efficiency. American Council for an Energy Efficient Economy, Report Number U1404.

[5] Carter, S. (2001). Breaking the consumption habit: Ratemaking for efficient resource decisions. Electricity Journal, 14, 66-74.

[6] Cavanaugh, R. (2013). Report: "Decoupling" is transforming the utility industry. Natural Resources Defense Council.

[7] Eto, J., S. Stoft, and T. Belden. (1997). The theory and practice of decoupling utility revenues from sales. Utility Policy, 6, 43-55.

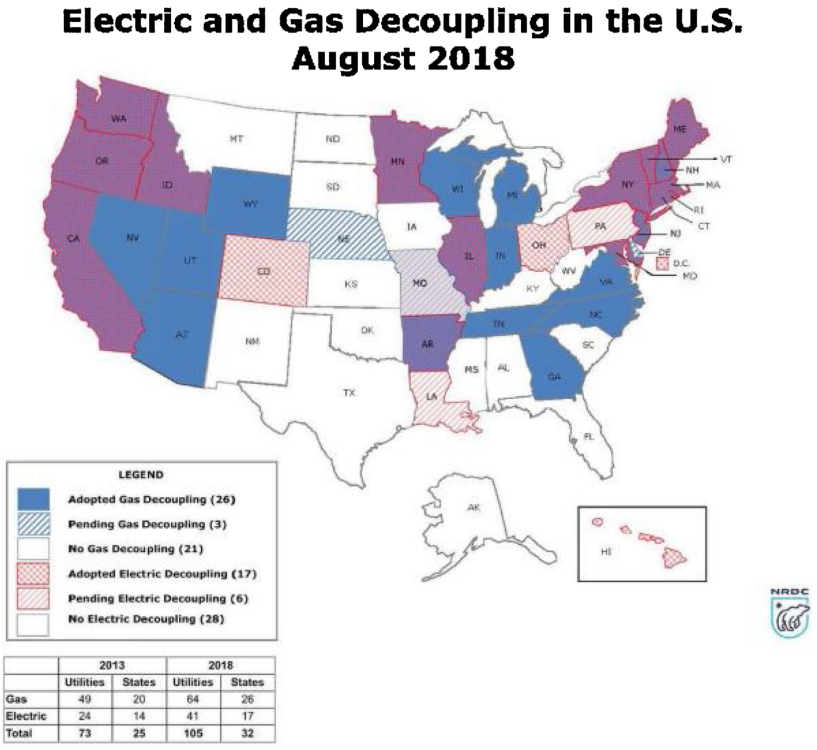
[8] Water derivatives, although not traded in markets as are gas and electricity futures and forwards, are created through private contracts. Some water distribution systems are interconnected to others and have various contracting structures for buying water if a demand shock should cause the need for more water that the incumbent system cannot supply. Some sewer systems have similar contracts to transfer excessive wastewater flows to another utility's treatment plant if their own capacity reaches its limit.

[9] A less technical discussion of this model can be found in "Comparative Evaluation of the Predictive Risk Premium Model, the Discounted Cash Flow Model and the Capital Asset Pricing Model for Estimating the Cost of Common Equity Capital," by Richard A. Michelfelder, Pauline Ahern, Dylan D'Ascendis and Frank Hanley, *The Electricity Journal*, 26, 2013.

[10] Wharton, J. and M. Vilbert. (2015). Decoupling and the cost of capital. The Electricity Journal, 28, 19-28.

[11] Vilbert, M., J. Wharton, S. Zhang, and J. Hall. (2016). Effect on the cost of capital of ratemaking that relaxes the linkage between revenue and kwh sales, an updated empirical investigation of the electric industry. A Brattle Group Report.

[12] Moody's Investors Service. (2011). Decoupling and 21st Century Ratemaking. Special Comment.



	2013		2018	
	Utilities	States	Utilities	States
Gas	49	20	64	26
Electric	24	14	41	17
Total	73	25	105	32

Fig. 1. Electric and Gas Decoupling in the U.S. August 2018.
Source: https://www.nrdc.org/resources/gas-and-electric-decoupling, accessed March 31, 2019.

There are no empirical studies on water utilities such as those performed in this study.

Wharton, et al. (2015, 2016) concluded that decoupling has no statistically significant measurable impact on the public utility cost of common equity. They found that while decoupling may reduce revenue volatility, it may not reduce investment risk. In fact, they find that it may actually exacerbate risk as decoupling regulatory policy is viewed as a new and uncertain regime and may be used to promote other regulatory policy goals and create regulatory risk.[13] Reductions in peak loads and the commodity sales impacts of consumer energy or water efficiency measures are difficult and expensive to estimate. This difficulty introduces an additional regulatory risk that may result in exposure to regulatory financial penalties due to the uncertainties associated with such efficiency estimation. Thus, Wharton, et al. (2015, 2016) concluded that on a net basis, decoupling may increase the investment risk of utilities.

Chu and Sappington[14] developed an economic model that investigated under what conditions a utility would provide an economic value maximizing level of energy efficiency services to its consumers. Their investigation is important to our discussion as decoupling is implemented as a tool to incent (or remove the disincentive) utilities to encourage consumers to invest in the optimal level of end-use efficiency resources. In considering the use of decoupling, they found that, generally, decoupling alone is not sufficient to induce utilities to provide the optimal level, that is, enough energy efficiency services. Khazzoom[15,16] found that one problem is that end-use energy efficiency resources cause a rebound effect whereby lower utility bills cause consumers to increase their energy use as they buy more comfort with their bill savings.

Depending on the specific conditions facing a utility, decoupling may not generate a profit motive for utilities to reduce sales through energy or water efficiency. Utilities could be placed in the position of delivering the predicted amount of energy or water savings expected by regulators but possibly without any profit motive other than the avoidance of regulatory penalties for not meeting a goal. This disincentive has become a major topic relative to alternative ratemaking mechanisms, as the growth in electricity sales is currently less correlated with the growth rate in the US GDP relative to the past, with such sales growing more slowly than the general economy in recent years.[17]

Since the US is widely adopting decoupling (revenue caps) whereas the EU is doing the same with price caps, it is an ongoing natural experiment that allows for comparisons of the consumer value and

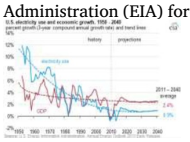
[13] Since multiple types of risk are discussed, we generically define risk as the chance of a disappointment in financial performance.

[14] Chu, L.Y., and D.E.M. Sappington. (2013). Motivating energy suppliers to promote energy conservation. Journal of Regulatory Economics, 49, 227-249.

[15] Khazzoom J.D. (1980). Economic implications of mandated efficiency in standards for household appliances. Energy Journal, 1, 21–39.

[16] Khazzoom J.D. (1987). Energy savings resulting from the adoption of more efficient appliances. Energy Journal, 8, 85–89.

[17] US Energy Information Administration. (2013). Annual Energy Outlook 2013 Early Release US electricity use is expected to experience an annual average growth rate of 0.9% compared with a 2.4% US GDP annual growth rate between 2011 and 2040, according to the US Energy Information Administration (EIA) forecast in 2013, as demonstrated in the EIA graph below:



shareholder value performance between EU price cap utilities and US decoupled utilities. However, since the EU has not adopted decoupling, the data are not available to include EU decoupled utilities in this study.

Since decoupling, as a regulatory policy tool, is being adopted rapidly in the US, Edison Electric Institute, the US electric utility trade association {EEI(2015)}[18] finds that questions arise in regulatory rate proceedings regarding the impacts on the cost of common equity. Due to the importance of this issue and the lack of related literature, we investigate the impact of decoupling on the investor perceived risk of public utilities and resultant cost of common equity.

2. The modeling approach

This paper uses the GCAPM developed by Michelfelder and Pilotte[19] to estimate the impact of decoupling on the public utility cost of common equity[20] . The GCAPM is a financial valuation model recently developed as an alternative to the capital asset pricing model and the dividend discount model for estimating the cost of common equity. Ahern, Hanley, and Michelfelder[21] and as Michelfelder[22] review and apply the GCAPM to estimate public utilities' cost of common equity.

The GCAPM model has fewer restrictions than most financial models. Unlike the CAPM, the GCAPM prices the total risk actually faced by the investor and does not assume that all unsystematic risk is diversified away, which is a key foundation of the standard CAPM.[23] Thus, the priced risk in the GCAPM is based on the level of risk actually faced by the investor, not the risk theoretically imposed by the CAPM. In addition, Fama and French[24] find that the CAPM understates returns and risk, based on a large empirical study of portfolios of common stocks with a continuum of low to high betas. The GCAPM also does not assume or require the efficient markets assumption as does the CAPM.

In the GCAPM, the anticipated risk premium on an asset or common stock depends on the anticipated volatility of that asset's risk premium. The anticipated volatility in the risk premium is driven by current and past risk premia and shocks to the premium. The variances of rates of return are highly correlated with past such variances.

Another property of the model allows us to infer whether decoupling causes a public utility common stock to be a business cycle hedge {Michelfelder and Pilotte (2011)}. This is indicated by the sign of the slope of the risk premium and anticipated volatility. If profits rise or are flat as GDP declines with lower commodity sales and stable revenues, the common stock price could systematically rise when the business cycle is contracting.[25] A public utility with a strong level of decoupling could conceivably experience stable revenues during a contraction in the business cycle. Therefore, utility profits may rise, or at least not fall, when commodity sales fall generated by consumer end-use efficiency and contracting GDP.

To calibrate the GCAPM, we perform a simple test of this property by estimating the model with the risk premium on gold (percent change in the price of gold per troy ounce minus a risk-free rate). Gold is commonly known to be a business cycle and common stock market hedging asset as noted by Hillier, Draper, and Faff[26] . Hillier, Draper, and Faff (2006) show that gold is a common stock market hedge, especially during abnormally high periods of common stock market volatility. Our calibration test results indicate that that the GCAPM model does indeed detect a hedging asset as the slope of the risk premium on its volatility is negative.[27]

The GCAPM can be applied to any asset that is traded in any financial market and therefore can be applied to all traded public utility common stocks. The GCAPM has the added advantage that the decoupling impact on changes in common stock returns as well as the conditional volatility of these returns can be estimated separately within the same model.

Decoupling is expected to lower the variance of the operating cash flows of a public utility due to the increased stability of revenues. The variance of operating cash flows should be driven mainly by the variance of costs[28] Since the volatility of revenues is theoretically equal to zero with decoupling, the covariance of revenues and costs is zero as revenues do not vary, and volatility of *OCF* is purely driven by costs only as *VAR* (R – C) = *VAR (C)*.[29] This is essentially the model used by Moody's (2011)[30] which found that utilities with decoupling experienced a reduction in business risk as measured by the change in the standard deviation of the growth rate in gross profit before and after decoupling.

We also estimate changes in systematic investment risk resulting from decoupling by analyzing the change in the short-term (12-month) CAPM beta (β). This short-term beta, a measure of systematic risk, should be more sensitive to regulatory regime changes, such as, for example, decoupling, relative to the standard betas estimated with five years of data typically employed to assess investment risk. Beta is expected to decline with decoupling.[31]

The only other studies on the impact of decoupling on the utility cost of capital, Wharton, et.al. (2015, 2016)[32,33] estimated the impact of decoupling on the cost of capital for the overall electric and gas utility industries. They also addressed the issue that decoupled subsidiary utilities may represent substantially less than the entire portfolio of assets reflected in the common stock price of a holding company. Using the standard dividend discount model to estimate the cost of common equity portion of their weighted average cost of capital

[18] EEI, Alternative Regulation for Emerging Utility Challenges: 2015 Update.

[19] Michelfelder, R.A., and Eugene A. Pilotte. (2011). Treasury bond risk and return, the implications for the hedging of consumption and lessons for asset pricing. Journal of Economics and Business, 63, 582-604.

[20] The model is based on generalizing variants of intertemporal capital asset pricing models. The literature discussing the development of the model based on more restrictive versions is voluminous and summarized by Michelfelder and Pilotte (2011) and therefore not repeated here.

[21] Ahern, P., F. J. Hanley, and R.A. Michelfelder. (2011). New approach for estimating of cost of common equity capital for public utilities. Journal of Regulatory Economics, 39, 261-278.

[22] Michelfelder, R.A. (2015). Empirical analysis of the generalized consumption asset pricing model: estimating the cost of common equity capital. Journal of Economics and Business, 80, 37-50.

[23] There is no perfect portfolio that removes all idiosyncratic risk as assumed in the development of the CAPM. Unsystematic risk is reduced but not completely mitigated with a highly diversified portfolio and the standard CAPM understates the cost of common equity as it does not price all risk exposure.

[24] Fama, E., and K. French. (2004). The capital asset pricing model: Theory and evidence. Journal of Economic Perspectives, 18, 25-46.

[25] One of the most effective "energy efficiency tools" to generate energy use reduction is a recession. Although the energy-use-US-GDP correlation has declined, it remains substantially positive {EIA (2013), as shown in the figure in footnote 18 above, www.eia.gov/todayinenergy/detail.php?id=10491}.

[26] Hillier, D., P. Draper, and R. Faff. (2006). Do precious metals shine? An investor's perspective. Financial Analysts Journal, 62, 98-106.

[27] All empirical results on gold are available on request.

[28] Operating Cash Flows (*OCF*) is Revenues (*R*) – Cost (*C*), therefore the variance of *OCF* is *VAR (R – C) = VAR (R) + VAR (C) + 2COV (R,C).*

[29] Therefore, in comparing the variance of operating cash flows with and without decoupling, the *VAR (OCF with decoupling) = VAR (C) < VAR (OCF without decoupling) = VAR (R) + VAR (C) + 2COV (R,C)* as *VAR (R) = 0* and *COV (R,C) = 0* with decoupling and *VAR (R) > 0* and *COV (R,C) ≠ 0* without decoupling.

[30] Moody's Investment Services, "Decoupling and 21st Century Ratemaking", Special Comment, November 4, 2011.

[31] Systematic risk is defined as the correlation of an individual common stock's and the market total rates of return

[32] Wharton, J. and M. Vilbert. (2015). Decoupling and the cost of capital. The Electricity Journal, 28, 19-28.

[33] Vilbert, M., J. Wharton, S. Zhang, and J. Hall. (2016). Effect on the cost of capital of ratemaking that relaxes the linkage between revenue and kwh sales, an updated empirical investigation of the electric industry. A Brattle Group Report.

estimates, they regressed this cost of capital on an intensity index of decoupling for each publicly-traded utility common stock to estimate the industry impact. They found no statistically significant impact of decoupling on the cost of capital.

The present study estimates the impact on the cost of common equity of the decoupled firm individually rather than that on an industry as a whole. We use the GCAPM and changes in beta before and after the implementation of decoupling to estimate the impact on risk and the cost of common equity.

3. Methodology

Two versions of the GCAPM model are estimated.[34] Both estimations use a binary variable to reflect the implementation of decoupling for a specific utility with a value of 1 with decoupling and 0 if otherwise.

These results provide separate empirical estimates of the impacts of decoupling on the public utility common stock returns as well as volatility of the returns (risk). As event studies, these and all financial market-based event studies face the question of when the event impacted asset prices, as they can reflect forthcoming events before they are implemented. One example that is relevant for this study is when decoupling implementation was announced in a utility's regulatory decision. We find that using the date of implementation is a conservative approach to estimating the impact as it is most likely the latest date that a decoupling impact would be detected in a common stock price with much of the impact already priced in the asset. However, if a utility's revenues have been decoupled from sales to the extent that revenues are not affected by the business cycle, then the utility's common stock as a hedging asset would be detected in a zero or negative risk-premium-to-volatility slope. Also, if a sufficiently long pre-decoupling time period for observing returns and volatility is available, the change in the post-period should be detected as all of the post-decoupling period returns and volatilities are in a different business risk regime.

4. Data

We perform the empirical work on US utilities only. As discussed in the Introduction, decoupling had not yet been adopted in the EU at the time of this study. The group of US public utility common stocks includes all electric as well as electric and gas combination companies that have 95 % or more of their revenues decoupled and water utility common stocks that have all of their revenues decoupled before 2014. Data for the common stock rates of return are the total monthly rates of return on the common stock of the public utilities from the Center for Research in Security Prices database (CRSP) of the University of Chicago. Data for each public utility common stock include differing pre- and post-decoupling dates and therefore differing rate of return and beta samples. The pre-decoupling data for each common stock include all available past monthly returns data in the CRSP before decoupling for that common stock. Post-decoupling rate of return data for all common stocks end at December 2014 for consistency in the post-decoupling ending period for all utility common stocks. We calculated historical monthly common stock equity risk premiums (monthly common stock returns less the monthly yields on long-term U.S. Treasury Bonds for the selected publicly traded water utilities using common stock returns data from the CRSP database and Morningstar (2015) SBBI® 2015 Market Results for Stocks, Bonds, Bill and Inflation 1926–2015[35] and the Federal Reserve Statistical Release H.15 for long-term Treasury bond yields. The CAPM beta data include all short-term betas available for each public utility common stock that has been decoupled in the CRSP database and ends at 2014. They are available on an annual basis. The CAPM short-term beta is a one-year estimate of beta that approximately involves regressing daily rates of return on the public utility common stock on a market index as shown footnote 31. The standard beta available from financial firm databases such as Value Line Investment Survey or CRSP are 5-year betas based on regressing monthly or weekly common stock rates of return for the past 5 years on a market index. We find that the longer-term beta would be less sensitive to regime changes in risk such as decoupling. We restrict the sample of pre- and post-decoupling betas for each common stock so that the number of beta observations are the same before and after decoupling.

Since the number of data observations has different times series of ranges for each public utility common stock and decoupling occurred on different dates for most utilities, we have developed Table 1 to show each public utility common stock's data date range, that is, the dates and number of risk premium (rate of return minus risk-free rate) observations used to estimate the GCAPM and the total number of betas used for the pre- and post beta comparison. Table 1 also has the date of decoupling for each public utility.

5. Results and discussion

Table 2 presents the public utility common stocks in the study and the empirical results of the GCAPM estimates. The risk-premium-to-volatility slopes re shown along with the decoupling slope in the risk-premium and volatility equations for each electric, electric and gas combination, and water utility common stocks. The decoupling slope in the risk-premium equation will be negative (positive) if the risk premium should decline (rise) and decoupling creates a reduction (increase) in business risk. None of these slope estimates are statistically significant. The decoupling slope in the volatility equation should be negative (positive) if decoupling caused a reduction (increase) in the volatility of the profit of the utilities. Two of the slopes are negative and significant at $p = 0.10$, yet the magnitudes of the slopes are very small.

All of the return-volatility slopes, except for one of the energy utilities are positive and significant, yet none in the water utility group are significant. These results indicate that the energy utility common stocks are not business cycle hedging assets and that their profits are synchronized with the business cycle. The results for the water group may indicate that they are business cycle hedging assets as none are statistically significant. The zero value for the water utility slopes imply that there is no relation between water utility rates of return and the business cycle. Water utility profits are not correlated with the business cycle even in the absence of decoupling. Also, water usage attrition is occurring across the US as households (water consumption per household is declining) due to the use of water-efficient appliances (such as low-flow faucets, showerheads and efficient toilets) and the change per capita water use behaviors to conserve water.

Table 3 presents the pre- and post-decoupling changes in the systematic risk as represented by the short-term CAPM beta for all of the public utility common stocks. Although, the betas drop after the implementation of decoupling, none of the changes in beta are statistically significant using a t-statistic at a $p = 0.05$. Additionally, the standard errors of the betas (σ_{pre} and σ_{post}) show no consistent pattern of increasing or decreasing after decoupling.

Our results do not show any statistically significant impacts of decoupling on the cost of common equity and risk. Therefore, we find no evidence to conclude that decoupling affects investor perceived risk or the cost of common equity. While electric and gas public utility common stocks were not found to be business cycle hedges, we do find that water utility common stocks may be business cycle hedges, or more likely, water usage and revenue simply have no relation with GDP.

Our results are based on the moderate amount of data available to date. Although we would obviously prefer more data than are available

[34] Specifications available on request.

[35] Morningstar® SBBI®. (2015). Market Results for Stocks, Bonds, Bills, and Inflation 1926 - 2014, Appendix A Tables.

Table 1
Data Description for Risk Premiums and Betas.

Electric, Elec. & Gas Comb. Utility	Effective Decoupling Date	Beginning of Measurement Period Returns Data	Total # of Months Return Data	Total Number of Pre- and Post- Annual Beta Observations
Consolidated Edison	10/2007	07/30/02	126	10
Pacific Gas & Electric	01/1983	01/31/53	720	60
Edison International	01/1983	01/31/53	720	60
CH Energy Group	07/2009	01/31/06	84	6
CMS Energy Corp.	05/2010	9/30/07	64	6
Hawaii Electric	12/2010	11/30/08	50	5
Portland General Electric	12/2010	11/30/08	50	6
Idaho Power	03/2007	05/30/01	140	12
Water Utility				
American States Water	1/2002	6/2002	153	12
California Water	1/2009	10/2001	162	12
Connecticut Water	7/2008	10/2002	150	10
Artesian Resources	11/2008	6/1996	226	12

Table 2
GCAPM Estimation Results.

Electric, Elec. & Gas Comb. Utility	Risk premium to volatility slope	Change in risk premium to volatility slope with decoupling	Decoupling Impact on Volatility Decoupling
Consolidated Edison	1.460***	0.004	–0.000
Pacific Gas & Electric	1.781***	0.001	–0.001
Edison International	1.379***	0.003	0.000
CH Energy Group	2.094***	0.004	–0.000
CMS Energy Corp.	1.440***	0.011	–0.000
Hawaii Electric	1.607***	0.004	–0.000*
Portland General Electric	0.461	0.010	–0.000
Idaho Power	1.939***	0.003	–0.000
Water Utility			
American States Water	0.596	0.011	0.000
California Water	0.525	0.004	–0.000
Connecticut Water	–1.008	0.009	0.000
Artesian Resources	3.006	–0.004	–0.002*

Table 3
Changes in Systematic Risk from Decoupling.[a]

Electric, Elec. & Gas Comb. Utility	Mean β_{PRE}	Mean β_{POST}	σ (β_{PRE})	σ (β_{POST})	t-Statistic
Consolidated Edison	0.608	0.427	0.172	0.064	–1.329
Pacific Gas & Electric	0.522	0.535	0.174	0.373	0.112
Edison International	0.588	0.582	0.199	0.294	–0.051
CH Energy Group	0.680	0.401	0.279	0.326	–0.759
CMS Energy Corp.	0.758	0.559	0.198	0.140	–0.815
Hawaii Electric	0.619	0.570	0.253	0.155	–0.171
Portland General Electric	0.637	0.658	0.069	0.052	–0.151
Idaho Power	0.905	0.728	0.251	0.125	–0.818
Mean	0.670	0.560			
Water Utility					
American States Water	0.975	0.623	0.535	0.279	–1.430
California Water	1.192	0.520	0.544	0.257	–2.735***
Connecticut Water	0.664	0.502	0.235	0.176	–1.232
Artesian Resources	0.075	0.146	0.100	0.161	0.909
Mean	0.434	0.475			

[a] Beta is the annual year-ending beta from the CRSP database. The data timeframe is different for each utility with an equal number of annual pre- and post-decoupling beta data observations for the specific stock in the CSRP database and ends in 2014. Each single beta was estimated with one year of daily rate of return data. See Table 1 and footnote 32. ***, **, * refers to statistical significance at 0.01, 0.05, and 0.10 respectively.

at this juncture, there is no time to wait for a larger volume of data as regulators and utilities have been and are implementing policy now as if decoupling does reduce business risk and, thus, the costs of capital without any evidence that it does. This paper serves as an early warning signal, albeit with the limited evidence that is available.

6. Conclusion and policy implications

We conclude that decoupling has no statistically measurable impact on the cost of common equity or business risk based on our empirical analysis for electric, electric and gas, and water utility common stocks. Some researchers may view this result as a "non-result." This is an important finding as it is consistent with the empirical findings of Vilbert, et al. It is also important for policy globally as decoupling is considered as a potential reducer to risk and the cost of common equity by regulators and public utilities in the US based on intuition, without any empirical evidence.

Moody's (2011) finds a reduction in business risk as measured by the change in the variability of gross profit after decoupling but did not estimate the impact on the cost of common equity. Moody's (2011) did find that electric utilities were somewhat reluctant to adopt decoupling as electric utility executives anticipated that growth in sales would return after the steep recession that ended with the business cycle trough in June 2009 as identified by the National Bureau of Economic Research[36] . Since the US business cycle expansion post-June 2009, electricity sales have remained almost flat, which may have caused the change in sentiment toward decoupling by electric utility executives. Growth in a utility's commodity sales above the level used to design regulated rates would increase the profit and rate of return on common equity. The US investor-owned electric utility industry also expected that the adoption of decoupling would cause state public utility regulators to reduce their allowed rate of return under the notion that it reduces risk. Moody's (2011) was written soon after the recession had ended, but the anticipated growth in sales has not materialized after more than ten years into the US business cycle expansion. A few years after the Moody's (2011) study, in a more recent report, the EEI found a change in sentiment {EEI (2015)} that electric utilities favor decoupling and that it has become more widespread across the US.

Although we conclude that decoupling has no statistically significant impact on investor perceived risk and the cost of common equity, this does not mean necessarily that decoupling has no impact on the perceived risk and the cost of common equity of public utilities. We find that it cannot be isolated and estimated, given the many other factors affecting investor perceived risk. For many electric utilities, some current major risk drivers are flat or declining sales from customer-owned solar projects and energy efficiency resources; the

[36] National Bureau of Economic Research. (2018). NBER.org.

requirement to buy back excess customer generated electric from renewable resources at full retail rates (net metering); increasing requirements in the proportion of a utility's sales that have to be generated from renewable energy, causing larger purchases of renewable energy credits (known as renewable portfolio standards that have been adopted by many states and across Europe); increasingly stringent environmental regulations on coal plants; and the impact of falling and low natural gas prices on the competitiveness of existing coal and nuclear plants.

For water utilities, we find their common stocks to be moderate business cycle hedges (no correlation with the business cycle rather than a strong negatively correlated hedge). Since water utility sales are declining on a per capita basis and unassociated with the business cycle, decoupling may provide financial protection if water revenues decline. To the extent that there is positive growth in the number of water utility customers that offsets the declining per capita consumption, total revenues and sales may not be falling. The impact of decoupling on water utility investment risk and cost of common equity was not able to be detected in this study. This is the first study on decoupling in the water utility industry and provides an area for future research.

Another explanation for the lack of detection of a change in risk or the cost of common equity from decoupling is that risk may be created with the implementation of decoupling and the net impact may not be clear as an increase or decrease in risk as Vilbert, et al. They find that the implementation of decoupling is a new and alternative regulatory regime that may be a new source of regulatory risk for the utility. Finally, as discussed in detail in the Introduction above, volume risk, that is, the fundamental nature of the business and business risk, is not alleviated by changing the reward mechanism, and attempts to do so may increase risk and the cost of common equity. The point is that there are cogent theoretical and practical bases to expect that decoupling increases or decreases risk, so it is problematic to develop an *a priori* hypothesis to test a one-way directional impact of risk and return from decoupling.

Therefore, we do not recommend that public utility regulators in the US or elsewhere reduce common equity cost rates in the presence of decoupling mechanisms based on the assumption of reduced risk. The impact is *de minimis* and not statistically significant amongst all of the other investor perceived risk factors affecting the market prices of public utility common stocks. While an alternative research approach may attempt to isolate the impacts of other individual risk factors on the cost of common equity and risk, making for a long regression equation, we cannot detect a statistically significant signal of decoupling on the cost of common equity or volatility. As a contrast, for example, the risk and cost of common equity impact of owning nuclear power generation assets (versus no nuclear assets) has a measurable impact on investors' returns, risk and cost of common equity without attempting to isolate the myriad of other risk variable impacts. Decoupling as a regulatory policy mechanism to encourage public utilities to provide resources and funding to their consumers to conserve electricity, natural gas, and water (therefore also wastewater flows) has no *measurable* impact on the investment risk and the cost of common equity (either up or down). As a policy prescription, public utility regulators should not adjust the allowed rate of return which affects the public utility's rates as a spillover impact of using decoupling to promote environmental policy.

Finally, the US may be further ahead in adopting rate mechanisms that address energy and water efficiency due to its long-term lag relative to Europe in the efficient use of energy and water and the recent "necessity-is-the-mother-of-invention" US driver of energy and water efficiency. European and other global regulators should proceed slowly in adopting decoupling and assuming that decoupling reduces risk as there is no empirical evidence to date that it does.

An extension of this research could evaluate risk premiums or discounts in bond yields as there are many more investor-owned utilities which have outstanding bonds relative to those that have their own publicly traded common stock due to consolidation in the utility industry in the US. For example, Exelon is the holding company of six utilities whose stocks were publicly traded on the New York Stock Exchange. They are Atlantic City Electric, Baltimore Gas and Electric, Commonwealth Edison, Delmarva Power and Light, Philadelphia Electric and Potomac Edison Power. Another future extension could focus on decoupling when some EU investor-owned utilities and regulators, inevitably, adopt decoupling should it prove to substantially encourage more conservation in the US. An investigation of hedging costs and savings, risk impacts, and effects on profits with and without decoupling may shed more light on the topic. More research is also needed on water decoupling as this is the first study known to date on the topic involving cost of capital and risk. Lastly, a comparison that separates consumer and shareholder value creation and investigating the impacts on conservation from price and revenue caps is another extension of this paper for future research.

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Decoupling impact and public utility conservation investment

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ABSTRACT

Public utilities and regulators are implementing various forms of regulatory mechanisms that decouple revenues from commodity sales to remove a disincentive or create an incentive for utilities to invest in and encourage consumers to conserve electricity, natural gas and water. A major question is whether such regulatory mechanisms affect investor-perceived risk, the cost of common equity and the utility rates of such commodities. This is an important question as regulators in the US are and have been considering the impact of decoupling on investment risk and therefore the cost of common equity in rate proceedings. This matter is also important for regulators globally as they consider decoupling as a policy initiative in setting rates and rate of return. Currently, decoupling is primarily a US ratemaking policy for energy and water utilities as are price caps in Europe. Empirical testing, based on the available data in the US, consistently demonstrates that decoupling has no statistically measurable impact on risk and the cost of common equity. Therefore, at this juncture, policy is moving ahead, at least in the US, without empirical evidence on whether it does have impact on risk and return.

1. Introduction

Beginning in the late 1970s, US policymakers, legislators, regulators and public utilities began to focus on reducing consumers' demand for energy rather than increasing supply. This was mainly a reaction to the oil supply shock in the US in the early 1970s, which began with the National Energy Conservation Act of 1978. Europe was already much more efficient in the use of energy by the 1970s as the BTU content of GDP of many European countries was a substantially small fraction relative to the US.

More recently in the US, regulatory policy has required water utilities to encourage the reduction in water use by their consumers. The US and European utility industries seem to observe each other's experiments in decoupling and price caps before adopting such alternative ratemaking policy movements. Price cap regulation, where utility prices are allowed to rise to a cap set by an inflation index minus a total factor productivity offset that reflects potential cost savings (known as $RPI - X$), was implemented decades ago for British utilities. Only afterward was it adopted by many other utilities in Europe (EU). However, it has largely not been adopted in the US as very few utilities are under price cap regulation except for telecommunications local exchange carriers. On the other hand, decoupling, which effectively disassociates revenue levels from commodity (electric, gas or water) sales has been sweeping across the US in the last two decades for energy and water utilities, while being not adopted in Europe.

Campini and Rondi (2010) show that alternative rate mechanisms in the EU have been in the form of price caps to promote efficient investment and operating expenditures. There is no mention in that article of decoupling. They also point out that since many utilities in the EU are government owned there has not been any major adoption of alternative regulatory rate making methods across the utility industry as government utility rates are not regulated. Therefore, this study is limited to analyzing decoupling in the US, as it is still almost exclusively a regulatory tool implemented in the US.

A major financial impediment preventing investor-owned utilities from encouraging conservation of energy and water usage and sales is the profit disincentive associated with subsequent revenue and profit reductions. Therefore, various regulatory policy mechanisms have been developed to provide utilities with a financial incentive, or, at least, remove the disincentive to utilities to encourage energy and water efficiency. Some mechanisms have been the inclusion of conservation expenditures in rate base so the such expenditures earn a return. Other mechanisms allow for a profit incentive equal to a proportion of the life cycle of net benefits, as well as rate of return premiums for meeting or exceeding conservation goals. Increasingly, revenues are being decoupled from sales volumes so that reductions in sales volumes will

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potentially stabilize profits rather than reduce them.[1] Decoupling revenues from sales volumes was first implemented in California in 1982 and in New York in the 1980s. Although decoupling did not gain momentum outside of California and New York for decades afterward, it has recently been implemented in various state regulatory jurisdictions across the US for electric, natural gas, and water public utilities. Fig. 1 is a map depicting the extent of decoupling across the US developed by the National Resources Defense Council (2018). Although it shows the extent of decoupling across the US for electricity and natural gas utility industries, it does not show the same for water/wastewater utility industries. Fig. 1 shows that as of August 2018, 26 states have adopted gas decoupling (compared with 20 in 2013) and 17 have adopted electricity decoupling (compared with 14 in 2013).

The types of decoupling generally fall into three categories: fixed and variable mechanisms, lost revenue recovery from commodity sales reductions due specifically to energy or water efficiency programs, and fixed revenue true-up mechanisms. Fixed and variable rate mechanisms have a high fixed rate component that may or may not include a set maximum volume of the commodity included in the fixed rate and the variable component is the rate for partial or all volume use. The fixed rate is meant to cover all or most fixed costs. They are rarely used in the electric or gas utility industries but are frequently used for water utilities. Lost revenue recovery mechanisms allow the utility to collect the revenue lost directly from the specific sales reductions due to energy or water efficiency programs. True-up mechanisms set a fixed overall level of revenues and the utility can recover a shortfall in revenues from the set level in higher rates. Nadel and Herndon (2014) discuss the future of the energy utilities industries and the role that decoupling as a form of alternative ratemaking may play in that future. Also, see Carter (2001), Cavanaugh (2013), Eto et al. (1997) and the American Council for an Energy Efficient Economy and Natural Resource Defense Council websites for discussion on the trends, theory and implementation of decoupling and various decoupling mechanisms.

One key consideration in many US rate proceedings and policy discussions is the impact of decoupling on the investment risk of a public utility and its cost of common equity (and therefore the allowed rate of return set by regulators). Since decoupling disassociates revenues with sales volumes, the intended impact is that it generates an increasingly stable and non-declining level of revenues and net income if sales do decline. Therefore, the public utility is expected to be perceived by investors as having lower investment risk, which would lead to a lower cost of common equity capital, i.e., the investor required return.

Decoupling can also be viewed as exacerbating investment risk rather than decreasing it. To the extent that investors are concerned about a changing regulatory regime, uncertainty about the measurement of the savings impacts of conservation programs, partially implemented or gamed mechanisms, to name a few potential issues associated with such an alternative ratemaking mechanism, may exacerbate investors' perceived risk and the cost of common equity.

Decoupling is implemented with the intention to reduce or eliminate volume risk and therefore potentially the cost of common equity as stated above. If the utility hedges volume risk due to weather, which is the most likely cause of demand shocks to electric, gas or water commodities, hedging derivatives[2] allow the utility to insure such risk. If the utility hedges most of the commodity demand risk while meeting demand regardless of compensation mechanisms, the risk may fall if the volume risk is systematic. Whether such weather risk is systematic or not is questionable as weather shocks do not affect most common stocks in a highly diversified portfolio nor the business cycle that drives the systematic risk of a market portfolio. It may not be systematic even within a utility-only portfolio as weather patterns can be diversified away with geographical diversification. If weather happens to have a systematic effect on the risk of the public utility common stock, it is conceivable that cost-effective hedges may reduce risk and the cost of common equity. Should the utility hedge risks that do not materialize into an adverse effect such as a demand shock, they incur costs to do so, and the hedges do not payoff. That is, they spend too much on hedged positions or insurance or take title to commodity that they cannot sell, such as with a take-or-pay contract, thus facing increased risk, costs and higher costs of common equity. Therefore, volume risk is not actually alleviated with decoupling. Essentially, the question is that although the risk of the business is not changed by reward mechanisms, as demand shocks (positive or negative) still occur, do investors perceive, as do some regulators and utility management, that decoupling reduces risk? A change in the reward structure does not change the fundamental riskiness of a firm. It is the investors' perceived risk that affects the cost of common equity. This would not seem to occur in an efficient market, but it is not so obvious that financial markets are efficient.

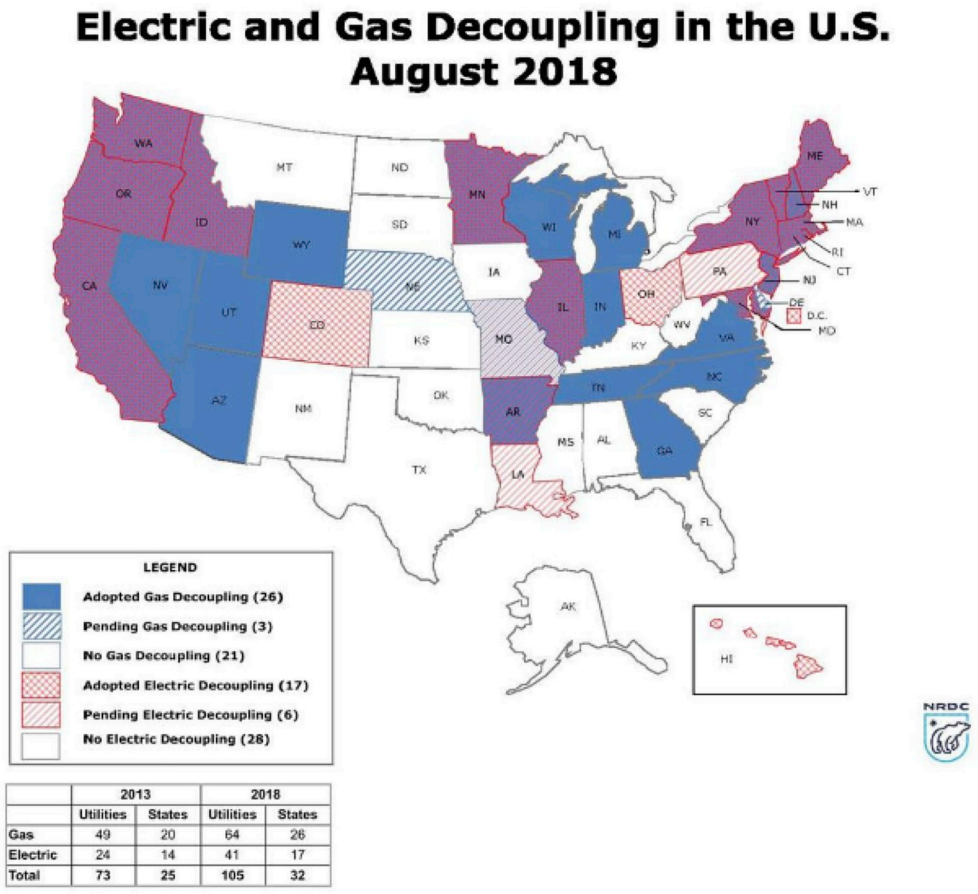
An efficient market is one of a number of assumptions that has been relaxed in the derivation of the generalized consumption asset model (GCAPM) used in this paper. As one example of inefficiency, cash flows generate the fundamental value of a firm, yet the best predictor of common stock prices statistically is earnings per share growth rates, not cash flow per share growth. Investors seem to erroneously price common stocks with earnings, not cash flow based on their perceptions of what affects common equity financial value.

The topic of this paper has been the subject of only a few empirical investigations so far by Wharton and Vilbert (2015) and Vilbert et al. (2016). Moody's (2011) has estimated the change in business risk and credit metrics due to decoupling, but not the impacts on the cost of capital. There are no empirical studies on water utilities such as those performed herein.

Wharton and Vilbert (2015) developed an index of decoupling exposure for public utility and utility holding company common stocks and estimated the after-tax weighted average cost of capital (ATWACC) using the dividend discount model to estimate the cost of common equity. They regressed the ATWACC on an index of decoupling intensity for each public utility in their sample and observed the slope to

[1] In response to the challenges to achieving the allowed return on common equity due to expected significant capital expenditures to repair and replace utility infrastructure, as well as declining per capita commodity consumption, the National Association of Regulatory Utility Commissioners (NARUC) recommends that regulators carefully consider and implement appropriate ratemaking measures so that water and sewer utilities have a reasonable opportunity to earn their allowed rate of return on common equity. Decoupling, or revenue adjustment stabilization mechanisms (RAM) separate rates/revenues from electricity, gas or water volumes sold. Such mechanisms address the effects of the more efficient use of the commodity and declining per capita consumption, for water, and to a lesser extent, electricity, while maintaining the financial soundness and viability of the utilities. With RAMs, utilities are made whole for revenue shortfalls from allowed revenues used to design rates, which generally result from weather and conservation efforts by customers. RAMs allow for the recovery/crediting of differences between actual and allowed quantity charge revenues. RAMs seem to be effective in mitigating the effects of regulatory lag and improving utilities' opportunities to earn their allowed returns on common equity while upgrading infrastructure, ensuring safe and reliable service, removing the incentive to sell more commodity, and helping to protect valuable natural resources. However, in base rate cases for utilities that have such mechanisms, the question often arises as to whether and to what extent the presence of such mechanisms reduces the utility's investment risk as well and to what extent such a perceived or actual reduction in risk should be reflected in the allowed return on common equity.

[2] Water derivatives, although not traded in markets as are gas and electricity futures and forwards, are created through private contracts. Some water distribution systems are interconnected to others and have various contracting structures for buying water if a demand shock should cause the need for more water that the incumbent system cannot supply. Some sewer systems have similar contracts to transfer excessive wastewater flows to another utility's treatment plant if their own capacity reaches its limit.



	2013		2018	
	Utilities	States	Utilities	States
Gas	49	20	64	26
Electric	24	14	41	17
Total	73	25	105	32

Fig. 1. Trend in Energy Utility Decoupling in the US. Source: https://www.nrdc.org/resources/gas-and-electric-decoupling, accessed March 31, 2019

estimate the impact. Although the slope of the regression is negative, it is not statistically significant. They concluded that decoupling has no statistically significant measurable impact on the public utility cost of common equity. They found that decoupling may reduce revenue volatility, but it may not reduce investment risk. They find that it may actually exacerbate risk as decoupling regulatory policy is viewed as a new and uncertain regime and may be used to promote other regulatory policy goals and create regulatory risk.[3]

Reductions in peak loads and the commodity sales impacts of consumer energy or water efficiency measures are difficult and expensive to estimate. This difficulty introduces an additional regulatory risk that may result in exposure to regulatory financial penalties due to the uncertainties associated with such efficiency estimation. Thus, Wharton and Vilbert (2015) concluded that on a net basis, decoupling may increase the investment risk of utilities.

Chu and Sappington (2013) developed a social welfare model that investigated under what conditions a utility would provide a welfare maximizing level of energy efficiency services to its consumers. Their investigation is important to our discussion as decoupling is implemented as a tool to incent utilities to encourage consumers to invest in the optimal level of end-use efficiency resources. In considering the use of decoupling, Chu and Sappington (2013) found that, generally, decoupling alone is not sufficient to induce utilities to provide the socially optimal level, that is, enough energy efficiency services. One problem is that end-use energy efficiency resources cause a rebound effect {Khazzoom (1980, 1987)} whereby lower utility bills cause consumers to increase their energy use as they buy more comfort with the savings.

Chu and Sappington (2013) also discuss that, if the price of electricity is above the private marginal cost (in contrast to social marginal cost), falling sales reduce the utility's profits.[4] Since public utility ratemaking uses average cost to set rates, this is a highly unlikely occurrence to find price above marginal cost. Depending on the specific conditions facing a utility, decoupling may not generate a profit motive for utilities to reduce sales through energy or water efficiency. Utilities could be placed into the position of delivering the predicted amount of energy savings expected by regulators but possibly without any profit motive other than the avoidance of regulatory penalties for not meeting a goal. This disincentive has become a major topic relative to alternative ratemaking mechanisms, as the growth in electricity sales is less correlated with the growth rate in the US GDP relative to the past, with such sales growing more slowly than the general economy has been in recent years.[5]

Brennan (2010) developed a social welfare model to derive conditions under which utilities would be incented to provide energy efficiency services, showing that decoupling must separate revenues from the generation of electricity and not just revenues and sales from the

[3] Since multiple types of risk are discussed, we generically define risk as the chance of a disappointment in financial performance.

[4] The key problem with the over-use of utility services is that public utility pricing is based on average versus marginal cost pricing. Utility services have an excess demand (over-consumed) and end-use efficiency resources have an excess supply (under-consumed) with general equilibrium not attained. The authors of this study are hard-pressed to find where the actual price of electricity is above private marginal cost.

[5] US electricity use is expected to experience an annual average growth rate of 0.9% compared with a 2.4% US GDP annual growth rate between 2011 and 2040, according to the US Energy Information Administration (EIA) forecast in 2013, as demonstrated in the EIA graph below.

distribution of electricity, leading to a highly complex form of electricity pricing regulation, rather than just the simpler separation of sales to the consumer and the related revenues collected. Brennan (2010a) compared incentive regulation using price caps versus decoupling. His paper analyzed the difference between separating profits from management decision-making and incentive-based regulation in the form of price caps which are meant to promote better input decision-making than rate of return regulation that provides an opportunity to earn a set rate of return, somewhat regardless of the outcomes of input choice decision-making. Brennan (2010a) concluded that utilities will encourage energy savings or more usage under price caps depending upon whether the price is below or above marginal cost, respectively.

Since the US is widely adopting decoupling (revenue caps) whereas the EU is doing the same with price caps, it is an ongoing natural experiment that allows for comparisons of the consumer surplus and shareholder value performance (collectively, social welfare) from EU price cap utilities and US decoupled utilities. Since the EU has adopted price caps and US has adopted decoupling, the data are not available to include EU decoupled utilities in this investigation.

Since decoupling, as a regulatory policy tool, is being adopted rapidly in the US {Edison Electric Institute, the US electric utility trade association, EEI (2015)}, questions arise in rate proceedings regarding the impacts on the cost of common equity. Due to the importance of this issue and the lack of related literature, we investigate the impact of decoupling on the investor perceived risk of public utilities and resultant cost of common equity. The next section discusses the models that are the basis of the analysis. Section 3 discusses the empirical methodology. Section 4 describes the data. Section 5 discusses the results and Section 6 provides concluding remarks, policy recommendations and areas for future research.

2. The modeling approach

This paper uses the GCAPM developed by Michelfelder and Pilotte (2011) to estimate the impact of decoupling on the public utility cost of common equity. The model is based on generalizing variants of intertemporal capital asset pricing models. The literature discussing the development of the model based on more restrictive versions is voluminous and summarized by Michelfelder and Pilotte (2011) and therefore not repeated here. The GCAPM was empirically applied by Michelfelder and Pilotte (2011) to the full spectrum of assets on the US Treasury yield curve. The GCAPM is a financial valuation model recently developed as an alternative to the CAPM and the dividend discount model for estimating the cost of common equity. Ahern et al. (2011) and as Michelfelder (2015) review and apply the GCAPM to estimate public utilities' cost of common equity.

The GCAPM model has the following characteristics. It does not have restrictions on the coefficient of risk aversion in investors' utility function as do most models. It allows for a negative relation between the rate of return and volatility.[6] This relation will occur for assets with prices that move in the opposite direction of the business cycle. Unlike the CAPM, the GCAPM prices the total risk actually faced by the investor and does not assume that all unsystematic risk is diversified away, which is a key foundation of the standard CAPM. There is no perfect portfolio that removes all idiosyncratic risk as assumed in the development of the CAPM. Unsystematic risk is reduced but not completely mitigated with a highly diversified portfolio and the standard CAPM understates the cost of common equity as it does not price all risk exposure. The priced risk in the GCAPM is based on the level of risk actually faced by the investor, not the risk theoretically imposed by the CAPM. Fama and French (2004) find that the CAPM understates returns and risk, based on a large empirical study of portfolios of common stocks with a continuum of low to high betas. The GCAPM also does not assume or require the efficient markets assumption as does the CAPM.

Ahern et al. (2011) find that the CAPM generates lower costs of common equity than the GCAPM. Michelfelder (2015) applied the GCAPM to estimate the cost of common equity to public utilities concluding that the CAPM does not price all risk faced by the investor and that the CAPM understates the cost of common equity for public utilities. The GCAPM is specified as:

$$E_t[R_{i,t+1}] - R_{f,t} = -\frac{vol_t[M_{t+1}]}{E_t[M_{t+1}]} vol_t[R_{i,t+1}] corr_t[M_{t+1}, R_{i,t+1}], \quad (1)$$

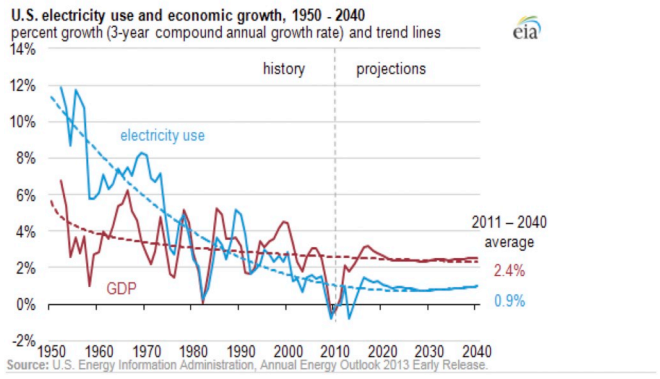
where the anticipated risk premium on an asset i depends on the conditional volatility of the asset; $R_{i,t+1}$ is the ex ante return on asset i; $R_{f,t}$ is the rate of return on a risk-free asset at time t; M_{t+1} is the stochastic discount factor (SDF); vol_t is the conditional volatility of the rate of return; and $corr_t$ is the conditional correlation coefficient. The SDF is the intertemporal marginal rate of substitution in consumption, which is the ratio of expected future marginal utility to the current marginal utility of consumption. This is an important factor to discuss as this model specification allows for the empirical estimation to determine if decoupling results in more stable revenues for utilities relative to changes in the business cycle. If this holds true for a utility during a recession, then investment in the common stock of public utilities could be a business cycle hedge. The SDF is:

$$M_{t+1} = \left(\frac{1}{1+k}\right)\frac{U_{c,t+1}}{U_{c,t}}, \quad (2)$$

where the U_c's are the marginal utilities of consumption and k is the discount rate for the period from t to $t+1$. The ratio M_{t+1} rises if expected future consumption falls below the current level due to the standard concave (to the origin) shape of investors' consumption utility function. This property allows the model to accommodate the business cycle (represented by consumption expenditures) hedging property of a given asset.

If the conditional volatility of intertemporal consumption, or consumption risk, rises, investors will price a greater risk premium into the asset. The sign of the relation between risk premium and its conditional volatility is defined by the correlation ($corr_t$) of the risk premium and the SDF. The sign of the risk premium-to-volatility relation is opposite to the sign of the correlation of the asset return and the ratio of the marginal utilities. A decline in business cycle consumption increases investors' marginal utility. An asset that generates positive returns

(*footnote continued*)



[6] It seems counterintuitive, yet some investors are willing to pay (give up return) for more volatility in an asset's return rather than less, if the pattern of that volatility is desired by those investors. Some researchers confuse risk and volatility as synonymous. For example, gold returns have a tendency to spike upward during recessions and downturns in stock markets. Thus, gold can hedge the downturn in an investor's portfolio and offset the reduction in income from employment. Systematic upward spikes in gold prices increase volatility. Such increases in volatility are generally associated with reductions in the market returns to gold. Such assets with negative relations among returns and volatility are business cycle hedges.

when the business cycle is in a contraction with falling consumption, is a business cycle hedge. Therefore, a negative risk premium-to-volatility slope identifies the asset as a business cycle hedge.

This property allows us to infer whether decoupling causes a public utility common stock to be a business cycle hedge. If profits rise or are flat as GDP declines with lower commodity sales and stable revenues, the common stock price could systematically rise when the business cycle is contracting.[7] A public utility with a strong level of decoupling would conceivably experience stable revenues during a contraction in the business cycle. Therefore, utility profits may rise, or at least not fall, when commodity sales fall generated by consumer end-use efficiency and contracting GDP.

To calibrate the GCAPM, we perform a simple test of this property by estimating the model with the risk premium on gold (percent change in the price of gold per troy ounce minus a risk-free rate). Gold is commonly known to be a business cycle and common stock market hedging asset {Hillier et al. (2006)}. The correlation coefficient between the quarterly percent changes in the price of gold and real GDP (data are publicly available from the St. Louis Federal Reserve Database) from 1968 to 2017 is −0.058. Hillier et al. (2006) show that gold is a common stock market hedge, especially during abnormally high periods of common stock market volatility. We used the daily and monthly US gold commodity cash price data and futures price data to estimate the GCAPM. The risk-premium-to-volatility slope "*α*" (see footnote 10) is either negative and significant or insignificant using daily and monthly data and many rolling time frames for estimation. These calibration test results for the GCAPM show that the model does detect a hedging asset.[8]

The GCAPM can be applied to any asset that is traded in any financial market and therefore can be applied to all traded public utility common stocks. The GCAPM has the added advantage that the decoupling impact on changes in common stock returns as well as the conditional volatility of these returns can be estimated separately within the same model using the GARCH-in-Mean (GARCH-M) method initially developed for asset model estimation. The GARCH-M method is discussed in the next section.

Decoupling is expected to lower the variance of the operating cash flows of a public utility due to the increased stability of revenues {Moody's (2011)}. The variance of operating cash flows should be driven mainly by the variance of costs as follows: Operating Cash Flows (*OCF*) is Revenues (*R*) – Cost (*C*), therefore the variance of *OCF* is *VAR (R-C) = VAR (R) + VAR (C) + 2COV (R,C)*. Since the volatility of revenues is theoretically equal to zero with decoupling, the covariance of revenues and costs is zero as revenues do not vary, and volatility of *OCF* is purely driven by costs only as *VAR (R-C) = VAR (C)*. Therefore, in comparing the variance of operating cash flows with and without decoupling, the *VAR (OCF with decoupling) = VAR (C) < VAR (OCF without decoupling) = VAR (R) + VAR (C) + 2COV (R,C)* as *VAR (R) = 0* and *COV (R,C) = 0* with decoupling and *VAR (R) > 0* and *COV (R,C) ≠ 0* without decoupling. This is essentially the model used by Moody's (2011) which found that utilities with decoupling experienced a reduction in business risk as measured by the change in the standard deviation of the growth rate in gross profit before and after decoupling.

We also estimate changes in systematic investment risk resulting from decoupling by analyzing the change in the short-term CAPM beta. This short-term beta (12-month), a measure of systematic risk, should be more sensitive to regime changes for a common stock relative to the standard betas estimated with five years of data typically employed to assess investment risk. Beta is expected to decline with decoupling.[9]

The only other studies on the impact of decoupling on the utility cost of capital, Wharton and Vilbert (2015), estimated the impact of decoupling on the cost of capital for the overall electric and gas utility industries. They also addressed the issue that decoupled utilities may represent substantially less than the entire portfolio of assets reflected in the common stock price of a holding company. Using the standard dividend discount model to estimate the cost of common equity portion of their weighted average cost of capital estimates, they regressed this cost of capital on an intensity index of decoupling for each publicly-traded utility common stock with a panel-data regression to estimate the industry impact. They found no statistically significant impact of decoupling on the cost of capital.

The present study estimates the impact on the cost of common equity of the decoupled firm individually rather than that on an industry as a whole. We use the GCAPM and changes in beta before and after the implementation of decoupling to estimate the impact on risk and the cost of common equity.

3. Methodology

The GCAPM is estimated with the GARCH-M method.[10] GARCH-M specifies the conditional risk premium as a linear function of its conditional volatility, which is the specification of the GCAPM in equation (1). Since the returns data contains ARCH effects (available on request), another benefit of using GARCH-M is that it improves the efficiency of the estimates. Engle et al. (1987) developed the GARCH-M method and used it to estimate the relation between US Treasury and corporate bond yield risk premiums and their volatilities.

Two versions of the GCAPM-GARCH-M model are estimated. The first estimation includes a binary variable that reflects the implementation of decoupling for the specific utility ($D_i = 1$ if decoupled, *0* otherwise) in the risk premium equation only and the volatility equation the same:

$$R_{i,t+1} - R_{f,t} = \alpha_{i,t}\sigma^2_{i,t+1} + \alpha_{i,D}D_{i,t} + \varepsilon_{i,t+1} \quad (3)$$

where "αi, D" is an estimate of the decoupling impact on the risk premium.

The second estimation has the same variable in the volatility equation of the GARCH-M model only and the return equation does not (as shown in footnote 10 in the second set of equations):

$$\sigma^2_{i,t+1} = \beta_0 + \beta_1\sigma^2_{i,t} + \beta_2\varepsilon^2_{i,t} + \beta_{i,D}D_{i,t} + \eta_{i,t+1} \quad (4)$$

[7] One of the most effective "energy efficiency tools" to generate energy use reduction is a recession. Although the energy-use-US-GDP correlation has declined, it remains substantially positive {EIA (2013), as shown in the figure in footnote 4 above, www.eia.gov/todayinenergy/detail.php?id=10491}.

[8] All empirical results on gold are available on request.

[9] Systematic risk is defined as $\beta_i = \rho_{i,m}\ \sigma_i/\sigma_m$, where $\rho_{i,m}$ is the correlation coefficient of the individual stock (i) and the market (m) total rates of return and σ_i and σ_m are the standard deviations of the individual stock and market returns, respectively. Defining variables with superscript "*D*", to denote decoupling, σ_i^D and $\rho_{i,m}^D$ should be lower as the volatility of the utility's returns are lower with decoupling and the utility's return has a lower correlation with the market return as the utility's revenues and profits are decoupled from the business cycle. Therefore systematic risk is lower with decoupling and defined as $\beta_i^D = \rho_{i,m}^D\ \sigma_i^D/\sigma_m$. Therefore, β_i^D is less than β_i as.

$$\rho_{i,m}^D\sigma_i^D/\sigma_m^D \ < \ \rho_{i,m}\sigma_i/\sigma_m$$

[10] The GCAPM was estimated with the GARCH-M method. The estimated models are.

$$R_{i,t+1} - R_{f,t} = \alpha_{i,t}\sigma^2_{i,t+1} + \alpha_{i,D}D_{i,t} + \varepsilon_{i,t+1}$$

$$\sigma^2_{i,t+1} = \beta_0 + \beta_1\sigma^2_{i,t} + \beta_2\varepsilon^2_{i,t} + \eta_{i,t+1},$$

And $R_{i,t+1} - R_{f,t} = \alpha_{i,t}\sigma^2_{i,t+1} + \varepsilon_{i,t+1}$

$$\sigma^2_{i,t+1} = \beta_0 + \beta_1\sigma^2_{i,t} + \beta_2\varepsilon^2_{i,t} + \beta_{i,D}D_{i,t} + \eta_{i,t+1}.$$

where "βi, D "is an estimate of the decoupling impact on the volatility of the risk premium.

These specifications provide separate empirical estimates of the impacts of decoupling on conditional public utility common stock returns and conditional volatility. As event studies, these and all financial market-based event studies face the question of when the event impacted asset prices. Asset prices can reflect forthcoming events before they are implemented. One example that is relevant for this investigation is when decoupling implementation was announced in a utility's regulatory decision. We find that using the date of implementation is a conservative approach to estimating the impact as it is most likely the latest date that a decoupling impact would be detected in a common stock price and much of the impact may already have been priced in the asset. However, if a utility's revenues have been decoupled from sales to the extent that revenues are not affected by the business cycle, then the utility's common stock as a hedging asset would be detected in a zero or negative alpha. Also, if a sufficiently long pre-decoupling time period for observing returns and volatility is obtained, the change in the post-period should be detected as all of the post-decoupling period returns and volatilities are in a different business risk regime.

4. Data

We perform the empirical work on US utilities only. As discussed in the Introduction, decoupling has not been adopted in the EU. EU investor-owned utilities and their regulators have widely adopted price cap regulation, an alternative form of regulation to rate-base-rate-of-return regulation to promote expense and investment efficiency, but not necessarily to encourage utility expenditure on consumer end-use energy and water efficiency. The group of US public utility common stocks includes all electric and gas combination companies that have 95% or more of their revenues decoupled and water utility common stocks that have all of their revenues decoupled before 2014. Data for the common stock rates of return are the total monthly rates of return on the common stock of the public utilities from the Center for Research in Security Prices database (CRSP) of the University of Chicago. Data for each public utility common stock include differing pre- and post-decoupling dates and therefore differing rate of rate and beta samples. The pre-decoupling data for each common stock include all available past monthly returns data in the CRSP before decoupling for that common stock. Post-decoupling rate of returns data for all common stocks end at December 2014 for consistency in the post-decoupling ending period for all utility common stocks. We calculated historical monthly common stock equity risk premiums monthly common stock returns less the monthly yields on long-term U.S. Treasury Bonds for the selected publicly traded water utilities using common stock returns data from the CRSP database and Morningstar (2015) SBBI® 2015 Market Results for Stocks, Bonds, Bill and Inflation 1926–2015 and the Federal Reserve Statistical Release H.15 for long-term Treasury bond yields. The CAPM beta data include all short-term betas available for each public utility common stock that has been decoupled in the CRSP database and ends at 2014. They are available on an annual basis. The CAPM short-term beta[11] is a one-year estimate of beta that approximately involves regressing daily rates of return on the public utility common stock on a market index as shown footnote 10. The standard beta available from financial firm databases such as Value Line Investment Survey or CRSP is a 5-year beta based on regressing monthly or weekly common stock rates of return for the past 5 years on a market index. We find that the longer-term beta would be less sensitive to regime changes in risk such as decoupling. We restrict the sample of pre- and post-decoupling betas for each common stock so that the number of beta observations are the same before and after decoupling.

Since the number of data observations has different times series of ranges for each public utility common stock and decoupling occurred on different dates for most utilities, we have developed Table 1 to show each public utility common stock's data date range, that is, the dates and number of risk premium (rate of return minus risk-free rate) observations used to estimate the GCAPM and the total number of betas used for the pre- and post beta comparison. Table 1 also has the date of decoupling for each public utility.

5. Results and discussion

Table 2 presents the public utility common stocks in the study and the empirical results of the GCAPM estimates. The risk-premium-to-volatility slopes ("alpha") are shown along with the decoupling slope in the risk-premium and volatility equations for each electric, electric and gas combination, and water utility common stocks. The decoupling slope in the risk-premium equation will be negative (positive) if the risk premium should decline (rise) and decoupling creates a reduction (increase) in business risk. None of these slope estimates are statistically significant. The decoupling slope in the volatility equation should be negative (positive) if decoupling caused a reduction (increase) in the volatility of the profit of the utilities. Two of the slopes are negative and significant at $p = 0.10$, yet the magnitudes of the slopes are very small.

All of the alphas, except for one of the energy utilities are positive and significant, yet none in the water utility group are significant. These results indicate that the energy utility common stocks are not business cycle hedging assets and that their profits are synchronized with the business cycle. The results for the water group may indicate that they are business cycle hedging assets as none are statistically significant. The zero value for alpha implies that there is no relation between the business cycle as represented by expected changes in consumption and the return on water utility common stocks. Water utility profits are not correlated with the business cycle even in the absence of decoupling. Also, water use attrition is occurring across the US as households (water consumption per household is declining) due to the use of water-efficient appliances (such as low-flow faucets, showerheads and efficient toilets) and the change per capita water use habits to conserve water.

Table 3 presents the pre- and post-decoupling changes in the systematic risk as represented by the short-term CAPM beta for all of the public utility common stocks. The betas drop after the implementation of decoupling but none of the changes in beta are statistically significant using a t-statistic at a $p = 0.05$. Additionally, the standard errors of the betas (σ_{pre} and σ_{post}) show no consistent pattern of increasing or decreasing after decoupling.

Our results do not show any statistically significant impacts of decoupling on the cost of common equity and risk. Therefore, we find no evidence to conclude that decoupling affects investor perceived risk or the cost of common equity. While electric and gas public utility common stocks were not found to be business cycle hedges, we do find that water utility common stocks may be business cycle hedges.

Our results are based on the moderate amount of data available to date. Although we would obviously prefer more data than are available at this juncture, there is no time to wait for a larger volume of data. Regulators and utilities have been and are implementing policy now as if decoupling does reduce risk and the costs of capital without any

[11] The CRSP short-term beta is described by CRSP as "a statistical measurement of the relationship between two time series, and has been used to compare security data with benchmark data to measure risk in financial data analysis. CRSP provides annual betas computed using the methods developed by Scholes and Williams (Myron Scholes and Joseph Williams, "Estimating Betas from Nonsynchronous Data," *Journal of Financial Economics*, vol 5, 1977, 309–327). Beta is calculated each year as follows where.

$$\beta_i = \frac{\Sigma(lr_{i,t} * M3_t) - \left(\frac{1}{n_i}\right) * (\Sigma lr_{i,t}) * (\Sigma M3_t)}{\Sigma(lM_t * M3_t) - \left(\frac{1}{n_i}\right) * (\Sigma lM_t) * (\Sigma M3_t)}$$

Table 1
Data description for risk premiums and betas.

Electric, Elec. & Gas Comb. Utility	Effective Decoupling Date	Beginning of Measurement Period Returns Data	Total # of Months Return Data	Total Number of Pre- and Post- Annual Beta Observations
Consolidated Edison	10/2007	07/30/02	126	10
Pacific Gas & Electric	01/1983	01/31/53	720	60
Edison International	01/1983	01/31/53	720	60
CH Energy Group	07/2009	01/31/06	84	6
CMS Energy Corp.	05/2010	9/30/07	64	6
Hawaii Electric	12/2010	11/30/08	50	5
Portland General Electric	12/2010	11/30/08	50	6
Idaho Power	03/2007	05/30/01	140	12
Water Utility				
American States Water	1/2002	6/2002	153	12
California Water	1/2009	10/2001	162	12
Connecticut Water	7/2008	10/2002	150	10
Artesian Resources	11/2008	6/1996	226	12

Table 2
GCAPM estimation results.[a]

Electric, Elec. & Gas Comb. Utility	α_i	α_D	β_D
Consolidated Edison	1.460***	0.004	−0.000
Pacific Gas & Electric	1.781***	0.001	−0.001
Edison International	1.379***	0.003	0.000
CH Energy Group	2.094***	0.004	−0.000
CMS Energy Corp.	1.440***	0.011	−0.000
Hawaii Electric	1.607***	0.004	−0.000*
Portland General Electric	0.461	0.010	−0.000
Idaho Power	1.939***	0.003	−0.000
Water Utility	α_i	α_D	β_D
American States Water	0.596	0.011	0.000
California Water	0.525	0.004	−0.000
Connecticut Water	−1.008	0.009	0.000
Artesian Resources	3.006	−0.004	−0.002*

[a] The GCAPM was estimated with the GARCH-M method. The estimated models are.

$$R_{i,t+1} - R_{f,t} = \alpha_{i,t}\sigma^2_{i,t+1} + \alpha_{i,D}D_{i,t} + \varepsilon_{i,t+1}$$

$$\sigma^2_{i,t+1} = \beta_0 + \beta_1\sigma^2_{i,t} + \beta_2\varepsilon^2_{i,t} + \eta_{i,t+1},$$

And $R_{i,t+1} - R_{f,t} = \alpha_{i,t}\sigma^2_{i,t+1} + \varepsilon_{i,t+1}$

$$\sigma^2_{i,t+1} = \beta_0 + \beta_1\sigma^2_{i,t} + \beta_2\varepsilon^2_{i,t} + \beta_{i,D}D_{i,t} + \eta_{i,t+1}.$$

Table 3
Changes in systematic risk from decoupling. [a]

	Mean β_{PRE}	Mean β_{POST}	$\sigma(\beta_{PRE})$	$\sigma(\beta_{POST})$	t-Statistic
Electric, Elec. & Gas Comb. Utility					
Consolidated Edison	0.608	0.427	0.172	0.064	−1.329
Pacific Gas & Electric	0.522	0.535	0.174	0.373	0.112
Edison International	0.588	0.582	0.199	0.294	−0.051
CH Energy Group	0.680	0.401	0.279	0.326	−0.759
CMS Energy Corp.	0.758	0.559	0.198	0.140	−0.815
Hawaii Electric	0.619	0.570	0.253	0.155	−0.171
Portland General Electric	0.637	0.658	0.069	0.052	−0.151
Idaho Power	0.905	0.728	0.251	0.125	−0.818
Mean	0.670	0.560			
Water Utility					
American States Water	0.975	0.623	0.535	0.279	−1.430
California Water	1.192	0.520	0.544	0.257	−2.735***
Connecticut Water	0.664	0.502	0.235	0.176	−1.232
Artesian Resources	0.075	0.146	0.100	0.161	0.909
Mean	0.434	0.475			

[a] Beta is the annual year-ending beta from the CRSP database. The data timeframe is different for each utility with an equal number of annual pre- and post-decoupling beta data observations for the specific stock in the CSRP database and ends in 2014. Each single beta was estimated with one year of daily rate of return data. See Table 1 and footnote 11. ***, **, * refers to statistical significance at 0.01, 0.05, and 0.10 respectively.

evidence that it does. This paper serves as an early warning signal, albeit with the limited evidence that is available.

6. Conclusion and policy implications

We conclude that decoupling has no statistically measurable impact on the cost of common equity based on our empirical analysis for electric, electric and gas, and water utility common stocks. Some researchers may view this result as a "non-result." This is an important finding as it is consistent with the empirical findings of Vilbert et al. (2016). It is also important for policy globally as decoupling is considered as a potential reducer to risk and the cost of common equity by regulators and public utilities in the US based on intuition, without any empirical evidence.

Moody's (2011) finds a reduction in business risk as measured by the change in the variability of gross profit after decoupling but did not estimate the impact on the cost of common equity. Moody's (2011) did find that electric utilities were somewhat reluctant to adopt decoupling as electric utility executives anticipated that growth in sales would return to the industry after the steep recession that ended with the business cycle trough in June 2009 {NBER (2018)}. Since the US business cycle expansion post-June 2009, electricity sales have remained almost flat, which may have caused the change in sentiment toward decoupling by electric utility executives. Growth in a utility's commodity sales above the level used to design regulated rates would increase the profit and rate of return on common equity. The US investor-owned electric utility industry also expected that the adoption of decoupling would cause state public utility regulators to reduce their allowed rate of return under the notion that it reduces risk. Moody's (2011) was written soon after the recession had ended, but the anticipated growth in sales has not materialized after more than ten years into the US business cycle expansion. A few years after the Moody's (2011) study, the EEI found in a more recent report a change in sentiment {EEI (2015)} that electric utilities favor decoupling and that it has become more widespread across the US.

We conclude that decoupling has no statistically significant impact on investor perceived risk and the cost of common equity. This does not mean necessarily that decoupling has no impact on the perceived risk and the cost of common equity of public utilities. We find that it cannot be isolated and estimated, given the many other factors affecting investor perceived risk. For many electric utilities, some current major risk drivers are flat or declining sales from customer-owned solar projects and energy efficiency resources; the requirement to buy back excess customer generated electric from renewable resources at full retail

rates (net metering); increasing requirements in the proportion of a utility's sales that have to be generated from renewable energy, causing larger purchases of renewable energy credits (known as renewable portfolio standards that have been adopted by many states and across Europe); increasingly stringent environmental regulations on coal plants; and the impact of falling and low natural gas prices on the competitiveness of existing coal and nuclear plants.

For water utilities, we find their common stocks to be moderate business cycle hedges (no correlation with the business cycle rather than a strong negatively correlated hedge). Since water utility sales are declining on a per capita basis and unassociated with the business cycle, decoupling may provide financial protection if water revenues decline. To the extent that there is positive growth in the number of water utility customers that offsets the declining per capita consumption, total revenues and sales may not be falling. The impact of decoupling on water utility investment risk and cost of common equity was not able to be detected in this study. This is the first study on decoupling in the water utility industry and an area for future research.

Another explanation for the lack of detection of a change in risk or the cost of common equity from decoupling is that risk may be created with the implementation of decoupling and the net impact may not be clear as an increase or decrease in risk as Vilbert et. al. (2016) and Wharton and Vilbert (2015) concludes. They find that the implementation of decoupling is a new and alternative regulatory regime that may be a new source of regulatory risk for the utility. Finally, as discussed in detail in the Introduction above, volume risk, that is, the fundamental nature of the business and business risk, is not alleviated by changing the reward mechanism, and attempts to do so may increase risk and the cost of common equity. The point is that there are cogent theoretical and practical bases to expect that decoupling increases or decreases risk, so it is problematic to develop an *a priori* hypothesis to test a one-way directional impact of risk and return from decoupling.

Therefore, we do not recommend that public utility regulators in the US or elsewhere reduce or increase authorized common equity cost rates in the presence of decoupling mechanisms based on the assumption of changed or reduced risk. The impact is *de minimis* and not statistically significant amongst all of the other investor perceived risk factors affecting the market prices of public utility common stocks. While an alternative research approach may attempt to isolate the impacts of other individual risk factors on the cost of common equity and risk, making for a long regression equation, we cannot detect a statistically significant signal of decoupling on the cost of common equity or volatility. As a contrast, for example, the risk and cost of common equity impact of owning nuclear power generation assets (versus no nuclear assets) has a measureable impact on investors' returns, risk and cost of common equity without attempting to isolate the myriad of other risk variable impacts. Decoupling as a regulatory policy mechanism to encourage public utilities to provide resources and funding to their consumers to conserve electricity, natural gas, and water (therefore also wastewater flows) has no *measurable* impact on the investment risk and the cost of common equity (either up or down). As a policy prescription, public utility regulators should not adjust the allowed rate of return which affects the public utility's rates as a spillover impact of using decoupling to promote environmental policy.

Finally, the US may be further ahead in adopting rate mechanisms that address energy and water efficiency due to its long-term lag relative to Europe in the efficient use of energy and water and the recent "necessity-is-the-mother-of-invention" US driver of energy and water efficiency. European and regulators globally should proceed slowly in adopting decoupling and assuming that decoupling reduces risk as there is no empirical evidence to date that it does.

An extension of this research could evaluate risk premiums or discounts in bond yields as there are many more investor-owned utilities which have outstanding bonds relative to those that have their own publicly traded common stock due to consolidation in the utility industry in the US. For example, Exelon is the holding company of six utilities whose stocks were publicly traded on the New York Stock Exchange. They are Atlantic City Electric, Baltimore Gas and Electric, Commonwealth Edison, Delmarva Power and Light, Philadelphia Electric and Potomac Edison Power. Another future extension could focus on decoupling when some EU investor-owned utilities and regulators, inevitably, adopt decoupling should it prove to substantially encourage more conservation in the US. An investigation of hedging costs and savings, risk impacts, and effects on profits with and without decoupling may shed more light on the topic. There also needs more research on water/wastewater decoupling as this is the first study known to date on the topic involving cost of capital and risk. Lastly, a social welfare comparison, separating out consumer-surplus and shareholder-value creation and investigating the impacts on conservation from price and revenue caps is another extension of this paper for future research.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.enpol.2019.04.006.where R_i is the conditional total return on the stock, R_f is the risk-free rate of return, $\sigma^2_{i,\,t+1}$ is the next period conditional volatility, D is the dummy variable that equals 1 when decoupling is in place, and α_D and β_D are the slopes on the conditional returns and volatility decoupling dummy variable that represent the impact of decoupling on those variables. Monthly returns data are from the CRSP database and includes all data available from the CRSP database and ends at 12/2014. The monthly risk-free rate of return is the Ibbotson income return on Long-Term US Treasuries. ***, **, * refers to statistical significance at p values of 0.01, 0.05 and 0.10 respectively.where R_i is the conditional total return on the stock, R_f is the risk-free rate of return, $\sigma_{2i,\,t+1}$ is the next period conditional volatility of the risk premium for asset *i*. $\varepsilon_{i,t}$ and $\eta_{i,t+1}$ are the error terms for the mean and volatility equations, D is the dummy variable that equals 1 when decoupling is in place for utility *i*, and α_D and β_D are the slopes on the conditional returns and volatility decoupling dummy variable that represent the impact of decoupling on those variables.

The parameter, α_i, is the risk-premium-to-volatility slope. It is specified from equation (1) as:

$$\alpha_{i,t} = -\frac{vol_t[M_{t+1}]}{E_t[M_{t+1}]} corr_t[M_{t+1}, R_{i,t+1}]$$

It is positive for assets that are not business cycle hedges as $corr_t$ is negative. A rising (falling) M and rising (falling) expected marginal utility from falling (rising) consumption in a recession is associated with a fall (rise) in returns. The above empirical model specifies a 0 intercept in the risk premium equation as does the GCAPM. The estimation results support the 0 intercept specification (results available upon request).

β_i is the Beta for security i for the year being calculated, $r_{i,t}$ is the return of security i at day t,$lr_{i,t} = \ln(1+r_{i,t})$ is the natural log of the return of security i at time $t+1$ or the continuously compounded return, M_t is the value-weighted market return at time t, $lM_t = \ln(1+M_t)$ is the natural log of the value-weighted market return at time $t+1$ or the continuously compounded return.

$M3_t = lM_t\text{-}1 + lM_t + lM_{t+1}$ is the three-day moving window of the above market return, n_i is the number of non-missing returns for security i during the year, where the summations are over t and include all days on which security i traded, beginning with the first trading day of the year and ending with the last trading day of the year."

(http://www.crsp.com/products/documentation/index-definitions-calculations, accessed March 12, 2019.)

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BEFORE

THE PUBLIC SERVICE COMMISSION OF

SOUTH CAROLINA

DOCKET NO. 2017-292-WS - ORDER NO. 2018-345

MAY 17, 2018

IN RE:	Application of Carolina Water Service, Inc. for Adjustment of Rates and Charges and Modification to Certain Terms and Conditions for the Provision of Water and Sewer Service	)))))	ORDER APPROVING RATES AND CHARGES

This matter is before the Public Service Commission of South Carolina ("Commission") on the Application of Carolina Water Service, Inc. ("CWS" or "Company") for approval of a new schedule of rates and charges and modifications to certain terms and conditions for the provision of water and sewer services for its customers in South Carolina. CWS filed its Application on November 10, 2017, pursuant to S.C. Code § 58-5-240 and S.C. Code Regs. §§ 103-503, 103-703, 103-512.4.A and 103-712.4.A.

In the Application, CWS requested an increase in revenues for combined operations of $4,511,414 consisting of a water revenue increase of $2,272,914 and a sewer revenue increase of $2,238,500. The revenue increase utilizes a return on equity ("ROE") of 10.5% based on the rate of return on rate base methodology and a historical test year beginning September 1, 2016, and ending August 31, 2017.

CWS requested permission to modify its sewer service tariff to reduce the frequency with which customers must test their backflow devices from every year to every

two years, and to authorize the Company to terminate service, after notice, to a customer who fails to demonstrate that his backflow device is working properly. App. p. 6, ¶ 20. CWS requested authorization to increase its Water Meter Installation Charge from $35 to $45 per year, to more accurately reflect the utility's cost of providing this service. App. p. 6, ¶ 21. The Company also requested approval of a provision in its tariff limiting the liability of the Company, its agents, and employees for interruption of service, whether caused by acts or omissions, to those remedies provided in the Commission's rules and regulations. App. p. 6, ¶ 22.

CWS last rate case before this Commission was in Docket No. 2015-199-WS. In that case, the Commission approved a settlement in which CWS received a combined revenue increase of $3,068,441 based on a $50,955,443 rate base; an operating margin of 11.95%, an ROE of 9.34%, and a return on rate base of 7.99%.

CWS' South Carolina operations are classified by the National Association of Regulatory Utility Commissioners ("NARUC") as a Class A water and wastewater utility according to water and sewer revenues reported on its Application for the test year ending August 31, 2017. The Commission's approved service area for CWS is in parts of sixteen counties.

I. PROCEDURAL BACKGROUND

The Commission's Clerk's Office instructed CWS to publish a prepared Notice of Filing, one time, in a newspaper of general circulation in the area affected by CWS' Application and to mail copies of the Notice of Filing to all customers affected by the proposed rates and charges and modifications. The Notice of Filing indicated the nature of

the Application and advised all interested parties desiring to participate in the scheduled proceeding of the manner and time in which to file the appropriate pleadings. CWS filed affidavits demonstrating the Notice of Filing had been duly published and provided to all customers.

Petitions to Intervene were subsequently filed on behalf of the Forty Love Point Homeowners' Association ("Forty Love"), York County, and James S. Knowlton. The South Carolina Office of Regulatory Staff ("ORS"), a party of record pursuant to S.C. Code § 58-4-10(B), made on-site investigations of CWS' facilities, audited CWS' books and records, issued data requests, and gathered other detailed information concerning CWS' operations.

CWS was represented by Charles L.A. Terreni, and Scott Elliott. Laura P. Valtorta represented Forty Love. Michael K. Kendree represented York County, Mr. Knowlton appeared pro se. Jeffrey M. Nelson, and Florence P. Belser represented the ORS. On March 28, 2018 York County moved to withdraw from the proceedings without prejudice after CWS withdrew its request for approval of the Utility System Improvement Rate ("USIR"). York County's request was granted on the same day. Order No. 2018-38-H.

The Commission held public hearings in Lexington, York, and Greenville counties to allow CWS's customers to present their views regarding the Application. An evidentiary hearing was held April 3-4, 2018, at the Commission's offices in Columbia with the Honorable Swain E. Whitfield, presiding.

The Company presented the testimony of Michael R. Cartin, Operations and Regulatory Affairs Manager (direct, rebuttal and supplemental), Robert M. Hunter,

Financial Planning and Analysis Manager (direct and rebuttal), and Bob Gilroy, Vice President of Operations (direct, rebuttal, and testimony responsive to customers who testified at public hearings). Mr. Cartin, testified about the Company's operations and various expenses and capital expenditures made by CWS. Mr. Hunter testified about the Company's finances and revenue requirement, and Mr. Gilroy testified about various aspects of the Company's operations and customer service. The Company also presented the testimony of Dylan W. D'Ascendis, CRRA, Director at ScottMadden, Inc., who testified to the Company's capital structure, cost of debt, and recommended ROE.

Forty Love presented the direct testimony of subdivision residents and customers Barbara King and Jay Dixon. They testified to problems experienced with the sewer system serving Forty Love Point. Mr. Knowlton presented his rebuttal testimony opposing the amount and frequency of the Company's rate increases.

ORS presented the testimony of Matthew Schellinger (direct and surrebuttal), Zachary Payne (direct and surrebuttal), and Douglas H. Carlisle, Jr., Ph.D. (direct and surrebuttal) as a panel. Dr. Carlisle testified to the Company's capital structure, cost of debt, and recommended ROE.

Dr. Carlisle's testimony included an analysis and recommendation for an allowed ROE. Mr. Payne testified about ORS's examination of the Application and CWS' books and records and the subsequent accounting and pro forma adjustments recommended by ORS. Mr. Schellinger's direct testimony focused on CWS' compliance with Commission rules and regulations, ORS' business office compliance review, inspections of CWS' water

and wastewater systems, test year and proposed revenue, and performance bond requirements.

II. REVIEW OF THE EVIDENCE AND EVIDENTIARY CONCLUSIONS

A. Standards and Required Findings

In considering the Application, the Commission must ascertain and fix just and reasonable rates, standards, classifications, regulations, practices, and measurements of service to be furnished. The Commission must give due consideration to the Company's total revenue requirements and review the operating revenues and operating expenses of CWS to establish adequate and reasonable levels of revenues and expenses. The Commission will consider a fair rate of return for CWS based on the record and any increase must be just and reasonable and free of undue discrimination. CWS has also asked this Commission to approve revenues based on an authorized ROE established to allow CWS the opportunity to earn a fair return.

After evaluation of the positions of the parties, the Commission reaches the legal and factual conclusions discussed below, based on its review of the facts and evidence of record. The evidence supporting the Company's business and legal status is contained in the Application filed by CWS, testimony, and in prior Commission orders in the docket files of the Commission, of which the Commission takes judicial notice.

CWS has approximately 16,000 water customers and 14,000 sewer customers in Lexington, Richland, Sumter, Aiken, Saluda, Orangeburg, Beaufort, Georgetown, Abbeville, Union, Anderson, York, Cherokee, Greenville, Greenwood, and Williamsburg counties. App. Schd. F; R. p. 345 (Gilroy Dir. p. 2, ll. 21-24). As a public utility, its

operations are subject to the jurisdiction of the Commission pursuant to S.C. Code §§ 58-5-10 et seq.

B. Test Year

A fundamental principle of the ratemaking process is the establishment of a historical test year as the basis for calculating a utility's return on rate base. To determine the utility's expenses and revenues, we must select a 'test year' for the measurement of the expenses and revenues. Heater of Seabrook v. PSC, 324 S.C. 56, 59 n.1 (1996). While the Commission considers a utility's proposed rate increase based upon occurrences within the test year, the Commission will also consider adjustments for any known and measurable out-of-test year changes in expenses, revenues, and investments, and will also consider adjustments for any unusual situations which occurred in the test year. When the test year figures are atypical, the Commission should adjust the test year data. See S. Bell Tel. & Tel. Co. v. Pub. Serv. Com, 270 S.C. 590, 603 (1978).

In its Application, CWS utilized a historic test year, the twelve months beginning September 1, 2016, and ending August 31, 2017, with adjustments for 2018 expectations. App. p.2, ¶ 5. ORS used the same historical test year. R. p. 729 (Payne Dir. p. 2, ll. 5-10). None of the other parties contested CWS' proposed test year. Based on the information available to the Commission, and that none of the parties objected to CWS' proposed test year, the Commission concludes that the test year beginning September 1, 2016, and ending August 31, 2017, is appropriate for this Application.

C. Rate of Return on Rate Base

The Company requested rate base and rate of return treatment for its Application. App. pp. 4-5, ¶ 16. No other party of record proposed an alternative method for determining just and reasonable rates and the testimony of ORS' witnesses Payne and Carlisle assumes that return on rate base will be the methodology employed.

The Commission has wide latitude in selecting a rate setting methodology. Heater of Seabrook, at 64. Even though S.C. Code § 58-5-240(H) requires the Commission to specify an operating margin in all water and sewer rate cases, the Commission is not precluded by that statute from employing the return on rate base approach to ratemaking. Id. Operating margin "is less appropriate for utilities that have large rate bases and need to earn a rate of return sufficient to obtain the necessary debt and equity capital that a large utility needs for sound operation." Id at 65. In the Company's last rate case, the Commission employed the return on rate base methodology. The Commission finds the return on rate base methodology is appropriate. The Company's rate base, according to its Application, is $54,853,170. App. Ex. B, Sch. C, p. 1.

The determination of return on rate base requires consideration of three components, namely: capital structure, cost of equity (or "ROE") and the cost of debt. R. pp. 397-398 (D' Ascendis Dir. pp. 4-5).

Mr. D'Ascendis and Dr. Carlisle agreed the capital structure and cost of debt of CWS's parent, Utilities, Inc. should be employed: it is 48.11% long-term debt and 51.89% common equity. R. pp. 395 (D'Ascendis Dir. p. 2, ll. 10-17); 649 (Carlisle Dir. p.4, ll. 21-

p.5, l. 3). No other party disagreed. The Commission finds this capital structure supported by the uncontroverted testimony of the parties.

Mr. D'Ascendis and Dr. Carlisle disagreed on CWS's cost of debt. Mr. D'Ascendis used an embedded debt rate of 6.60%. Dr. Carlisle lowered CWS's cost of debt rate from 6.60% to 6.58% due to what he described as "unfavorable terms" of the Company's long-term debt. R. p. 649 (Carlisle Dir., p. 4, l. 21 – p. 5, l. 9). Dr. Carlisle argued the Company imprudently refinanced its long-term debt when interest rates were high and agreed to terms which prevent it from refinancing now that interest rates are lower. Id. Mr. D' Ascendis countered that the Company's long-term debt financing, which was agreed to in 2006, was in line with bond yields for similarly situated companies at the time. R. p. 438 (D'Ascendis, Rebut. p. 3, ll. 1-14). However, the Commission has not been provided any evidence to support the ORS position. We find the appropriate long-term debt rate for CWS is 6.60%.

The rate of return on common equity, or ROE, is a key figure used in calculating a utility's overall rate of return. Porter v. PSC, 333 S.C. 12 (1998). A utility is entitled to the opportunity to earn a fair rate of return. Federal Power Commission v. Hope Natural Gas Co., 320 U.S. 591 (1944) and Bluefield Water Works Improvement Co. v. Public Service Comm'n, 262 U.S. 679 (1922),

Mr. D'Ascendis recommended that CWS' ROE should fall within a range of 10.45% to 10.95%. R. p. 397 (D'Ascendis Dir. p. 4, ll. 4-20 (Table 2)).

To determine the cost of equity, Mr. D'Ascendis used the Discounted Cash Flow ("DCF") Risk Premium Model ("RPM") and the Capital Asset Pricing Model ("CAP-M")

and (“ECAP-M”) model to similar risk companies, i.e. proxy groups, of regulated and non-regulated companies. R. pp. 396-397 (D’Ascendis Direct pp. 3-4).

The proxy groups were used by Mr. D’Ascendis because the Company's common stock is not publicly traded, and, therefore, CWS's market-based common equity cost rates cannot be determined directly. Id. He used a proxy group of eight water companies whose common stocks were actively traded for insight into a common equity cost rate applicable to CWS. R. p. 402 (D’Ascendis Direct, p.10). The utility proxy group was selected according to these criteria: 1) they are included in the Water Utility Group of Value Line's Standard Edition (October 13, 2017); 2) they have 70% or greater of 2016 total operating income and 70% or greater of 2016 total assets attributable to regulated water operations; 3) at the time of the preparation of this testimony, they had not publicly announced that they were involved in any major merger or acquisition activity (i.e. one publicly traded utility merging with or acquiring another); 4) they have not cut or omitted their common dividends during the five years ending 2016 or through the time of the preparation of this testimony; 5) they have Value Line and Bloomberg adjusted betas; 6) they have a positive Value Line five-year dividends per share ("DPS") growth rate projection; and 7) they have Value Line, Reuters, Zacks, or Yahoo! Finance consensus five-year earnings per share ("EPS") growth rate projections. Id. The companies that met Mr. D’Ascendis’ criteria were: American States Water Co., American Water Works Co., Inc., Aqua America, Inc., California Water Service Group, Connecticut Water Service, Inc., Middlesex Water Co., SJW Corp., and York Water Co. Id.

Mr. D'Ascendis also selected a proxy group of twenty-eight non-price regulated companies comparable in total risk to the proxy group of water companies. R. Ex. 8 (D'Ascendis Direct, Ex. 1, Schd. DWD-6). The criteria for non-price regulated proxy group were: 1) they must be covered by Value Line Investment Survey (Standard Edition); 2) they must be domestic, non-price regulated companies, i.e., non-utilities; 3) their beta coefficients must lie within plus or minus two standard deviations of the average unadjusted beta of the utility proxy group; and 4) the residual standard errors of the Value Line regressions, which gave rise to the unadjusted beta coefficients, must lie within plus or minus two standard deviations of the average residual standard error of the utility proxy group. R, p. 423 (D'Ascendis Direct, p. 30, ll. 15-23).

Mr. D'Ascendis' DCF analysis yields cost rates for the water company proxy group of 8.64%. The RPM analysis produced a common equity cost rate of 10.69% for the water company proxy group. The CAP-M cost rate is 10.51% for the water company proxy group. D'Ascendis averaged the mean, 10.43%, and median, 10.58%, equity costs of the water company proxy group, resulting in 10.51%. R. p. 424 (D'Ascendis Direct, p. 29, ll. 10-15). With the non-price regulated proxy group, the DCF yields 13.57%, the RPM, 11.91%, and the CAP-M/ECAP-M, 11.15%. R. p. 424 (D'Ascendis Direct, pp. 31, l. 12-32, l. 4). The average of the mean and median of the non-price regulated proxy group is 12.06%. R. p. 425 (D'Ascendis Direct, p. 32, ll. 7-14).

The approximate average of the results produced by any of Mr. D'Ascendis' models is 10.45%. R. p. 426 (D'Ascendis Direct, p. 33, ll. 5-9). He also recommended an upward adjustment of 0.50% ROE, due to CWS's small size. R. pp. 426 - 429 (D'Ascendis Direct,

p. 33, l. 11- 36, l. 20). His average ROE after the size adjustment is 10.95%. R. p. 429 (D'Ascendis Direct, p. 36, ll. 17-20). Mr. D'Ascendis recommended range of ROE was 10.45% to 10.95%. R. p. 397 (D'Ascendis Dir. p. 4, ll. 4-20 (Table 2)).

Dr. Carlisle employed the DCF model, the Comparable Earnings Model ("CEM"), and the CAP-M method to calculate his ROE range of 8.82% to 9.54%. R. p. 647 (Carlisle Direct, p. 2, ll. 12-15).

Dr. Carlisle also used a water company proxy group of ten water companies for his DCF and CAP-M analyses. R. p. 649 (Carlisle Direct, p. 4, ll. 15-20). Dr. Carlisle's water company proxy group was identical to Mr. D'Ascendis' water company proxy group except for the addition of Global Water Resources and Artesian Resources. Carlisle Rev. Exhibit DHC-4.

Dr. Carlisle's DCF analysis yields cost rates for his water company proxy group of 8.82%. R. p. 654 (Carlisle Direct, p. 9, ll. 5-6). Dr. Carlisle did not perform the DCF analysis on non-price regulated proxy group as Mr. D'Ascendis did.

Dr. Carlisle's CAP-M analysis compared the returns of the companies in his water company proxy group to a "risk free rate of return" (projected 30 yr. Treasury bond yield). R. p. 658 (Carlisle Direct, p. 13, ll. 17-23). Dr. Carlisle's CAP-M analysis produced a range of 9.38% to 9.70%, which he averaged for a final CAP-M rate of 9.54%. R. p. 659 (Carlisle Direct, p. 14, ll. 12-13). Dr. Carlisle did not perform the CAP-M analysis on comparable non-price regulated stocks, as Mr. D'Ascendis did.

Dr. Carlisle's CEM analysis, was applied to a group of non-price regulated stocks selected from Value Line with a comparable price volatility factor ("beta" or "ß") to those

in his water company proxy group. R. p. 655 (Carlisle Dir. p. 10, ll. 1-6). The CEM analysis produced a "retrospective" return on equity of 9.15%, and a "prospective" ROE of 8.63%. Dr. Carlisle averaged the two to arrive at a CEM ROE of 8.89%. R. p. 656 (Carlisle Dir. p. 11, ll. 3-7).

Finally, Dr. Carlisle averaged his DCF, CEM, and CAP-M rates to arrive at his recommended ROE of 9.08%.

Mr. D'Ascendis and Dr. Carlisle disagreed often. Mr. D'Ascendis argued that Dr. Carlisle should have relied on analysts' estimates of earnings per share rather than historical and projected measures of book value per share, dividends per share, and sales growth to predict growth in earnings per share when performing his DCF analysis. R. p. 438 (D'Ascendis, Rebut. p. 3, l. 15 – p. 7, l. 5). On the other hand, Dr. Carlisle took issue with Mr. D' Ascendis' reliance on analysts' projections of earnings per share ("EPS") as the sole factor in his DCF analysis. R. pp. 666–667 (Carlisle Surr. p. 5, l. 8 – p. 6, l. 12). Dr. Carlisle, instead, also considers dividends per share ("DPS"), book value per share ("BPS"), and revenue or sales. R. pp. 650-651 (Carlisle Dir., pp. 6-7). Mr. D'Ascendis pointed to common market references, such as Yahoo Finance and Bloomberg, which provide earnings per share projections, but not projections of dividends per share, book value per share or sales growth, as evidence the investment community relies on the former but not the latter. R. p. 458, l. 24 – p. 459, l. 13. Had he done so, Mr. D'Ascendis testified, Dr. Carlisle's analysis would have produced a higher ROE. R. p. 442 (D'Ascendis Rebut., p. 7, ll. 1-5). Dr. Carlisle disagreed, citing studies showing that analysts' estimates have

been historically overly optimistic, and should not be the sole basis for the DCF analysis. R. pp. 664–666 (Carlisle, Surr. p. 3, l. 6 – p. 5, l. 4).

Mr. D'Ascendis also disagreed with Dr. Carlisle' CAP-M calculations. He argued that Dr. Carlisle used the wrong measures of market return, and that he should have used the arithmetic mean of monthly total return rates instead of a geometric mean (or compound growth rate). Mr. D'Ascendis contends using the arithmetic produces the best insight into future returns. R. pp. 443–445 (D' Ascendis Rebut. pp. 8-10). Dr. Carlisle responded that his market return measure better reflects the variety of companies in the market. Dr. Carlisle also defended his use of the geometric mean arguing that the arithmetic mean ignores the "compounding" effect of investing and can mislead investors by masking over the ups and downs of the market. R. p. 668 (Carlisle Surr. p. 7, l. 5 – p. 10, l. 26).

Mr. D'Ascendis criticized Dr. Carlisle for not performing an ECAP-M analysis, which he testified would have produced an equity cost rate of 10.03%. R. pp. 444–445 (D'Ascendis Rebut. p. 9, l. 8 – p. 10, l. 9). Mr. D'Ascendis also testified that Dr. Carlisle's selection of non-price regulated companies for his CEM analysis failed to reflect the total risk of his water company proxy group. Mr. D'Ascendis performed Dr. Carlisle's DCF and CAP-M analyses using a group that better reflected the risk of the water proxy group and found cost rates of 14.66% and 9.85% respectively. R. p. 448 (D'Ascendis Rebut. p. 13, ll. 14-24). Using the amended proxy group, Dr. Carlisle's range would change to 9.57% (DCF), 10.03% (CAP-M), and 12.26% (CEM) with an average of 10.62%. R. p. 449 (D'Ascendis Rebut. p. 14, ll. 4-10).

The Commission finds Mr. D'Ascendis' arguments persuasive. He provided more indicia of market returns, by using more analytical methods and proxy group calculations. Mr. D'Ascendis' use of analysts' estimates for his DCF analysis is supported by consensus, as is his use of the arithmetic mean. The Commission also finds that Mr. D'Ascendis' non-price regulated proxy group more accurately reflects the total risk faced price regulated utilities and CWS. Furthermore, there is no dispute that CWS is significantly smaller than its proxy group counterparts, and, therefore, it may present a higher risk. . An appropriate ROE for CWS is 10.45% to 10.95%. The Company used an ROE of 10.5% in computing its Application, a return on the low end of Mr. D'Ascendis' range, and the Commission finds that ROE is supported by the evidence.

Table 1 below indicates the capital structure of the Company, the cost of debt, the cost of equity as approved in this Order, and the resulting rate of return on rate base:

Table 1: Summary of Overall Rate of Return

Type of Capital	Ratios	Cost Rate	Weighted Cost Rate
Long-Term Debt	48.11%	6.60%	3.17%
Common Equity	51.89%	10.50%	5.45%
Total	100.00%		8.62%

D. Contested Rate Base Adjustments

The rate base proposed by CWS for combined operations was $54,853,170. App. Ex B., Sch. C. CWS disputed two of ORS's rate base adjustments: Adj. 32(c) in which ORS proposes to disallow $1,081,375 spent in connection with a liner of the equalization

basin ("EQ Liner") at the Friarsgate wastewater treatment plant, and Adj. 32(d) in which ORS proposes to disallow $306,552 in engineering costs incurred at the Friarsgate Plant. R. p. 744 (Payne Direct, p. 17).

1. Friarsgate EQ Basin Removal and Site Remediation

The Company proposes to include $1,081,375 for engineering costs and remediation costs associated with the replacement of the Equalization Basin's ("EQ") liner at the Friarsgate WWTF. An EQ Liner is a heavy-mill plastic liner placed in an in-ground basin that holds water. R. p. 478, ll. 20-24. CWS hired an engineering firm, W.K. Dickson, after an upset occurred at its Friarsgate Wastewater Treatment Facility ("Friarsgate Plant"). W.K. Dickson assisted CWS in formulating and presenting a Corrective Action Plan required by a Consent Order with DHEC. R. p. 555, l. 16 – p. 557, l. 1. W.K. Dickson submitted engineering plans on an expedited basis for various changes and improvements made to the plant. R. p. 555, ll. 19-25. DHEC also required CWS to have a professional engineer who was a wastewater expert on site to supervise the plant's operations. R. p. 556, ll. 14-22. W.K Dickson also provided required monthly reports to DHEC. R. p. 556, l. 22 – p. 557, l. 1.

The Company was required by a DHEC Consent Order to: 1) remove the existing liner, 2) complete any environmental mitigation efforts concerning the soils under the existing liner, and 3) replace the EQ Liner. This effort included removing and properly disposing of any affected soils. Once the site was sufficiently mitigated, new soil was brought in, graded, and compacted to prepare the site for the installation of the new liner. Although the EQ plastic liner has yet to be installed, the Company removed the existing

EQ Liner and completed the environmental mitigation required by DHEC before the audit cutoff date of February 12, 2018. CWS acted expeditiously to comply with the DHEC mandate. CWS is not asking to recover the cost of the new liner. R. p. 505, ll. 8-14.

CWS witness Cartin testified that the DHEC Consent Order required CWS to remove the EQ Liner at the Friarsgate Plant, remediate the soil underneath the liner, and replace the liner. R. pp. 318-319 (Cartin Rebut. p. 3, l. 3 – p. 4, l. 2). CWS spent $1,081,375 to remove the EQ Liner and remediate the soil under the liner. Id. The Company had not installed the new liner yet but is in the process of doing so. Id. CWS contends that its compliance with DHEC's Consent Order was required for its continued operations and the public has benefitted from the removal of the old EQ Liner and the soil remediation, and therefore the costs should be included in rate base. Id.

The ORS proposes to disallow these costs because the EQ Liner has not yet been replaced. The ORS reasons that the project included both the engineering and remediation and the replacement of the EQ Liner. ORS's witness, Zachary Payne, testified that, since the new EQ Liner is still under construction, the whole project is not used and useful and should not be included in rate base. R. p. 754 (Payne Surr. p. 4, ll. 7-17).

The Commission finds the measures required by the DHEC Consent Order were in the public interest. Disallowing recovery of remediation costs acts to impair a utility's ability to address environmental concerns and conflicts with the policy of allowing recovery of necessary and prudently incurred costs. These known and measurable expenditures provided prompt regulatory and environmental compliance and immediate environmental and customer benefits. CWS has not requested recovery of the cost of the

new EQ Liner, the part of the project that ORS challenges as not used and useful. The Commission finds the $1,081,375 cost of the removal of the existing EQ Liner and environmental remediation served the Company's customers and the public interest, and the Company is entitled to its recovery.

2. Friarsgate Engineering Costs

ORS proposed to disallow $306,552 in engineering costs paid to the W.K. Dickson firm for services at the Friarsgate Plant. R. p. 744 (Payne Direct, p. 17, l. 11 (Adj. 32(d)). CWS contends the costs are recoverable because W.K. Dickson was hired to comply with the terms of the Consent Order with DHEC. R. pp. 319-320 (Cartin Rebut. p. 4, l. 3 – p. 5, l. 4). Mr. Cartin testified that W.K. Dickson was hired to design an O&M Manual and take other measures to ensure compliance at the plant. Id. Mr. Gilroy testified that W.K. Dickson was continuously present at the plant following an upset that occurred in June 2016 whichled to a DHEC enforcement action. R. p. 353 (Gilroy Direct p. 10 ll. 1-7); R. p. 487, l. 12 – p. 488, l. 9. During that period, W.K. Dickson served as the principal point of contact with DHEC personnel and obtained permission for changes and improvements made to the facility. Id.

ORS took the position the W.K. Dickson costs should not be recoverable because they were incurred to comply with DHEC's Consent Order, which was caused by the Company's failure to adequately operate and maintain the Friarsgate Plant. R. p. 683, ll. 5-22. ORS's witness, Mr. Schellinger also testified the invoices for the work lacked sufficient detail to allow it to determine the work performed, and the work was required by Consent Orders which arose from the Company's violation of its NPDES permit. R.

pp.712-715 (Schellinger Surr. p. 5, l. 13 – p. 8, l. 20). If the costs were allowable, Mr. Schellinger testified that they should be booked as operations and maintenance expenses, not capital assets. CWS responded that costs incurred to ensure the Company's compliance with environmental regulations should be recoverable, and that treating them as capital expenditures is consistent with the practice adopted by the Company and the ORS in the settlement of the last rate case. R. pp. 319 - 320 (Cartin Rebut. p. 4, l. 3 – p. 5, l. 4). The Commission finds the engineering fees are recoverable as a capital expense prudently incurred to ensure necessary compliance with environmental regulations.

E. Expenses

CWS contested adjustments proposed by the ORS to the Company's O&M expenses: a reduction of $96,892 in sludge hauling expenses (Adj. 9(d)), and the disallowance of $998,606 in legal expenses incurred during litigation involving the I-20 wastewater treatment plant (Adj. 16).

1. Adjustment for Litigation Expenses

The Company proposes to amortize $998,606 in financial costs and litigation expenses associated with its I-20 sewer system over 66.67 years. R, pp. 316-317 (Cartin Rebut., p. 1, l. 12 – p. 2, l. 18). These costs were primarily incurred with five actions: 1) a lawsuit brought by the Congaree Riverkeeper in the U.S. District Court, 2) a condemnation action brought by the Town of Lexington, 3) a challenge to DHEC's denial of a permit for the I-20 Plant in the Administrative Law Court, 4) the Town of Lexington's challenge of DHEC's order that it interconnect with CWS brought in the Administrative Law Court, and 5) CWS's lawsuit against the EPA in the United States District Court. Schellinger Sur.

p. 3, ll. 1-11. The Company proposed to amortize these costs over 66.7 years, resulting in an expense of $14,979 per year. R. p. 300 (Cartin, Dir., p. 2, ll. 15-18).

ORS argued the legal expenses should not be allowed for two reasons. Mr. Schellinger testified that legal expenses incurred to defend the Congaree Riverkeeper's lawsuit should not be allowed because the District Court had ruled against CWS finding various violations of its NPDES permit and of effluent limitations since 2009. R. p. 692 (Schellinger Surr. p. 3, l. 11 – p. 4, l. 5). Mr. Schellinger viewed the company's lawsuit against the EPA and its litigation in the Administrative Law Court as related to the Riverkeeper proceeding, a position not disputed by CWS. Schellinger asserts that CWS should not be allowed to recover its legal costs because the actions arose from the Company's violations of environmental regulations. Id.

Schellinger testified the legal costs incurred in the condemnation action should not be recovered because CWS may be allowed to recover some costs if it prevailed. R. p. 730 (Schellinger Surr. p. 4, ll. 6-22). Schellinger also posited the actions before the Administrative Law Court could turn on the outcome of the condemnation action. R. p. 731 (Schellinger Surr. p. 5, ll. 1-12). He testified that since the outcome of the condemnation action was unknown and since if successful CWS may recover its litigation costs, the Commission should establish a regulatory asset in which to defer the litigation costs for future rate making treatment.

Mr. Cartin testified that CWS had no choice but to defend the Congaree Riverkeeper's lawsuit, and to prosecute its related actions. R. p. 490, l. 22 – p. 491, l. 7. He pointed out the Congaree Riverkeeper brought his suit to force an interconnection of

the I-20 Plant to the Town of Lexington's sewer system, an action CWS was ready to take but the Town of Lexington would not allow. R. p. 489, ll. 8-20. It was not until 2016, after DHEC ordered the Town of Lexington to seek an interconnection with CWS, that Lexington brought its condemnation proceeding. R. p. 567, ll. 1-12. When the condemnation suit was brought, CWS readily allowed the town to take possession of the I-20 system and interconnect the plant, reserving its right to contest Lexington's valuation of the plant. Id.

The Commission finds that regulated utilities, like any business, will experience litigation costs associated with its business operations. CWS acted to limit exposure to liability and benefit the utility and its rate payers. The financial and litigation costs were prudently incurred. Recovery of these costs equates to $14,979 in annual amortization expense. As Mr. Cartin testified, CWS had no alternative but to defend the Congaree Riverkeeper's lawsuit and engage in the related litigation. Therefore, CWS will be allowed to recover $998,606 amortized over 66.7 years, at the rate of $14,979 per year.

2. Sludge Hauling Expenses

CWS incurred $284,233 in sludge hauling expenses at its Friarsgate Plant and at its Watergate wastewater treatment facility ("Watergate Plant") during the test year. R. p. 753 (Payne Surr. p. 3). ORS proposed to remove $96,892 in sludge hauling costs. ORS proposes an adjustment to allow recovery of a three-year average of annual sludge hauling costs at the two facilities.

ORS witness Payne testified that the ORS reviewed the sludge costs in the test year and the costs in the previous two years, concluding that the sludge hauling costs in the test

year were atypical. R. pp. 751-752 (Payne Surr. p. 2, l. 19 – p. 3, l. 12). The ORS proposes to average the annual sludge expense for the three years reviewed and proposed an adjustment of $96,892, normalizing this operating expense. Id.

CWS witness Gilroy testified the increase of sludge hauling expense during the test year was caused by additional sludge removal requirements at the Friarsgate WWTF which produces large amounts of sludge that must be disposed of in a timely manner. R. pp. 358-360. The amount of sludge produced depends on many factors within the process of the waste water treatment. Id. The active sludge inventory within the process must be kept at a certain concentration for the biological process to be effective and result in a clear compliant effluent. Id. Excess sludge inventory must be removed frequently to keep sludge from building up to unacceptable levels which could cause problems with effluent quality. Id.

Mr. Gilroy testified that because the Friarsgate WWTF has been on a Consent Order, these sludge inventories are also monitored by DHEC, which recommends that the inventory to be kept at a constant rate. R. p. 365 (Gilroy Rebut. p. 3, ll. 3-12)). Ordinarily, the liquid sludge is poured into filtrate boxes that drain off the water leaving a very dry cake behind, which is then hauled and disposed of at the Northeast Sanitary Landfill. Id. When the sludge production exceeds the capacity of the filtrate boxes, CWS utilizes contractor liquid tanker trucks to haul the sludge to the City of Cayce's disposal site. Id. Disposing of the sludge in the cake form is more cost-effective than hauling truckloads of liquid sludge. Id. Although more expensive, sometimes the filtrate boxes are full, and tankers must be utilized. Id.

The Commission finds that the sludge hauling costs in the test year are recoverable as known and measurable, prudently incurred costs. The ORS does not dispute the sludge costs in the test year. It simply speculates that the costs will not recur in a similar amount. Speculation is not sufficient. Moreover, the testimony indicates that the sludge costs have increased because of the DHEC Consent Order, and were prudently incurred. The Commission denies the ORS adjustment to reduce the sludge hauling expenses.

3. Effects of the Income Tax and Jobs Act

a) Excess Accumulated Deferred Income Taxes

The Company filed its Application before Congress enacted the Tax Cuts and Jobs Act of 2017 ("TCJA"), which took effect on January 1, 2018. P.L. No: 115-97. The TCJA changed the tax laws affecting the Company. Mr. Hunter testified the TCJA reduced the corporate income tax rate from 35% to 21%, causing the Company to reduce its requested revenue requirement by approximately $877,000. R. p. 255, ll. 16-22. This Commission held in Order No. 2018-308 that, beginning January 1, 2018, regulatory accounting treatment is required for all regulated utilities for any impacts of the new law, including current and deferred tax impacts. We also held that the utilities should track and defer the effects resulting from the Tax Act in a regulatory liability account, and further, for water/wastewater utilities with operating revenues that are equal or greater than $250,000, the issue will be addressed at the next rate case or other proceeding. The provisions of Order No. 2018-308 apply to the present case, as well as to other utilities indicated in Order No. 2018-308.

F. Rate Case Expenses

CWS proposed to include rate case expenses incurred in this rate case through the date of the hearing, and ORS agreed to this proposal, subject to its review of the requested additional amount and examination of supporting documentation. R p. 754 (Payne Surreb., p. 4, ll. 5-7). ORS received and reviewed documentation supporting rate case expenses of $88,500 and informed the Commission at the hearing that the ORS agrees with them. After the hearing, CWS presented documentation supporting additional rate case expenses of $64,560. Because the additional rate case expenses are known and measurable, the Commission will allow them to be included in the total rate case expense and amortized over three years. We find the Company is entitled to $153,060 in total rate case expenses, including those expenses submitted to ORS post-hearing. This amount amortized over three years less the Company's per book amount yields a post-hearing adjustment of $21,520.

G. Other Adjustments

The remaining ORS adjustments are accepted by this Commission without discussion. They either were not disputed by the parties or were caused by carrying out the effects of the adjustments adopted above.

H. Deferred Accounts

By Order No. 2015-876 in Docket No. 2015-199-WS, the Commission approved two regulatory deferred accounts authorizing CWS 1) to record and monitor all rate increases from third-party providers for water supply and sewer treatment; and 2) to recover non-revenue water expenses. The Commission authorized CWS to seek recovery

of the balance of these deferred accounts, subject to audit by ORS and approval by the Commission in a subsequent rate case. In this Application CWS is seeking recovery of the balance in the regulatory deferral account associated with increases in purchased water from bulk water providers. (Application, para. 17) Mr. Hunter testified that the purchase water deferred account had a balance of $669,808 as of March 8, 2018 and explained CWS sought recovery of this balance in this docket R. p. 278 (Hunter Rebut. p. 3 ll. 7–17). At the hearing, Mr. Payne testified that the ORS had reviewed the supporting documentation of the purchase water deferred account and that the ORS agreed with CWS' request to recover the balance of $669,808. R. p. 752 (Payne Surreb., p. 2, ll.8-18). The Commission finds it reasonable for CWS to recover the purchased water deferred account balance of $669,808.

Because the non-revenue water deferral account has a balance of zero, the ORS recommended this account be closed. R. p. 701 (Schellinger Dir., p. 11, l. 18 – p. 12, l. 8). The Company did not dispute this recommendation. The Commission finds it reasonable that the non-revenue water account be closed.

I. Performance Bond

CWS currently provides the maximum amount required for its performance bond in the amount of $350,000 for water and $350,000 for sewer operations. Using the criteria set forth in S.C. Code Regs. §§ 103-512.3.1 and 103-712.3.1, ORS recommended that CWS be required to continue the current performance bond amounts. R. p. 701 (Schellinger Dir. p. 12, ll. 9-15). CWS agreed to the performance bond amounts. The Commission requires

that CWS maintain its performance bond in $350,000 for water and $350,000 for sewer operations.

J. Changes to Rates, Charges and Term of Service

1. Irrigation Only Meters

Mr. Cartin testified that after hearing concerns expressed by customers with irrigation only meters, the Company had determined to eliminate the base facilities charge for irrigation only meters for residential customers who are no longer receiving an economic benefit from having an irrigation meter. The impact on revenues will be $37,946 annually. The Company is not seeking recovery of this lost revenue here. R. p. 320 (Cartin Reb., p. 5, ll. 5-20).

The ORS has no objection to eliminating the base facilities charge on customers with irrigation only meters.

The Commission finds that eliminating the base facilities charge for customers with irrigation only meters is just and reasonable and in the public interest.

2. Backflow Testing.

CWS proposed to change the terms and conditions of its tariff to permit its customers to test their backflow devices every two years. The ORS proposed to limit the testing requirement to every two years for those residential customers with irrigation cross connections. R. pp. 699 - 700 (Schellinger Dir., p. 10, l. 18 – p. 11, l. 6). CWS concurred with the ORS recommendation with the additional provision that if the sewer system utilizes chemical injection, annual testing will be required. R. p. 363 (Gilroy Rebut., p. 1, ll. 1-7).

The Commission finds that permitting CWS' residential irrigation customers to test backflow preventers every two years is reasonable, provided that if the sewer system utilizes chemical injection, annual testing will be required

3. Water Meter Installation Charge

CWS requests authority to increase its Water Meter Installation Charge from$35.00 to $45.00 to more closely reflect the utility's costs. (Application at ¶ 20) The ORS has reviewed the cost justification for this increase and agrees the increase is reasonable. R. p. 699 (Schellinger Dir., p. 10, ll.14 – 17). The $45.00 charge is reasonable and CWS is authorized to increase its Water Meter Installation Charge to $45.00.

4. Limitation of Liability

CWS seeks authority to limit the liability of the Company, its agents and employees for damages arising out of interruption of service or the failure to furnish service, whether caused by acts or omission, to those remedies provided in the Commission's rules and regulations governing water and wastewater utilities. (Application at ¶ 22). Mr. Cartin points out that the Commission has promulgated regulations for quality of service and interruption of service. Limiting customer remedies to those provided in the regulations will eliminate the prospect of unnecessary litigation and result in cost savings which will benefit customers. R. pp. 310-311 (Cartin Dir., p. 12, l. 14 – p. 13 1, l. 2). The ORS does not oppose the Company's proposed changes to tariff language regarding liability for interruption of service. Interruption of service is regulated by the Commission in S.C, Code Ann. Regs. 103-771 and 103-551. R. p. 670 (Schellinger Dir., p. 11, ll. 7–12) The

proposed limitation of liability to those protections found in S.C. Code Reg. 103-771 and 103-551 is reasonable and is approved.

K. Authorized Revenues

CWS requested in its Application to increase revenues for combined operations by $4,511,414, comprising a water revenue increase of $2,272,914 and a sewer revenue increase of $2,238,500, based on the rate of return on rate base methodology utilizing an ROE of 10.5% and an historical test year ending August 31, 2017. The revenue and expense adjustments to the requested increase in revenue set out herein at the approved ROE of 10.50% produce additional operating revenue of $2,936,437 consisting of a water revenue increase of $1,286,127 and a sewer revenue increase of $1,650,310.

L. Rate Design

Exhibit "A" to the Application contains the Company's Schedule of Proposed Water Charges. The proposed water rate structure for Territory 1 and Territory 2 will remain the same as approved in Order No. 2015-876. In Territory 1 and Territory 2 there will remain separate charges for Water Supply Customers (where water is supplied by wells owned and operated by CWS) and Water Distribution Customers (where water is purchased from a governmental body or agency or other entity for distribution and resale by CWS). R. p. 264 (Hunter Dir. p. 5, ll. 18–25).

Exhibit "A" to the Application contains the Company's Schedule of Proposed Sewer Charges. Under the existing tariff, the flat rate charge for Sewer Collection & Treatment Only Customers and the flat rate charge for Sewer Collection Only Customers are two different rates. CWS proposes to combine Sewer Collection & Treatment Only

Customers and Sewer Collection Only Customers into one single rate per unit. Separate rates will remain on the tariff for Mobile Homes, and The Village Sewer Collection Customers. R. p. 265 (Hunter Dir., p.6, ll. 16–23).

Rate design is a matter of discretion for the Commission. In establishing rates, it is incumbent upon us to fix rates which "distribute fairly the revenue requirements [of the utility]." See Seabrook Island Property Owners Association v. S.C. Public Service Comm'n, 303 S.C. 493, 499 (1991). Our determination of "fairness" with respect to the distribution of the Company's revenue requirement is subject to the requirement that it be based upon some objective and measurable framework. See Utilities Services of South Carolina, Inc., v. South Carolina Office of Regulatory Staff, 392 S.C. 96, 113-114 (2011).

CWS has combined certain of its sewer rates in this docket moving closer to uniform rates. The water rate design was approved by Order No. 2015-876. No party contests the proposed rate design and it is approved by the Commission.

M. Forty Love Point

The Forty Love Point Homeowners Association intervened questioning sewer service in the neighborhood. Barbara King and Jay Dixon, residents of the Forty Love subdivision, testified that they experienced sewer backups in their homes and chronicled the efforts of CWS to address their concerns. Representatives of CWS and its engineers, DHEC and ORS have met with the witnesses. CWS provides collection only services to Forty Love and Richland County treats the sewage. The witnesses testified that Richland County and CWS should coordinate any remedy for the customer concerns. The witnesses believe their sewer system is outdated and inadequate. The witnesses also contest the

proposed rate increase. R. pp. 608–610 (Dixon Dir. p. 1, l. 1 – p. 4, l. 76); R. pp. 603 – 605 (King Dir., p. 1, l. 1 – p. 3, l. 59).

CWS witness Gilroy testified that the Forty Love sewer system is a LETTS design installed by the developer. LETTS systems are modified septic tanks in which solid waste accumulates in a holding tank with the gray water draining to a common sewer main for transport to the Richland County Utilities treatment plant. CWS has been working with the Kings and Dixons to determine why their LETTS tanks fail to drain during prolonged rain events. CWS believes the elevation and distance between their finished basements and the sewer main outside provides for no leeway when the sewer main backs up slightly. CWS has a contractor working to install a pump tank that will both pump their water into the main and provide the separation needed to eliminate backups of their homes. R. pp. 363–364 (Gilroy Rebut., p. 1, l. 8 – p. 2, l. 10).

CWS is also retaining a professional engineering firm to inspect the system and help solve the sewerage backup problems experienced by these customers. While it is working towards a permanent solution, CWS will continue to alleviate the problem by dispatching pump trucks to the neighborhood when heavy rains are anticipated. CWS is also inspecting each LETTS tank and will reseal them as necessary. Reduced water from the tanks should ease the stress placed on thesystem. Id.

CWS will continue to communicate the engineering assessment with the outside contractor with Forty Love. CWS and Forty Love have agreed to report their findings to the Commission and ORS in six months – by September 30, 2018. Id. The Commission finds that the agreement between CWS and Forty Love is reasonable.

CWS and the HOA have agreed to the following plan of action which, at their request, the Commission incorporates in its Order:

> CWS acknowledges that some of its customers in the Forty Love Point neighborhood have experienced problems with sewerage backups. CWS has taken, and will continue to take, measures to address these customers' concerns. CWS and the HOA agree to cooperatively investigate the source and extent of sewerage problems experienced by customers in the Forty Love Point neighborhood and formulate a plan to address them. The company is retaining an engineering firm to perform an assessment of the Forty Love Point system, and CWS will continue to work with DHEC and Richland County to determine whether issues with the latter's system may be affecting Forty Love Point. CWS and the HOA will report their findings to the PSC and the ORS in six months.

N. Dancing Dolphin, LLC

The Commission requested that the ORS investigate the allegations made by CWS' customer the Dancing Dolphin, LLC. The ORS recommends that CWS complete an inflow and infiltration study and a cost benefits analysis for the sewer system serving the properties owned by the Dancing Dolphin. R. pp. 705– 706 (Schellinger Dir., p. 16, l. 20 - -p. 17, l. 3) CWS will conduct an inflow and infiltration study and provide a report to the Commission within one year of the date of the Order. R. pp. 317–318 (Cartin Rebut., p. 2, 19 - p. 3, l. 2). In addition, CWS has credited the Dancing Dolphin, LLC with one month's bill to address the customer's concerns. R. p. 310 (Cartin Dir. p. 12, ll. 12–13). The Commission finds CWS conduct to be prudent and reasonable.

O. Customer Communications

The record reflects that CWS is working to give its customers a better understanding of the pressures and costs of operating its water and sewer systems. The Company has hired a communications coordinator to direct its customer outreach activities. R. pp. 251-253. Since December of 2017, CWS scheduled meetings with its customers in York County on December 4, 2017, and February 27, 2018; Lexington County on December 5, 2017; Anderson County on December 6, 2017; Richland County on February 21, 2018, and Greenville County on March 1, 2018. At those meetings, CWS gave customers the opportunity to meet with its management and field personnel to learn more about its operations and cost of service. R. p. 371 (Gilroy Resp., p.1, ll. 6–16).

This Commission would observe that, in prior years, the Company's customer service was perceived by some as being below standard. However, the Company's testimony in this case shows that it is committed to improvement in a proactive fashion. Relatively few customers appeared to complain about quality of service, as compared to the last several rate cases. We hold that the Company should routinely be responsive on quality of service issues, and that CWS should set the standard for quality and customer service.

However, in order to ensure that the Company is being responsive to quality of service issues, and to its customers, CWS shall prepare a report and submit it to the Commission and to ORS no less than semiannually, and the document should have headings for "Customer Complaint," "Company Response," "Customer Reaction to Company," and explain the Company reaction to Customer Complaints during the period

addressed, along with any explanations regarding quality of service. The Company shall also submit a separate report no less than semiannually reporting on all capital improvements made during the period to enhance customer service and to explain the cost of such capital improvements.

III. FINDINGS OF FACT

1) CWS is a water and sewer utility providing water and sewer service in its assigned service area in South Carolina. The Commission is vested with authority to regulate rates of every public utility in this state and to ascertain and fix just and reasonable rates for service. S.C. §58-5-210, et. seq. CWS's operations in South Carolina are subject to the jurisdiction of the Commission.

2) CWS requested in its Application to increase revenues for combined operations by $4,511,414 comprising a water revenue increase of $2,272,914 and a sewer revenue increase of $2,238,500, based on the rate of return on rate base methodology utilizing an ROE of 10.5% and a historical test year ending August 31, 2017.

3) The test year period for this proceeding, selected by the Company, is September 1, 2016 through August 31, 2017.

4) The Commission will use the return on rate base methodology in determining and fixing just and reasonable rates.

5) The return on rate base methodology requires three components: capital structure, cost of debt, and cost of equity (or ROE).

6) CWS's rate base is $55,524,956 after the adjustments adopted by the Commission.

7) The Commission adopts and approves of a capital structure of 48.11% long-term debt and 51.89% equity; a cost of debt rate of 6.60%; and an ROE of 10.50%.

8) The approved capital structure, cost of debt rate, and ROE produce additional operating revenue of $2,936,437 consisting of a water revenue increase of $1,286,127 and a sewer revenue increase of $1,650,310.

9) The approved revenues and expenses establish a fair and reasonable operating margin of 13.23%, and a return on rate base of 8.62%.

10) The schedule of rates and terms and conditions attached to this Order as Exhibit A (Order Exhibit 1) are just and reasonable and designed to achieve the Company's new revenue requirement.

IV. CONCLUSIONS OF LAW

Based upon the discussion, findings of fact and the record of the instant proceeding, the Commission makes these Conclusions of Law:

1) CWS is a public utility as defined in S.C. Code § 58-5-10(3) and is subject to the jurisdiction of this Commission.

2) The appropriate test year on which to set rates for CWS is the twelve-month period beginning September 1, 2016 and ending August 31, 2017.

3) Based on the information provided by the parties, the Commission concludes the rate setting methodology to use as a guide in determining the lawfulness of CWS's proposed rates and for fixing just and reasonable rates is return on rate base.

4) For CWS to have the opportunity to earn the 10.5% ROE, found fair and reasonable herein, CWS must be allowed additional revenues of $2,936,437.

5) The schedule of rates and terms and conditions in the attached Exhibit A are approved for use by CWS and are just and reasonable without undue discrimination and are also designed to meet the revenue requirements of CWS.

6) Pursuant to S.C. Code § 58-5-720 and 10 S.C. Code Regs. §§ 103-512.3 and 103-712.3, CWS will post a performance bond of $350,000 for water and $350,000 for sewer operations.

V. ORDERING PROVISIONS

IT IS THEREFORE ORDERED THAT:

I. The rates, fees, and charges in Order Exhibit 1 are both fair and reasonable and will allow CWS to continue to provide its customers with adequate water and wastewater services.

II. The Company is to provide thirty (30) days' notice of the increase to customers of its water and wastewater services prior to the rates and schedules being put into effect for service rendered. The schedules will be deemed filed with the Commission under S.C. Code § 58-5-240.

III. An ROE of 10.5%, return on rate base of 8.62% and operating margin of 13.23% based on the new rates, fees, and charges, is approved for CWS.

IV. The Company will continue to maintain current performance bonds in the amounts of $350,000 for water operations and $350,000 for wastewater operations pursuant to S.C. Code § 58-5-720.

V. The Company shall provide the written reports on quality of service and capital improvements no less than semiannually as described above.

VI. This Order will remain in full force and effect until further order of the Commission.

BY ORDER OF THE COMMISSION:

Swain E. Whitfield, Chairman

ATTEST:

Comer H. Randall, Vice Chairman

EXHIBIT A

Tariff

Carolina Water Service, Inc.
Docket No. 2017-292-WS
SCHEDULE OF PROPOSED RATES AND CHARGES

WATER

Service Territory 1

Monthly Charges - Water Supply Customers Only

Where water is supplied by wells owned and operated by the Utility, the following rates apply:

	Current	Proposed
Residential		
Base Facilities Charge per single-family house, condominium, mobile home, or apartment unit	$14.64 per unit	$14.43 per unit
Residential Commodity Charge	$5.69 per 1,000 gal. or 134 cft.	$5.61 per 1,000 gal. or 134 cft.
Commercial		
Base Facilities Charge by meter size		
5/8" meter *	$ 14.64 per unit	$ 14.43 per unit
3/4" meter	$ 14.64 per unit	$ 14.43 per unit
1" meter	$ 38.10 per unit	$ 37.54 per unit
1.5" meter	$ 76.21 per unit	$ 75.10 per unit
2" meter	$ 121.93 per unit	$ 120.15 per unit
3" meter	$ 228.63 per unit	$ 225.29 per unit
4" meter	$ 381.16 per unit	$ 375.59 per unit
8" meter	$1,171.21 per unit	$1,154.08 per unit
Commercial Commodity Charge	$5.69 per 1,000 gal or 134 cft.	$5.61 per 1,000 gal. or 134 cft.

Monthly Charges - Water Distribution Customers Only

Where water is purchased from a governmental body or agency or other entity for distribution and resale by the Utility, the following rates apply:

Residential		
Base Facilities Charge per single-family house, condominium, mobile home, or apartment unit	$14.64 per unit	$14.43 per unit
Residential Commodity Charge	$6.67 per 1,000 gal. or 134 cft.	$7.57 per 1,000 gal. or 134 cft.

Corrected

Carolina Water Service, Inc.
Docket No. 2017-292-WS
SCHEDULE OF PROPOSED RATES AND CHARGES

	Current	Proposed
Commercial		
Base Facilities Charge by meter size		
5/8" meter *	$ 14.64 per unit	$ 14.43 per unit
3/4" meter	$ 14.64 per unit	$ 14.43 per unit
1" meter	$ 38.10 per unit	$ 37.54 per unit
1.5" meter	$ 76.21 per unit	$ 75.10 per unit
2" meter	$ 121.93 per unit	$ 120.15 per unit
3" meter	$ 228.63 per unit	$ 225.29 per unit
4" meter	$ 381.16 per unit	$ 375.59 per unit
8" meter	$1,171.21 per unit	$1,154.08 per unit
Commercial Commodity Charge	$6.67 per 1,000 gal. or 134 cft.	$7.57 per 1,000 gal. or 134 cft/

***A "Fire Line" customer will be billed a monthly base facilities charge of a 5/8" meter or at the rate of any other meter size used as a detector.**

Corrected

Carolina Water Service, Inc.
Docket No. 2017-292-WS
SCHEDULE OF PROPOSED RATES AND CHARGES

Service Territory 2

Monthly Charges - Water Supply Customers

Where water is supplied by wells owned and operated by the Utility, the following rates apply:

	Current	Proposed
Residential Base Facilities Charge per single-family house, condominium, mobile home or apartment unit:	$24.72 per unit	$28.62 per unit
Residential Commodity Charge	$ 8.88 per 1,000 gal. or 134 cft.	$10.28 per 1,000 gal. or 134 cft.
Commercial Base Facilities Charge by meter size		
5/8" meter*	$ 24.72 per unit	$ 28.62 per unit
1" meter	$ 68.81 per unit	$ 79.65 per unit
1.5" meter	$ 126.45 per unit	$146.38 per unit
3" meter	$ 431.52 per unit	$499.53 per unit
Commercial Commodity Charge	$ 8.88 per 1,000 gal. or 134 cft.	$10.28 per 1,000 gal. or 134 cft.

Monthly Charges - Water Distribution Customers Only

Where water is purchased from a governmental body or agency or other entity for distribution and resale by the Utility, the following rates apply:

Residential Base Facilities Charge per single-family house, condominium, mobile home or apartment unit:	$ 24.72 per unit	$ 28.62 per unit
Residential Commodity Charge	$ 9.41 per 1,000 gal. or 134 cft.	$ 11.86 per 1,000 gal. or 134 cft.
Commercial Base Facilities Charge by meter size:		
5/8" meter*	$ 24.72 per unit	$ 28.62 per unit
1" meter	$ 68.81 per unit	$ 79.65 per unit
1.5" meter	$ 126.45 per unit	$146.38 per unit
3" meter	$ 431.52 per unit	$499.53 per unit
Commercial Commodity Charge	$ 9.41 per 1,000 gal.	$ 11.86 per 1,000 gal.

Carolina Water Service, Inc.
Docket No. 2017-292-WS
SCHEDULE OF PROPOSED RATES AND CHARGES

or 134 cft.	or 134 cft.

***A "Fire Line" customer will be billed a monthly base facilities charge of a 5/8" meter or at the rate of any other meter size used as a detector.**

Carolina Water Service, Inc.
Docket No. 2017-292-WS
SCHEDULE OF PROPOSED RATES AND CHARGES

WATER SERVICE
TERMS AND CONDITIONS
AND
NON-RECURRING CHARGES

1. Terms and Conditions

A. Where the Utility is required by regulatory authority with jurisdiction over the Utility to interconnect to the water supply system of a government body or agency or other entity and tap/connection/impact fees are imposed by that entity, such tap/connection/impact fees will also be charged to the Utility's affected customers on a pro rata basis, without markup.

B. Commercial customers are those not included in the residential category above and include, but are not limited to, hotels, stores, restaurants, offices, industry, etc.

C. The Utility will, for the convenience of the owner, bill a tenant in a multi-unit building, consisting of four or more residential units (or in such other circumstances as the law may allow from time to time), which is served by a master water meter or a single water connection. However, in such cases all arrearages must be satisfied before service will be provided to a new tenant or before interrupted service will be restored. Failure of an owner to pay for services rendered to a tenant in these circumstances may result in service interruptions.

D. When, because of the method of water line installation utilized by the developer or owner, it is impractical to meter each unit separately, service will be provided through a single meter, and consumption of all units will be averaged; a bill will be calculated based on that average and the result multiplied by the number of units served by a single meter.

E. Billing Cycle

Recurring charges will be billed monthly in arrears. Nonrecurring charges will be billed and collected in advance of service being provided.

F. Extension of Utility Service Lines and Mains

The Utility shall have no obligation at its expense to extend its utility service lines or mains in order to permit any customer to connect to its water system. However, anyone or entity which is willing to pay all costs associated with extending an appropriately sized and constructed main or utility service line from his/her/its premises to any appropriate connection point, and pay the appropriate fees and charges as set forth in this rate schedule, and comply with the guidelines and standards hereof, shall not be denied service unless water supply is unavailable or unless the South Carolina Department of Health and Environmental Control or other government entity has for any reason restricted the Utility from adding additional customers to the serving water system. In no event will the Utility be required to construct additional water supply capacity to serve any customer or entity without an agreement acceptable to the Utility first having been reached for the payment of all costs associated with adding water supply capacity to the affected water system.

Carolina Water Service, Inc.
Docket No. 2017-292-WS
SCHEDULE OF PROPOSED RATES AND CHARGES

G. Cross-Connection Inspection

Any customer installing, permitting to be installed, or maintain any cross connection between the Utilities water system and any other non-public water system, sewer, or a line from any container of liquids or other substances, must install an approved back-flow prevention device in accordance with 24A S.C. Code Ann. Regs. R.61-58.7.F.2, as may be amended for time to time. Such a customer shall have such cross connection inspected by a licensed certified tester and provide to Utility a copy of written inspection report indicating the back-flow device is functioning properly and testing results submitted by the tester in accordance with 24A S.C. Code Ann. Regs. R.61-58.7.F.2, as may be amended from time to time. Said report and results must be provided by the customer to the Utility no later June 30th of each year for required residential and commercial customers, provided that said report and results for residential irrigation customers shall be provided by the customer to the Utility no later than June 30th of every other year (unless the sewer system utilizes chemical injection for which annual testing will be required). Should a customer subject to these requirements fail to timely provide such report and results, Utility may arrange for inspection and testing by a licensed certified tester and add the charges incurred by the Utility in that regard to the customer's next bill. If after inspection and testing by the Utility's certified tester, the back-flow device fails to function properly, the customer will be notified and given a 30 day period in which to have the back-flow device repaired or replaced with a subsequent follow-up inspection by a licensed certified tester indicating the back-flow device is functioning properly. Failure to submit a report indicating the back-flow device is functioning properly will result in discontinuation of water service to said customer until such time as a passing inspection report is received by Utility.

H. A Single Family Equivalent (SFE) shall be determined by using the South Carolina Department of Health and Environmental Control Guidelines for Unit Contributory Loadings for Domestic Wastewater Treatment Facilities -- 6 S.C. Code Ann. Regs. 61-67 Appendix A, as may be amended from time to time. Where applicable, such guidelines shall be used for determination of the appropriate monthly service and tap fee. The Company shall have the right to request and receive water usage records from the water provider to its customers. In addition, the Company shall have the right to conduct an inspection of the customer's premises. If it is determined that actual flows or loadings are greater than the design flows or loadings, then the Company shall recalculate the customer's equivalency rating based on actual flows or loadings and thereafter bill for its services in accordance with such recalculated loadings.

I. The liability of the Company, its agents and employees for damages arising out of interruption of service or the failure to furnish service, whether caused by acts or omission, shall be limited to those remedies provided in the Public Service Commission's rules and regulations governing water utilities.

Carolina Water Service, Inc.
Docket No. 2017-292-WS
SCHEDULE OF PROPOSED RATES AND CHARGES

2. Non-Recurring Charges

A. Water Service Connection (New connections only) - $300 per SFE

B. Plant Impact Fee (New connections only) - $400 per SFE

The Plant Capacity Fee reflects the portion of plant capacity which will be used to provide service to the new customers as authorized by Commission Rule R. 103-702.13. The plant capacity fee represents the Utility's investment previously made (or planned to be made) in constructing water production, treatment and/or distribution facilities that are essential to provide adequate water service to the new customer's property.

C. Water Meter Installation - 5/8 inches x 3/4 inches meter $45.00

All 5/8 inch x 3/4 inch water meters shall meet the Utility's standards and shall be installed by the Utility. A one-time meter fee of $35 shall be due upon installation for those locations where no 5/8 inch x 3/4 inch meter has been provided by a developer to the Utility.

For the installation of all other meters, the customer shall be billed for the Utility's actual cost of installation. All such meters shall meet the Utility's standards and be installed by the Utility unless the Utility directs otherwise.

D. Customer Account Charge – (New customers only) $30.00

A one-time fee to defray the costs of initiating service.

E. Reconnection Charges: In addition to any other charges that may be due, in those cases where a customer's service has been disconnected for any reason as set forth in Commission Rule R.103-732.5, a reconnection fee shall be due in the amount of $40.00 and shall be due prior to the Utility reconnecting service.

F. Tampering Charge: In the event the Utility's equipment, water mains, water lines, meters, curb stops, service lines, valves or other facilities have been damaged or tampered with by a customer, the Utility may charge the customer responsible for the damage the actual cost of repairing the Utility's equipment, not to exceed $250. The tampering charge shall be paid in full prior to the Utility re-establishing service or continuing the provision of service.

Carolina Water Service, Inc.
Docket No. 2017-292-WS
SCHEDULE OF PROPOSED RATES AND CHARGES

SEWER

Service Territory 1 and 2
(Former customers of Carolina Water Service, Inc., Utilities Services of SC, Inc. and United Utility Companies, Inc.)

Former Customers of Carolina Water Service, Inc.

Monthly Charges – Sewer Collection & Treatment Only

Where sewage collection and treatment are provided through facilities owned and operated by the Utility, the following rates apply:

	Current	Proposed
Residential - charge per single-family house, condominium, villa, or apartment unit:	$57.58 per unit	$65.69 per unit
Mobile Homes:	$42.01 per unit	$47.94 per unit
Commercial	$57.58 per SFE*	$65.69 per SFE*

Commercial customers are those not included in the residential category above and include, but are not limited to, hotels, stores, restaurants, offices, industry, etc.

Monthly charge – Sewer Collection Only

When sewage is collected by the Utility and transferred to a government body or agency, or other entity for treatment, the Utility's rates are as follows:

Residential – per single-family house, condominium, or apartment unit	$52.93 per unit	$65.69 per unit
Commercial	$52.93 per SFE*	$65.69 per SFE*
The Village Sewer Collection	$29.95 per SFE*	$34.18 per SFE*

* Single Family Equivalent (SFE) shall be determined by using the South Carolina Department of Health and Environmental Control Guidelines for Unit Contributory Loadings for Domestic Wastewater Treatment Facilities -- 25 S.C. Code Ann. Regs. 61-67 Appendix A, as may be amended from time to time. Where applicable, such guidelines shall be used for determination of the appropriate monthly service and tap fee.

Corrected

SEWER SERVICE

Carolina Water Service, Inc.
Docket No. 2017-292-WS
SCHEDULE OF PROPOSED RATES AND CHARGES

TERMS AND CONDITIONS
AND
NON-RECURRING CHARGES

1. **Terms and Conditions**

A. Where the Utility is required under the terms of a 201/208 Plan, or by other regulatory authority with jurisdiction over the Utility, to interconnect to the sewage treatment system of a government body or agency or other entity and tap/connection/impact fees are imposed by that entity, such tap/connection/impact fees will be charged to the Utility's affected customers on a pro rata basis, without markup.

B. The Utility will, for the convenience of the owner, bill a tenant in a multi-unit building, consisting of four or more residential units (or in such other circumstances as the law may allow from time to time), which is served by a master sewer meter or a single sewer connection. However, in such cases all arrearages must be satisfied before service will be provided to a new tenant or before interrupted service will be restored. Failure of an owner to pay for services rendered to a tenant in these circumstances may result in service interruptions.

C. Billing Cycle
Recurring charges will be billed monthly in arrears. Non-recurring charges will be billed and collected in advance of service being provided.

D. Toxic and Pretreatment Effluent Guidelines
The utility will not accept or treat any substance or material that has been defined by the United States Environmental Protection Agency ("EPA") or the South Carolina Department of Health and Environmental Control ("DHEC") as a toxic pollutant, hazardous waste, or hazardous substance, including pollutants falling within the provisions of 40 CFR 129.4 and 401.15. Additionally, pollutants or pollutant properties subject to 40 CFR 403.5 and 403.6 are to be processed according to pretreatment standards applicable to such pollutants or pollutant properties, and such standards constitute the Utility's minimum pretreatment standards. Any person or entity introducing such prohibited or untreated materials into the Company's sewer system may have service interrupted without notice until such discharges cease, and shall be liable to the Utility for all damages and costs, including reasonable attorney's fees, incurred by the Utility as a result thereof.

E. Extension of Utility Service Lines and Mains
The Utility shall have no obligation at its expense to extend its utility service lines or mains in order to permit any customer to discharge acceptable wastewater into one of its sewer systems. However, anyone or entity which is willing to pay all costs associated with extending an appropriately sized and constructed main or utility service line from his/her/its premises to any appropriate connection point, and pay the appropriate fees and charges as set forth in this rate schedule, and comply with the guidelines and standards hereof, shall not be denied service unless sewer capacity is unavailable or unless the South Carolina Department of Health and Environmental Control or other government entity has for any reason restricted the Utility from adding additional customers to the serving sewer system.

Carolina Water Service, Inc.
Docket No. 2017-292-WS
SCHEDULE OF PROPOSED RATES AND CHARGES

In no event will the Utility be required to construct additional sewer treatment capacity to serve any customer or entity without an agreement acceptable to the Utility first having been reached for the payment of all costs associated with adding wastewater treatment capacity to the affected sewer system.

F. A Single Family Equivalent ("SFE") shall be determined by 6 S.C. Code Ann. Regs. 61-67 Appendix A, as may be amended from time to time. Where applicable, such guidelines shall be used for determination of the appropriate monthly service, plant impact fee and tap fee. The Company shall have the right to request and receive water usage records from the water provider to its customers. In addition, the Company shall have the right to conduct an inspection of the customer's premises. If it is determined that actual flows or loadings are greater than the design flows or loadings, then the Company shall recalculate the customer's equivalency rating based on actual flows or loadings and thereafter bill for its services in accordance with such recalculated loadings.

G. The liability of the Company, its agents and employees for damages arising out of interruption of service or the failure to furnish service, whether caused by acts or omission, shall be limited to those remedies provided in the Public Service Commission's rules and regulations governing wastewater utilities.

2. **Solids Interceptor Tanks**

For all customers receiving sewage collection service through an approved solids interceptor tank, the following additional charges shall apply:

A. Pumping Charge
At such time as the Utility determines through its inspection that excessive solids have accumulated in the interceptor tank, the Utility will arrange for the pumping tank and will include $150.00 as a separate item in the next regular billing to the customer.

B. Pump Repair or Replacement Charge
If a separate pump is required to transport the customer's sewage from solids interceptor tank to the Utility's sewage collection system, the Utility will arrange to have this pump repaired or replaced as required and will include the cost of such repair or replacement as a separate item in the next regular billing to the customer and may be paid for over a one-year period.

C. Visual Inspection Port
In order for a customer who uses a solids interceptor tank to receive sewage service from the Utility or to continue to receive such service, the customer shall install at the customer's expense a visual inspection port which will allow for observation of the contents of the solids interceptor tank and extraction of test samples therefrom. Failure to provide such visual inspection port after timely notice of not less than thirty (30) days shall be just cause for interruption of service until a visual inspection port has been installed.

Carolina Water Service, Inc.
Docket No. 2017-292-WS
SCHEDULE OF PROPOSED RATES AND CHARGES

3. Non-recurring Charges

A. Sewer Service Connection (New connections only) $300 per SFE

B. Plant Capacity Fee (New connections only) $400 per SFE

The Plant Capacity Fee shall be computed by using South Carolina DHEC "Guide Lines for Unit Contributory Loadings to Wastewater Treatment Facilities" (1972) to determine the single family equivalency rating. The plant capacity fee represents the Utility's investment previously made (or planned to be made) in constructing treatment and/or collection system facilities that are essential to provide adequate treatment and disposal of the wastewater generated by the development of the new property.

The nonrecurring charges listed above are minimum charges and apply even if the equivalency rating of non-residential customer is less than one (1). If the equivalency rating of a non-residential customer is greater than one (1), then the proper charge may be obtained by multiplying the equivalency rating by the appropriate fee. These charges apply and are due at the time new service is applied for, or at the time connection to the sewer system is requested.

C. Notification Fee

A fee of $15.00 shall be charged to each customer per notice to whom the Utility mails the notice as required by Commission Rule R. 103-535.1 prior to service being discontinued. This fee assesses a portion of the clerical and mailing costs of such notices to the customers creating the cost.

D. Customer Account Charge - (New customers only)

$30.00

A one-time fee to defray the costs of initiating service. This charge will be waived if the customer is also a water customer.

E. Reconnection Charges: In addition to any other charges that may be due, in those cases where a customer's service has been disconnected for any reason as set forth in Commission Rule R. 103-532.4 a reconnection fee in the amount of $500.00 shall be due at the time the customer reconnects service. Where an elder valve has been previously installed, a reconnection fee of $40.00 shall be charged.

F. Tampering Charge: In the event the Utility's equipment, sewage pipes, meters, curb stops, service lines, elder valves or other facilities have been damaged or tampered with by a customer, the Utility may charge the customer responsible for the damage the actual cost of repairing the Utility's equipment, not to exceed $250. The tampering charge shall be paid in full prior to the Utility re-establishing service or continuing the provision of service.

STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. W-354, SUB 363
DOCKET NO. W-354, SUB 364
DOCKET NO. W-354, SUB 365

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. W-354, SUB 363	)	
	)	
In the Matter of	)	
Application by Carolina Water Service, Inc.	)	
of North Carolina, 4944 Parkway Plaza	)	
Boulevard, Suite 375, Charlotte, North	)	
Carolina, 28217, for an Accounting Order to	)	
Defer Incremental Storm Damage Expenses	)	
Incurred as a Result of Hurricane Florence	)	
	)	
DOCKET NO. W-354, SUB 364	)	
	)	
In the Matter of	)	
Application by Carolina Water Service, Inc.	)	
of North Carolina, 4944 Parkway Plaza	)	
Boulevard, Suite 375, Charlotte, North	)	ORDER GRANTING PARTIAL
Carolina, 28217, for Authority to Adjust and	)	RATE INCREASE AND
Increase Rates for Water and Sewer Utility	)	REQUIRING CUSTOMER NOTICE
Service in All of its Service Areas in North	)	
Carolina	)	
	)	
DOCKET NO. W-354, SUB 365	)	
	)	
In the Matter of	)	
Application by Carolina Water Service, Inc.	)	
of North Carolina, 4944 Parkway Plaza	)	
Boulevard, Suite 375, Charlotte, North	)	
Carolina, 28217, for an Accounting Order to	)	
Defer Post-In-Service Depreciation and	)	
Financing Costs Related to Major New	)	
Projects That Are or Will Be In-Service Prior	)	
to the Date of An Order in Petitioner's	)	
Pending Base Rate Case	)	

HEARD: Thursday, September 5, 2019, at 7:00 p.m., in Courtroom 5350, Mecklenburg County Courthouse, 832 East 4th Street, Charlotte, North Carolina

Tuesday, September 10, 2019, at 7:00 p.m., in Courtroom A, Dare County Courthouse, 962 Marshall C. Collins Drive, Manteo, North Carolina

Tuesday, October 8, 2019, at 7:00 p.m., in Courtroom #1, Watauga County Courthouse, 842 W. King Street, Boone, North Carolina

Wednesday, October 9, 2019, at 7:00 p.m., in Courtroom 1A, Buncombe County Courthouse, 60 Court Plaza, Asheville, North Carolina

Monday, October 14, 2019, at 7:00 p.m., in Commission Hearing Room 2115, Dobbs Building, 430 North Salisbury Street, Raleigh, North Carolina

Tuesday, October 22, 2019, at 7:00 p.m., in the Superior Courtroom, Onslow County Courthouse, 625 Court Street, Jacksonville, North Carolina

Monday, December 2, 2019, at 2:00 p.m., in Commission Hearing Room 2115, Dobbs Building, 430 North Salisbury Street, Raleigh, North Carolina

BEFORE: Commissioner ToNola D. Brown-Bland, Presiding; Chair Charlotte A. Mitchell; and Commissioners Lyons Gray, Daniel G. Clodfelter, Kimberly W. Duffley, and Jeffrey A. Hughes

APPEARANCES:

For Carolina Water Service, Inc. of North Carolina:

Jo Anne Sanford, Sanford Law Office, PLLC, Post Office Box 28085, Raleigh, North Carolina 27611

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For Corolla Light Community Association, Inc.:

Brady W. Allen, The Allen Law Offices, PLLC, 1514 Glenwood Ave., Suite 200, Raleigh, North Carolina 27608

For the Using and Consuming Public:

Gina C. Holt, William E. Grantmyre, John Little, and William E. H. Creech, Staff Attorneys, Public Staff – North Carolina Utilities Commission, 4326 Mail Service Center, Raleigh, North Carolina 27699

BY THE COMMISSION: On January 17, 2019, in Docket No. W-354, Sub 363 (Sub 363) Carolina Water Service, Inc., of North Carolina (CWSNC or Company) filed a Petition for an Accounting Order to Defer Unplanned Incremental Hurricane Florence Storm Damage Expenses, Capital Investments, and Revenue Loss.

On May 24, 2019, pursuant to Commission Rule R1-17(a), CWSNC submitted notice of its intent to file a general rate case application in Docket No. W-354, Sub 364 (Sub 364).

On June 6, 2019, the Commission entered an order consolidating Sub 363 and Sub 364.

On June 28, 2019, CWSNC filed its verified application for a general rate increase (Application) in Sub 364 seeking authority to: (1) increase and adjust its rates for water and sewer utility service in all of its service areas in North Carolina, including the service areas of Riverbend Estates and Pace Utilities Group, Inc., which have been recently transferred to CWSNC; (2) consolidate rates for the Corolla Light/Monteray Shores (CLMS) service area with the Uniform Sewer Rate Division rates; and (3) pass through any increases in purchased bulk water rates and any increased costs of wastewater treatment performed by third parties and billed to CWSNC, all subject to CWSNC providing sufficient proof of such increases. In addition, the Company included as part of its rate case filing certain information and data required by NCUC Form W-1.

As part of the its Application CWSNC filed direct testimony of the following witnesses: Catherine E. Heigel, President of CWSNC, Tennessee Water Service, Inc., and Blue Granite Water Company; [1] Dante M. DeStefano, Director of Financial Planning and Analysis for CWSNC; Gordon R. Barefoot, President and CEO of Corix Infrastructure, Inc.;[2] J. Bryce Mendenhall, Vice President of Operations for CWSNC; Anthony Gray,

[1] On November 1, 2019, CWSNC filed notice that Donald H. Denton would adopt the prefiled direct testimony of Catherine E. Heigel.

[2] On November 8, 2019, CWSNC filed notice that Shawn Elicegui would adopt the prefiled direct testimony of Gordon R. Barefoot.

Senior Financial and Regulatory Analyst, CWSNC; and Dylan W. D'Ascendis, Director at ScottMadden, Inc.

The Company stated in its Application that it presently has approximately 34,915 water customers and 21,403 sewer customers in North Carolina (including water and sewer availability customers).[3] The present rates for water and sewer service have been in effect since February 21, 2019, pursuant to the Commission's Order Approving Joint Partial Settlement Agreement and Stipulation, Granting Partial Rate Increase and Requiring Customer Notice issued in CWSNC's last general rate case in Docket No. W-354, Sub 360 (Sub 360 Order).

On June 28, 2019, in Docket No. W-354, Sub 365 (Sub 365), CWSNC also filed a Petition for an Accounting Order to Defer Post-In-Service Depreciation and Financing Costs Relating to Major New Projects.

On July 15, 2019, the Commission issued an Order Establishing General Rate Case and Suspending Rates. By that order, the Commission declared the matter to be a general rate case pursuant to N.C. Gen. Stat. § 62-137, suspended the proposed new rates for up to 270 days pursuant to N.C.G.S. § 62-134, and established the test year period for this case as the 12-month period ending March 31, 2019.

On August 2, 2019, the Commission issued an Order Scheduling Hearings and Requiring Customer Notice (Scheduling Order) which required the parties to prefile testimony and exhibits, scheduled the matter for hearing, and required notice to all affected customers. That order scheduled customer hearings to be held in Charlotte, Manteo, Boone, Asheville, Raleigh, and Jacksonville, North Carolina, and set the expert witness hearing to be held in Raleigh, North Carolina.

Also on August 2, 2019, CWSNC witness DeStefano filed supplemental testimony, and on August 23, 2019, CWSNC filed an amended exhibit to witness DeStefano's supplemental testimony.

On August 21, 2019, CWSNC filed a certificate of service demonstrating that the Company provided notice of this general rate case proceeding to customers as required by the Commission's Scheduling Order.

On August 22, 2019, Corolla Light Community Association, Inc. (CLCA), filed a Petition to Intervene, which the Commission granted by order dated September 5, 2019.

[3] The Company did not indicate the specific date related to its present number of customers stated in the Application. The number of customers presented in Finding of Fact No. 13 herein is based on the detailed billing analysis prepared by Public Staff witness Casselberry for the 12-month period ended March 31, 2019, and is not disputed by the Company.

The Public Staff – North Carolina Utilities Commission's (Public Staff) participation in this proceeding is recognized pursuant to N.C.G.S. § 62-15(d) and Commission Rule R1-19(e).

Public witness hearings were held as scheduled. A total of 23 Company customers testified as public witnesses at the public witness hearings held in this proceeding.

CWSNC responded to public witness testimony by its filings of September 25 (combined Charlotte and Manteo), October 24 (combined Boone and Asheville), October 30 (Raleigh), and November 8, 2019 (Jacksonville).

On October 4, 2019, CWSNC filed its rate case updates, schedules, and supporting data as required by Ordering Paragraph No. 6 of the Commission's Scheduling Order.

The Public Staff filed its direct testimony on November 4, 2019, consisting of testimony and exhibits of Public Staff witnesses Gina Y. Casselberry, Utilities Engineer, Water, Sewer, and Telephone Division; Charles M. Junis, Utilities Engineer, Water, Sewer, and Telephone Division; Lindsey Q. Darden, Utilities Engineer, Water, Sewer, and Telephone Division**;** Windley E. Henry, Manager, Water, Sewer, and Telephone Section, Accounting Division; Michelle M. Boswell, Staff Accountant, Accounting Division; Lynn L. Feasel, Staff Accountant, Accounting Division; and John R. Hinton, Director, Economic Research Division.

The Public Staff filed the supplemental testimony of witness Casselberry on November 15, 2019.

On November 15, 2019, the Company filed a request to consolidate Sub 365 with this rate case. The Commission issued an order consolidating Sub 364 and Sub 365 on November 19, 2019.

The Public Staff filed revised exhibits of Public Staff witnesses Feasel and Henry on November 18, 2019.

On November 18, 2019, CWSNC withdrew its request for consideration of the Company's proposed Consumption Adjustment Mechanism and Conservation Rate Pilot Program proposed for The Point Subdivision.

CWSNC filed the rebuttal testimony of Company witnesses DeStefano, Mendenhall, and D'Ascendis on November 20, 2019.

On November 26, 2019, Public Staff witness Hinton filed supplemental testimony and exhibits, revising his recommended rate of return on common equity and updating four exhibits filed with his testimony on November 4, 2019.

On November 27, 2019, CWSNC and the Public Staff (Stipulating Parties) filed a Joint Partial Settlement Agreement and Stipulation (Stipulation). On that date, the Public Staff also filed exhibits and supporting schedules for the Stipulation.

On December 2, 2019, CLCA filed a resolution opposing CWSNC's rate increase Application but requesting that CLMS' rates be set as part of CWSNC's uniform rate division.

The expert witness hearing was held as scheduled beginning on December 2, 2019. All prefiled testimony and exhibits filed in the consolidated dockets were admitted into evidence without objection. All parties agreed to waive cross-examination on all prefiled direct testimony with respect to the issues the parties resolved by Stipulation.

During the hearing the Commissioners requested certain additional information in the form of late-filed exhibits. The Public Staff filed the late-filed exhibits of Public Staff witnesses Casselberry and Henry on December 9 and 11, 2019, respectively. CWSNC filed the late-filed exhibits of Company witnesses DeStefano, D'Ascendis, and Mendenhall on December 13, 2019.

On January 10, 2020, CWSNC filed the affidavit of its Financial Planning and Analysis Manager, Matthew Schellinger, providing the updated amount of regulatory commission expense agreed to by CWSNC and the Public Staff.

On January 13, 2020, the Public Staff filed Revised Settlement Exhibits I and II providing the final expense information of CWSNC and the Public Staff's final revised recommendation.

Based upon the foregoing, including the verified Application and accompanying NCUC Form W-1, the testimony and exhibits of the public witnesses appearing at the hearings, the testimony and exhibits of the expert witnesses received into evidence, the Stipulation, and the entire record herein, the Commission makes the following:

FINDINGS OF FACT

General Matters

1. CWSNC is a corporation duly organized under the laws of and is authorized to do business in the State of North Carolina. It is a franchised public utility providing water and sewer utility service to customers in 38 counties in North Carolina. CWSNC is

a wholly-owned subsidiary of Corix Regulated Utilities, Inc. (Corix),[4] previously known as Utilities, Inc.

2. CWSNC is properly before the Commission pursuant to Chapter 62 of the North Carolina General Statutes for a determination of the justness and reasonableness of its proposed rates and charges for the water and sewer utility service it provides to customers in North Carolina.

3. The appropriate test year for use in this proceeding is the 12-month period ending March 31, 2019, updated for known and measurable changes through the close of the expert witness hearing.

4. CWSNC's present rates for water and sewer service have been in effect since February 21, 2019, pursuant to the Commission's Sub 360 Order.

The Stipulation

5. On November 27, 2019, the Stipulating Parties filed the Stipulation, resolving all but two of the contested issues between CWSNC and the Public Staff in this matter.

6. The Stipulation is the product of give-and-take in negotiations between the Stipulating Parties, is material evidence in this proceeding, and is entitled to be given appropriate weight in this case along with the other evidence of record, including that submitted by the Company, the Public Staff, and the public witnesses who testified at the public witness hearings.

7. The Stipulation is a settlement of matters in controversy in this proceeding as between the Stipulating Parties and was not joined in nor objected to by CLCA, the other party to the proceeding.

8. The two remaining contested issues (Unsettled Issues) which were not resolved by the Stipulation between CWSNC and the Public Staff are:

a. Rate of return on common equity; and

b. CWSNC's request for deferred accounting treatment of certain costs related to the Automatic Meter Reading (AMR) meter installation projects in the Fairfield Mountain and Connestee Falls systems.

[4] Pursuant to the Articles of Amendment filed with the Illinois Secretary of State, Department of Business Services on July 25, 2019, Utilities Inc, changed its corporate name to Corix Regulated Utilities, Inc. Corix owns regulated utilities which provide water and sewer utility service to approximately 190,000 customers in 17 states, with primary service areas in Florida, North Carolina, South Carolina, Louisiana, and Nevada.

Acceptance of Stipulation

9. The Stipulation will provide CWSNC and its ratepayers just and reasonable rates when combined with the rate effects of the Commission's decisions regarding the Unsettled Issues in this proceeding.

10. The provisions of the Stipulation are just and reasonable to all parties to this proceeding, as well as the CWSNC ratepaying customers, and serve the public interest.

11. It is appropriate to approve the Stipulation in its entirety.

Customer Concerns and Service

12. As of the 12-month period ended March 31, 2019, CWSNC served approximately 30,724 water customers and 20,105 wastewater customers, including CLMS. For the same period, CWSNC also had 3,532 water availability customers in Carolina Forest, Woodrun, Linville Ridge, Sapphire Valley, Connestee Falls, and Fairfield Harbour; and 1,274 sewer availability customers in Sapphire Valley, Connestee Falls, and Fairfield Harbour. CWSNC operates 96 water utility systems and 37 sewer utility systems.

13. A total of 23 witnesses testified at the six public witness hearings held for the purpose of receiving customer testimony.[5] In general, public witness testimony at those hearings primarily dealt with objections to the rate increase with some customers raising concerns about quality of service, including, but not limited to, old equipment, delays in attention to meter repair, hardness of the water, digital meter boxes installed below the water table, boil water notices (including incidents and related communication), sewer spills in the lake at Connestee Falls, fluoride in the water, the ratio of base to fixed charges, response time to some inquiries, mineral content, the proposed Consumption Adjustment Mechanism, and the requirement of paying sewer charges while a home was unoccupied due to hurricane damage.

14. As of November 15, 2019, the Public Staff had received approximately 316 written customer statements of position from CWSNC customers. The service areas represented by those submitting such statements are: Belvedere (1), Brandywine Bay (2), Carolina Pines (1), Carolina Trace (11), Corolla Light/Monteray Shores (1), Connestee Falls (48), Fairfield Harbour (33), Kings Grant (1), Sapphire Valley (2), The Point (161), Treasure Cove (1), Ski Mountain (1) Waterglyn, (1) Woodhaven (1), and unspecified service areas (51).[6] All of the customers objected to the magnitude and frequency of the

[5] As noted above in the procedural history, there were no witnesses in Manteo, four in Charlotte, none in Boone, nine in Asheville, four in Raleigh, and six in Jacksonville.

[6] Approximately 80% of the customer statements came from four subdivisions or systems. Public Staff witness Casselberry testified that nearly all of the customers in The Point Subdivision opposed CWSNC's proposed Pilot Program.

Company's rate increases. Their primary concern was that CWSNC's request for another rate increase was so soon after the most recent increase was granted in February 2019. Customers were also concerned about the rate of return on common equity requested, the increase in rates compared to inflation, the impact of recent federal corporate income tax reductions, and the ratio of the base facility charge to volumetric charges. The majority of the customers in The Point Subdivision opposed CWSNC's proposed Pilot Program.[7]

15. CWSNC filed four verified reports with the Commission addressing the service-related concerns and other comments by witnesses who testified at the public witness hearings. The reports described each of the witnesses' specific service-related concerns and comments, the Company's response, and how each concern and comment was resolved or addressed, if applicable.

16. The Company's customers in the Bradfield Farms Subdivision, Brandywine Bay, and the Fairfield Harbour Service Area testified to hardness of the water and unpleasant taste, conditions that are not regulated by the North Carolina Department of Environmental Quality (DEQ).

17. It is appropriate for CWSNC to provide an estimate of the cost of installing a central water filter system for Bradfield Farms Subdivision and the Fairfield Harbour Service Area, for the homeowners' association's consideration, within 60 days of the final order in this case, as recommended by the Public Staff.[8]

18. CWSNC has continued its course of increased attention to the communications component of service to customers since the Company's last rate case, with a positive emphasis on more proactive communications and the expansion of several social media platforms.

19. The Public Staff's description of the quality of service provided by CWSNC as "good" is supported by the record in this case.

20. The overall quality of service provided by CWSNC is adequate.

[7] Public Staff witness Casselberry testified that the primary objections of customers at The Point Subdivision were that: (1) customers in The Point Subdivision were being penalized and that the block rates should apply to all CWSNC customers, (2) the average consumption did not take into account customers who live on the lake and use lake water for irrigation, (3) the covenants do not allow individual wells for irrigation, and (4) the conditions and rules for landscaping would increase the average bill by approximately 30% if the block tiered rates were approved.

[8] Public Staff witness Casselberry testified that in CWSNC's previous rate case, Sub 360, filed in 2018, the Public Staff investigated whether installing a central water filter system for Fairfield Harbour was a prudent investment. In that proceeding the Public Staff determined it was not a prudent investment because most customers had individual water softeners and filter systems in their homes and the cost in 2011 to install the system was approaching $1 million dollars. However, since it still remains an issue with customers at Fairfield Harbour and Bradfield Farms, the Public Staff recommended that if the majority of homeowners want a central water filter system, a monthly surcharge could be added to customer bills in those service areas to recover the costs for the systems.

Rate Base

21. The appropriate level of rate base used and useful in providing service is $132,897,368 for CWSNC's combined operations, itemized as follows:

Item	Amount
Plant in service	$238,212,084
Accumulated depreciation	(57,897,943)
Net plant in service	180,314,141
Cash working capital	2,404,800
Contributions in aid of construction	(40,270,675)
Advances in aid of construction	(32,940)
Accumulated deferred income taxes	(5,995,444)
Customer deposits	(315,447)
Inventory	271,956
Gain on sale and flow back taxes	(417,811)
Plant acquisition adjustment	(837,878)
Excess book value	(0)
Cost-free capital	(261,499)
Average tax accruals	(143,198)
Regulatory liability for excess deferred taxes	(3,941,344)
Deferred charges	2,122,707
Pro forma plant	0
Original cost rate base	$132,897,368

Operating Revenues

22. The appropriate level of operating revenues under present rates for use in this proceeding is $33,968,582, consisting of service revenues of $33,852,232 and miscellaneous revenues of $387,492, reduced by uncollectibles of $271,142.

Maintenance and General Expense

23. The appropriate level of maintenance expense and general expense for combined operations for use in this proceeding is $14,897,501 and $6,560,142, respectively.

24. It is appropriate for CWSNC to recover total rate case expenses of $519,416 related to the current proceeding and $649,806 of unamortized rate case costs related to the prior proceedings in Docket Nos. W-354, Sub 356 (Sub 356) and W-354, Sub 360 (Sub 360).

25. It is appropriate to amortize the total rate case costs for the current and prior proceedings over five years and to include an annual level of costs in the amount of

$73,911 related to miscellaneous regulatory matters, resulting in an annual level of rate case expense of $307,755, as agreed to by the Stipulating Parties.

Storm Reserve Fund and Normalized Storm Damage Expense

26. It is reasonable and appropriate for CWSNC to include in rates an annualized level of storm expenses in its maintenance and repair expense, based on a ten-year average of the Company's actual storm costs. This is the first general rate case proceeding in which CWSNC has sought Commission approval of a normalized level of storm expenses to be included in base rates. As part of the Stipulation CWSNC and the Public Staff agreed that CWSNC would rescind its request for a storm reserve fund and that the calculation of normalized storm damage expense would be based on a ten-year average of the Company's actual storm costs rather than utilizing the Company's requested three-year average.

27. The appropriate annual amount of normalized storm costs that should be included in the Company's rates in this case is $34,567, as set out in the Stipulation.

Hurricane Florence Expense

28. It is reasonable and appropriate for CWSNC to include in rates the incremental operating and maintenance (O&M) costs amounting to $146,773 incurred by the Company related to Hurricane Florence.

29. The Company and the Public Staff have agreed to use deferral accounting treatment for Hurricane Florence storm-related expenses, which will be amortized over three years.

30. It is appropriate to include in the Company's maintenance and repair expense Hurricane Florence storm-related costs in the amount of $48,924, as set out in the Stipulation.

Deferral of Wastewater Treatment Plant and AMR Meter Installation Projects

31. In its Petition for an Accounting Order to Defer Post-In-Service Depreciation and Financing Costs Relating to Major New Projects in Sub 365 CWSNC requested deferral accounting treatment for post-in-service depreciation expense and financing costs (carrying costs) related to the Connestee Falls wastewater treatment plant (WWTP) project in Buncombe County; the Nags Head WWTP project in Dare County; the Fairfield Mountain AMR meter installation project in Transylvania County; and the Connestee Falls AMR meter installation project, also in Buncombe County.

32. During the test year for this rate case CWSNC earned a return on equity per books of 1.63% on a consolidated basis. The Company's current rates were set in the Sub 360 rate case effective for service rendered on and after February 21, 2019, based upon an authorized rate of return on common equity of 9.75%. CWSNC invested

approximately $22 million of additional capital in its North Carolina water and sewer systems since the Sub 360 rate case, which served to depress its post-test year earned rate of return on common equity.

33. Each of the four capital projects covered by the Petition requesting deferral accounting treatment was completed and placed in service prior to the expert witness hearing in these proceedings. As evidenced by the Stipulation, CWSNC and the Public Staff agreed to the Company's deferral of incremental post-in-service depreciation expense and financing costs of the two WWTP projects and to the amount of the costs to be included in the rate case.

34. The Public Staff did not agree to deferral accounting treatment for the incremental post-in-service depreciation expense and return on capital expenditures relating to the two AMR meter installation projects.

35. In this case the two WWTP projects subject to the Company's deferral request were prudent and necessary to the provision of service, and the costs for each of those projects were reasonable and prudently incurred. CWSNC and the Public Staff agree that the Company should be authorized to defer post-in-service costs of $1,098,778 for the two WWTP projects ($520,144 for Connestee Falls and $578,634 for Nags Head). CWSNC and the Public Staff also agree that the rate of return on common equity impact is 434 basis points for the Uniform Sewer Rate Division.

36. The project costs for each of the two WWTP projects, considered both collectively and singularly, are unusual or extraordinary in that they represent major capital investments in the Company's infrastructure; they are non-routine projects which are of considerable complexity and major significance; and they are necessary to CWSNC's provision of safe, adequate, reliable, and affordable utility service in this state. The WWTP costs are of a magnitude that would have an adverse material impact on the Company's financial condition if they are not afforded deferral accounting treatment.

37. It is reasonable and appropriate for CWSNC to receive deferral accounting treatment for the post-in-service depreciation expense and carrying costs related to the Company's capital investments in the WWTPs placed in service at Nags Head and Connestee Falls during the pendency of this proceeding.

38. The Company should be authorized to defer and amortize post-in-service depreciation expense and carrying costs in the amount of $1,098,778 related to its capital investments in the Nags Head and Connestee Falls WWTPs for the ten- and eight-month periods, respectively, from their in-service dates until the projects are included for recovery in base rates, as stipulated between CWSNC and the Public Staff. These costs should be amortized over a period of five years.

39. CWSNC expects significant ongoing capital needs at levels comparable to the $22 million additional capital it invested in its North Carolina water and sewer systems since the Sub 360 rate case. Deferral accounting treatment for the post-in-service costs

related to the two WWTPs is appropriate to support the Company's ability to earn its authorized return and, as a result, could impact CWSNC's ability to finance needed investments on reasonable terms. Accordingly, deferral accounting treatment for the two WWTP costs will have a favorable impact on CWSNC's earnings and financial standing in general thereby enhancing the Company's ability to access and obtain capital on favorable terms and such results will accrue to the benefit of the Company's customers as well as to its investors.

40. The two AMR meter installation projects included in CWSNC's deferral accounting request were prudent and the costs for the installation were reasonable and prudently incurred. CWSNC and the Public Staff agree that the rate of return on common equity impact is 24 basis points for the Uniform Water Rate Division.[9] CWSNC and the Public Staff also agree that the requested cost deferral amount related to the AMR meter installation costs is $64,736 for the eight-month period from their in-service dates until the projects are included for recovery in base rates in this case.

41. The two AMR meter installation projects in the Fairfield Mountain and Connestee Falls service areas are not unusual or extraordinary, and thus the incremental post-in-service depreciation expense and carrying costs related to the two projects are not appropriate for deferral accounting treatment.

Depreciation and Amortization Expense

42. The appropriate level of depreciation and amortization expense for combined operations for use in this proceeding is $5,026,554.

Franchise, Property, Payroll, and Other Taxes

43. The appropriate level of franchise, property, payroll, and other taxes for use in this proceeding is $795,507 for combined operations, consisting of ($655) for franchise and other taxes, $268,734 for property taxes, and $527,428 for payroll taxes.

Regulatory Fee and Income Taxes

44. It is reasonable and appropriate to calculate regulatory fee expense using the regulatory fee rate of 0.13% effective July 1, 2019, pursuant to the Commission's June 18, 2019 Order issued in Docket No. M-100, Sub 142. The appropriate level of regulatory fee for use in this proceeding is $44,159.

[9] Calculated on a rate division basis, per Public Staff DeStefano Cross-Examination Exhibit 2. The total company ROE impact is 13 basis points as shown on Public Staff witness Henry Late-Filed Exhibit 4, Line 9.

45. It is reasonable and appropriate to use the current North Carolina corporate income tax rate of 2.50% to calculate CWSNC's revenue requirement. The appropriate level of state income taxes for use in this proceeding is $75,474.

46. It is reasonable and appropriate to use the federal corporate income tax rate of 21.00% to calculate CWSNC's revenue requirement. The appropriate level of federal income taxes for use in this proceeding is $618,133.

47. It is appropriate to calculate income taxes for ratemaking purposes based on the adjusted level of revenues and expenses and the tax rates for utility operations.

The Federal Tax Cuts and Jobs Act

48. CWSNC's federal protected EDIT should continue to be flowed back in accordance with the Reverse South Georgia Method (RSGM) as ordered by the Commission in the Sub 360 Order.

49. It is reasonable and appropriate, for purposes of this proceeding, for CWSNC to refund its remaining federal unprotected EDIT balances over 24 months instead of the remaining 35 months as originally ordered by the Commission in the Sub 360 Order.

50. CWSNC's North Carolina EDIT recorded pursuant to the Commission's May 13, 2014 Order Addressing the Impacts of HB 998 on North Carolina Public Utilities issued in Docket No. M-100, Sub 138 should continue to be amortized in accordance with the Commission's Sub 356 Order.

Capital Structure, Cost of Capital, and Overall Rate of Return

51. The cost of capital and revenue increase approved in this order is intended to provide CWSNC, through sound management, the opportunity to earn an overall rate of return of 7.39%. This overall rate of return is derived from applying an embedded cost of debt of 5.36%, and a rate of return on common equity of 9.50%, to a capital structure consisting of 50.90% long-term debt and 49.10% common equity.

52. A 9.50% rate of return on common equity for CWSNC is just and reasonable in this general rate case.

53. A 49.10% equity and 50.90% debt ratio is a reasonable and appropriate capital structure for CWSNC in this case.

54. A 5.36% cost of debt for CWSNC is reasonable and appropriate for the purpose of this case.

55. Any increase in the Company's rate for service will be difficult for some of CWSNC's customers to pay, in particular for those considered to be low-income customers.

56. Continuous safe, adequate, reliable, and affordable water and wastewater utility service by CWSNC is essential to CWSNC's customers.

57. The rate of return on common equity and capital structure approved by the Commission appropriately balances the benefits received by CWSNC's customers from CWSNC's provision of safe, adequate, and reliable water and wastewater utility service with the difficulties that some of CWSNC's customers will experience in paying the Company's increased rates.

58. The 9.50% rate of return on common equity and the 49.10% equity capital structure approved by the Commission balance CWSNC's need to obtain equity and debt financing with its customers' need to pay the lowest possible rates.

59. The authorized levels of overall rate of return and rate of return on common equity set forth above are supported by competent, material, and substantial record evidence; are consistent with the requirements of N.C.G.S. § 62-133; and are fair to CWSNC's customers generally and in light of the impact of changing economic conditions.

Revenue Requirement

60. CWSNC's rates should be changed by amounts which, after all pro forma adjustments, will produce the following increases in revenues:

Item	Amount
CWSNC Uniform Water	$ 1,778,015
CWSNC Uniform Sewer	2,929,386
BF/FH/TC Water	96,561
BF/FH Sewer	141,797
Total	$4,945,759

These increases will allow CWSNC the opportunity to earn a 7.39% overall rate of return, which the Commission has found to be reasonable upon consideration of the findings in this order.

Rate Design

61. Regarding the CLMS sewer service area, CWSNC has maintained the CLMS system at the same rates for the last four general rate cases (Docket No. W-354, Subs 336, 344, 356, and 360) in order to allow the remainder of the Uniform Sewer Rate Division to move toward parity with the CLMS sewer rates. In this proceeding the Company proposes to consolidate the CLMS sewer service area rates with the Uniform

Sewer Rate Division rates, as the total Uniform Sewer revenue requirement is currently sufficient to allow for such consolidation of rate structures. It is reasonable and appropriate at this time to consolidate the CLMS sewer service area rates with the Company's Uniform Sewer rates. This rate design is supported by both the Public Staff and CLCA.

62. It is reasonable and appropriate for CWSNC's rate design for water utility service for its Uniform Water and Bradfield Farms/Fairfield Harbour/Treasure Cove (BF/FH/TC) Water residential customers to be based on a 50/50 ratio of base charge to usage charge, and to use an 80/20 ratio of base charge to usage charge for CWSNC's Uniform Sewer residential customers, as set out in the Stipulation.

63. The rates and charges included in Appendices A-1 and A-2, and the Schedules of Connection Fees for Uniform Water and Uniform Sewer, attached hereto as Appendices B-1 and B-2, are just and reasonable and should be approved.

Water and Sewer System Improvement Charges

64. Consistent with Commission Rules R7-39(k) and R10-36(k), CWSNC's WSIC and SSIC surcharges will reset to zero as of the effective date of the approved rates in this proceeding.

65. Pursuant to N.C.G.S. § 62-133.12, the cumulative maximum charges that the Company can recover between rate cases cannot exceed 5% of the total service revenues approved by the Commission in this rate case.

Recommendations of the Public Staff

66. It is reasonable and appropriate for the Company, in its next general rate case filing, to ensure that its NCUC Form W-1, Item 26 has been carefully reviewed so that the filing does not include double bills, that the Company accounts for multi-unit customers, and that other bills produced, such as final bills, late notices, re-bills, or other miscellaneous bills, are not included in the filing.

67. It is reasonable to approve an increase in the Company's reconnection fee from $27.00 to $42.00.

68. The connection charge of $1,080 for water and $1,400 for sewer for Winston Pointe Subdivision, Phase IA, recommended by the Public Staff is reasonable and appropriate.

EVIDENCE AND CONCLUSIONS FOR FINDINGS OF FACT NOS. 1–4

General Matters

The evidence supporting these findings of fact is found in the verified Application and the accompanying NCUC Form W-1, the testimony and exhibits of the witnesses, and the entire record in this proceeding. These findings are informational, procedural, and jurisdictional in nature and are not contested by any party.

EVIDENCE AND CONCLUSIONS FOR FINDINGS OF FACT NOS. 5–11

The Stipulation and Acceptance of Stipulation

The evidence supporting these findings of fact is found in the Stipulation, the testimony of both CWSNC's and the Public Staff's witnesses, the affidavit of Matthew Schellinger, and Revised Settlement Exhibits I and II.

On November 27, 2019, CWSNC and the Public Staff entered into and filed a Partial Settlement Agreement and Stipulation, which memorializes their agreements on some of the issues in this proceeding. Attached to the Stipulation is Settlement Exhibit 1, which demonstrates the impact of the Stipulating Parties' agreements on the calculation of CWSNC's gross revenue for the test year ended March 31, 2019. Thus, the Stipulation is based upon the same test period as the Company's Application, adjusted for certain changes in plant, revenues, and costs that were not known at the time the case was filed, but are based upon circumstances occurring or becoming known through the close of the expert witness hearing. In addition to the Stipulating Parties' agreements on some of the issues in this proceeding, the Stipulation provides that CWSNC and the Public Staff agree that the Stipulation reflects a give-and-take partial settlement of contested issues, and that the provisions of the Stipulation do not reflect any position asserted by either CWSNC or the Public Staff, but instead reflect compromise and settlement between them. The Stipulation provides that it is binding as between CWSNC and the Public Staff, and that it is conditioned upon the Commission's acceptance of the Stipulation in its entirety. No party filed a formal statement or presented testimony indicating opposition to the Stipulation. During the expert witness hearing in response to a question from the Commission, CLCA indicated that it has no objection to the Stipulation. Tr. vol. 9, 200–01. There are no other parties to this proceeding.

The key aspects of the Stipulation are as follows:

- ***Tariff Rate Design*** – The Stipulating Parties agree that rate design in this case should be based on a 50/50 ratio of fixed/volumetric revenues for the Uniform Water and BF/FH/TC Water residential customers and an 80/20 ratio of fixed/volumetric revenues for the Uniform Sewer residential customers.

- ***Capital Structure*** – The Stipulating Parties agree that the capital structure appropriate for use in this proceeding is a capital structure consisting of 49.10% common equity and 50.90% long-term debt at a cost of 5.36%.

- ***Property Insurance Expense*** – The Stipulating Parties agree to the Company's rebuttal position of $279,912.

- ***Treatment of Water Service Corporation (WSC) Rent Expense*** – The Stipulating Parties agree to the Public Staff's calculation of WSC's rent expense for its Chicago, Illinois office lease as reflected in Revised Feasel Exhibit I, Schedule 3-11.

- ***Water Loss Adjustment for Purchased Water Expense*** – The Stipulating Parties agree upon a 20% water loss threshold for Whispering Pines, Zemosa Acres, Woodrun, High Vista, and Carolina Forest subdivisions.

- ***Purchase Acquisition Adjustment (PAA) Amortization Expense Rates*** – The Company agrees to the Public Staff's PAA amortization rates per Revised Feasel Exhibit I, Schedule 3-15.

- ***Storm Reserve Fund and Storm Expense*** – The Company agrees to rescind its request to implement its proposed Storm Reserve Fund, and to utilize the Public Staff's position per Revised Feasel Exhibit I, Schedule 3-4.

- ***Application of Hurricane Florence Insurance Proceeds*** – The Public Staff agrees to the Company's rebuttal position removing insurance overpayments to date from the insurer.

- ***Accumulated Deferred Income Taxes (ADIT)*** - The Company agrees to the Public Staff's proposed calculations of ADIT regarding unamortized rate case expense. The Stipulating Parties agree to revise ADIT for any updates made to rate case expense deferrals.

- ***Deferral Accounting for Capital Investments in WWTPs -*** The Stipulating Parties agree that deferral accounting treatment for post-in-service depreciation expense and carrying costs related to the Company's capital investments in WWTPs placed in service at Nags Head and Connestee Falls during the pendency of this proceeding is reasonable and appropriate.

- ***Regulatory Commission Expense*** - The Stipulating Parties agree to a methodology for calculating regulatory commission expense, also known as rate case expense, and agreed to update the number in Settlement Exhibit 1, Line 41, for actual and estimated costs once supporting documentation is provided by the Company. The Stipulating Parties agreed to amortize rate case expenses for a five-year period.

- ***Revenue Requirement*** – The Stipulating Parties agree to certain other revenue requirement issues designated as "Settled Items" on Settlement Exhibit 1, which was attached to the Stipulation and is incorporated by reference therein.

As the Stipulation has not been adopted by all of the parties to this docket, its acceptance by the Commission is governed by the standards set out by the North Carolina Supreme Court in *State ex rel. Utils. Comm'n v. Carolina Util. Customers Ass'n, Inc.*, 348 N.C. 452, 500 S.E.2d 693 (1998) (*CUCA I*), and *State ex rel. Utils. Comm'n v. Carolina Util. Customers Ass'n, Inc.*, 351 N.C. 223, 524 S.E.2d 10 (2000) (*CUCA II*). In *CUCA I*, the Supreme Court held that:

> a stipulation entered into by less than all of the parties as to any facts or issues in a contested case proceeding under Chapter 62 should be accorded full consideration and weighed by the Commission with all other evidence presented by any of the parties in the proceeding. The Commission must consider the nonunanimous stipulation along with all the evidence presented and any other facts the Commission finds relevant to the fair and just determination of the proceeding. The Commission may even adopt the recommendations or provisions of the nonunanimous stipulation as long as the Commission sets forth its reasoning and makes "its own independent conclusion" supported by substantial evidence on the record that the proposal is just and reasonable to all parties in light of all the evidence presented.

348 N.C. at 466, 500 S.E.2d at 703. However, as the Court made clear in *CUCA II*, the fact that fewer than all of the parties have adopted a settlement does not permit the Court to subject the Commission's order adopting the provisions of a nonunanimous stipulation to a "heightened standard" of review. *CUCA II*, 351 N.C. at 231, 524 S.E.2d at 16. Rather, the Court said that Commission approval of the provisions of a nonunanimous stipulation "requires only that the Commission ma[k]e an independent determination supported by substantial evidence on the record [and] . . . satisf[y] the requirements of [C]hapter 62 by independently considering and analyzing all the evidence and any other facts relevant to a determination that the proposal is just and reasonable to all parties." *Id*. at 231-32, 524 S.E.2d at 17.

Based upon the foregoing and the entire record herein, the Commission finds that the Stipulation was entered into by the Stipulating Parties after full discovery and extensive negotiations, that the Stipulation is the product of give-and-take in settlement negotiations between CWSNC and the Public Staff, and that the Stipulation represents a reasonable and appropriate resolution of certain specific matters in dispute in this proceeding. In making this finding the Commission gives substantial weight to the testimony of CWSNC witness DeStefano and the testimony and supporting exhibits of Public Staff witnesses Henry and Feasel which support the Stipulation, and notes that no party expressed opposition to the provisions of the Stipulation. In addition when the provisions of the Stipulation are compared to CWSNC's Application and the recommendations included in the testimony of the Public Staff's witnesses, the Stipulation

results in a number of downward adjustments to the expenses sought to be recovered by CWSNC, and resolves issues, some of which were more important to CWSNC and, others of which were more important to the Public Staff. Therefore, the Commission further finds that the Stipulation is material evidence to be given appropriate weight in this proceeding, along with all other evidence of record, including that submitted by CWSNC, the Public Staff, CLCA, and the public witnesses who testified at the hearings.

In addition, the Commission finds that the Stipulation is a nonunanimous settlement of matters in controversy in this proceeding and that the Stipulation resolves only some of the disputed issues between CWSNC and the Public Staff. The Stipulation leaves the following Unsettled Issues to be resolved by the Commission: (1) rate of return on common equity; and (2) the deferral of expenses related to the installation of AMR meters in the Company's Fairfield Mountain and Connestee Falls service areas.

After careful consideration the Commission finds that when combined with the rate effects of the Commission's decisions regarding the foregoing Unsettled Issues, the Stipulation strikes a fair balance between the interests of CWSNC to maintain its financial strength at a level that enables it to attract sufficient capital on reasonable terms, on the one hand, and its customers to receive safe, adequate, reliable, and affordable water and sewer service at the lowest reasonably possible rates, on the other. The Commission finds that the resulting rates are just and reasonable to both CWSNC and its ratepayers. In addition, the Commission finds that the provisions of the Stipulation are just and reasonable to all parties to this proceeding and serve the public interest, and that it is appropriate to approve the Stipulation in its entirety.

EVIDENCE AND CONCLUSIONS FOR FINDINGS OF FACT NOS. 12-20

Customer Concerns and Service

The evidence supporting these findings of fact is found in the testimony of the public witnesses appearing at the hearings, in the testimony of Public Staff witness Casselberry, in the testimony and exhibits of CWSNC witnesses DeStefano and Mendenhall, and in the verified reports filed by CWSNC in response to the concerns testified to by the public witnesses at hearings.

On June 28, 2019, CWSNC filed an application for a general rate increase, which was verified by CWSNC's Financial Planning and Analysis Manager. The Application stated that CWSNC presently serves approximately 34,915 water customers and 21,403 sewer customers in North Carolina. The Company's service territory spans 38 counties in North Carolina, from Corolla in Currituck County to Bear Paw in Cherokee County.

The Commission held hearings throughout CWSNC's service territory for the purpose of receiving testimony from members of the public, and particularly from CWSNC's water and wastewater customers, as follows:

Hearing Date	Location	Public Witnesses
September 5, 2019	Charlotte	William Colyer, Rachel Fields, William Michael Wade, and James Sylvester
September 10, 2019	Manteo	None
October 8, 2019	Boone	None
October 9, 2019	Asheville	Chuck Van Rens, Jack Zinselmeier, Jeff Geisler, Phil Reitano, Jeannie Moore, Linda Huber, Brian McCarthy, Ron Shuping, and Steve Walker
October 14, 2019	Raleigh	Alfred Rushatz, Vince Roy, Mark Gibson, and David Smoak
October 22, 2019	Jacksonville	Danny Conner, Ralph Tridico, James C. Kraft, John Gumbel, David Stevenson, and Irving Joffee

Public Staff witness Casselberry testified that her investigation included a review of customer complaints, contact with the DEQ Division of Water Resources (DWR) and Public Water Supply Section (PWSS), review of Company records, and analysis of revenues at existing and proposed rates. Tr. vol. 8, 78. Witness Casselberry testified that she contacted the seven regional offices in North Carolina. The PWSS identified four water systems – Riverwood, Meadow Glen, Wood Trace, and Sapphire Valley – which required action by CWSNC; DWR identified three wastewater treatment plants – CLMS, Carolina Trace, and Asheley Hills – which required action by CWSNC. Witness Casselberry investigated each concern and testified that CWSNC has taken the necessary actions and that the Public Staff is satisfied that the concerns reported by PWSS and DWR have been addressed or are in the process of being resolved. Tr. vol. 8, 81.

In addition, witness Casselberry testified that she had reviewed approximately 316 consumer statements of position from CWSNC customers received by the Public Staff as a result of this proceeding. Witness Casselberry stated that the service areas represented by those submitting statements are Belvedere (1), Brandywine Bay (2), Carolina Pines (1), Carolina Trace (11), Corolla Light/Monteray Shores (1), Connestee Falls (48), Fairfield Harbour (33), Kings Grant (1), Sapphire Valley (2), The Point (161), Treasure Cove (1), Ski Mountain (1), Waterglyn (1), Woodhaven (1), and unspecified service areas (51). Tr. vol. 8, 96. She testified that all customers objected to the magnitude of the rate increase. She indicated that public witnesses' primary concern was

that CWSNC's request for another rate increase was filed just four months after it had been granted an increase in rates in February 2019. Most of the customers in Connestee Falls said there was no justification for such a large increase, that they had to pay the base charge for service when they were not occupying their homes, and that they experienced numerous leaks and boil water advisory notices over the summer. The customers in Fairfield Harbour said that they were still recovering from Hurricane Florence and that they could not afford an increase. They also stated that the water quality was poor and that they had to install individual softeners and filter systems. Nearly all of the customers in The Point Subdivision opposed CWSNC's proposed Pilot Program. Their primary objections were that (1) customers in The Point were being penalized, and that the block rates should apply to all CWSNC customers, (2) the average consumption did not take into account customers who live on the lake and use lake water for irrigation, (3) the covenants do not allow individual wells for irrigation, and (4) the conditions and rules for landscaping would increase the average bill by approximately 30 percent if the block tiered rates were approved. Tr. vol. 8, 96–101. Customer concerns were addressed in Public Staff witness Casselberry's supplemental testimony filed on November 15, 2019.

Witness Casselberry also testified regarding service and water quality complaints registered by customers at each of the five public hearings. Tr. vol. 8, 111. She stated that she had read each of the four reports filed by CWSNC in response to the customer concerns and complaints which were included in testimony at the public hearings. Witness Casselberry testified that there were a few isolated service issues which the Company had addressed or was in the process of resolving.

After reviewing the testimony and complaints of the customers regarding water quality and hardness in the Fairfield Harbour and Bradfield Farms service areas, witness Casselberry stated CWSNC should provide an estimate of the cost of installing a central water filter system for Bradfield Farms Subdivision, Tr. vol. 8, 102–03, and the Fairfield Harbour Service Area, Tr. vol. 8, 109–110, for the homeowners' associations' consideration.

With the exception of her recommendation for Bradfield Farms Subdivision and the Fairfield Harbour Service Area, witness Casselberry had no additional comments or recommendations. Tr. vol. 8, 111. She testified that CWSNC's quality of service is good. Tr. vol. 8, 111. Witness Casselberry also testified that the quality of water meets the standards set forth by the Safe Drinking Water Act and is satisfactory. Tr. vol. 8, 111.

With regard to the concerns expressed by customers about the Company's proposed Pilot Program to test conservation rates in The Point Subdivision, the Commission acknowledges that this matter is no longer an issue in this proceeding because CWSNC withdrew its request for authority to implement its proposed Pilot Program on November 18, 2019. CWSNC stated its withdrawal of the Pilot Program was based on the Public Staff's opposition to CWSNC's proposed Pilot Program in the present case and the existence of the Commission's generic rate design proceeding in Docket No. W-100, Sub 59 (Sub 59). CWSNC noted that the Company will continue to actively

participate in the Commission's Sub 59 generic rate design proceeding to explore and consider rate design proposals that may better achieve the Company's desire for revenue sufficiency and stability, while also sending appropriate signals to consumers that support and encourage water efficiency and conservation.

Additionally, in CWSNC's November 18, 2019 filing, the Company withdrew its request for the consumption adjustment mechanism (CAM) proposed in this proceeding. CWSNC stated its withdrawal for the CAM was prompted by the Commission's initiation of a rulemaking proceeding in Docket No. W-100, Sub 61 on November 14, 2019; the Public Staff's testimony in this matter recommending that the Commission deny CWSNC's request to implement a CAM; and the Company's expectation that other water and wastewater providers will seek to have input on the implementation of any CAM guidelines. CWSNC maintained that the contested issues concerning the requested CAM are more suitable for resolution in the generic proceeding than in this rate case proceeding.

Based upon the foregoing, and after careful review of the testimony of the customers at the public hearings, the Company's reports on customer comments, the Public Staff's engineering and service quality investigation, and the late-filed exhibits submitted by CWSNC and the Public Staff, the Commission concludes that, consistent with the statutory requirements of N.C.G.S. § 62-131(b), the overall quality of service provided by CWSNC is adequate, efficient, and reasonable.

EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NO. 21

Rate Base

The evidence supporting this finding of fact is found in the verified Application and the accompanying NCUC Form W-1, the testimony of Company witness DeStefano, the testimony of Public Staff witnesses Feasel and Henry, the Stipulation, and Revised Settlement Exhibits I and II.

The following table summarizes the differences between the Company's level of rate base from its Application and the amounts recommended by the Public Staff:

Item	Company Per Application	Difference	Amount Per Public Staff
Plant in service	$217,460,239	$20,751,845	$238,212,084
Accumulated depreciation	($55,739,757)	($2,158,186)	($57,897,943)
Net plant in service	161,720,483	18,593,659	180,314,141
Cash working capital	2,467,676	(62,876)	2,404,800
Contributions in aid of construct.	(40,916,105)	645,430	(40,270,675)
Advances in aid of construction	(32,940)	0	(32,940)
Accum. deferred income taxes	(6,699,939)	704,495	(5,995,444)
Customer deposits	(304,114)	(11,333)	(315,447)
Inventory	271,956	0	271,956
Gain on sale and flow back taxes	(131,695)	(286,116)	(417,811)
Plant acquisition adjustment	(873,734)	35,856	(837,878)
Excess book value	(331)	331	0
Cost-free capital	(261,499)	0	(261,499)
Average tax accruals	125,013	(268,211)	(143,198)
Regulatory liability for EDIT	(3,941,344)	0	(3,941,344)
Deferred charges	2,252,645	(129,938)	2,122,707
Pro forma plant	17,195,228	(17,195,228)	0
Original cost rate base	$130,871,300	$2,026,068	$132,897,368

On the basis of the Stipulation and revisions made by the Public Staff in its Revised Settlement Exhibits I and II, the Company and the Public Staff are in agreement concerning all components of rate base except for the amount of cash working capital. Therefore, the Commission finds that the uncontested adjustments to rate base recommended by the Public Staff are appropriate adjustments to be made in this proceeding.

CWSNC and the Public Staff disagree on the amount of cash working capital to include in rate base for use in this proceeding due to the unsettled issue concerning the deferral accounting treatment of the AMR meter installation projects in Fairfield Mountain and Connestee Falls. Based on the testimony of Company witness DeStefano, CWSNC disagrees with the Public Staff's recommendation to deny deferral accounting treatment for the two AMR meter installation projects. As a result of their differing positions concerning this issue and its effect on their respective recommended level of maintenance and repair expense, CWSNC and the Public Staff recommend different amounts for cash working capital to include in rate base, $2,406,418 and $2,404,800, respectively.

Based on the conclusions reached elsewhere in this order concerning the deferral accounting treatment for AMR meter installation projects in Fairfield Mountain and Connestee Falls, the Commission concludes that the appropriate amount for cash

working capital is $2,404,800. Consequently, the appropriate level of rate base for combined operations for use in this proceeding is as follows:

Item	Amount
Plant in service	$238,212,084
Accumulated depreciation	($57,897,943)
Net plant in service	180,314,141
Cash working capital	2,404,800
Contributions in aid of construction	(40,270,675)
Advances in aid of construction	(32,940)
Accumulated deferred income taxes	(5,995,444)
Customer deposits	(315,447)
Inventory	271,956
Gain on sale and flow back taxes	(417,811)
Plant acquisition adjustment	(837,878)
Excess book value	0
Cost-free capital	(261,499)
Average tax accruals	(143,198)
Regulatory liability for excess deferred taxes	(3,941,344)
Deferred charges	2,122,707
Pro forma plant	0
Original cost rate base	$132,897,368

EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NO. 22

Operating Revenues

The evidence supporting this finding of fact is found in the testimony of Public Staff witnesses Feasel and Casselberry, and Company witness DeStefano. The following table summarizes the differences between the Company's level of operating revenues under present rates from its Application and the amounts recommended by the Public Staff:

Item	Company per Application	Difference	Amount per Public Staff
Operating Revenues:			
Service revenues	$33,269,517	$582,715	$33,852,232
Miscellaneous revenues	353,280	34,212	387,492
Uncollectible accounts	(246,348)	(24,794)	(271,142)
Total operating revenues	$33,376,449	$592,133	$33,968,582

Based on the Stipulation and the revisions made by the Public Staff in its Feasel Revised Exhibits I and II, the Company does not dispute the following Public Staff adjustments to operating revenues under present rates:

Item	Amount
Reflect pro forma level of service revenues	$582,715
Adjustment to forfeited discounts	10,128
Adjustment to sale of utility property	24,084
Adjustment to uncollectible accounts	(24,794)
Total	$592,133

For reasons discussed elsewhere in this order, the Commission has found that the adjustments listed above are appropriate adjustments to be made to operating revenues under present rates in this proceeding.

Based on the foregoing, the Commission concludes that the appropriate level of operating revenues under present rates for combined operations for use in this proceeding is as follows:

Item	Amount
Service revenues	$33,852,232
Miscellaneous revenues	387,492
Uncollectible accounts	(271,142)
Total operating revenues	$33,968,582

EVIDENCE AND CONCLUSIONS FOR FINDINGS OF FACT NOS. 23-25

Maintenance and General Expenses

The evidence for these findings of fact is found in the verified Application and the accompanying NCUC Form W-1; the testimony of Public Staff witnesses Feasel, Henry, and Darden; the testimony of Company witnesses DeStefano and Mendenhall; the affidavit of Matthew Schellinger; and the Revised Settlement Exhibits I and II.

The following table summarizes the differences between the Company's requested level of maintenance and general expenses and the amounts recommended by the Public Staff:

Item	Company Per Application	Difference	Amount Per Public Staff
Maintenance Expenses:			
Salaries and wages	$5,143,430	($193,719)	$4,949,710
Purchased power	2,110,722	(7,679)	2,103,043
Purchased water & sewer	2,171,965	47,278	2,219,243
Maintenance and repair	2,955,315	165,620	3,120,935
Maintenance testing	546,264	(1,832)	544,432
Meter reading	206,176	0	206,176
Chemicals	713,452	(19,856)	693,596
Transportation	539,115	(4,915)	534,200
Operating expenses charged to plant	(615,663)	(49,470)	(665,133)
Outside services - other	1,219,715	(28,417)	1,191,299
Total maintenance expenses	$14,990,492	($92,991)	$14,897,501
General Expenses:			
Salaries and wages	$2,386,901	($382,491)	$2,004,409
Office supplies and other office expense	569,400	(536)	568,864
Regulatory commission expense	303,485	4,269	307,754
Pension and other benefits	1,531,096	69,062	1,600,158
Rent	392,552	(62,244)	330,308
Insurance	664,043	118,519	782,562
Office utilities	751,728	(4,058)	747,670
Miscellaneous	355,931	(137,513)	218,417
Total general expenses	$6,955,135	($394,993)	$6,560,142

Regulatory Commission Expense

In his January 10, 2020 affidavit, Matthew Schellinger provided an amount of $519,416 for the actual costs incurred to date and the estimated expense to be incurred related to this rate case. Affiant Schellinger requested that the Commission approve total rate case costs of $1,169,222 to be amortized over five years. He stated that the $1,169,222 includes $649,806 for unamortized rate case expense from prior proceedings plus $519,416 related to this case. Affiant Schellinger commented that the annual amortization expense for rate case costs for this proceeding total $233,844 ($1,169,222 amortized over five years). Affiant Schellinger also requested that the Commission include in regulatory commission expense an annual amount of $73,911 in miscellaneous regulatory costs for filings and compliance type activities not directly related to rate case costs. He maintained that these expenses are a direct cost of service, are not disputed, and were agreed upon between CWSNC and the Public Staff in the Stipulation. In sum, Affiant Schellinger requested that the Commission include a total annual amount of

$307,755 in regulatory commission expense in this proceeding, consisting of rate case costs of $233,844 and miscellaneous regulatory costs of $73,911.

The Public Staff stated that it has reviewed the invoices and other supporting documents along with the rate case expense spreadsheet provided by CWSNC and found that the types of rate case expense in this rate case matched the nature of the expense in prior rate cases and the amount of these expenses in the current proceeding are appropriate and reasonable to be included in this rate case. The Public Staff and the Company are in agreement that the miscellaneous regulatory matters costs in the Company's books as provided in the affidavit of Matthew Schellinger should also be included as regulatory commission expense to be recovered in this rate case as a reasonable cost of service incurred by CWSNC. Therefore, in light of the foregoing the Commission finds that it is appropriate and reasonable to amortize the sum of the total rate case costs of $519,416 for the current proceeding and the unamortized rate case cost balance of $649,806 from the prior rate cases over five years and to include an annual level of costs in the amount of $73,911 related to miscellaneous regulatory matters, resulting in an annual level of regulatory commission expense of $307,755 to be recovered in this proceeding.

On the basis of the Stipulation and revisions made by the Public Staff in Henry Revised Exhibit I, Feasel Revised Exhibits I and II, and Revised Settlement Exhibits I and II, the Company and the Public Staff are in agreement concerning all adjustments recommended by the Public Staff to maintenance and general expenses except for maintenance and repair expense. Therefore, the Commission finds that the uncontested adjustments to maintenance and general expenses recommended by the Public Staff are appropriate adjustments to be made in this proceeding.

CWSNC and the Public Staff disagree on the amount of maintenance and repair expense to include in maintenance and general expenses in this proceeding due to the unsettled issue concerning the deferral accounting treatment of the AMR meter installation projects in Fairfield Mountain and Connestee Falls. Based on the testimony of Company witness DeStefano, CWSNC disagrees with the Public Staff's recommendation to deny deferral accounting treatment for the two AMR meter installation projects. As a result of their differing positions concerning this issue, CWSNC and the Public Staff recommend differing amounts for maintenance and repair expense, $3,133,882[10] and $3,120,935, respectively. The Company included an amount of $12,947 ($64,736 amortized over five years) in maintenance and repair expense related to its requested deferral accounting treatment for the two AMR meter installation projects whereas the Public Staff did not.

Based on the conclusions reached elsewhere in this Order concerning the deferral accounting treatment for the AMR meter installation projects in Fairfield Mountain and

[10] See page 160 of the Company's proposed order filed on January 10, 2020, in these dockets which includes the agreed-upon pro forma adjustments per the Stipulation and CWSNC's recommendations concerning the two unsettled issues in this rate case.

Connestee Falls, the Commission concludes that the appropriate level of maintenance and repair expense for combined operations for use in this proceeding is $3,120,935.

Based upon the foregoing, the Commission concludes that the appropriate level of maintenance and general expenses for combined operations for use in this proceeding are as follows:

Item	Amount
Maintenance Expenses:	
Salaries and wages	$4,949,710
Purchased power	2,103,043
Purchased sewer	2,219,243
Maintenance and repair	3,120,935
Maintenance testing	544,432
Meter reading	206,176
Chemicals	693,596
Transportation	534,200
Operation exp. charged to plant	(665,133)
Outside services - other	1,191,299
Total maintenance expenses	$14,897,501
General Expenses:	
Salaries and wages	$2,004,409
Office supplies and other office expense	568,864
Regulatory commission expense	307,754
Pension and other benefits	1,600,158
Rent	330,308
Insurance	782,562
Office utilities	747,670
Miscellaneous	218,417
Total general expenses	$6,560,142

EVIDENCE AND CONCLUSIONS FOR FINDINGS OF FACT NOS. 26-27

Storm Reserve Fund and Normalized Storm Damage Expense

The evidence for these findings of fact is found in the verified Application and the accompanying NCUC Form W-1, the testimony of Public Staff witnesses Feasel and Henry, and the Stipulation and Revised Settlement Exhibits I and II.

In the Company's Application, it requested to establish a storm reserve fund to support extraordinary O&M costs resulting from damages sustained in severe storms such as Hurricane Florence. CWSNC witness DeStefano testified that CWSNC proposes to create a monthly, flat surcharge for each active customer's water and sewer service bill until the reserve threshold of $250,000 is reached. Witness DeStefano commented that CWSNC proposed to collect a monthly surcharge of $0.42 per customer per month

based on the threshold of $250,000. In addition, this is the first general rate case proceeding in which CWSNC seeks Commission approval of a normalized level of storm expenses to be included in base rates. In NCUC Form W-1, Item 10, Schedule 24, the Company used three years (2016–2018) to calculate the average storm cost requested to be recovered in this rate case. Witness DeStefano maintained that the storm reserve fund would only be utilized if the Company's storm costs for the last 12 months exceed the level of normalized storm expenses included in the base rate revenue requirement.

Public Staff witness Henry testified that in addition to the storm reserve fund, CWSNC applied to include in rates a normalized level of storm expense calculated using a three-year average of actual storm expenses incurred, excluding Hurricane Florence expenses. Witness Henry stated that ten years has historically been used to calculate the average storm cost because a ten-year time period would include some years in which storm costs were high and others in which they were low, resulting in a more reasonable average than that which would result from using only the three most recent years. Additionally, witness Henry stated that using a ten-year time period has been approved by the Commission in prior decisions. For the reasons set forth in his prefiled testimony, witness Henry recommends that the Commission deny CWSNC's request for a storm reserve fund. In the Stipulation the Company agreed to rescind its request to implement its proposed storm reserve fund and also agreed to the Public Staff's use of a ten-year average for storm costs. The Stipulating Parties have agreed to a normalized level of storm expenses in the amount of $34,567, to be included in maintenance and repair expense.

Therefore, in light of the foregoing the Commission concludes that it is appropriate and reasonable to continue its historical practice of using a ten-year time period as the standard for calculating average annualized storm costs to be recovered in the Company's rates as an ongoing level of expense. Consequently, the appropriate annual level of normalized storm costs that should be included in CWSNC's rates in this proceeding is $34,567, as set out in the Stipulation.

EVIDENCE AND CONCLUSIONS FOR FINDINGS OF FACT NOS. 28-30

Hurricane Florence Expense

The evidence supporting these findings of fact is found in the Company's Petition for Accounting Order in Sub 363, the testimony of Company witness DeStefano, the testimony of Public Staff witnesses Henry and Feasel, the Stipulation, Settlement Exhibit I, and Revised Settlement Exhibits I and II in Sub 364.

On January 17, 2019, CWSNC filed a Petition for an Accounting Order to Defer Unplanned Incremental Hurricane Florence Storm Damage Expenses, Capital Investments, and Revenue Loss in Sub 363 requesting an accounting order authorizing it to establish a regulatory asset and defer until the Company's next general rate case costs incurred in connection with damage to the Company's water and wastewater systems resulting from the impacts of Hurricane Florence. Additionally, the Company

sought Commission approval to defer O&M costs, lost revenues, and depreciation expense on its capital investments. According to the Sub 363 Petition, CWSNC's facilities suffered extensive damage due to the storm, particularly in the coastal region of the Company's service territory.

CWSNC stated that it incurred extraordinary, unplanned operating and capital costs, as well as lost revenues from customers who were forced to disconnect their service due to damage to their homes. Additionally, the Company provided invoices to the Public Staff showing that it has incurred, to date, $146,773 in storm-related incremental O&M expenses, $582,570 in capital investments, and $46,320 in estimated revenue loss. In its comments filed on April 4, 2019, the Public Staff did not object to CWSNC's recovery of a substantial portion of its 2018 verified storm O&M costs and deferral accounting treatment for the incremental O&M costs related to Hurricane Florence; however, it opposed CWSNC's request to defer depreciation expense associated with the Company's capital investments and lost revenues. Additionally, the Public Staff recommended that the amortization period begin as of October 2018, the date of the storm, and not begin with the effective date of the Company's next general rate case, which is the instant case, Sub 364, filed on June 28, 2019.

After considering prior cases and the tests applied by the Commission, the Public Staff determined that "the damage to CWSNC's system from Hurricane Florence was greater than that caused by any other storm in the Company's history, which will affect the Company's rate of return on common equity. The Public Staff concluded that this is an exceptional circumstance justifying some deferral of costs." Public Staff's Sub 363 Comments. However, in opposing CWSNC's request to defer depreciation expense associated with the Company's capital costs and lost revenues, the Public Staff cited the Commission's order in the last Duke Energy Progress, LLC. (DEP), general rate case, Docket No. E-2, Sub 1142, where DEP's request for deferral of depreciation expense, return on the undepreciated balance of capital costs, and the carrying costs on the entirety of the deferred costs was denied.

The Public Staff, therefore, recommends the following:

(a) that the Commission approve a deferral of $146,773 in 2018 Hurricane Florence storm O&M expenses, but no deferral of CWSNC's depreciation expense or lost revenues;
(b) that CWSNC be required to amortize the costs deferred over a three-year period beginning in October 2018;
(c) that upon final determination of the actual amount of costs of Hurricane Florence the Company be required to file a final accounting of said costs with the Commission for review and approval;
(d) that approval of this accounting procedure is without prejudice to the right of any party to take issue with the amount of or the ratemaking treatment accorded these costs in any future regulatory proceeding; and
(e) that any applicable insurance proceeds received by CWSNC will be used to offset the deferred O&M expenses.

As shown in Settlement Exhibit I, witness Feasel calculated a total deferral amount of $146,773 for the incremental O&M costs related to the 2018 storm costs with an amortization period of three years beginning in October 2018, using the procedure recommended by witness Henry. The Company and the Public Staff agree to the amount of Hurricane Florence storm-related costs included in Settlement Exhibit I as noted in the Stipulation.

The Commission finds and concludes that it is just and reasonable for the Company to receive deferral accounting treatment for the incremental O&M costs amounting to $146,773 in Hurricane Florence storm costs and that these costs should be amortized over three years. Consequently, it is appropriate to include in CWSNC's maintenance and repair expense Hurricane Florence storm-related costs in the amount of $48,924, as set out in the Stipulation.

EVIDENCE AND CONCLUSIONS FOR FINDINGS OF FACT NOS. 31-41

Deferral of WWTP Projects and AMR Meter Installation Projects

The evidence for these findings of fact is found in the record of Sub 365, including the initial comments of the Public Staff and the reply comments of the Company; the testimony of Company witnesses DeStefano and Mendenhall; the testimony and exhibits of Public Staff witnesses Henry, Feasel, and Junis; the Stipulation, and Revised Settlement Exhibits I and II.

Summary of the Evidence

On June 28, 2019, contemporaneously with the Sub 364 rate case application, the Company filed a Petition for an Accounting Order to Defer Post-In-Service Depreciation and Financing Costs Relating to Major New Projects in Sub 365.

On September 20, 2019, the Public Staff filed comments, and on October 21, 2019, CWSNC filed reply comments. On November 15, 2019, the Company filed a motion to consolidate the Sub 365 docket with the Sub 364 rate case proceeding, which was granted by Commission order dated November 19, 2019.

In its Sub 365 petition, CWSNC describes four major new projects that were in progress and would be placed in service after the close of the test year but during the pendency of this general rate case proceeding. The Company requests authority to defer the incremental post-in-service depreciation expense and financing costs of those projects and then to recover those costs in the rates approved in Sub 364, amortized over a five-year period. The four projects are:

(a) Connestee Falls WWTP in Buncombe County;
(b) Nags Head WWTP in Dare County;
(c) Fairfield Mountain AMR meters installed in Transylvania County; and
(d) Connestee Falls AMR meters installed in Buncombe County.

CWSNC witness DeStefano's testimony explained that the accounting and cost recovery treatment of these projects would have a material impact on the Company's ability to earn its authorized return from its last rate case. The Company requests deferral of incremental post-in-service depreciation expense and financing costs on these four projects from their respective in-service dates until the projects are included for recovery in base rates in this case.

Company witness Mendenhall described the four projects. He stated that the Connestee Falls WWTP project involved the installation of a “sequencing batch reactors” treatment facility which replaced a 300,000 gallons per day (gpd) concrete plant installed in the early 1970s. He noted that the plant is located in the mountains and exposed to winter weather, including cold, ice, and snow. These conditions led to the serious erosion of exposed areas of concrete, most significantly the above-the-waterline walls and walkways, due to years of “freeze/thaw” cycles. Witness Mendenhall maintained that the concrete deterioration had reached the point of “end of life” of the asset and that the old plant presented a high risk of failure. He stated that the build-out needs of the community require 460,000 gpd of wastewater treatment capacity and that the new plant was built adjacent to the existing plant. He commented that the cost of the project was $7,177,326 and that it was placed in-service on July 31, 2019.

Witness Mendenhall testified that the Nags Head WWTP project consisted of the installation of a new membrane treatment facility to allow for effluent disposal below permitted nitrate levels in groundwater monitoring wells. He explained that the purpose of this project was to modify the existing Aeromod 0.400 million gallon per day (mgd) plant with membrane filtration to provide reuse-quality effluent to meet groundwater nitrate and total dissolved solids (TDS) compliance testing limits. Witness Mendenhall noted that in 2018, the Division of Water Quality, DEQ, issued a Notice of Violation requiring the plant to comply with current groundwater testing limits of 500 mg/L for TDS and 5 mg/L for nitrates. He stated that the previous plant met the wastewater treatment plant effluent limits but was unable to meet the newly imposed groundwater limits for the monitoring wells. Witness Mendenhall maintained that had the new facility not been constructed, the risk of imposition of severe penalties or a consent decree was high. He noted that the cost of the project was $6,876,116, and it was placed in-service on May 31, 2019.

Witness Mendenhall further stated that in 2019, CWSNC continued to expand its AMR meter footprint in its mountain systems. He commented that approximately 2,500 AMR meters were installed in the Connestee Falls and Fairfield Mountain Subdivisions. Witness Mendenhall testified that benefits of AMR meter technology to customers and the Company include: (1) customer satisfaction with data and billing accuracy; (2) improved customer service; (3) reduction in re-read/re-billing; (4) employee safety, especially during hazardous weather events; (5) replacement of inaccurate meters which can improve non-revenue water percentages; and (6) customer interaction with respect to personal consumption habits and trends. He noted that while AMR technology would be beneficial to CWSNC customers across the state, the mountain area systems, in particular, benefit due to the extreme weather events and related safety hazards that are common in this region. Witness Mendenhall testified that the Connestee Falls and

Fairfield Mountain AMR meter installation projects were completed by July 31, 2019, at a total cost of $880,209.

At the time this rate case and CWSNC's deferral accounting Petition were filed Company witness DeStefano estimated that implementing these four projects would create a material drag on the consolidated Company's earned rate of return on common equity of 193 basis points. Witness DeStefano testified that the Company included in its rate case filing both a calculation of the deferral balances and proposed amortizations of the deferrals, as well as a pro forma adjustment relating to O&M savings that will result from the implementation of the AMR meter projects[11]. Public Staff witness Darden confirmed in her testimony that the Company included in this rate case proceeding a pro forma adjustment of $21,000 to remove the meter reading expense for the Fairfield Mountain and Connestee Falls water systems because AMR meters do not require an operator to read each meter individually.

According to Public Staff witness Henry, all of the foregoing projects were completed and in service as of the date of the expert witness hearing as verified by Public Staff witness Casselberry, and final invoices were reviewed by the Public Staff. Tr. vol. 8, 172.

In its Sub 365 comments, the Public Staff recommended that the requested deferral accounting treatment with respect to the cost of the WWTPs at Nags Head and Connestee Falls be granted and that the requested deferral accounting treatment with respect to the AMR meters installed in Fairfield Mountain and Connestee Falls be denied in its entirety.

The Public Staff commented that in its Order Approving Deferral Accounting with Conditions in Docket No. E-7, Sub 874, the Commission stated:

> [T]he Commission has historically treated deferral accounting as a tool to be allowed only as an exception to the general rule, and its use has been allowed sparingly. That is due, in part, to the fact that deferral accounting, typically, provides for the future recovery of costs for utility services provided to ratepayers in the past; and . . . the longer the deferral period, the greater the likelihood that the ratepayers who are ultimately required to pay rates including the deferred charges, which are related to resources consumed by the utility in providing services in earlier periods, may not be the same ratepayers who received the services. The Commission has also been reluctant to allow deferral accounting because it, typically, equates to single-issue ratemaking for the period of deferral, contrary to the well-established, general ratemaking principle that all items of revenue and costs germane to the ratemaking and cost-recovery

[11] See NCUC Form W-1, Item 10, Schedules 26 and 34, filed June 28, 2019.

> process should be examined in their totality in determining the appropriateness of the utility's existing rates and charges.

Order Approving Deferral Accounting with Conditions, *Petition of Duke Energy Carolinas, LLC, for an Accounting Order to Defer Certain Environmental Compliance Costs and the Incremental Costs Incurred From the Purchase of a Portion of Saluda River's Ownership in the Catawba Nuclear Station*, No. E-7, Sub 874, at 24 (N.C.U.C. Mar. 31, 2009) (DEC Sub 874 Order).

In addition the Public Staff noted that in its Order Approving in Part and Denying in Part Request for Deferral Accounting in Docket No. E-7, Sub 1029, the Commission stated, "In determining whether to allow deferral requests, the Commission has consistently and appropriately based its decision on whether, absent deferral, the costs in question would have a material impact on the company's financial condition, and in particular, the company's achieved level of earnings." Order Approving in Part and Denying in Part Request for Deferral Accounting, *Petition of Duke Energy Carolinas, LLC, for an Accounting Order to Defer Certain Capital and Operating Costs Incurred for the Advanced Clean Coal Cliffside Unit 6 Steam Generating Plant, the Dan River Natural Gas Combined Cycle Generating Plant, and the Capacity-Related Modifications at the McGuire Nuclear Generating Plant,* No. E-7, Sub 1029, at 12-13 (N.C.U.C. Apr. 3, 2013).

Thus, the Public Staff maintained that the Commission's receptivity to deferral requests is not unlimited or without regard for traditional ratemaking principles. Rather, the Public Staff stated that the Commission requires a clear and convincing showing that the costs in question were of an unusual or extraordinary nature and that, absent deferral, the costs for which deferral was requested would have a material impact on the Company's financial condition.

In determining whether to grant a deferral request the Public Staff noted that the Commission analyzes the impact the costs would have on currently achieved earnings of the utility. The Public Staff stated that the appropriate test and criteria are as follows:

> The impact on earnings, typically, has been measured and assessed in terms of ROE, considered in conjunction with (1) the return on equity (ROE) realized and (2) the company's currently authorized ROE. Also . . . current economic conditions; the Company's need for new investment capital; and the impact that the Commission decision will have on future availability and cost of such capital are also relevant to the appropriate resolution of matters of this nature. Additionally, whether the company has requested or is contemplating requesting a general rate increase and the timing, or proposed timing, of the filing of such a request is also pertinent.

DEC Sub 874 Order at 26.

The Public Staff stated in its Sub 365 comments that it had evaluated the deferrals requested in CWSNC's petition against the above criteria. Based on these criteria and

other Commission decisions, the Public Staff supported deferral accounting treatment for the costs related to the WWTP projects at Nags Head and Connestee Falls. The Public Staff based its recommendation on the fact that (1) costs for the WWTPs were related to major construction projects that, at the time the Sub 365 comments were filed, were not yet in service but expected to be completed and in operation prior to the date of the expert witness hearing in this general rate case; (2) the deferral accounting request was made contemporaneously with the filing of the rate case application; and (3) the deferral period would not be so long as to cause undue concern that the ratepayers who pay rates including the deferred WWTP costs during the deferral period may not be the same ratepayers who receive service from the WWTPs. Sub 365 Comments at 6–7. Additionally, the Public Staff stated that "the impact of the costs, if not deferred, on the Company's rate of return on common equity of 9.75% approved in the Sub 360 Rate Case, will be significant. Without deferral, the Company's earnings can be expected to decline due to the WWTPs becoming plant in service." *Id*. at 7. Thus, the Public Staff contended that the WWTPs at Nags Head and Connestee Falls presented the kind of circumstances in terms of nature, impact, and timing for which deferral accounting treatment is appropriate.

Moreover, as evidenced by the Stipulation filed on November 27, 2019, the Company and the Public Staff are in agreement that the Company's request to defer incremental post-in-service depreciation expense and financing costs of the WWTPs at Nags Head and Connestee Falls is appropriate and have agreed that the Company should be authorized to defer its costs of $1,098,778 related to its WWTPs, and these costs should be amortized over five years, for an annual amount to be included in rates of $219,756.

With respect to the Public Staff's recommendation that the Commission deny deferral accounting treatment for the AMR meters installed in Fairfield Mountain and Connestee Falls, the Public Staff stated it used the same criteria for evaluating the Company's request for deferral of the WWTPs and the AMR meter costs and concluded that CWSNC's request for deferral of the AMR meter costs should be denied. Witness Henry contended that CWSNC failed to make a clear, complete, and convincing showing, in view of the entire record, that the costs of the AMR meters are of an unusual or extraordinary nature and, absent deferral, will have a material impact on the Company's financial condition. In his direct testimony, witness Henry referred the Commission to the Public Staff's initial comments filed on September 20, 2019 in Sub 365.

In its Sub 365 initial comments, the Public Staff contended that meter replacement of any kind (AMR, AMI, traditional, etc.) is not an extraordinary or unusual project but should be considered routine and as part of a properly planned and managed meter replacement program. The Public Staff stated that water meters have an industry recognized 10- to 20-year useful life before degradation of functionality and accuracy necessitate replacement. Additionally, the Public Staff stated that CWSNC has water meters in service that range in age and condition, and that it is not unusual for a water and sewer utility to undertake, during one time period, to replace a large number of aged meters in an entire subdivision or service area because doing so promotes efficiency of

time and cost. Due to the nature of meter replacement being an expected and usual occurrence, the Public Staff stated that the only different or unusual aspect of the Company's replacement project is the increased cost of the new AMR meters over the cost of analog meters. The Public Staff further noted that although the Company stated that the upgraded technology will benefit the Company and the customers, the Company's decision to upgrade does not change the nature of the typical and expected meter replacement project. The Public Staff maintained that the increased cost of AMR meters and the number of meters replaced is the result of management decisions within CWSNC's control and a failure of the Company to implement a systematic and measured meter replacement program.

On cross-examination witness Henry confirmed that the Public Staff's accounting investigation did not raise any prudency issues with respect to the costs incurred by the Company to complete the AMR meter installation projects, that the Public Staff did not recommend any significant disallowance of any part of these costs for ratemaking purposes, that this is the third rate case in which the Company has included costs for AMR meters for its mountain systems, and that the Public Staff did not raise any objections or questions about the prudency of the installations or of the costs of prior AMR meter installations in the previous two cases. He also agreed that deferred accounting is one way to address the issue of regulatory lag faced by a utility.

Further, witness Henry agreed that the $22 million in additional investment made by the Company since its last rate case is a significant amount of investment of capital for a company the size of CWSNC and that those investments result in regulatory lag, depending on the timing of the investments and when those investments are incorporated for recovery in rates. He also updated his estimate of earnings erosion that would occur if CWSNC's request for deferral of costs related to AMR meter installation projects is denied based upon the Company's updated project costs. He testified that the Company's rate of return on common equity for the Uniform Water Rate Division would be negatively impacted by 24 basis points if the Commission denies deferral accounting treatment for the AMR meter installation projects. Witness Henry testified that he added the AMR meter installation projects to the rate case model that was used to calculate the gross revenue and overall rate of return allowed by the Commission in the Sub 360 Rate Order. Witness Henry stated that by including the AMR meter installation projects in that model for the Uniform Water Rate Division the rate of return on common equity granted in the Sub 360 case was decreased from 9.75% to 9.51%, a decrease of 24 basis points. Tr. vol. 8, 180. Witness Henry maintained that it was appropriate to evaluate the rate of return on common equity impact at the Rate Division level because CWSNC has four separate rate divisions: Uniform Water, Uniform Sewer, BF/FH/TC Water, and BF/FH Sewer. He stated that each of these rate divisions has a separate rate base, revenues, expenses, and rate of return. Tr. vol. 8, 217–18. Witness Henry further stated that rates have not been established on a total company basis in this rate case nor in prior rate cases filed by CWSNC.

Witness Henry agreed that, in addition to the basis point impact on rate of return on common equity, the Commission has considered the actual earned rate of return on

common equity of the utility requesting deferral accounting when addressing whether non-deferral of project costs would have a material negative impact on a company's financial condition. Further, he agreed that the Commission considers deferral requests on a case-by-case basis.

On cross-examination Public Staff witness Junis expanded upon witness Henry's conclusion that the Company's AMR meter installation projects did not meet the Commission's criteria for deferral accounting. He maintained that the projects were not unusual or extraordinary because they were the result of a business choice by the Company to install AMR meter technology. Tr. vol. 8, 191. He stated that the Company could have installed traditional meters rather than AMR meters. Witness Junis testified that meter replacement should be a part of normal business. Further, he stated that AMR meters are not providing service to customers or improving service to customers and thus they are not integral to providing service. Tr. vol. 8, 198. Witness Junis distinguished AMR meters from new electricity generation investments or wastewater treatment plant investments, stating that the latter are integral to providing quality service. *Id.*

Witness Junis discounted CWSNC's claim that the Company is underearning because the underearning took place primarily under previously set rates, before the current rates were established by the last rate order in Sub 360. Tr. vol. 8, 205. Witness Junis contended that for this reason, the test period would not be the "proper window to look at when considering are they under-earning or over-earning" for purposes of the Commission's test to determine whether deferral accounting is appropriate. Tr. vol. 8, 205–06. He testified that the utility decides when it files rate cases; the Company's management decides how much consequence of regulatory lag it can accept and financially tolerate between rate cases. Tr. vol. 8, 195.

On cross-examination, witness Junis acknowledged that the Public Staff's position is that AMR meter installation projects are not eligible for cost recovery in WSIC proceedings because the WSIC statute calls for "in-kind" replacements. Witness Junis testified that the Public Staff does not consider AMR meters as in-kind with regard to differing kinds of meters. Tr. vol. 8, 195–96. He further testified that both deferral accounting and the WSIC and SSIC statute minimize regulatory lag for cost-recovery purposes. He agreed that the fact that the AMR meter installation projects do not qualify for WSIC treatment is worth considering in the context of a deferral accounting request. However, he testified that it should not be a major factor in the determination and ultimately this fact did not change the Public Staff's position that deferral should be denied.

Witness DeStefano presented rebuttal testimony explaining the appropriateness of deferral accounting treatment for the Company's two AMR meter installation projects. First, he testified that major technological upgrades such as the Company's AMR meter projects are the type of projects for which deferral accounting is appropriate. He noted that the Company's AMR meter program involves the mass replacement and technological upgrade of aged analog meters in certain targeted geographical areas, as opposed to the typical individual meter replacements that occur due to aging or damaged

individual meters. He emphasized that this AMR meter program differs dramatically from individual and routine meter replacements in scope, scale, purpose, and financial impact. Witness DeStefano generally testified that the large-scale meter replacement at issue was undertaken to improve service through efficiencies, safety, and advanced technology, and that the project benefitted customers by saving some costs associated with manual meter reading and reducing system water loss. He further testified that the Company would face significant adverse impact if either the four projects subject to the petition to defer or the AMR meter projects alone were not afforded deferral accounting treatment. He explained that the Company's current overall rate of return of 7.75% authorized by the Commission in Sub 360 was not being achieved and that the Company's consolidated actual earned overall return during the test year for the instant rate case was only 3.69%.

Witness DeStefano maintained that the Public Staff's proposed rejection of deferral accounting for the two AMR meter installation projects, as well as the inability of the Company to recover the costs of depreciation and a return on the full investment of AMR meters in a WSIC filing, has the effect of significantly penalizing the Company through denial of timely cost recovery for investments in modernizing its water system operations. Witness DeStefano contended that if the Company's cost recovery for AMR meters is limited solely to a final decision in a general rate case, with no interim deferral accounting, the Company's earnings will be materially affected to its detriment. He reported that other state regulatory commissions have authorized deferral accounting in connection with meter replacement projects although he did not state whether such deferrals related specifically to the deferral of post-in-service depreciation expense and carrying costs from the AMR meter replacement projects in-service dates until the projects are included for recovery in base rates as requested by CWSNC in its petition.

Witness DeStefano urged the Commission to consider the collective financial impact of the four projects, noting that the Commission has previously considered projects on a collective basis when making deferral accounting determinations. Witness DeStefano commented that in the DEC Sub 874 Order, the Commission authorized a utility to use deferred accounting combining costs for two projects, wherein it allowed deferral accounting for both an environmental compliance cost project and the purchase of a portion of a nuclear facility on the grounds that the authorized rate of return on common equity would be eroded due to the rate of return on common equity impact of costs of 114 basis points — 67 for the environmental costs and 47 points for the facility purchase. In its reply comments CWSNC maintained that when considering the four major new projects together, the financial impact to the total Company earnings would be materially adverse, having a rate of return on common equity impact of 187 total basis points.[12]

[12] See updated Schedule 1 attached to CWSNC's reply comments filed on October 21, 2019 in Sub 365. In its Petition filed on June 28, 2019 CWSNC calculated a rate of return on common equity impact of 193 basis points for the four major new projects on a total Company basis.

Finally, witness DeStefano argued that even if the Commission were to evaluate the WWTP and the AMR meter projects separately, the rate of return on common equity impact of the AMR meter costs would still have an adverse material effect on the Company's earnings, and, thus, deferral accounting for the meter projects is merited – particularly given the Company's current underearning position. Witness DeStefano stated that given the Company's size and current underearning status, a 20-basis point AMR meter impact for the Uniform Water Rate Division[13] is unquestionably material to the Company.

During cross-examination Company witness DeStefano was questioned about Public Staff DeStefano Cross-examination Exhibit 1, which contained witness DeStefano's responses to Public Staff Data Request No. 81. Witness DeStefano confirmed that the Company had sought and received rate recovery in its Docket No. W-354, Sub 344 (Sub 344) rate case for AMR meter installation projects that occurred in 2015 in seven systems. The evidence presented confirmed that the Company's Sub 344 rate increase included the costs of 1,157 AMR meters for a total cost of over $1.2 million, and in the Company's Sub 356 rate case, CWSNC received rate recovery for AMR meter installation projects in three systems, including 2,440 meters, for a total cost of over $1.8 million. Tr. vol. 9, 158–59. Witness DeStefano also confirmed that the Company planned to complete eight similar projects over the next four years, including nearly 4,000 AMR meter replacements. Witness DeStefano further confirmed that the Company has already completed ten AMR meter projects, including 3,597 meters at a total capital cost of over $3 million, prior to the two projects presented in this case at a cost of less than $900,000.

Upon further questioning by the Public Staff witness DeStefano explained why CWSNC requested deferral accounting for two AMR meter projects at issue, but not for its previous AMR meter projects. He explained that the AMR meter projects currently being made are part of a much larger overall capital investment by the Company. He noted that in prior years overall capital investments made by the Company were in the $10 million per year range, versus $20 million invested in the current year. As a result, according to witness DeStefano, the deferral accounting request is due in part to the additional regulatory lag impact being experienced by the Company beyond the impact of the AMR meter projects alone. Additionally, he testified that the two AMR meter installation projects for which deferral accounting treatment is currently requested are larger than every meter system previously installed.[14] He explained that installing AMR meters in these two systems in this one year and trying to gain the efficiencies of completing the projects this year increases the financial implications to the Company and the significance of the projects to the Company. In summary witness DeStefano testified that with the magnitude of the capital spending CWSNC anticipates over the next few

[13] During the expert witness hearing, witness DeStefano agreed with Public Staff witness Henry's calculation of a 24-basis point negative impact on CWSNC's earned rate of return on common equity for the Uniform Water Rate Division if deferral accounting treatment for the AMR meter projects is not approved by the Commission.

[14] Company witness Mendenhall added that the 2,500 AMR meters at issue represent about 40% of the total AMR meters installed and about 8% of CWSNC's total meters in service in the State.

years to address aging system needs, the Company is looking for ways to mitigate the effect of regulatory lag on earned returns.

Discussion and Conclusions

In its Sub 365 Petition CWSNC has requested that the Commission enter an accounting order allowing the Company to defer certain post-in-service costs that were incurred in connection with two WWTP projects and two AMR meter installation projects. The related costs for which the Company seeks deferral include the incremental post-in-service depreciation expense and cost of capital (financing costs) from their respective in-service dates until the projects are included for recovery in base rates in this case. According to the evidence of record, the amounts of such costs with respect to the WWTP projects and the AMR meter installation projects are $1,098,778 and $64,736, respectively. The Company contends that the financial impact of these costs is material and would, absent deferral, equate to a significant basis point reduction in the Company's rate of return on common equity. Evidence submitted by the Public Staff confirmed that such projects when included in plant in service would individually equate to a 434-basis point rate of return on common equity reduction for the WWTPs and a 24-basis point rate of return on common equity reduction for the AMR meter installation projects for the Uniform Sewer Rate Division and the Uniform Water Rate Division, respectively. No party has suggested that either the WWTP projects or the AMR meter installation projects are imprudent in any way. Moreover, the Company and the Public Staff are in agreement regarding the amount of costs included in plant in service in this proceeding for the WWTP projects and the AMR meter installation projects.

Under the Company's proposal the costs in question would not be charged against revenues realized during the accounting period in which the costs were actually incurred. Rather, such costs would be deferred and accumulated in a regulatory asset account. As a result, the deferred costs, in effect, would be specifically reserved for recovery prospectively. The period over which the costs would be accumulated in a regulatory asset account would begin when the assets were placed in service and end on the date the Company is authorized to begin charging rates reflecting the inclusion of the WWTPs and the AMR meter installation projects in CWSNC’s water and wastewater cost of service. Consequently, approval of CWSNC's deferral and cost recovery proposal would ultimately result in a level of rates, to be charged prospectively, that would specifically include an allowance providing for the recovery of the present deferred costs. On the other hand, if the request for deferral is denied, the Company would then be required to recognize the costs for which it seeks deferral as items of expense in the period in which they were incurred. In this instance, the Company would then be required to recognize those costs during a period in which it contends it is already significantly under-recovering its Commission-authorized return.

Deferral accounting should only be used sparingly as an exception to the general rule that all items of revenue and costs germane to the ratemaking and cost-recovery process should be examined in their totality in determining the appropriateness of the utility's existing rates and charges. DEC Sub 874 Order at 24. Deferral is not favored, in

part, because deferral accounting typically provides for the future recovery of costs for utility services provided to ratepayers in the past. The Commission has also been reluctant to allow deferral accounting because it typically equates to single-issue ratemaking for the period of deferral. *Id.* The Commission acknowledges that considering an increase in one or a few expense items in isolation, without considering reductions in other costs, brings with it the increased risk of over-recovery. However, the Commission gives significant weight in this instance that the consolidation of the Sub 365 petition for deferral accounting with the Sub 364 general rate case means that the concern regarding single-issue ratemaking and the related risk of such over-recovery should be reduced and of lesser concern because all revenues and expenses will have been examined close in time to any possible deferral.

While deferral accounting must not be used routinely or frequently, the Commission has found that an exception can be made when the costs at issue "were reasonably and prudently incurred, unusual or extraordinary in nature, and of a magnitude that would result in a material impact on the Company's financial position (level of earnings)." Order Denying Request to Implement Rate Rider and Schedule Hearing to Consider Request for Creation of Regulatory Asset Account, *Application of Duke Energy Carolinas, LLC, for Approval of Rate Rider to Allow Prompt Recovery of Costs Related to Purchases of Capacity Due to Drought Conditions,* No. E-7, Sub 849, at 19 (N.C.U.C. June 2, 2008) The Commission has, over the years, on infrequent but appropriate occasions, approved requests proposing the use of deferral accounting. Such requests, by necessity, must be examined and resolved on a case-by-case fact-specific basis and will be approved only where the Commission is persuaded by clear and convincing evidence that the costs in question are unusual or extraordinary in nature and that, absent deferral, would have a material impact on the utility's financial condition. *Id. See also,* Order Approving Deferral Accounting with Conditions*, Petition of Duke Energy Carolinas, LLC, for an Accounting Order to Defer Certain Environmental Compliance Costs and the Incremental Costs Incurred From the Purchase of a Portion of Saluda River's Ownership in the Catawba Nuclear Station,* No. E-7, Sub 874 (N.C.U.C. Mar. 31, 2009); Order Approving Deferral Accounting, *Petition of Duke Energy Carolinas, LLC, for an Accounting Order to Defer Certain Capital and Operating Costs Incurred for the Buck Natural Gas Combined Cycle Generating Plant and the Bridgewater Hydro Generating Plant*, No. E-7, Sub 999 (N.C.U.C. June 20, 2012) (DEC Sub 999 Order); Order Approving Deferral and Amortization, *Request by Duke Power, A Division of Duke Energy Corporation for Approval of Accounting Treatment,* No. E-7, Sub 776 (Dec. 28, 2004).

In determining whether the costs sought to be deferred or the events or circumstances leading to the costs are of such an unusual or extraordinary nature as to justify an exception to the rule against allowing deferral accounting treatment, the Commission historically examines the record for clear and convincing evidence that the costs in question represent major non-routine, infrequent, non-regularly occurring investments of considerable complexity and significance or were beyond the control of the utility such as storm costs or new operating requirements/standards imposed by newly-enacted legislation or other governmental action. *See,* Order Approving Deferral Accounting, *Petition of Duke Energy Carolinas, LLC, for an Accounting Order to Defer*

Certain Environmental Compliance Costs at Unit 5 of the Cliffside Steam Station, No. E-7, Sub 966 at 10 (N.C.U.C. June 27, 2011); *Order Ruling on Petition,* Petition of Duke Energy Carolinas, LLC, for an Accounting Order to Defer 2009 and 2010 Non-Fuel Energy Costs Excluded from Cost Recovery in the Commission's August 6, 2010 Order in Docket No. E-7, Sub 934, No. E-7, Sub 967, at 14-15 (N.C.U.C. June 14, 2011); *Order Approving in Part and Denying in Part Request for Deferral Accounting,* Petition of Duke Energy Carolinas, LLC for an Accounting Order to Defer Certain Capital and Operating Costs Incurred for the Advanced Clean Coal Cliffside Unit 6 Steam Generating Plant, the Dan River Natural Gas Combined Cycle Generating Plant, and the Capacity-Related Modifications at the McGuire Nuclear Generating Plant, No. E-7, Sub 1029, at 13, 15 (N.C.U.C. April 3, 2013); Order Adopting and Amending Rules, *Rulemaking Proceeding to Implement G.S. 62-110.8,* No, E-100, Sub 150 at 22 (November 16, 2017).

In certain circumstances the Commission may find that the magnitude or level of the costs requested for deferral make the costs major, non-routine, or extraordinary. In some cases, the Commission has looked to determine whether costs were unanticipated, unplanned, beyond the control of the utility, and of an infrequent, non-recurring nature; that is, whether the costs and the circumstances of the costs are sufficiently unusual or extraordinary to warrant deferral accounting treatment – a tool not to be used routinely but sparingly as discussed above. Order Approving Amended Schedule NS and Denying Deferral Accounting, *Application by Virginia Electric and Power Company, d/b/a Dominion North Carolina Power, for Approval of Amended Schedule NS,* No. E-22, Sub 517, at 11–12 (N.C.U.C. Mar. 29, 2016). A finding that the magnitude of the costs supports a determination that they are unusual or extraordinary may not, in some circumstances also support a finding that these costs, if not deferred, will have a material adverse impact on the company's financial condition to warrant deferral accounting treatment. In determining whether deferral or non-deferral will have a material impact on the company's financial condition while the Commission may consider other matters, it often examines whether and to what extent the costs incurred will have a significant impact on the level of company earnings and the company's ability to achieve its currently authorized rate of return on common equity. DEP Sub 874 Order at 25–26. In determining materiality, while the Commission may consider other matters, it often examines whether and to what extent the costs incurred will have a significant impact on the level of company earnings and the company's ability to achieve its currently authorized rate of return on common equity. *Id.*

With regard to the WWTP projects, the Commission is persuaded that the costs are of an unusual, extraordinary nature. Both the Company and the Public Staff also agree that the costs associated with the WWTP projects are unusual or extraordinary in nature, as the Commission has used those terms in previous deferral accounting orders and as those terms are commonly understood. The Commission observes as stated in a previous deferral accounting case, *"[t]he costs in question are unusual or extraordinary in the sense that they are associated with the incorporation of the costs of two [WWTP] facilities – representing major investments – into the Company's rate structure; which is not a simple, regularly occurring, inconsequential event, but rather, is a major non-routine matter of considerable complexity and major significance."* DEC Sub 999 Order, at 18. In the present proceeding, the evidence demonstrates that the WWTP projects were not an

everyday, regular occurrence but were in fact non-routine, complex, and of major significance and that the associated costs are similarly unusual or extraordinary. The WWTP projects involved the installation of new treatment facilities that were integral to providing wastewater utility service and that were necessitated by conditions causing the old facilities to present unacceptable risks of failure and inability to comply with environmental requirements exposing the company to the further high risk of severe penalties and imposition of a consent decree. Such circumstances and replacement of such major facilities that are at risk of both functional and environmental compliance failure do not occur on a frequent basis.

The Commission is likewise persuaded that absent deferral, the costs will have a material impact on the Company's financial condition. The evidence demonstrates that the Company is not meeting its currently authorized rate of return on common equity and that even if the Sub 360 rate increase had been in effect for a full year, the rate of return on common equity impact of the costs of the WWTP projects would have an adverse impact on the Company's financial condition. The Commission gives significant weight to the undisputed testimony of witness DeStefano that CWSNC's consolidated actual earned rate of return on common equity during the test year for this rate case (the 12-month period ended March 31, 2019) was 1.63%. The Commission further finds credible the evidence that the rate increase in the last rate case was approximately $1.1 million, which would not make up the difference from an actual rate of return on common equity of 1.63% to 9.75%, CWSNC's authorized rate of return on common equity granted in the Sub 360 Rate Order. Further, the evidence shows that the WWTP investments of approximately $14 million would result in a 434-basis point rate of return on common equity reduction for the Uniform Sewer Rate Division. The Commission concludes that if the requested deferral for the WWTP projects is not allowed, it would appear that the Company's already low rate of return on common equity would be further eroded and that the Company would not have a reasonable opportunity to earn its authorized rate of return on common equity.

Furthermore, given the Company's depressed level of current earnings and its expected near-term significant financing needs, the Commission determines that deferral of the WWTP costs as requested by CWSNC will have a favorable impact on CWSNC's earnings and financial standing in general. As such, the deferral will enhance the Company's ability to access and obtain capital on more favorable terms, as it will help assure investor confidence in the Company. Such results will ultimately accrue to the benefit of CWSNC's customers.

Moreover, the Company and the Public Staff have agreed by Stipulation that the Company should be allowed to defer the incremental post-in-service depreciation expense and financing costs of the WWTPs at Nags Head and Connestee Falls as requested by CWSNC because they are both unusual in nature and material to the Company's financial condition. In light of the Commission's having accepted the Stipulation in its entirety and in light of the foregoing independent determination based on the evidence of record that the costs at issue are both unusual, non-routine, and material to the Company's financial well-being, the Commission finds the Company's request to

defer post-in-service depreciation and financing costs for the WWTP projects is just and reasonable and should be approved.

Thus, as provided in the Stipulation, Revised Settlement Exhibits I and II, and the testimony of witness Henry (as revised on the stand) and in Henry Late-Filed Exhibits 2, 3, and 4, the Commission finds and concludes that the Company should be authorized to defer its WWTP costs of $1,098,778 related to its WWTPs (consisting of incremental post-in-service depreciation expense and financing costs from their respective in-service dates until the WWTPs are included for recovery in base rates in this case), and these costs should be amortized over five years, for an annual amount to be included in rates of $219,756.

Unlike the deferral accounting request related to the WWTP projects, the Public Staff opposed deferral accounting treatment of the costs associated with the two AMR meter installation projects. The Commission agrees with the Public Staff. The Commission finds that the Company provided insufficient evidence that the projects and their associated costs are unusual or extraordinary such as to warrant deferral accounting. While a mass replacement of meters in an entire subdivision is not an everyday occurrence for CWSNC, the Commission is not convinced that such an event is sufficiently unusual or extraordinary to justify special deferral accounting treatment. The need to replace meters on a planned schedule is an anticipated need of the business and the timing and manner of implementation of such replacement, at least as was the case in this proceeding, is entirely within the control of the Company. Further, the Company did not establish by clear and convincing evidence that the meter installation costs sought to be deferred support a finding that the projects or said costs are unusual or extraordinary. On cross-examination witness DeStefano confirmed that the Company had sought and received rate recovery in its Docket No. W-354, Sub 344 (Sub 344) rate case for AMR meter installation projects that occurred in 2015 in seven systems. The evidence presented confirmed that the Company's Sub 344 rate increase included the costs of 1,157 AMR meters, for a total cost of over $1.2 million, and in the Company's Sub 356 rate case, CWSNC received rate recovery for AMR meter installation projects in three systems, including 2,440 meters, for a total cost of over $1.8 million. Considering that since 2015 CWSNC has completed ten AMR meter projects, including 3,597 meters at a total capital cost of over $3 million, the Commission determines that the two AMR meter installation projects for Fairfield Mountain and Connestee Falls in the amount of $880,209 are not major non-routine, infrequent, non-regularly occurring investments of considerable complexity and significance for CWSNC. Rather, the Commission finds that the two AMR meter installation projects are routine and regularly occurring and are not unusual or extraordinary in nature.

Having determined that the Company failed to establish that its AMR meter installation project and the related costs were unusual or extraordinary such as to justify allowing exceptional deferral accounting treatment, the Commission does not reach the issue of whether the AMR costs sought to be deferred have a material adverse impact on the Company's financial condition or stability. The determination that this project and its related costs are not unusual or extraordinary is dispositive. Therefore, the Company's

petition to defer these costs is not just and reasonable and is denied. However, the Commission emphasizes that decisions such as this one are made on a case-by-case basis, and this decision should not be construed to suggest that costs relating to a meter project can never be allowed deferral accounting treatment. The Commission acknowledges that every request for deferral accounting is shaped by its own unique factual circumstances, and whether an event and its related costs are sufficiently unusual or extraordinary in nature to merit an exception to the general rule against deferral accounting treatment is a determination for the Commission that will be based on the specific facts of each such request. The Commission notes that the Company's request for deferral accounting treatment for costs related to the WWTPs and the two AMR installation projects is determined within the context of this general rate case where the Commission is setting just and reasonable rates on a going-forward basis. The Commission's decision either granting or denying deferral accounting treatment in the present case is made from the standpoint of fairness and equity to both consumers and the Company.

Although deferral accounting is to be employed sparingly, the Commission finds that CWSNC has another option available to use to recover costs associated with future AMR meter deployments. Recognizing the challenges confronting North Carolina's water and wastewater industries in needing to make high cost capital investments to install and replace aging infrastructure, the General Assembly has provided the Commission with a tool specific to water and sewer utilities to alleviate the effects of regulatory lag. Section 62-133.12 authorizes the Commission to approve a rate adjustment mechanism in a general rate case to allow a water or sewer utility to recover the incremental depreciation expense and capital costs associated with reasonable and prudently incurred investment in eligible system improvement projects through the collection from customers of a water or sewer system improvement charge (WSIC or SSIC). The Commission approved such a mechanism for CWSNC in Docket No. W-354, Sub 336 pursuant to an order issued on March 10, 2014. Eligible water system improvements to be recovered by use of WSIC include "distribution system mains, valves, utility service lines (including meter boxes and appurtenances), meters, and hydrants installed as in-kind replacements." N.C.G.S. § 62-133.12(c)(1).

Notwithstanding this tool created to help utilities better manage regulatory lag, both Public Staff witness Junis and CWSNC witness DeStefano testified that, other than deferral, there is currently no rate mechanism such as the WSIC or SSIC mechanism available to the Company to mitigate the regulatory lag and resultant adverse earnings impacts associated with the mass replacement of traditional meters with AMR meters because, according to them, the WSIC and SSIC statute only allows recovery for "in-kind" replacements. Tr. vol. 8, 61-62, 195–96. As is clear from the testimony and CWSNC's stated position in its proposed order, the Company has accepted the Public Staff's interpretation that replacing an analog meter with an AMR meter is not an "in-kind" replacement. Tr. vol. 8, 61–62. The Commission does not agree with this interpretation. Although this question has not previously been brought to the Commission for decision, the Commission holds that the exchange of one type of meter reading device for another type of meter reading device is an "in-kind" replacement as that term is used in

N.C.G.S. § 62-133.12(c)(1). The Public Staff appears to read the words "in kind" to mean "like kind and quality' or perhaps "like grade and quality" but this amounts to an impermissible rewriting of the statute. Such an interpretation would defeat the purpose of providing water and sewer utilities with the opportunity to seek recovery under an approved rate adjustment mechanism. Black's Law Dictionary defines "in kind" as "of the same species or category" or "in the same kind, class or genus." Black's Law Dictionary (5th ed. 1979) Bouvier Law Dictionary defines "in kind" as "[p]roperty in its physical form, or property similar to property in issue. In kind refers to specific property, either the property itself in issue or similar property of the same form, quality, and value as the property in issue." Bouvier Law Dictionary (Desk ed. 2020) The Commission concludes an "in-kind" replacement can be an identical replacement or one that is a reasonable alternative to serve the same purpose. If the General Assembly's use of "in kind" limited replacement to the exact identical equipment, upgrade replacements could never be eligible improvements for WSIC or SSIC recovery. A utility seeking to replace a non-functioning obsolete item of equipment with the then-current industry standard equipment would be stymied, and the Commission is not able to conclude that such an outcome was intended by a statute that was meant to facilitate repair and replacement of basic items of utility plant and equipment. Accordingly, with regard to AMR meter installation projects planned for the future, CWSNC and the Public Staff should work together pursuant to Commission Rule R7-39 to mitigate regulatory lag using WSIC recovery. However, the Commission's decision herein does not in any way relieve the Company of its burden to prove its investments are reasonable and prudently incurred as required by N.C.G.S. § 62-133.12 and Commission Rule R7-39(a). Moreover, in its Order Adopting Rules to Implement G.S. § 62-133.12, *Petition for Rulemaking to Implement G.S.62-133.12, North Carolina Session Law 2013-106(House Bill 710)*, No. W-100, Sub 54 (N.C.U.C. June 6, 2014), the Commission concluded that

> any rate adjustments authorized under the WSIC and SSIC mechanisms outside of a general rate case will be allowed to become effective, but not unconditionally approved. In other words, the adjustments will be provisional, will not be deemed *prima facie* just and reasonable, and, thus, may be rescinded retroactively in the utility's subsequent general rate case, at which time the adjustment may be further examined for a determination of its justness and reasonableness.

Id. at 5.

The Commission also notes the Company's testimony and evidence regarding ongoing improvement projects and the need and plans for substantial capital investment in the near future. In consideration of this continuing and anticipated increase in capital spending to address aging infrastructure, the Commission recommends that CWSNC seek to make better use of the WSIC and SSIC mechanisms as a regulatory tool to mitigate the negative effects of regulatory lag for all statutorily allowed system improvement projects.

EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NO. 42

Depreciation and Amortization Expense

The evidence supporting this finding of fact is found in the verified Application and the accompanying NCUC Form W-1, the testimony of Public Staff witnesses Feasel and Henry, and the testimony of Company witness DeStefano. The following table summarizes the differences between the Company's level of depreciation and amortization expenses from its Application and the amounts recommended by the Public Staff:

Item	Company per Application	Difference	Amount per Public Staff
Depreciation expense	$6,399,241	$181,470	$6,580,711
Amortization exp. - CIAC	(1,485,664)	8,710	(1,476,955)
Amortization exp. - PAA	(85,341)	8,718	(76,623)
Amortization of ITC	(579)	0	(579)
Total	$4,827,656	$198,898	$5,026,554

With respect to CWSNC's depreciation expense, in light of the agreements reached in the Stipulation and revisions recommended by the Public Staff in its testimony and reflected in Henry Revised Exhibit I and Feasel Revised Exhibits I and II, the Company does not dispute the adjustments recommended by the Public Staff to depreciation expense. As detailed elsewhere in this Order, the Commission finds that the adjustments recommended by the Public Staff to depreciation expense, which are not contested, are appropriate adjustments to be made to operating revenue deductions in this proceeding.

Based on the foregoing, the Commission concludes that the appropriate level of depreciation and amortization expense for use in this proceeding is as follows:

Item	Amount
Depreciation expense	$6,580,711
Amortization expense – CIAC	(1,476,955)
Amortization expense – PAA	(76,623)
Amortization of ITC	(579)
Total	$5,026,554

EVIDENCE AND CONCLUSIONS FOR FINDING OF FACT NO. 43

Franchise, Property, Payroll and Other Taxes

The evidence supporting this finding of fact is found in the verified Application and the accompanying NCUC Form W-1, and in the testimony of Public Staff witness Henry and Company witness DeStefano. The following table summarizes the differences

between the Company's level of franchise, property, payroll, and other taxes from its Application and the amounts recommended by the Public Staff:

Item	Company Application	Difference	Amount per Public Staff
Franchise and other taxes	($789)	$135	($655)
Property taxes	268,734	0	268,734
Payroll taxes	596,100	(68,672)	527,428
Total	$864,045	$(68,537)	$795,507

With the Stipulation and revisions made by the Public Staff in its Feasel Revised Exhibits I and II and Henry Revised Exhibit I, the Company does not dispute adjustments recommended by the Public Staff to franchise and other taxes and property taxes. Therefore, the Commission finds that the adjustments recommended by the Public Staff to franchise and other taxes and payroll taxes, which are not contested, are appropriate adjustments to be made to operating revenue deductions in this proceeding.

Based on the foregoing, the Commission concludes that the appropriate level of franchise, property, payroll, and other taxes for use in this proceeding is as follows:

Item	Amount
Franchise and other taxes	($655)
Property tax	268,734
Payroll taxes	527,428
Total	$795,507

EVIDENCE AND CONCLUSIONS FOR FINDINGS OF FACT NOS. 44-47

Regulatory Fee and Income Taxes

The evidence supporting these findings of fact is found in the testimony of Public Staff witnesses Boswell and Henry, and of Company witness DeStefano. The following table summarizes the differences between the Company's level of regulatory fee and income taxes from its Application and the amounts recommended by the Public Staff:

Item	Company per Application	Difference	Amount per Public Staff
Regulatory fee	$56,361	($12,202)	$44,159
State income taxes	218,982	(143,508)	75,474
Federal income taxes	1,793,462	(1,175,329)	618,133
Deferred income taxes	0	(69,128)	(69,128)
Total	$2,068,805	($1,400,167)	$668,638

Regulatory Fee

The difference in the level of regulatory fee is due to the differing levels of revenues recommended by the Company and the Public Staff. Based on conclusions reached elsewhere in this Order regarding the levels of revenues, the Commission concludes that the appropriate level of regulatory fee for use in this proceeding is $44,159.

State Income Taxes

The difference in the level of state income taxes is due to the differing levels of revenues and expenses recommended by the Company and the Public Staff. Based on the conclusions reached elsewhere in the Order regarding the levels of revenues and expenses, the Commission concludes that the appropriate level of state income taxes for use in this proceeding is $75,474 based on the current state corporate income tax rate of 2.50%.

Federal Income Taxes

The difference in the level of federal income taxes is due to the differing levels of revenues and expenses recommended by the Company and the Public Staff. Based on the conclusions reached elsewhere in the Order regarding the levels of revenues and expenses, the Commission concludes that the appropriate level of federal income taxes for use in this proceeding is $618,133 based on the current federal corporate income tax rate of 21.00%.

Deferred Income Taxes

With the Stipulation and revisions made by the Public Staff in its Feasel Revised Exhibits I and II, and Henry Revised Exhibit I, and in the testimony of witness Boswell and Boswell Exhibit 1, the Company agreed with the Public Staff adjustment to deferred income tax of $69,128 to reflect the annual amortization of protected and unprotected federal EDIT.

Based on the foregoing, the Commission concludes that the appropriate level of regulatory fee and income taxes for use in this proceeding is as follows:

Item	Amount
Regulatory fee	$44,159
State income taxes	75,474
Federal income taxes	618,133
Deferred income taxes	(69,128)
Total	$668,638

EVIDENCE AND CONCLUSIONS FOR FINDINGS OF FACT NOS. 48-50

The Federal Tax Cuts and Jobs Act

The evidence supporting these findings of fact is found in the verified Application and the accompanying NCUC Form W-1, the testimony of Company witness DeStefano, the testimony of Public Staff witness Boswell, and the Stipulation and Settlement Exhibit 1.

In its Application and in the direct testimony of CWSNC witness DeStefano, the Company proposes to include adjustments to the reserve balances for both federal protected EDIT and federal unprotected EDIT based upon the Company's final 2017 federal income tax return filed in late 2018. For federal protected EDIT the Company recommends that the Commission conclude that it is appropriate for CWSNC to continue to return the federal protected EDIT balance maintaining the amortization period approved by the Commission in the Sub 360 Order. In addition, in witness DeStefano's testimony, the Company recommends reducing the term of the federal unprotected EDIT rider approved in the Sub 360 Order (originally 48 months with 35 months now remaining) to a two-year (or 24-month) term as of the effective date of the current proceeding.

Public Staff witness Boswell stated in her direct testimony that certain adjustments to book balances and reserves related to EDIT were recorded to CWSNC's books, adjustments that were not reflected in the Company's most recent rate case. She noted that these adjustments affect the balance of both federal protected EDIT and federal unprotected EDIT. Witness Boswell further stated that the adjustments to the federal protected EDIT and federal unprotected EDIT balances are primarily because: (1) the Company took advantage of a late IRS notice stating that regulated utilities were allowed 100% bonus depreciation for those assets placed in service during the period of September 28, 2017, to December 31, 2017, without a binding contract in place before September 28, 2017, and (2) the Company adjusted amounts utilized in the prior rate case to the actual amounts on its final tax return for 2017. Witness Boswell recommended one adjustment to correct mismatched calculations. She proposed calculating both federal protected EDIT and federal unprotected EDIT amortizations with the adjustments effective as of April 1, 2020. Finally, the Public Staff does not oppose the Company's request to refund the remaining federal unprotected EDIT balance over 24 months instead of the remaining 35 months as originally ordered in Sub 360.

Settlement Exhibit I filed with the Stipulation in the current proceeding reflects the correction to the calculation of federal unprotected EDIT proposed by Public Staff witness Boswell, the reduction of the rider period for the federal unprotected EDIT from 35 months to 24 months, and includes the rate base impact of the flow back of federal protected EDIT in accordance with the RSGM, as approved in Sub 360, in the revenue requirement. In addition, the revenue requirement depicted on Settlement Exhibit I also includes the flow back of state EDIT in accordance with previous Commission orders in Sub 356 and Sub 360. No other party presented evidence on these matters.

Based on the foregoing, the Commission concludes that it is reasonable and appropriate for purposes of this proceeding to accept the Stipulation between CWSNC and the Public Staff on the tax issues. Therefore, the Commission concludes that CWSNC should continue to flow back the federal protected EDIT in accordance with the RSGM as ordered in Sub 360, and the Company shall refund its remaining federal unprotected EDIT balances over 24 months instead of the remaining 35 months as originally ordered by the Commission in Sub 360. Further, CWSNC should continue to flow back the state EDIT (which was originally over a three-year period) in accordance with the Commission's Sub 356 Order as confirmed in the Commission's Sub 360 Order.

EVIDENCE AND CONCLUSIONS FOR FINDINGS OF FACT NOS. 51-59

Capital Structure, Cost of Capital, and Overall Rate of Return

The evidence supporting these findings of fact and conclusions is contained in the verified Application and the accompanying NCUC Form W-1, the testimony and exhibits of the public witnesses, the direct and rebuttal testimony and exhibits of Company witness D'Ascendis, and the direct and supplemental testimony and exhibits of Public Staff witness Hinton.

Rate of Return on Equity

The Commission's consideration of the evidence and decision on this issue is set out below and is organized into three sections. The first is a summary of the record evidence on rate of return on common equity. The second is a summary of the law applicable to the Commission's decision on rate of return on common equity. The third is an application of the law to the evidence and a discussion and explanation of the Commission's ultimate decision on rate of return on common equity.

Summary of Record Evidence on Return on Equity

In its Application, the Company requested approval for its rates to be set using a rate of return on common equity of 10.75%. This request was based upon and supported by the direct testimony of CWSNC witness D'Ascendis. In his rebuttal testimony, witness D'Ascendis reduced his recommended rate of return on common equity to 10.20% based upon his updated analyses. This rate of return on common equity compares to a 9.75% rate of return on common equity underlying CWSNC's current rates. Public Staff witness Hinton, in his direct testimony, recommended a rate of return on common equity for CWSNC of 9.00%. In his supplemental testimony, witness Hinton revised and increased his recommended return on common equity to 9.10%.

Direct and Rebuttal Testimony of Dylan W. D'Ascendis (CWSNC)

Company witness D'Ascendis recommended in his direct testimony a rate of return on common equity of 10.75%. This 10.75% was based upon his indicated cost of common equity of 10.35%, plus a recommended size adjustment of 0.40%. In his rebuttal

testimony, witness D'Ascendis provided an updated analysis reflecting current investor expectations and reduced his recommended rate of return on common equity to 10.20%, including his recommended 0.40% size adjustment.

CWSNC witness D'Ascendis' recommendation was based upon his Discounted Cash Flow (DCF) model, his Risk Premium Model (RPM), and his Capital Asset Pricing Model (CAPM), applied to market data of a proxy group of six water companies (Utility Proxy Group). He also applied the DCF, RPM, and CAPM to a proxy group of domestic, non-price regulated companies (Non-Price Regulated Proxy Group) which he described as comparable in total risk to his Utility Proxy Group.

The results derived from witness D'Ascendis' analyses in his direct and rebuttal testimony are as follows:

Summary of D'Ascendis Pre-Filed Testimony on Common Equity Cost Rate		
	Direct Testimony	Rebuttal Testimony
Discounted Cash Flow Model	8.70%	8.81%
Risk Premium Model	10.62%	10.12%
Capital Asset Pricing Model	10.21%	9.35%
Cost of Equity Models Applied to Comparable Risk, Non-Price Regulated Proxy Group	11.78%	11.29%
Indicated Common Equity Cost Rate Before Adjustment	10.35%	9.80%
Size Adjustment	0.40%	0.40%
Recommended Common Equity Cost Rate After Adjustment	10.75%	10.20%

He concluded that a common equity cost rate of 9.80% for CWSNC is indicated before any Company-specific adjustments. He then adjusted this indicated rate upward by 0.40% to reflect CWSNC's smaller relative size as compared with the members of his Utility Proxy Group, resulting in a size-adjusted indicated common equity cost rate of 10.20%.

CWSNC witness D'Ascendis testified the six companies in his Utility Proxy Group were: American States Water Co.; American Water Works Co., Inc.; Artesian Resources, Inc.; California Water Service Group; Middlesex Water Co.; and York Water Co.

CWSNC witness D'Ascendis testified he used the single-stage constant growth DCF model. He testified his unadjusted dividend yields are based on the proxy companies' dividends as of October 18, 2019, divided by the average of closing market

prices for the 60 trading days ending October 18, 2019.[15] He made an adjustment to the dividend yield because dividends are paid periodically, usually quarterly.

For CWSNC witness D'Ascendis' DCF growth rate he testified he only used analysts' five-year forecasts of earning per share (EPS) growth. He testified the mean result of his application of the single-stage DCF model is 8.73%, the median result is 8.88%, and the average of the two is 8.81% for his Utility Proxy Group as shown on D'Ascendis Rebuttal Exhibit 1, Schedule DWD-1R, page 3. He testified in arriving at a conclusion for the DCF-indicated common equity cost rate for his Utility Proxy Group, he relied on an average of the mean and the median results of the DCF.

Witness D'Ascendis used two risk premium methods. He testified his first method is the Predictive Risk Premium Model (PRPM), while the second method is a Risk Premium Model Using an Adjusted Total Market Approach. He testified the PRPM estimates the risk/return relationship directly, as the predicted equity risk premium is generated by the prediction of volatility or risk. He testified the inputs to his PRPM are the historical returns on the common shares of each company in the Utility Proxy Group minus the historical monthly yield on long-term U.S. Treasury securities through April 2019. He testified he added the forecasted 30-year U.S. Treasury Bond yield, 2.64% to each company's PRPM-derived equity risk premium to arrive at an indicated cost of common equity. His rebuttal mean PRPM indicated common equity cost rate for the Utility Proxy Group is 11.30%, and the median is 10.38%. He relied on the average of the mean and median results of the Utility Proxy Group PRPM to calculate a cost of common equity rate of 10.84% as shown on D'Ascendis Rebuttal Exhibit 1, Schedule DWD-1R, page 11, column (5).

CWSNC witness D'Ascendis testified his total market approach RPM adds a prospective public utility bond yield to an average of (1) an equity risk premium that is derived from a beta-adjusted total market equity risk premium, and (2) an equity risk premium based on the S&P Utilities Index. He calculated in his rebuttal testimony the adjusted prospective bond yield for the Utility Proxy Group to be 4.01% as shown on D'Ascendis Rebuttal Exhibit 1, Schedule DWD-1R, page 12, line 5, and the average equity risk premium to be 5.38% resulting in risk premium derived common equity to be 9.39% for his RPM using his Total Market Approach.

For his CAPM, witness D'Ascendis testified he applied both the traditional CAPM and the empirical CAPM (ECAPM) to the companies in his Utility Proxy Group and averaged the results. He testified the model is applied by adding a risk-free rate of return to a market risk premium, which is adjusted proportionately to reflect the systematic risk of the individual security relative to the total market as measured by the beta coefficient. For his CAPM beta coefficient, he considered two methods of calculation: the average of the beta coefficients of the Utility Proxy Group companies reported by Bloomberg

[15] See Schedule DWD-1R, page 3, footnote 1.

Professional Services, and the average of the beta coefficients of the Utility Proxy Group companies as reported by Value Line Investment Survey (Value Line).

CWSNC witness D'Ascendis in his rebuttal testified the risk-free rate adopted for both applications of the CAPM at 2.64%. This risk-free rate of 2.64% is based on the average of the *Blue Chip* consensus forecast of the expected yields on 30-year U.S. Treasury bonds for the six quarters beginning with the fourth calendar quarter of 2019 and ending with the first quarter in 2021, and long-term projections for the years 2021 to 2025, and 2026 to 2030. D'Ascendis Rebuttal Exhibit 1, DWD-1R, page 22, column (5), and page 23, column (2).

Witness D'Ascendis testified on rebuttal that the mean result of his CAPM/ECAPM analyses is 9.39%, the median is 9.31%, and the average of the two is 9.35%. Witness D'Ascendis testified that, consistent with his reliance on the average of his mean and median DCF results, the indicated common equity costs rate using the CAPM/ECAPM is 9.35%.

Witness D'Ascendis also selected 11 domestic, non-price regulated companies for his Non-Price Regulated Proxy Group that he believes are comparable in total risk to his Utility Proxy Group. He calculated common equity cost rates using the DCF, RPM, and CAPM for the Non-Price Regulated Proxy Group. In his rebuttal testimony, witness D'Ascendis' DCF result was 11.63%, his RPM cost rate was 11.41%, and his CAPM/ECAPM cost rate was 10.44%. Witness D'Ascendis testified that the average of the mean and median of these models was 11.29%, which he used as the indicated common equity cost rate for the Non-Price Regulated Proxy Group.

Based on the results of the application of multiple cost of common equity models to the Utility Proxy Group and the Non-Price Regulated Proxy Group, witness D'Ascendis testified that the reasonable, appropriate and indicated cost of equity for CWSNC before any adjustment for relative risk was 9.80%.

Witness D'Ascendis also made a 0.40% equity cost rate adjustment due to CWSNC's small size relative to the Utility Proxy Group. He testified that the Company has greater relative risk than the average company in the Utility Proxy Group because of its smaller size compared with the group, as measured by an estimated market capitalization of common equity for CWSNC (whose common stock is not publicly traded). This resulted in a size-adjusted cost of common equity for CWSNC of 10.20%.

Additionally, witness D'Ascendis stated that he had reviewed the Commission's Sub 360 Order regarding the issues of the use of the PRPM, the ECAPM, the use of a non-price regulated proxy group, and the applicability of a size adjusted cost of common equity for CWSNC. In response to these concerns, witness D'Ascendis provided testimony further supporting the inclusion of such factors in determining his recommended return on equity.

Specifically, in terms of the PRPM, he addressed the Commission's concerns about using a specific statistical package to calculate the PRPM results, which made the Commission skeptical that investors would place significant weight on the model. He explained that the general autoregressive conditional heteroskedasticity (GARCH) model used for the PRPM has been in the public domain since the 1980s and is available in several statistical packages which are not financially prohibitive for investors.

In response to the Commission's concerns regarding the ECAPM, which were that there was not enough evidence in the record as to why the ECAPM was superior to the CAPM, witness D'Ascendis provided substantially more information on the subject than what was presented in Sub 360.

In response to the Commission's concerns regarding the use of non-price regulated companies, which were that the non-price regulated companies were not of similar risk to the utility proxy group, witness D'Ascendis provided an additional measure of risk to show that, indeed, his non-price regulated proxy group was similar in total risk to the utility proxy group. The study showed that the non-price regulated proxy group's mean and median coefficient of variation (CoV), of net profit were within the range of CoVs of net profit set by the utility proxy group. The coefficient of variation is often used by investors and economists to determine volatility (i.e. risk) and the use of net profit directly ties to earnings and stock prices.

Finally, witness D'Ascendis responded to the Commission's concerns regarding the size adjustment which were whether the size studies presented in the record were applicable to utilities, and that the selection of a 40-basis point adjustment from an indicated 461 basis point risk premium was rather arbitrary. In order to provide more information to the Commission in this case, witness D'Ascendis conducted a study on whether the size effect is in fact applicable to utilities. His study included the universe of water, gas, and electric companies included in Value Line Standard Edition. From each of the utilities' Value Line Ratings & Reports, witness D'Ascendis calculated the 10-year CoV of net profit (a measure of risk) and current market capitalization (a measure of size) for each company. After ranking the companies by size (largest to smallest) and risk (least risky to most risky), he made a scatter plot of the data, as shown on Chart 1 in his direct testimony.

Witness D'Ascendis testified that, as shown in his Chart 1 of his direct testimony, as company size decreases (increasing size rank), the CoV increases, linking size and risk for utilities. The R-Squared value of 0.0962 means that approximately 10% of the change in risk rank is explained by the size rank. While a 0.0962 R-Squared value does not appear to have strong explanatory power, the average R-Squared value of the Utility Proxy Group's beta coefficient is 0.0794. The selection of a 40-basis point upward adjustment based on its difference in size given an indicated risk premium of approximately 400 basis points is consistent with the approximate 0.10 R-Squared value of the size study applicable to utilities. With this additional information, witness D'Ascendis stated that he hoped the Commission would revisit this concern in its Order in this case.

Witness D'Ascendis' rebuttal testimony criticized the testimony of witness Hinton's approach to estimating CWSNC's required return on equity for a number of perceived shortcomings, including Hinton's:

(a) Inclusion of a gas proxy group to determine a rate of return on common equity for a water utility;
(b) Misapplication of the discounted cash flow model;
(c) Misapplication of the risk premium model;
(d) Misapplication of the capital asset pricing model;
(e) Misapplication of the Comparable Earnings Model;
(f) Failure to account for size-specific risks; and
(g) Opinion that the approval of the Company's requested consumption adjustment mechanism (CAM) in this proceeding requires a downward adjustment to the rate of return on common equity.

Tr. vol. 8, 267–68.

CWSNC Witness D'Ascendis Cross-Examination

CWSNC witness D'Ascendis testified on cross-examination that in the Middlesex Water Company, New Jersey general rate case decided in July 2015, he recommended a specific rate of return on common equity of 10.40%, but that a rate of return on common equity of 9.75% was approved which was 65 basis points less than his recommendation. Witness D'Ascendis testified that in the Carolina Water Service, Inc. South Carolina 2015 general rate case where his recommended rate of return on common equity range was 10.00% to 10.50%, the approved rate of return on common equity was 9.34% which was 91 basis points below the midpoint of his recommended range.

CWSNC witness D'Ascendis further testified on cross-examination that in the Middlesex Water Company, New Jersey general rate case decided in March 2018, his recommended specific rate of return on common equity was 10.70%, and a 9.60% rate of return on common equity was approved whereby his recommended rate of return on common equity was 110 basis points above the approved rate of return on common equity. He testified that the 2018 South Carolina decision for Carolina Water Service, Inc. of South Carolina was the only one of the fifteen listed return on equity decisions, that a commission approved an allowed rate of return on common equity within his recommended range. He also testified that in the recent CWSNC general rate case, order dated February 21, 2019, his recommended rate of return on common equity range was 10.80% to 11.20%, with a midpoint of 11.00%, which was 125 basis points above the Commission approved rate of return on common equity of 9.75%.

Witness D'Ascendis testified on cross-examination that the authorized rates of return on equity for all 15 decisions averaged 127 basis points below his recommended rates of return on equity, and after removing a 2016 outlier case in Missouri where he was 360 basis points above the approved rate of return on common equity, the average difference between falls to 110 basis points. He further testified on cross-examination that

his rebuttal specific return on equity recommendation of 10.20% less the 110 basis points, would be the same number as Public Staff witness Hinton's recommended 9.10% rate of return on common equity.

Witness D'Ascendis also testified that Public Staff D'Ascendis Cross-Examination Exhibit 1, page 2 listed the RRA approved rates of return on equity for the last three years for his Utility Proxy Group companies with approved average rates of return on equity of 9.42%.

Witness D'Ascendis testified that as shown on Public Staff D'Ascendis Cross-Examination Exhibit 2, which was a RRA summary of commission approved rates of return on equity from January 2014 through June 30, 2019, the average approved return on equity was 9.50% for 30 return on equity decisions in the most recent three-year period July 1, 2016 through June 30, 2019.

With respect to his recommended 40 basis point size adjustment, witness D'Ascendis testified on cross-examination that he knew CWSNC served approximately 50,000 customers in North Carolina, was the second largest Commission regulated water and wastewater utility in North Carolina, and the two next largest companies serve approximately 7,000 customers each.

Witness D'Ascendis testified he was aware CWSNC did not have any industrial customers, and that more than 99.5% of its customers were residential plus some small stores and some schools. He testified that CWSNC was geographically diversified in North Carolina with systems along the North Carolina coast, the Piedmont and throughout the mountains.

Witness D'Ascendis further testified on cross-examination that CWSNC obtains all its debt through its parent, Utilities, Inc., and that CWSNC does not go into the debt market. He testified that Utilities Inc. is owned by Corix. Witness D'Ascendis read into the record sections of the pre-filed testimony of Corix CEO and President Gordan Barefoot, which stated Corix provides to CWSNC a full suite of support services, and Corix provides access to favorable terms for debt financing in capital markets. Both the Public Staff and CWSNC used the Utilities, Inc. capital structure and debt costs for CWSNC in this general rate case.

Witness D'Ascendis testified that based on Public Staff D'Ascendis Cross-Examination, Exhibit 4, that the Utilities, Inc. has common equity of $280.2 million. When multiplied by the D'Ascendis Utility Proxy Group market to book ratio of 347.3%, the result is a market capitalization for Utilities, Inc. of $973.3 million. Witness D'Ascendis testified that this market capitalization of three of the companies in the D'Ascendis Utility Proxy Group; those companies being Artesian Resources Corporation at $316.0 million, York Water Company at $440.0 million, and Middlesex Water Company at $951.0 million.

CWSNC witness D'Ascendis on cross-examination further testified Public Staff D'Ascendis Cross-Examination Exhibit 5 was a comparison of the growth in dividends

and stock market prices of the D'Ascendis Proxy Group of companies from April 15, 2011 to November 29, 2019. During that period dividend and stock price movements were as follows:

Company	Dividend Growth	Share Price Appreciation
American States Water	126%	378%
American Water Works	127%	419%
Artesian Resource Group	32%	91%
California Water Service	27%	173%
Middlesex Water Company	29%	243%
York Water Co.	36%	163%
Six Company Average	59%	245%

Witness D'Ascendis testified that he agreed that stock market prices have increased materially since April 2011, and dividend amounts have lagged way behind. He further testified that dividend yields are one of the two major components of the DCF.

During cross-examination CWSNC witness D'Ascendis also testified as to the stock price increases subsequent to the California Public Utilities Commission Order dated March 22, 2018 which approved a 9.20% rate of return on common equity for California American Water Co., a wholly-owned subsidiary of American Water Works; a 9.20% rate of return on common equity for California Water Service Co.; an 8.90% rate of return on common equity for Golden State Water Co., a wholly-owned subsidiary of American States Water; and an 8.90% rate of return on common equity for San Jose Water Co. The stock market percentage increases for the period March 22, 2018 to November 29, 2019, were: American Water Works 51.0%, American States Water 56.6%, California Water Service 36.3% and San Jose Water 33.1%, as shown on Public Staff D'Ascendis Cross-Examination Exhibit 6.

Witness D'Ascendis also testified on cross-examination about the significant decrease in the yields of 30-year Treasury Bond and A-Rated Public Utility Bonds as shown on Public Staff D'Ascendis Cross-Examination Exhibit 7. During the one-year period September 2018 to September 2019, the yields on A Rated Public Utility Bonds decreased from 4.32% to 3.37%, a decrease of 95 basis points from the previous CWSNC general rate case expert witness hearing heard before the Commission on October 16, 2018. Witness D'Ascendis' risk free 30-year Treasury Bond projected yield in this current case, shown in rebuttal exhibits filed on November 20, 2019, Schedule DWD-1R, page 22 was 2.64% compared to the 3.74% in September 2018, as stated in his prior Sub 360 CWSNC case testimony in D'Ascendis Rebuttal Exhibit 1, Schedule DWD-1R, page 11, column 6, and page 22, footnote 2, resulting in a bond yield decrease between his two rebuttal testimonies of 110 basis points. He further testified that as of November 29, 2019, the actual 30-year Treasury Bond yield was 2.19% compared to the October 16, 2018 actual 30-year Treasury Bond yield of 3.32%, a decrease of 113 basis points.

With respect to the non-price regulated companies in witness D'Ascendis' testimony for which he performed DCF, Risk Premium and CAPM analyses, he testified on cross-examination that these companies had competition unlike CWSNC, which has franchises protecting it from competition by other investor owned water utilities. Witness D'Ascendis testified that each time he has presented the non-priced regulated company analyses, the Commission has rejected and given no weight to these analyses.

Witness D'Ascendis testified that the Commission in CWSNC's February 19, 2019, Sub 360 Order found credible, probative, and entitled to substantial weight to his DCF, Total Market Risk Premium, and Traditional CAPM. He testified that his rebuttal exhibits in this case for these same analyses stated DCF 8.81%, Total Market Risk Premium 9.39%, Traditional CAPM 8.90%, with the average of these three of his models being 9.03%, all as shown on Public Staff D'Ascendis Cross-Examination Exhibit 10.

In response to a request by Chair Mitchell, CWSNC witness D'Ascendis filed a Late Filed Exhibit on December 13, 2019, showing the effect on each of his models using witness Hinton's 2.53% interest rate as the current yield for 30-year Treasury Bonds rather than the projected yields in witness D'Ascendis' rebuttal exhibits. This D'Ascendis On-the-Record Data Request provided the following results:

	D'Ascendis Late-Filed Exhibit #1
Discounted Cash Flow Model	8.81%
Risk Premium Model	10.00%
Capital Asset Pricing Model	9.29%
Cost of Equity Models Applied to Comparable Risk, Non-Price Regulated Proxy Group	11.16%
Indicated Common Equity Cost Rate Before Adjustment	9.75%
Size Adjustment	0.40%
Recommended Common Equity Cost Rate After Adjustment	10.15%

Public Staff Witness Hinton Testimony

Public Staff Director of Economic Research John R. Hinton testified the Public Staff recommends an overall rate of return of 7.20%, based on a capital structure consisting of 50.90% long-term debt at a cost rate of 5.36% and 49.10% common equity at a cost rate of 9.10%. He testified his recommendations result in pre-tax interest coverage equaling 3.1 times and a funds flow to debt ratio of 25.0%, which should qualify for a single "A" bond rating.

Witness Hinton described the current financial market conditions, testifying that the cost of financing is much lower today than in the more inflationary period of the 1990s. More recently, the continued low rates of inflation and expectations of future low inflation rates have contributed to even lower long-term interest rates. He testified that according

to Moody's Bond Survey, yields on long-term "A" rated public utility bonds have fallen 88 basis points from 4.25% on February 21, 2019, the date of the order in Sub 360, as compared to 3.37% for September 2019. He testified that by the close of this proceeding, CWSNC will have received five rate increases over the last six years in Docket Nos. W-354, Sub 360, Sub 356, Sub 344, and Sub 336. He further testified relative to the filing of the cost of capital settlement in the CWSNC January 2014 rate case in Docket No. W-354, Sub 336, yields on Moody's A-rated utility bonds are 126 basis points lower than the average 4.63% yield observed during the CWSNC January 2014, as illustrated by Hinton Exhibit JRH-1.

Witness Hinton testified that interest rates on various loans have fallen as the yields on treasury securities have declined since the Commission issued its order on February 21, 2019. The graph on page 15 of witness Hinton's direct testimony shows the lower yields that on average are over 100 basis points lower for all durations except for a minor increase in 90-day treasury bills. He testified that the average decrease in treasury bonds of 5-, 7-, 10-, 20-, and 30-year bonds is 111 basis points. He testified while Utilities, Inc., Corix, and its ultimate parent, the British Columbia Investment Management Corporation (BCIMC) generally cannot obtain capital at these interest rates, the falling yields are indicators of the declining cost of debt capital.

Public Staff witness Hinton testified that the current lower interest rates, especially for longer-term securities, and stable inflationary environment of today indicate that borrowers are paying less for the time value of money. He testified that this is significant since utility stocks and utility capital costs are highly interest rate-sensitive relative to most industries within the securities markets. He testified that given that investors often view purchases of the common stocks of utilities as substitutes for fixed income investments, the reductions in interest rates observed over the past ten years or more has paralleled the decreases in investor required rates of return on common equity.

Public Staff witness Hinton testified that he does not rely on interest rate forecasts. Rather, he believes that relying on current interest rates, especially in relation to yields on long-term bonds, is more appropriate for ratemaking in that it is reasonable to expect that as investors in the marketplace price bonds based upon expectations on demand and supply of capital, future interest rates, inflation rates, etc. He testified that while he has a healthy respect for forecasting, he is aware of the risk of relying on predictions of rising interest rates to determine utility rates. He presented a portion of the testimony of Aqua North Carolina, Inc. witness Pauline Ahern in the 2013 Aqua rate case, Docket No. W-218, Sub 363. In that case she identified several interest rate forecasts by Blue Chip Financial Forecasts of 30-year Treasury Bond yields that were predicted to rise to 4.3% in 2015, 4.70% in 2016, 5.20% in 2017, and 5.50% for 2020-2024. He presented the graph 30-Year US Treasury Bonds on page 18 of his direct testimony, which showed in 2015, the range was approximately 2.50% to 3.10%, in 2016 the range was approximately 2.50% to 3.10%, and in 2017 the range was approximately 2.25% to 3.10%. Witness Hinton testified that similar overestimated forecasts can be identified in witness D'Ascendis' Exhibit DWD-4 in the CWSNC's 2018 rate case where the Blue-Chip consensus forecast predicted the 30-year Treasury Bonds would rise to 3.80% by the

third quarter of 2019. According to the Federal Reserve, the highest observed yield on 30-year Treasury Bonds for the third quarter of 2019 is 2.65%, and the average for the quarter was 2.29%. He testified that these types of errors make these interest rate forecasts inappropriate for ratemaking.

Public Staff witness Hinton testified that he used the discounted cash flow (DCF) model and the Risk Premium model to determine the cost of equity for CWSNC. He testified that the DCF model is a method of evaluating the expected cash flows from an investment by giving appropriate consideration to the time value of money. Witness Hinton testified that the DCF model is based on the theory that the price of the investment will equal the discounted cash flows of returns. The return to an equity investor comes in the form of expected future dividends and price appreciation. He testified that as the new price will again be the sum of the discounted cash flows, price appreciation is ignored, and attention focused on the expected stream of dividends.

Witness Hinton testified that he applied the DCF method to a comparable group of seven water utilities followed by Value Line Investment Survey. He testified that the standard edition of Value Line covers eight water companies. He excluded Consolidated Water Co. due to its significant overseas operations. Witness Hinton included a group of nine natural gas local distribution companies (LDCs) in his DCF analysis stating these LDCs exhibit risk measures similar to his proxy group of water companies.

Public Staff witness Hinton calculated the dividend yield component of the DCF by using the Value Line estimate of dividends to be declared over the next 12 months divided by the price of the stock as reported in the Value Line Summary and Index sections for each week of the 13-week period July 26, 2019, through October 18, 2019. He testified that a 13-week averaging period tends to smooth out short-term variations in the stock prices. This process resulted in an average dividend yield of 1.7% for his proxy group of water utilities and 2.6% for the LDC group utilities.

To calculate the expected growth rate component of the DCF, Public Staff witness Hinton employed the growth rates of his proxy group in earnings per share (EPS), dividends per share (DPS), and book value per share (BPS) as reported in Value Line over the past ten and five years. He also employed the forecasts of the growth rates of his water and LDC proxy groups in EPS, DPS, and BPS as reported in Value Line. He testified that the historical and forecast growth rates are prepared by analysts of an independent advisory service that is widely available to investors and should also provide an estimate of investor expectations. He testified that he includes both historical known growth rates and forecast growth rates, because it is reasonable to expect that investors consider both sets of data in deriving their expectations.

Public Staff witness Hinton testified that he also incorporated the consensus of various analysts' forecasts of five-year EPS growth rate projections as reported in Yahoo Finance. He testified the dividend yields and growth rates for each of the companies and for the average for his comparable proxy groups are shown in Exhibit JRH-4.

Public Staff witness Hinton concluded that based upon his DCF analysis that a reasonable expected dividend yield is 1.7% with an expected growth rate of 6.0% to 7.0%. He testified that his DCF analysis produces a cost of common equity for his comparable proxy group of water utilities of 7.7% to 8.7%. Based upon the DCF analysis for the comparable group of LDCs, he determined that a reasonable expected dividend yield is 2.6%, with an expected growth rate of 5.7% to 6.7%, which yields a range of results of 8.3% to 9.3% for the cost of equity.

He testified that his ultimate DCF based cost of equity is based on the average estimates for the two groups of companies, which he summarized in his Hinton Exhibit 8 that quantifies an approximate range of DCF based cost of equity estimates of 8.48% to 8.80% for his DCF based cost of equity estimate of 8.64%.

Witness Hinton testified that the equity risk premium method can be defined as the difference between the expected return on a common stock and the expected return on a debt security. The differential between the two rates of return are indicative of the return investors require in order to compensate them for the additional risk involved with an investment in the company's common stock over an investment in the company's bonds that involves less risk.

Witness Hinton testified that his method relies on approved returns on common equity for water utility companies from various public utilities commissions that is published by the Regulatory Research Associates, Inc. (RRA), within SNL Global Market Intelligence. In order to estimate the relationship with a representative cost of debt capital, he regressed the average annual allowed equity returns with the average Moody's A-rated yields for Public Utility Bonds from 2006 through 2019. His regression analysis which incorporates years of historical data is combined with recent monthly yields to provide an estimate of the current cost of common equity.

Witness Hinton testified that the use of allowed returns as the basis for the expected equity return has two strengths over other approaches that involve various models that estimate the expected equity return on common stocks and subtracting a representative cost of debt. He testified that one strength of his approach is that authorized returns on equity are generally arrived at through lengthy investigations by various parties with opposing views on the rate of return required by investors. He testified that it is reasonable to conclude that the approved allowed returns are good estimates of the cost of equity.

Public Staff witness Hinton testified that the summary data of risk premiums shown on his Exhibit JRH-5, page 1 of 2, indicates that the average risk premium is 5.00%, with a maximum premium of 5.78%, and minimum premium of 3.73%, which when combined with the last six months of Moody's A-rated utility bond yields produces yields with an average cost of equity of 8.70%, a maximum cost of equity of 9.48%, and a minimum cost of equity of 7.44%. To better estimate the current cost of equity, he performed a statistical regression analysis as shown on Exhibit JRH 5, page 2 of 2 in order to quantify the relationship of allowed equity returns and bond costs. He testified that by applying the risk

premium to the current utility bond cost of 3.71%, resulted in a current estimate of the equity risk premium of equity of 9.57%.

Public Staff witness Hinton concluded that based on all of the results of his DCF model that indicate a cost of equity from 8.48% to 8.80% with a central point estimate of 8.64%, and the risk premium model that indicates a cost of equity of 9.57%, he determined that the investor required rate of return on common equity for CWSNC is between 9.11% which he rounded to 9.10% as shown on Hinton Exhibit 8.

Public Staff witness Hinton testified as to the reasonableness of his recommended return, that he considered the pre-tax interest coverage ratio produced by his cost estimates for the cost equity. He testified that based on his recommended capital structure, cost of debt, and equity return of 9.10%, the pre-tax interest coverage ratio is approximately 3.1 times. He testified that this tax interest coverage and a funds flow to debt ratio of 25.0%, as shown on Supplemental Hinton Exhibit 10, should allow CWSNC to qualify for a single “A” bond rating.

Witness Hinton also performed a comparable earnings analysis and a CAPM analysis solely as checks on the results of this DCF and Risk Premium Regression Analysis. He testified that his comparable earnings analysis for a group of eight water utilities and nine LDC companies produced a five-year average return on equity of 9.83%. He testified that a weakness is that actual earned rates of return can be impacted by factors outside the company’s control, such as weather, inflation, and tax changes, including deferred income taxes. These unforeseen developments can cause a company’s earned rate of return to exceed or fall short of its cost of capital during any certain period making this method somewhat less reliable than other cost of capital methods, and it suffers from circular reasoning. In addition, he testified that earned rates of return on equity may often include non–regulated income. He testified that his CAPM analysis utilizing his preferred geometric mean return produced return on equity estimates of 7.65% and 7.68% that are at the low end of CWSNC’s cost of equity. As such, he testified his CAPM provides a limited check on his recommended cost of equity.

Witness Hinton in his direct testimony had a recommended a rate of return on common equity of 9.10% with a downward 10 basis point adjustment to reflect reduced risk due to the consumption adjustment mechanism CWSNC applied for in this proceeding. His resulting recommended allowed rate return on equity was thus 9.00%. After CWSNC withdrew its request for a consumption adjustment mechanism, witness Hinton filed supplemental testimony withdrawing this 10-basis point downward adjustment.

Witness Hinton testified that his recommended return on common equity takes into consideration the impact of the water and sewer system improvement charges (WSIC and SSIC) pursuant to N.C.G.S. § 62-113.12 on CWSNC’s financial risk. He testified that the WSIC and SSIC mechanisms provide the ability for enhanced cost recovery of the eligible capital improvements which reduces regulatory lag through incremental and timely rate increases. He testified he believes this mechanism is seen by debt and equity

investors as supportive regulation that mitigates business and regulatory risk. Witness Hinton testified that he believes that this mechanism is noteworthy and is supportive of his 9.10% return on equity recommendation.

Witness Hinton testified that it is not appropriate to add a risk premium to the cost of equity due to the size of the company. He testified that CWSNC is owned by Corix Infrastructure, Inc. (Corix), which is owned by BCIMC. Corix has a significant influence over the balances of common equity and long-term debt of Utilities, Inc. and CWSNC. Corix determines the amounts of dividend payments to BCIMC and the frequency of those payments. He testified that from a regulatory policy perspective; ratepayers should not be required to pay higher rates because they are located in the franchise area of a utility of a size which is arbitrarily considered to be small. He further testified that if such adjustments were routinely allowed, an incentive would exist for large existing utilities to form subsidiaries when merging or even to split-up into subsidiaries as to obtain higher allowed returns. He further testified that CWSNC operates in a franchise environment that insulates the company from competition and it operates with procedures in place that allow for rate adjustments for eligible capital improvements, cost increases, and other unusual circumstances that impact its earnings. Witness Hinton testified that CWSNC operates in the water and sewer industry, where expensive bottled water provides the only alternative to utility service. It is factually correct that rating agencies and investors add a risk factor for small companies with relatively limited capital resources; however, the inherent protection from competition removes this risk that would otherwise be a concern to investors.

Witness Hinton noted that he also testified to these same size adjustment concerns in the last CWSNC rate case, Sub 360, where the Commission found that a size adjustment was not warranted. He testified that similar arguments were made in a 1997 CWS System, Inc., rate case, Docket No. W-778, Sub 31, by witness Hanley of AUS Consultants, who relied on similar cost of capital methods as witness D'Ascendis, as noted on pages 824-25 in its Eighty-Seventh Report of Orders and Decisions. In CWSNC's 1994 rate case, Docket No. W-354, Sub 128, the Commission was not persuaded to accept an adjustment for small size and its elevated risk, as noted on page 520 in its Eighty-Fourth Report on Orders and Decisions. Tr. vol. 7, 785–86. In a rate case brought by North Carolina Natural Gas, Inc., Docket No, G-21, Sub 293, the explicit consideration of the small size of a regulated utility was argued before this Commission. In its December 6, 1991 Order in that case, the Commission disagreed with the Company witness who testified that the Company's small size warranted the selection of other small sized companies in his proxy group. Witness Hinton testified that while there are published studies that address how the small size of a company relates to higher risks, he is aware of only one study by Dr. Annie Wong[16] that focuses on the size of regulated utilities and risk. He testified that Dr. Wong has tested the data for a size premium in utilities and concluded that "unlike industrial stocks, utility stocks do not exhibit a significant size premium. As explained, there are several reasons why such a size

[16] Annie Wong, "Utility Stocks and the Size Effect: An Empirical Analysis," Journal of the Midwest Finance Association, pp. 95-101, (1993).

premium would not be attributable to utilities because they are regulated closely by state and federal agencies and commissions, and hence, their financial performance is monitored on an ongoing basis by both the state and federal governments." Tr. vol. 7, 187.

Public Staff Witness Hinton Cross-Examination

Witness Hinton testified on cross-examination that the electric and natural gas industries in North Carolina have a number of surcharge rate adjustment mechanisms available to them which serve to enhance revenue recovery and thereby stabilize earnings and that those mechanisms also employ deferral accounting as part of the true-up process. Witness Hinton also testified that all utilities are concerned with regulatory lag and that surcharge rate adjustment mechanisms reduce regulatory lag, . . . maybe significantly . . . ." Tr. vol. 7, 105, 93.

Witness Hinton also testified on cross-examination that during "the last couple years your [CWSNC's] earned returns have been less than your allowed returns." *Id.* at 104.

Witness Hinton further stated that he considered his initial proposal (which he withdrew when CWSNC withdrew its request to implement a CAM) to impose a 10-basis point downward adjustment with respect to his recommended rate of return on common equity in consideration of the Company's initially-proposed CAM to be a "material" adjustment. *Id.* at 111.

Witness Hinton also testified on cross-examination that the 23-basis point reduction in CWSNC's cost of long-term debt from 5.59% at the time the Company filed its Verified Rate Case Application to 5.36% at September 30, 2019, was "material." *Id*. at 133.

Law Governing the Commission's Decision on Return on Equity

In the absence of a settlement agreed to by all parties the Commission must exercise its independent judgment and arrive at its own independent conclusion as to all matters at issue, including the rate of return on common equity. *See, e.g., CUCA I,* 348 N.C. at 466, 500 S.E.2d 707. In order to reach an appropriate independent conclusion regarding the rate of return on common equity the Commission should evaluate the admitted evidence, particularly that presented by conflicting expert witnesses. *State ex rel. Utils. Comm'n v. Cooper*, 366 N.C. 484, 739 S.E.2d 541, 546-47 (2013) (*Cooper I*). In this case the evidence relating to the Company's cost of equity capital was presented by Company witness D'Ascendis and Public Staff witness Hinton. No rate of return on common equity expert evidence was presented by any other party.

The baseline for establishment of an appropriate rate of return on common equity is the constitutional constraints established by the decisions of the United States Supreme Court in *Bluefield Water Works & Improvement Co., v. Pub. Serv. Comm'n of W. Va.,* 262

U.S. 679 (1923) (*Bluefield*), and *Fed. Power Comm'n v. Hope Natural Gas Co.,* 320 U.S. 591 (1944) (*Hope*) which, as the Commission has previously noted, establish that:

> To fix rates that do not allow a utility to recover its costs, including the cost of equity capital, would be an unconstitutional taking. In assessing the impact of changing economic conditions on customers in setting an ROE, the Commission must still provide the public utility with the opportunity, by sound management, to (1) produce a fair profit for its shareholders, in view of current economic conditions, (2) maintain its facilities and service, and (3) compete in the marketplace for capital.

DEC Sub 1146 Order at 50; *see also State ex rel. Utils. Comm'n v. Gen. Tel. Co.*, 281 N.C. 318, 370, 189 S.E.2d 705, 738 (1972) (*General Telephone*). As the North Carolina Supreme Court held in *General Telephone*, these factors constitute "the test of a fair rate of return declared" in *Bluefield* and *Hope*. *Id.*

The rate of return on common equity is, in fact, a cost. The return that equity investors require represents the cost to the utility of equity capital.

> [T]he cost of capital to the utility is synonymous with the investor's return, and the cost of capital is the earnings which must be generated by the investment of that capital in order to pay its price, that is, in order to meet the investor's required rate of return.

Morin, Roger A., *Utilities' Cost of Capital* 19-21 (Public Utilities Reports, Inc. 1984). "The term 'cost of capital' may [also] be defined as the annual percentage that a utility must receive to maintain its credit, to pay a return to the owners of the enterprise, and to ensure the attraction of capital in amounts adequate to meet future needs." Phillips, Charles F., Jr., *The Regulation of Public Utilities* (Public Utilities Reports, Inc. 1993), at 388.

Long-standing decisions of the North Carolina Supreme Court have recognized that the Commission's subjective judgment is a necessary part of determining the authorized rate of return on common equity. *Public Staff,* 323 NC at 490, 374 S.E.2d at 369. Likewise, the Commission has observed as much in exercising its duty to determine the rate of return on common equity, noting that such determination is not made by application of any one simple mathematical formula:

> Throughout all of its decisions, the [United States] Supreme Court has formulated no specific rules for determining a fair rate of return, but it has enumerated a number of guidelines. The Court has made it clear that confiscation of property must be avoided, that no one rate can be considered fair at all times and that regulation does not guarantee a fair return. The Court also has consistently stated that a necessary prerequisite for profitable operations is efficient and economical

> management. Beyond this is a list of several factors the commissions are supposed to consider in making their Decisions, but no weights have been assigned.
>
> The relevant economic criteria enunciated by the Court are three: financial integrity, capital attraction and comparable earnings. Stated another way, the rate of return allowed a public utility should be high enough: (1) to maintain the financial integrity of the enterprise, (2) to enable the utility to attract the new capital it needs to serve the public, and (3) to provide a return on common equity that is commensurate with returns on investments in other enterprises of corresponding risk. These three economic criteria are interrelated and have been used widely for many years by regulatory commissions throughout the country in determining the rate of return allowed public utilities.
>
> In reality, the concept of a fair rate of return represents a "zone of reasonableness." As explained by the Pennsylvania commission:
>
> > There is a range of reasonableness within which earnings may properly fluctuate and still be deemed just and reasonable and not excessive or extortionate. It is bounded at one level by investor interest against confiscation and the need for averting any threat to the security for the capital embarked upon the enterprise. At the other level it is bounded by consumer interest against excessive and unreasonable charges for service.
>
> As long as the allowed return falls within this zone, therefore, it is just and reasonable . . . . It is the task of the commissions to translate these generalizations into quantitative terms.
>
> Charles F. Phillips, Jr., *The Regulation of Public Utilities,* 3d ed. 1993, pp. 381-82. (notes omitted)

Order Granting General Rate Increase, *Application of Carolina Power & Light Company, d/b/a Progress Energy Carolinas, Inc., for Adjustment of Rates and Charges Applicable to Electric Utility Service in North Carolina,* No. E-2, Sub 1023, at 35-36 (N.C.U.C. May 30, 2013), *aff'd, State ex rel. Utils. Comm'n v. Cooper,* 367 N.C. 444, 761 S.E.2d 640 (2014) (2013 DEP Rate Case Order) (additions and omissions after the first quoted paragraph in original).

Moreover, in setting rates the Commission must not only adhere to the dictates of both the United States and North Carolina Constitutions, but, as has been held by the North Carolina Supreme Court, it must set rates as low as possible consistent with constitutional law. *State ex rel. Utils. Comm'n v. Pub. Staff-N. Carolina Utils. Comm'n*, 323 N.C. 481, 490, 374 S.E.2d 361, 370 (1988) (*Public Staff)*. Further, the North Carolina General Assembly has provided that the Commission must also set rates employing a multi-element formula set forth in N.C.G.S. § 62-133. The formula requires consideration of elements beyond just the rate of return on equity element, and it inherently necessitates that the Commission make many subjective determinations, in addition to the subjectivity required to determine the rate of return on equity. The subjective decisions the Commission must make as to each of the elements of the formula can and often do have multiple and varied impacts on all of the other elements of the formula. In other words, the formula elements are intertwined and often interdependent in their impact to the setting of just and reasonable rates.

The fixing of a rate of return on the cost of property used and useful to the provision of service (as determined through the end of the historic 12-month test period prior to the proposed effective date of a requested change in rates, and adjusted for proven changes occurring up to the close of the evidentiary hearing) is but one of several interdependent elements of the statutory formula to be used in setting just and reasonable rates. *See* N.C.G.S. § 62-133. North Carolina General Statute § 62-133(b)(4) provides in pertinent part that the Commission shall:

> Fix such rate of return on the cost of the property . . .as will enable the public utility by sound management [1] to produce a fair return for its shareholders, *considering changing economic conditions and other factors* . . . [2] to maintain its facilities and services in accordance with the reasonable requirements of its customers in the territory covered by its franchise, and [3] to compete in the market for capital funds on terms that are reasonable and that are fair to its customers and to its existing investors. [Emphasis added.]

The North Carolina Supreme Court has interpreted the above-emphasized language as requiring the Commission to make findings regarding the impact of changing economic conditions on customers when determining the proper rate of return on common equity for a public utility. *Cooper I*, 366 N.C. at 495, 739 S.E.2d at 548. The Commission must exercise its subjective judgment so as to balance two competing rate of return on common equity-related factors—the economic conditions facing the Company's customers and the Company's need to attract equity financing on reasonable terms in order to continue providing safe and reliable service. 2013 DEP Rate Case Order at 35-36. The Commission's determination in setting rates pursuant to N.C.G.S § 62-133, which includes the fixing of the rate of return on common equity, always takes into account affordability of public utility service to the using and consuming public. The impact of changing economic conditions on customers is embedded in the testimony of expert witnesses regarding their analyses of the rate of return on common equity using various economic models widely used and accepted in utility regulatory rate-setting proceedings. 2013 DEP Rate Case Order, at 38. Further,

> [t]he Commission always places primary emphasis on consumers' ability to pay where economic conditions are difficult. By the same token, it places the same emphasis on consumers' ability to pay when economic conditions are favorable as when the unemployment rate is low. Always there are customers facing difficulty in paying utility bills. The Commission does not grant higher rates of return on equity when the general body of ratepayers is in a better position to pay than at other times . . . .

Id. at 37. Economic conditions existing during the modified test year, at the time of the public hearings, and at the date of the issuance of the Commission's order setting rates will affect not only the ability of the utility's customers to pay rates, but also the ability of the utility to earn the authorized rate of return during the period the new rates will be in effect. However, in setting the rate of return, just as the Commission is constrained to address the impact of difficult economic times on customers' ability to pay for service by establishing a lower rate of return on common equity in isolation from the many subjective determinations that must be made in a general rate case, it likewise is constrained to address the effect of regulatory lag[17] on the Company by establishing a higher rate of return on common equity in isolation. Instead, the Commission sets the rate of return considering both of these negative impacts taken together in its ultimate decision fixing a utility's rates.

Thus, in summary and in accordance with the applicable law, the Commission's duty under N.C.G.S. § 62-133 is to set rates as low as reasonably possible to the benefit of the customers without impairing the Company's ability to attract the capital needed to provide reliable electric service and recover its cost of providing service. The Commission is guided by this premise when it makes it determination of the appropriate rate of return on common equity.

It is against this backdrop of overarching principles that the Commission analyzes the evidence presented in this case.

[17] Regulatory lag exists where a utility's realized, earned return is less than its authorized return negatively affecting the shareholder's return on investment as other expenses and debts owed are paid ahead of investor return.

Discussion and Application of Law to the Facts in this Case Regarding the Issue of Rate of Return on Common Equity

The Commission has carefully evaluated the testimony of CWSNC witness D'Ascendis and Public Staff witness Hinton. The results of each of the models or methods used by these two witnesses to derive the return on equity that each witness recommends is shown below:

Utility Proxy Group	D'Ascendis Rebuttal Exhibits	D'Ascendis Late-Filed Exhibits	Hinton
DCF	8.81%	8.81%	8.64%
Risk Premium	10.12%	10.00%	9.57%
PRPM	10.84%	10.73%	
Total Market RPM	9.39%	9.27%	
CAPM	9.35%	9.29%	7.65-8.96%*
Traditional CAPM	8.90%	8.84%	
ECAPM	9.80%	9.74%	
Comparable Earnings	———	———	9.83%*
Non–Price Regulated Proxy Group	11.29%	11.16%	———
DCF	11.63%	11.63%	
Risk Premium	11.41%	11.23%	
CAPM	10.44%	10.39%	
Indicated on Return on Equity Before Adjustment	9.80%	9.75%	9.10%
Size Adjustment	0.40%	0.40%	———
Recommended Return on Equity	10.20%	10.15%	9.10%

* Note: Provided solely as a check and not used in formulating this witness's recommended allowed rate of return on common equity.

The range of the rate of return on common equity recommendations from the two expert witnesses is 9.10% to 10.20%. Underlying the lower rate of return on common equity recommendation of 9.10%, is a rate of return on common equity range of 7.65% to 9.83%, according to witness Hinton's testimony concerning his cost of common equity analyses. Similarly, underlying the higher rate of return on common equity recommendation of 10.20% is a range of 8.81% to 11.29%, according to witness D'Ascendis' rebuttal testimony concerning his cost of common equity analyses. Such a wide range of estimates by expert witnesses is not atypical in proceedings before the Commission with respect to the return on the equity issue. Neither is the seemingly endless debate and habitual differences in judgment among expert witnesses on the virtues of one model or method versus another and how to best determine and measure

the required inputs of each model in representing the interests of the party on whose behalf they are testifying. Nonetheless, the Commission is uniquely situated, qualified, and required to use its impartial judgment to determine the return on equity based on the testimony and evidence in this proceeding in accordance with the legal guidelines discussed above.

In doing so the Commission finds that the DCF (8.81%), Risk Premium (10.00%) and CAPM (9.29%) model results provided by witness D'Ascendis, as updated to use current rates in D'Ascendis Late-Filed Exhibit No. 1, as well as the risk premium (9.57%) analysis of witness Hinton, are credible, probative, and are entitled to substantial weight as set forth below. The Commission further finds that the rate of return on common equity trends, particularly as embodied by data points in Public Staff D'Ascendis Cross-Examination Exhibits 1 and 2 to be credible, positive and corroborative evidence entitled to some weight.[18] Accordingly, the evidence presented concerning other authorized rates of return on equity, when put into proper context, lends substantial support and corroboration to a finding that a 9.50% rate of return on common equity is appropriate in this case.

Company witness D'Ascendis, noting that CWSNC is not publicly traded, first established a group of six relatively comparable risk water companies that are publicly traded (Utility Proxy Group). He testified that use of relatively comparable risk companies as proxies is consistent with principles of fair rate of return established in the Hope and Bluefield cases, which are recognized as the primary standards for the establishment of a fair return for a regulated public utility. He then applied the DCF, the CAPM, and the risk premium models to the market data of the Utility Proxy Group. Witness D'Ascendis' DCF model indicated a cost of equity of 8.81%, his CAPM model indicated a cost of equity of 9.29%, and his Risk Premium model indicated a cost of equity of 10.00%. The Commission finds and concludes that analyses using interest rate forecasts rely unnecessarily on projections. The Commission approves the use of current interest rates, rather than projected near–term or long–term interest rates. The Commission finds witness D'Ascendis' late-filed exhibit Risk Premium Model and his late-filed exhibit CAPM analysis using the current 30–year Treasury yields to be credible, probative and entitled to substantial weight.

Witness Hinton applied a risk premium analysis by performing a regression analysis using the allowed returns on common equity for water utilities from various public utility commissions, as reported in an RRA Water Advisory, with the average Moody's

[18] The Commission determines the appropriate rate of return on common equity based upon the evidence and particular circumstances of each case. However, the Commission believes that the rate of return on common equity trends and decisions by other regulatory authorities deserve some weight, as (1) they provide a check or additional perspective on the case-specific circumstances, and (2) the Company must compete with other regulated utilities in the capital markets, meaning that a rate of return on common equity significantly lower than that approved for other utilities of comparable risk would undermine the Company's ability to raise necessary capital, while a rate of return on common equity significantly higher than other utilities of comparable risk would result in customers paying more than necessary. In this proceeding, witness Hinton's risk premium analysis, as well as Public Staff D'Ascendis Cross-Examination Exhibit No. 1, page 2 and No. 2 provide credible, positive and corroborative evidence.

A-rated bond yields for public utility bonds from 2006 through 2019. The results of the regression analysis were combined with recent monthly yields to provide the current cost of equity. According to witness Hinton, the use of allowed returns as the basis for the expected equity return has strengths over other risk premium approaches that estimate the expected return on equity and subtract a representative cost of debt. He testified that one strength of his approach is that authorized returns on equity are generally arrived at through lengthy investigations by various parties with opposing views on the rate of return required by investors. Thus, it is reasonable to conclude that the approved returns are good estimates for the cost of equity. Witness Hinton testified that applying the significant statistical relationship of the allowed equity returns and bond yields from the regression analysis and adding current utility bond cost of 3.71% resulted in a current estimate of the cost of equity of 9.57%.

The average of witness D'Ascendis' Utility Proxy Group late-filed exhibit DCF result of 8.81%, CAPM result of 9.29% and RPM result of 10.00% and witness Hinton's RPM of 9.57% is 9.42%. A return on common equity of 9.50% is thus supported by the average of the results of the four above-listed cost of equity models which the Commission finds are credible, probative, and entitled to consideration based on the record in this proceeding.

The Commission gives no weight to the DCF, CAPM and comparable earnings analyses of witness Hinton who presented his CAPM and comparable earnings methods only as a check on his DCF and Risk Premium Regression analyses. For reasons generally stated by witness D'Ascendis, the Commission concludes that witness Hinton's use of a proxy group of natural gas companies in his DCF and CAPM analyses is inappropriate for determining the appropriate return on equity in this case. The indicated returns on equity using the water proxy groups in witness Hinton's DCF (8.48%) and CAPM (7.65% to 8.96% with a midpoint of 8.31%) are outliers as they fall far below the other rate of return on common equity analyses in this proceeding.

Witness Hinton's comparable earnings analyses are not reliable as the earned rates of return on equity listed in Hinton Exhibit 6 contain non-regulated earnings and increased earnings resulting from deferred income taxes. Witness D'Ascendis on cross-examination testified that American States Water has significant operations in Army bases around the country and also has an electric utility. Although the California Utilities Commission on March 22, 2018, approved an 8.90% rate of return on common equity for Golden State Water Company which is a wholly-owned subsidiary of American States Water as shown on Public Staff D'Ascendis Cross-Examination Exhibit 6, American States Water achieved earned rates of return on equity of 11.40% in 2018 and 12.0% in 2019 as shown on Hinton Exhibit 6. In addition, although the most recent rate order for Middlesex Water Co. in New Jersey was issued on March 24, 2018, which approved a 9.60% rate of return on common equity as shown on Public Staff D'Ascendis Cross-Examination Exhibit 3, the Middlesex Water Co. earned rate of return on common equity for 2018 was 13.0% and 2019 earned rate of return on common equity was 12.0% as shown on Hinton Exhibit 6.

In addition to estimating the cost of equity for his Utility Proxy Group of publicly-traded water utilities, witness D'Ascendis attempted to estimate the cost of equity for another proxy group consisting of 10 domestic, non-price regulated companies. The rebuttal results of the DCF, RPM, and CAPM applied to the non-price regulated proxy group are 11.63%, 11.23%, and 10.39%, respectively. The Commission concludes that these results are unreasonably high. Each of these results is higher than witness D'Ascendis' estimates of the cost of equity for his own Utility Proxy Group and deserves no weight. The Commission further concludes that given the difference in these results, the risk of the two groups is not equal and the Utility Proxy Group is more reliable as a proxy for the investment risk of common equity in CWSNC.

After determining that the indicated cost of equity from the DCF, CAPM, and risk premium methods applied to both of his proxy groups equals in his rebuttal 9.80% rate of return on common equity, witness D'Ascendis then adjusted the indicated cost of equity upward by 0.40% to reflect CWSNC's smaller size compared to companies in his Utility Proxy Group. He testified that the size of the company is a significant element of business risk for which investors expect to be compensated through higher returns. Witness D'Ascendis calculated his size adjustment as described in his prefiled direct testimony and stated that even though a 3.94% upward size adjustment is indicated, he applies a 0.40% size premium to CWSNC's indicated common equity cost rate.

Witness Hinton testified that he does not believe it is appropriate to add a risk premium to the cost of equity of CWSNC due to size for several reasons. First, from a regulatory policy perspective, witness Hinton stated that ratepayers should not be required to pay higher rates because they are located in the franchise area of a utility that is arbitrarily considered to be small. Further, if such adjustments were routinely allowed, an incentive would exist for large utilities to form subsidiaries or split-up subsidiaries to obtain higher returns. In addition, he noted that CWSNC operates in a franchise environment that insulates the Company from the competition with procedures in place for rate adjustments for circumstances that impact its earnings. Finally, while witness Hinton stated that while there are studies that address how the small size of a company relates to higher returns, he is aware of only one study that focuses on the size of regulated utilities and risk and that study concluded that utility stocks do not exhibit a significant differential in risk due to size. In rebuttal, witness D'Ascendis maintained that a small size adjustment was necessary based on the results of studies he cited and discussed. He contended that the study concerning size premiums for utilities discussed by witness Hinton was flawed.

The uncontroverted evidence is that both CWSNC and the Public Staff used the Utilities, Inc. capital structure and debt cost in this proceeding. CWSNC obtains all its debt and equity from CWSNC's parent company Utilities, Inc. CWSNC does not participate in the debt markets. The Corix CEO, Gordon Barefoot, testified that Corix, the parent company of Utilities, Inc., provides access to favorable terms for debt financing in capital markets.

Based upon the foregoing and the entire record in this proceeding, the Commission concludes that a size adjustment of 0.40% is not warranted and should not be approved. The Commission determines there is insufficient evidence to authorize an adjustment to the approved rate of return on common equity in this case. The record simply does not indicate the extent to which CWSNC's size alone justifies the added risk premium. While a small water/wastewater utility might face greater risk than a publicly-traded peer group, because for example the service area was confined to a hurricane-prone coastal geographic area, evidence of such factual predicates is absent from the record. CWSNC has water and wastewater systems along the North Carolina coast, in the Piedmont, and in the mountains. The Commission notes that the witnesses also disagreed with respect to whether the studies discussed in the testimony concerning size and risk are reliable or even applicable to regulated utilities. The Commission concludes that the testimony regarding these studies is not convincing and does not support a size adjustment.

Having determined that the appropriate rate of return on common equity based upon the evidence in this proceeding is 9.50%, the Commission notes that there is considerable testimony concerning the authorized returns on equity for water utilities in other jurisdictions. While the Commission has relied upon the record in this proceeding and is certainly aware that returns in other jurisdictions can be influenced by many factors, such as different capital market conditions during different periods of time, settlements versus full litigation, the Commission concludes that the rate of return on common equity trends and decisions by other regulatory authorities deserve some weight as (1) they provide a check or additional perspective on the case-specific circumstances, and (2) the Company must compete with other regulated utilities in the capital markets, meaning that a rate of return significantly lower than that approved for other utilities of comparable risk would undermine the Company's ability to raise necessary capital, while a rate of return significantly higher than other utilities of comparable risk would result in customers paying more than necessary.

Public Staff D'Ascendis Cross-Examination Exhibit 2, which has RRA approved rate of return on common equity listings showing approved return on equity decisions for water utilities across the country from January 2014 through June 30, 2019, is helpful in illustrating that the average rate of return on common equity for water utilities was 9.59% in 2014, 9.79% in 2015, 9.71% in 2016, 9.31% in 2017, 9.45% in 2018, and in the only five reported cases for the first six months of 2019 the average is 9.60%. This authorized return data is generally supportive of the Commission approved return on equity of 9.50% based upon all the evidence in this proceeding.

These factors lead the Commission to conclude that a 9.50% rate of return on common equity is supported by the substantial weight of the evidence in this proceeding. However, to meet its obligation in accord with the holding in *Cooper I*, the Commission will next address the impact of changing economic conditions on customers.

In this case all parties had the opportunity to present the Commission with evidence concerning changing economic conditions as they affect customers. The testimony of witnesses D'Ascendis and Hinton, which the Commission finds entitled to

substantial weight, addresses changing economic conditions. As to the impact of changing economic conditions on CWSNC's customers, witness Hinton testified that he reviewed information on the economic conditions in the areas served by CWSNC, specifically, the 2016 and 2017 data on total personal income from the Bureau of Economic Analysis (BEA) and the 2019 Development Tier Designations published by the North Carolina Department of Commerce for the counties in which CWSNC's systems are located. The BEA data indicates that total personal income weighted by the number of water customers by county grew at a compound annual growth rate of approximately 3.1%.

Witness Hinton testified that the North Carolina Department of Commerce annually ranks the state's 100 counties based on economic well-being and assigns each a Tier designation. The most distressed counties are rated a "1" and the most prosperous counties are rated a "3". The rankings examine several economic measures such as, household income, poverty rates, unemployment rates, population growth, and per capita property tax base. For 2017, the average Tier ranking that has been weighted by the number of water customers by county is 2.5. He testified that both of these economic measures indicate that there has been improvement in the economic conditions for CWSNC's service area relative to the three previous CWSNC rate increases in Sub 360, Sub 356, and Sub 344 that were approved in 2019, 2017, and 2015, respectively.

Witness D'Ascendis testified concerning his review of economic conditions in North Carolina that he reviewed. He testified that he reviewed: unemployment rates from the United States, North Carolina, and the counties comprising CWSNC's service territory; the growth in Gross National Product (GDP) in both the United States and North Carolina; median household income in the United States and in North Carolina; and national income and consumption trends.

Witness D'Ascendis testified that the rate of unemployment has fallen substantially in North Carolina and the U.S. since late 2009 and early 2010, when the rates peaked at 10.00% and 12.00%, respectively. He testified that by April 2019, the unemployment rate had fallen to less than one-half of those peak levels: 3.30% nationally; and 3.60% in North Carolina.

Witness D'Ascendis testified that he was also able to review (seasonally unadjusted) unemployment rates in the counties served by CWSNC. At its peak, which occurred in late 2009 into early 2010, the unemployment rate in those counties reached an average 12.86% (58 basis points higher than the State-wide average); by April 2019, it had fallen to 3.68% (8 basis points higher than the state-wide average).

Witness D'Ascendis testified that for real Gross Domestic Product growth, there also has been a relatively strong correlation between North Carolina and the national economy (approximately 69%). Since the financial crisis, the national rate of growth at times (during portions of 2010 and 2012) outpaced North Carolina's rate of growth. He testified that since the second quarter of 2015; however, North Carolina has consistently exceeded the national growth rate.

As to median household income, witness D'Ascendis testified that the correlation between North Carolina and the U.S. is relatively strong (approximately 87% from 2005 through 2018). Since 2009, the years subsequent to the financial crisis, median household income in North Carolina has grown at a similar annual rate as the national median income (2.32% vs. 2.65%).

Witness D'Ascendis summarized stating in the Commission's order on Remand in Docket No. E-22, Sub 479, the Commission observed that economic conditions in North Carolina were highly correlated with national conditions, such that they were reflected in the analyses used to determine the cost of common equity. He testified that those relationships still hold: Economic conditions in North Carolina continue to improve from the recession following the 2008/2009 financial crisis, and they continue to be strongly correlated to conditions in the United States, generally. He testified that unemployment, at both the State and county level, continues to fall and remains highly correlated with national rates of unemployment; real Gross Domestic Product recently has grown faster in North Carolina than the national rate of growth, although the two remain fairly well correlated; and median household income also has grown faster in North Carolina than the rest of the Country, and remains strongly correlated with national levels.

The Commission's review also includes consideration of the evidence presented by 23 witnesses during the public witness hearings, almost all of whom presently are customers of CWSNC. The Commission held six evening hearings throughout CWSNC's North Carolina service territory to receive public testimony. The testimony presented at the hearings illustrates the difficult economic conditions facing many North Carolina citizens. The Commission accepts as credible, probative, and entitled to substantial weight the testimony of the public witnesses.

Based upon the general state of the economy and the continuing affordability of water and wastewater utility service, and after weighing and balancing factors affected by the changing economic conditions in making the subjective decisions required, the Commission concludes that an allowed rate of return on common equity of 9.50% will not cause undue hardship to customers even though some will struggle to pay the increased rates resulting from this decision. When the Commission's decisions are viewed as a whole, including the decision to establish the rate of return on common equity at 9.50%, the Commission's overall decision fixing rates in this general rate case results in lower rates to consumers in the existing economic environment.[19]

All of the scores of adjustments the Commission approves reduce the revenues to be recovered from ratepayers and the return to be paid to equity investors. Some

[19] The Commission notes consumers pay rates, a charge in dollars per 1,000 gallons for the water they consume and a monthly flat rate for residential wastewater customers. They do not pay a "rate of return on equity," though it is a component of the Company's cost of providing service which is built into the billed rates. Investors are compensated by earning a return on the capital they invest in the business. Per the Commission determination of the rate of return on common equity in this matter, investors will have the opportunity to be paid in dollars for the dollars they invested at the rate of 9.50%.

adjustments reduce the authorized rate of return on investment financed by equity investors. The noted adjustments are made solely to reduce rates and provide rate stability to consumers (and return to equity investors) to recognize the difficulty for consumers to pay in the current economic environment. while the equity investor's cost was calculated by resort to a rate of return on common equity of 9.50% instead of the 10.20% recommended by CWSNC witness D'Ascendis on rebuttal. This is only one approved adjustment that reduced ratepayer responsibility and equity investor reward. Many other adjustments reduced the dollars the investors actually have the opportunity to receive. Therefore, nearly all of these other adjustments reduce ratepayer responsibility and equity investor returns in compliance with the Commission's responsibility to establish rates as low as reasonably permissible without transgressing constitutional constraints, and thus, inure to the benefit of consumers' ability to pay their bills in this economic environment.

Despite the improving economic conditions and their effects on CWSNC's customers, the Commission recognizes the financial difficulty that an increase in CWSNC's rates may create for some of CWSNC's customers, especially low-income customers. As shown by the evidence, relatively small changes in the rate of return on common equity have a substantial impact on a utility's base rates. Therefore, the Commission has carefully considered changing economic conditions and their effects on CWSNC's customers in reaching its decision regarding CWSNC's approved rate of return on common equity.

The Commission recognizes that the Company is investing significant sums in system improvements to serve its customers, thus requiring the Company to maintain its creditworthiness in order to compete for large sums of capital on reasonable terms. The Commission must weigh the impact of changing economic conditions on CWSNC's customers against the benefits that those customers derive from the Company's ability to provide safe, adequate, and reliable water and wastewater service. Safe, adequate, and reliable water and wastewater service is essential to the well-being of CWSNC's customers.

The Commission finds and concludes that these investments by the Company provide significant benefits to CWSNC's customers. The Commission concludes that the return on equity approved by the Commission in this proceeding appropriately balances the benefits received by CWSNC's customers from CWSNC's provision of safe, adequate, and reliable water and wastewater service with the difficulties that some of CWSNC's customers will experience in paying CWSNC's increased rates.

The Commission notes further that its approval of a rate of return on common equity at the level of 9.50% or for that matter at any level, is not a guarantee to the Company that it will earn a rate of return on common equity at that level. Rather, as North Carolina law requires, setting the rate of return on common equity at this level merely affords CWSNC the opportunity to achieve such a return. The Commission finds and concludes, based upon all the evidence presented, that the rate of return on common equity provided for herein will indeed afford the Company the opportunity to earn a

reasonable and sufficient return for its shareholders while at the same time producing rates that are just and reasonable to its customers.

Capital Structure

CWSNC witness D'Ascendis' direct testimony recommended the use of the actual capital structure of Utilities, Inc. of 52.04% long-term debt and 47.96% common equity as of March 31, 2019.

In his testimony Public Staff witness Hinton recommended a 50.90% long-term debt and 49.10% common equity capital structure based upon updated information provided by CWSNC concerning the Utilities, Inc. actual capital structure at September 30, 2019. The Partial Stipulation also supports a 50.90% long-term debt and 49.10% common equity capital structure. No other party presented evidence as to a different capital structure.

Accordingly, the Commission finds that the recommended capital structure of 49.10% common equity and 50.90% long-term debt is just and reasonable to all parties in light of all the evidence presented.

Cost of Debt

In its Application CWSNC proposed a cost rate for long-term debt of 5.59%. In his testimony, witness Hinton recommended the cost of debt 5.36% as of September 30, 2019. In addition, the Stipulation includes a cost of debt rate of 5.36%. No other party offered any evidence supporting a debt cost rate below 5.36%.

Therefore, the Commission finds that the use of a debt cost rate of 5.36% is just and reasonable to all parties based upon the evidence presented in this proceeding.

EVIDENCE AND CONCLUSIONS FOR FINDINGS OF FACT NOS. 60

Revenue Requirement

The following schedules summarize the gross revenue and overall rate of return that the Company should have a reasonable opportunity to achieve based on the increases in revenues approved in this Order for each rate entity. These schedules, illustrating the Company's gross revenue requirements, incorporate the adjustments found appropriate by the Commission in this Order.

SCHEDULE I

Carolina Water Service, Inc. of North Carolina
Docket No. W-354, Sub 364
Net Operating Income for a Return
For the Twelve Months Ended March 31, 2019
CWSNC Combined Operations

	Present Rates	Increase Approved	After Approved Increase
Operating Revenues:			
Service revenues	$33,852,232	$4,969,441	$38,821,673
Miscellaneous revenues	387,492	14,956	402,448
Uncollectibles	(271,142)	(38,638)	(309,780)
Total operating revenues	33,968,582	4,945,759	38,914,341
Operating Revenue Deductions:			
Salaries and wages – Maintenance	4,949,710	0	4,949,710
Purchased power	2,103,043	0	2,103,043
Purchased water and sewer	2,219,243	0	2,219,243
Maintenance and repair	3,120,935	0	3,120,935
Maintenance testing	544,432	0	544,432
Meter reading	206,176	0	206,176
Chemicals	693,596	0	693,596
Transportation	534,200	0	534,200
Operating expense charged to plant	(665,133)	0	(665,133)
Outside services – other	1,191,299	0	1,191,299
Salaries and wages – General	2,004,409	0	2,004,409
Office supplies & other office exp.	568,864	0	568,864
Regulatory commission expense	307,754	0	307,754
Pension and other benefits	1,600,158	0	1,600,158
Rent	330,308	0	330,308
Insurance	782,562	0	782,562
Office utilities	747,670	0	747,670
Miscellaneous	218,417	0	218,417
Depreciation expense	6,580,711	0	6,580,711
Amortization of CIAC	(1,476,955)	0	(1,476,955)
Amortization of PAA	(76,623)	0	(76,623)
Amortization of ITC	(579)	0	(579)
Franchise and other taxes	(655)	0	(655)
Property taxes	268,734	0	268,734
Payroll taxes	527,428	0	527,428
Regulatory fee	44,159	6,429	50,588
Deferred income tax	(69,128)	0	(69,128)
State income tax	75,474	123,484	198,958
Federal income tax	618,133	1,011,327	1,629,460
Rounding	0	1	1
Total operating revenue deductions	27,948,343	1,141,241	29,089,584
Net operating income for a return	$6,020,239	$3,804,518	$9,824,757

SCHEDULE II

Carolina Water Service, Inc. of North Carolina
Docket No. W-354, Sub 364
Original Cost Rate Base
For the Twelve Months Ended March 31, 2019
CWSNC Combined Operations

Item	Amount
Plant in service	$238,212,084
Accumulated depreciation	(57,897,943)
Net plant in service	180,314,141
Cash working capital	2,404,800
Contributions in aid of construction	(40,270,675)
Advances in aid of construction	(32,940)
Accumulated deferred income taxes	(5,995,444)
Customer deposits	(315,447)
Inventory	271,956
Gain on sale and flow back taxes	(417,811)
Plant acquisition adjustment	(837,878)
Excess book value	0
Cost-free capital	(261,499)
Average tax accruals	(143,198)
Regulatory liability for excess deferred taxes	(3,941,344)
Deferred charges	2,122,707
Pro forma plant	0
Original cost rate base	$132,897,368
Rates of return:	
Present	4.53%
Approved	7.39%

SCHEDULE III

Carolina Water Service, Inc. of North Carolina
Docket No. W-354, Sub 364
Statement of Capitalization and Related Costs
For the Twelve Months Ended March 31, 2019
CWSNC Combined Operations

	Ratio	Original Cost Rate Base	Embedded Cost	Net Operating Income
		PRESENT RATES		
Long-Term Debt	50.90%	$ 67,644,760	5.36%	$3,625,759
Common Equity	49.10%	65,252,608	3.67%	2,394,480
Total	100.00%	$132,897,368		$6,020,239
		APPROVED RATES		
Long-Term Debt	50.90%	$ 67,644,760	5.36%	$3,625,759
Common Equity	49.10%	65,252,608	9.50%	6,198,998
Total	100.00%	$132,897,368		$9,824,757

SCHEDULE I-A
Carolina Water Service, Inc. of North Carolina
Docket No. W-354, Sub 364
Net Operating Income for a Return
For the Twelve Months Ended March 31, 2019
CWSNC Water Operations

	Present Rates	Increase Approved	After Approved Increase
Operating Revenues:			
Service revenues	$17,485,912	$1,785,873	$19,271,785
Miscellaneous revenues	189,818	5,357	195,175
Uncollectibles	(129,396)	(13,215)	(142,611)
Total operating revenues	17,546,334	1,778,015	19,324,349
Operating Revenue Deductions:			
Salaries and wages – Maintenance	2,684,228	0	2,684,228
Purchased power	1,048,858	0	1,048,858
Purchased water and sewer	1,478,502	0	1,478,502
Maintenance and repair	909,143	0	909,143
Maintenance testing	202,228	0	202,228
Meter reading	175,422	0	175,422
Chemicals	311,580	0	311,580
Transportation	283,615	0	283,615
Operating expense charged to plant	(360,703)	0	(360,703)
Outside services – other	654,506	0	654,506
Salaries and wages – General	1,086,991	0	1,086,991
Office supplies & other office expense	308,786	0	308,786
Regulatory commission expense	169,355	0	169,355
Pension and other benefits	867,766	0	867,766
Rent	178,706	0	178,706
Insurance	423,389	0	423,389
Office utilities	411,346	0	411,346
Miscellaneous	120,273	0	120,273
Depreciation expense	3,198,990	0	3,198,990
Amortization of CIAC	(704,302)	0	(704,302)
Amortization of PAA	(115,669)	0	(115,669)
Amortization of ITC	(328)	0	(328)
Franchise and other taxes	(3,473)	0	(3,473)
Property taxes	154,066	0	154,066
Payroll taxes	286,024	0	286,024
Regulatory fee	22,810	2,312	25,122
Deferred income tax	(26,513)	0	(26,513)
State income tax	50,650	44,393	95,043
Federal income tax	414,823	363,575	778,398
Total operating revenue deductions	14,231,071	410,280	14,641,351
Net operating income for a return	$3,315,263	$1,367,735	$4,682,998

SCHEDULE II-A
Carolina Water Service, Inc. of North Carolina
Docket No. W-354, Sub 364
Original Cost Rate Base
For the Twelve Months Ended March 31, 2019
CWSNC Water Operations

Item	Amount
Plant in service	$114,766,817
Accumulated depreciation	(29,553,703)
Net plant in service	85,213,114
Cash working capital	1,184,436
Contributions in aid of construction	(17,662,813)
Advances in aid of construction	(23,760)
Accumulated deferred income taxes	(2,312,807)
Customer deposits	(175,942)
Inventory	167,608
Gain on sale and flow back taxes	(281,868)
Plant acquisition adjustment	(2,085,004)
Excess book value	0
Cost-free capital	(121,791)
Average tax accruals	(81,595)
Regulatory liability for excess deferred taxes	(2,084,991)
Deferred charges	1,611,323
Pro forma plant	0
Original cost rate base	$63,345,909

Rates of return:

Present	5.23%
Approved	7.39%

SCHEDULE III-A
Carolina Water Service, Inc. of North Carolina
Docket No. W-354, Sub 364
Statement of Capitalization and Related Costs
For the Twelve Months Ended March 31, 2019
CWSNC Water Operations

	Ratio	Original Cost Rate Base	Embedded Cost	Net Operating Income
		PRESENT RATES		
Long-term Debt	50.90%	$32,243,068	5.36%	$1,728,228
Common Equity	49.10%	31,102,841	5.10%	1,587,035
Total	100.00%	$ 63,345,909		$3,315,263
		APPROVED RATES		
Long-term Debt	50.90%	$ 32,243,068	5.36%	$1,728,228
Common Equity	49.10%	31,102,841	9.50%	2,954,770
Total	100.00%	$ 63,345,909		$4,682,998

SCHEDULE I-B
Carolina Water Service, Inc. of North Carolina
Docket No. W-354, Sub 364
Net Operating Income for a Return
For the Twelve Months Ended March 31, 2019
CWSNC Sewer Operations

	Present Rates	Increase Approved	After Approved Increased
Operating Revenues:			
Service revenues	$12,961,929	$2,942,923	$15,904,852
Miscellaneous revenues	124,500	8,829	133,329
Uncollectibles	(98,511)	(22,366)	(120,877)
Total operating revenues	12,987,918	2,929,386	15,917,304
Operating Revenue Deductions:			
Salaries and wages – Maintenance	1,622,020	0	1,622,020
Purchased power	838,308	0	838,308
Purchased water and sewer	740,741	0	740,741
Maintenance and repair	1,940,932	0	1,940,932
Maintenance testing	308,671	0	308,671
Meter reading	0	0	0
Chemicals	318,617	0	318,617
Transportation	171,371	0	171,371
Operating expense charged to plant	(217,966)	0	(217,966)
Outside services – other	395,475	0	395,475
Salaries and wages – General	656,845	0	656,845
Office supplies & other office exp.	186,580	0	186,580
Regulatory commission expense	102,331	0	102,331
Pension and other benefits	524,372	0	524,372
Rent	107,979	0	107,979
Insurance	255,830	0	255,830
Office utilities	248,550	0	248,550
Miscellaneous	74,254	0	74,254
Depreciation expense	2,821,151	0	2,821,151
Amortization of CIAC	(570,054)	0	(570,054)
Amortization of PAA	(16,931)	0	(16,931)
Amortization of ITC	(251)	0	(251)
Franchise and other taxes	(2,595)	0	(2,595)
Property taxes	93,092	0	93,092
Payroll taxes	172,838	0	172,838
Regulatory fee	16,884	3,808	20,692
Deferred income tax	(33,406)	0	(33,406)
State income tax	14,845	73,140	87,985
Federal income tax	121,581	599,012	720,593
Total operating revenue deductions	10,892,064	675,960	11,568,024
Net operating income for a return	$2,095,854	$2,253,426	$4,349,280

SCHEDULE II-B
Carolina Water Service, Inc. of North Carolina
Docket No. W-354, Sub 364
Original Cost Rate Base
For the Twelve Months Ended March 31, 2019
CWSNC Sewer Operations

Item	Amount
Plant in service	$102,974,564
Accumulated depreciation	(23,646,093)
Net plant in service	79,328,471
Cash working capital	941,771
Contributions in aid of construction	(17,559,280)
Advances in aid of construction	(9,180)
Accumulated deferred income taxes	(2,884,203)
Customer deposits	(106,311)
Inventory	101,275
Gain on sale and flow back taxes	(135,943)
Plant acquisition adjustment	296,963
Excess book value	0
Cost-free capital	(139,708)
Average tax accruals	(49,923)
Regulatory liability for excess deferred taxes	(1,259,826)
Deferred charges	307,657
Pro forma plant	0
Original cost rate base	$58,831,763

Rates of return:

Present	3.56%
Approved	7.39%

SCHEDULE III-B
Carolina Water Service, Inc. of North Carolina
Docket No. W-354, Sub 364
Statement of Capitalization and Related Costs
For the Twelve Months Ended March 31, 2019
CWSNC Sewer Operations

	Ratio	Original Cost Rate Base	Embedded Cost	Net Operating Income
		PRESENT RATES		
Long-term Debt	50.90%	$ 29,945,367	5.36%	$1,605,072
Common Equity	49.10%	28,886,396	1.70%	490,782
Total	100.00%	$ 58,831,763		$2,095,854
		APPROVED RATES		
Long-term Debt	50.90%	$ 29,945,367	5.36%	$1,605,072
Common Equity	49.10%	28,886,396	9.50%	2,744,208
Total	100.00%	$ 58,831,763		$4,349,280

SCHEDULE I-C
Carolina Water Service, Inc. of North Carolina
Docket No. W-354, Sub 364
Net Operating Income for a Return
For the Twelve Months Ended March 31, 2019
BF/FH/TC Water Operations

	Present Rates	Increase Approved	After Approved Increase
Operating Revenues:			
Service revenues	$1,304,521	$97,488	$1,402,009
Miscellaneous revenues	51,060	312	51,372
Uncollectibles	(16,567)	(1,239)	(17,806)
Total operating revenues	1,339,014	96,561	1,435,575
Operating Revenue Deductions:			
Salaries and wages – Maintenance	308,862	0	308,862
Purchased power	69,724	0	69,724
Purchased water and sewer	0	0	0
Maintenance and repair	63,151	0	63,151
Maintenance testing	8,314	0	8,314
Meter reading	30,753	0	30,753
Chemicals	44,189	0	44,189
Transportation	38,746	0	38,746
Operating expense charged to plant	(41,503)	0	(41,503)
Outside services – other	69,135	0	69,135
Salaries and wages – General	125,075	0	125,075
Office supplies & other office exp.	35,984	0	35,984
Regulatory commission expense	17,639	0	17,639
Pension and other benefits	99,850	0	99,850
Rent	21,337	0	21,337
Insurance	50,550	0	50,550
Office utilities	43,252	0	43,252
Miscellaneous	11,671	0	11,671
Depreciation expense	169,164	0	169,164
Amortization of CIAC	(56,417)	0	(56,417)
Amortization of PAA	13,303	0	13,303
Amortization of ITC	0	0	0
Franchise and other taxes	2,583	0	2,583
Property taxes	10,553	0	10,553
Payroll taxes	32,912	0	32,912
Regulatory fee	1,741	125	1,866
Deferred income tax	(923)	0	(923)
State income tax	2,145	2,411	4,556
Federal income tax	17,569	19,745	37,314
Total operating revenue deductions	1,189,358	22,281	1,211,639
Net operating income for a return	$149,656	$74,280	$223,936

SCHEDULE II-C
Carolina Water Service, Inc. of North Carolina
Docket No. W-354, Sub 364
Original Cost Rate Base
For the Twelve Months Ended March 31, 2019
BF/FH/TC Water Operations

Item	Amount
Plant in service	$6,285,688
Accumulated depreciation	(2,083,262)
Net plant in service	4,202,426
Cash working capital	124,591
Contributions in aid of construction	(1,055,139)
Advances in aid of construction	0
Accumulated deferred income taxes	(84,226)
Customer deposits	(16,236)
Inventory	1,503
Gain on sale and flow back taxes	0
Plant acquisition adjustment	13,196
Excess book value	0
Cost-free capital	0
Average tax accruals	(5,624)
Regulatory liability for excess deferred taxes	(291,777)
Deferred charges	140,413
Pro forma plant	0
Original cost rate base	$3,029,127
Rates of return:	
Present	4.94%
Approved	7.39%

SCHEDULE III-C
Carolina Water Service, Inc. of North Carolina
Docket No. W-354, Sub 364
Statement of Capitalization and Related Costs
For the Twelve Months Ended March 31, 2019
BF/FH/TC Water Operations

	Ratio	Original Cost Rate Base	Embedded Cost	Net Operating Income
		PRESENT RATES		
Long-term Debt	50.90%	$ 1,541,826	5.36%	$82,642
Common Equity	49.10%	1,487,301	4.51%	67,014
Total	100.00%	$ 3,029,127		$149,656
		APPROVED RATES		
Long-term Debt	50.90%	$ 1,541,826	5.36%	$82,642
Common Equity	49.10%	1,487,301	9.50%	141,294
Total	100.00%	$ 3,029,127		$223,936

SCHEDULE I-D
Carolina Water Service, Inc. of North Carolina
Docket No. W-354, Sub 364
Net Operating Income for a Return
For the Twelve Months Ended March 31, 2019
BF/FH Sewer Operations

	Present Rates	Increase Approved	After Approved Increase
Operating Revenues:			
Service revenues	$2,099,870	$143,157	$2,243,027
Miscellaneous revenues	22,114	458	22,572
Uncollectibles	(26,668)	(1,818)	(28,486)
Total operating revenues	2,095,316	141,797	2,237,113
Operating Revenue Deductions:			
Salaries and wages – Maintenance	334,600	0	334,600
Purchased power	146,154	0	146,154
Purchased water and sewer	0	0	0
Maintenance and repair	207,709	0	207,709
Maintenance testing	25,219	0	25,219
Meter reading	0	0	0
Chemicals	19,210	0	19,210
Transportation	40,468	0	40,468
Operating expense charged to plant	(44,961)	0	(44,961)
Outside services – other	72,182	0	72,182
Salaries and wages – General	135,498	0	135,498
Office supplies & other office expense	37,514	0	37,514
Regulatory commission expense	18,429	0	18,429
Pension and other benefits	108,171	0	108,171
Rent	22,286	0	22,286
Insurance	52,793	0	52,793
Office utilities	44,523	0	44,523
Miscellaneous	12,219	0	12,219
Depreciation expense	391,406	0	391,406
Amortization of CIAC	(146,182)	0	(146,182)
Amortization of PAA	42,674	0	42,674
Amortization of ITC	0	0	0
Franchise and other taxes	2,830	0	2,830
Property taxes	11,022	0	11,022
Payroll taxes	35,654	0	35,654
Regulatory fee	2,724	184	2,908
Deferred income tax	(8,286)	0	(8,286)
State income tax	7,834	3,540	11,374
Federal income tax	64,160	28,995	93,155
Total operating revenue deductions	1,635,850	32,719	1,668,569
Net operating income for a return	$459,466	$109,078	$568,544

SCHEDULE II-D
Carolina Water Service, Inc. of North Carolina
Docket No. W-354, Sub 364
Original Cost Rate Base
For the Twelve Months Ended March 31, 2019
BF/FH Sewer Operations

Item	Amount
Plant in service	$14,185,016
Accumulated depreciation	(2,614,885)
Net plant in service	11,570,131
Cash working capital	154,002
Contributions in aid of construction	(3,993,443)
Advances in aid of construction	0
Accumulated deferred income taxes	(714,208)
Customer deposits	(16,958)
Inventory	1,570
Gain on sale and flow back taxes	0
Plant acquisition adjustment	936,967
Excess book value	0
Cost-free capital	0
Average tax accruals	(6,056)
Regulatory liability for excess deferred taxes	(304,750)
Deferred charges	63,314
Pro forma plant	0
Original cost rate base	$7,690,568
Rates of return:	
Present	5.97%
Approved	7.39%

SCHEDULE III-D
Carolina Water Service, Inc. of North Carolina
Docket No. W-354, Sub 364
Statement of Capitalization and Related Costs
For the Twelve Months Ended March 31, 2019
BF/FH Sewer Operations

	Ratio	Original Cost Rate Base	Embedded Cost	Net Operating Income
		PRESENT RATES		
Long-term Debt	50.90%	$ 3,914,499	5.36%	$209,817
Common Equity	49.10%	3,776,069	6.61%	249,649
Total	100.00%	$ 7,690,568		$ 459,466
		APPROVED RATES		
Long-term Debt	50.90%	$ 3,914,499	5.36%	$ 209,817
Common Equity	49.10%	3,776,069	9.50%	358,727
Total	100.00%	$ 7,690,568		$ 568,544

EVIDENCE AND CONCLUSIONS FOR FINDINGS OF FACT NOS. 61–63

Rate Design

The evidence supporting these findings of fact is found in the verified Application and the accompanying NCUC Form W-1, the Stipulation, and the testimony and exhibits of Public Staff witnesses Junis and Casselberry and CWSNC witness DeStefano.

The water rates proposed by CWSNC in its Application were based on a fixed-to-variable ratio of 52% fixed for the base facility charge and 48% variable for the usage charge. Sewer rates were based on a fixed-to-variable ratio of 80% fixed for the base facility charge and 20% variable for the usage charge.

As part of its Application and as a matter of rate design in this case CWSNC proposes to include in its Uniform Sewer Rate Division, customers in the CLMS service area. CWSNC has maintained the CLMS system rates steady for the last four general rate cases (Docket No. W-354, Subs 336, 344, 356, and 360) in order to allow the remainder of the Uniform Sewer Rate Division to move toward parity with the CLMS sewer rates.

Public Staff witness Junis testified that the Public Staff recommended a service revenue ratio of 45/55 (base facilities charge to usage charge) for Uniform Water and BF/FH/TC Water residential customers, which he stated was consistent with the Public Staff's previous recommendations in CWSNC rate cases and similar to the stated target of 40/60 in the most recent Aqua North Carolina, Inc. (Aqua) rate case, Docket No. W-218, Sub 497. Moreover, he stated the rate design ratio of 45/55 was incorporated in Public Staff witness Casselberry's testimony and exhibits detailing the billing analysis and proposed rates. Tr. vol. 8, 107, 155.

Public Staff witness Junis recommended a 65/35 ratio for Uniform Sewer residential customers, an incremental approach to the target of 45/55, which was also incorporated in witness Casselberry's billing analysis and proposed rates. Tr. vol. 8, 159. Further, the Public Staff recommended that CLMS should be fully incorporated into the Uniform Sewer Rate Division as requested by the Company and that the Public Staff's recommended rates for the Uniform Sewer Rate Division should apply to CLMS customers.

On December 2, 2019, the CLCA filed a Resolution with the Commission whereby it stated that the Association

- strongly opposes being singled out for higher rates than any other territory served by CWSNC, and requests that the Commission adopt a uniform rate schedule for all CWSNC wastewater treatment customers; and
- requests that the Commission move Corolla Light and Monteray Shores area to the uniform rate schedule after thoroughly investigating and

analyzing the basis of the CWSNC request, allowing only an increase that is clearly justified.

During the expert witness hearing in response to a question from the Commission, CLCA indicated that it has no objection to the Stipulation. Tr. vol. 9, 200–01.

In the Stipulation, the Stipulating Parties agreed to a rate design for water utility service for its Uniform Water and BF/FH/TC Water residential customers to be based on a 50/50 ratio of base charge to usage charge, and to use an 80/20 ratio of base charge to usage charge for CWSNC's Uniform Sewer residential customers.[20]

Based upon the foregoing and the entire record herein, the Commission finds that it is appropriate to utilize a 50/50 ratio of base charge to usage charge in this proceeding for CWSNC's Uniform Water and BF/FH/TC Water residential customers and an 80/20 ratio of base charge to usage charge for CWSNC's Uniform Sewer residential customers as agreed to by the Company and the Public Staff, embodied in the Stipulation, and not opposed by any party. Further, the Commission concludes that it is reasonable and appropriate to consolidate the CLMS sewer service rates with the Company's Uniform Sewer Division rates as requested by CWSNC and supported by both the Public Staff and the CLCA. The Commission concludes that such rate design is fair and reasonable to both CWSNC and its customers. Therefore, taking into account the forgoing findings and conclusions, the Commission concludes that the rates and charges included in Appendices A-1 and A-2, and the Schedules of Connection Fees for Uniform Water and Uniform Sewer, attached hereto as Appendices B-1 and B-2, are just and reasonable and should be approved.

EVIDENCE AND CONCLUSIONS FOR FINDINGS OF FACT NOS. 64-65

Water and Sewer System Improvement Charges

The evidence supporting these findings of fact is found in the generic rulemaking proceeding, Docket No. W-100, Sub 54, wherein the Commission issued orders establishing procedures for implementing and applying the WSIC and SSIC mechanism; in CWSNC's 2013 rate case, Docket No. W-354, Sub 336, wherein the Commission initially approved the Company's WSIC and SSIC mechanism; and in the Commission's prior orders approving WSIC and SSIC mechanisms for CWSNC and the other Corix companies that have been merged into CWSNC.

The Commission's previously-approved WSIC and SSIC rate adjustment mechanism continues in effect, although as required by Commission Rules R7-39(k) and R10-26(k), it has been reset to zero in this rate case. The WSIC and SSIC mechanism is designed to recover between rate case proceedings the costs associated with investment in certain completed, eligible projects for water and sewer system or water quality improvements pursuant to N.C.G.S. § 62-133.12. The WSIC and SSIC surcharge is

[20] BF/FH Sewer Rate Division has a monthly flat rate for residential customers.

subject to Commission approval and to audit and refund provisions. Any cumulative system improvement charge recovered pursuant to the WSIC and SSIC mechanism may not exceed 5% of the total annual service revenues approved by the Commission in this rate case proceeding.

Based on the service revenues set forth and approved in this Order, the maximum WSIC and SSIC charges as of the effective date of this Order are:

Item	Service Revenues	Cap %	WSIC & SSIC Cap
CWSNC Uniform Water Operations	$19,271,785	X 5% =	$963,589
CWSNC Uniform Sewer Operations	$15,904,852	X 5% =	$795,243
BF/FH/TC Water Operations	$1,402,009	X 5% =	$70,100
BF/FH Sewer Operations	$2,243,027	X 5% =	$112,151

EVIDENCE AND CONCLUSIONS FOR FINDINGS OF FACT NOS. 66-68

Recommendations of the Public Staff

The evidence for these findings of fact is found in the Company's NCUC Form W-1, the testimony of Public Staff witness Casselberry, and the testimony of Company witness DeStefano.

In her prefiled testimony, witness Casselberry stated,

> The Public Staff recommends that in the next general rate case, W-1, Item 26, be reconciled with the Company's bill data to ensure that the filing does not include double bills, that the Company accounts for multi-unit customers, and that other bills produced, such as final bills, late notices, re-bills, or other miscellaneous bills are not included in the W-1, Item 26 filing.

Tr. vol. 8, 91. The Company does not oppose this recommendation of the Public Staff.

In response to the Commission's question during the expert witness hearing regarding whether the Company will be able to provide the information requested by the Public Staff, witness DeStefano responded that, "[t]he Company expects to be able to provide the information requested." Tr. vol. 9, 197.

In its Application the Company requested to increase its reconnection fee from $27.00 to $42.00. Witness Casselberry stated in her testimony that the Public Staff did not oppose increasing the reconnection fee from $27.00 to $42.00.

In its Application the Company also proposed to increase the water connection charge from $500 to $1,080 and the sewer connection charge from $2,000 to $2,635 for Winston Pointe Subdivision, Phase IA. Witness Casselberry stated in her testimony that

the Public Staff recommended a connection charge of $1,080 for water and $1,400 for sewer in Winston Pointe Subdivision, Phase IA, as the connection charge should reflect Johnston County's – where the Company purchases bulk water and sewer treatment for Winston Pointe Subdivision – current bulk capacity fee for water and sewer. Witness Casselberry stated that CWSNC indicated that it agreed with the Public Staff's recommendation. Tr. vol. 8, 94.

In light of the foregoing the Commission concludes that it is reasonable and appropriate for the Company to provide accurate bill data and ensure that accurate data is filed in its NCUC Form W-1, Item 26 in its next rate case filing. The Commission further concludes that the reconnection fee should be increased from $27.00 to $42.00, and that a connection charge of $1,080 for water and $1,400 for sewer in Winston Pointe Subdivision, Phase 1A, is reasonable and appropriate.

IT IS, THEREFORE, ORDERED as follows:

1. That the affidavit of CWSNC's Financial Planning and Analysis Manager, Matthew Schellinger, filed on January 10, 2020, and the Public Staff's Revised Settlement Exhibits I and II filed on January 13, 2020, in these dockets are hereby entered into evidence;

2. That all late-filed exhibits filed by CWSNC and the Public Staff in these dockets are hereby admitted into evidence. That the Resolution of Corolla Light Community Association, Inc., filed on December 2, 2019 is also admitted into evidence;

3. That the Partial Joint Settlement Agreement and Stipulation is incorporated herein by reference and is hereby approved in its entirety;

4. That the Partial Joint Settlement Agreement and Stipulation and the parts of this Order pertaining to the contents of that agreement shall not be cited or treated as precedent in future proceedings;

5. That CWSNC's request to defer incremental O&M costs related to Hurricane Florence storm impacts is approved as set forth in the Stipulation and stated herein, and that CWSNC's request to defer depreciation expense on its capital investments and lost revenues related to Hurricane Florence storm impacts is hereby denied;

6. That CWSNC's Petition to defer post-in-service costs associated with the two WWTPs is approved; provided, however, that the Company shall be, and hereby is, required to cease deferring said costs concurrent with the date the Company is authorized to begin reflecting the costs associated with the WWTPs in rates;

7. That CWSNC's Petition to defer post-in-service costs associated with the two AMR installation projects is denied;

8. That the Schedules of Rates, attached hereto as Appendices A-1 and A-2, and the Schedules of Connection Fees for Uniform Water and Uniform Sewer, attached hereto as Appendices B-1 and B-2, are hereby approved and deemed to be filed with the Commission pursuant to N.C.G.S. § 62-138, and are hereby authorized to become effective for service rendered on and after the issuance date of this Order;[21]

9. That the Notices to Customers, attached hereto as Appendices C-1 and C-2 shall be mailed with sufficient postage or hand delivered to all affected customers in each relevant service area, respectively, in conjunction with the next regularly scheduled billing process;

10. That CWSNC shall file the attached Certificate of Service, properly signed and notarized, not later than ten days after the Notices to Customers are mailed or hand delivered to customers;

11. That CWSNC's federal protected EDIT should continue to be flowed back in accordance with the RSGM pursuant to the Commission's Sub 360 Order;

12. That it is reasonable and appropriate for purposes of this proceeding for CWSNC to refund its remaining federal unprotected EDIT balances over 24 months instead of the remaining 35 months as originally ordered by the Commission in Sub 360;

13. That CWSNC's state EDIT recorded pursuant to the Commission's Sub 138 Order should continue to be amortized in accordance with the Commission's Sub 356 Order and as confirmed by the Commission in its Sub 360 Order;

14. That CWSNC shall receive estimates for the cost of a filtration system in Bradfield Farms Subdivision within 60 days of the date of this Order and shall share those estimates with the Bradfield Farms Homeowners Association;

15. That with respect to AMR meter installation projects planned for the future, CWSNC shall work with the Public Staff pursuant to N.C.G.S. § 62-133.12 and Commission Rule R7-39 to mitigate regulatory lag using WSIC recovery. The burden to prove CWSNC's investments recovered under the WSIC mechanism are reasonably and prudently incurred as required by N.C.G.S. § 62-133.12 and Commission Rule R7-39 shall remain with CWSNC;

16. That in the Company's next general rate case filing CWSNC shall ensure that its NCUC Form W-1, Item 26 is reconciled with the Company's bill data to ensure that the filing does not include double bills, that the Company accounts for multi-unit

[21] CWSNC's tariffs will be revised to reflect the change in taxability of CIAC based on the process outlined in Ordering Paragraph 4 of the Commission's February 11, 2020 Order, in Docket Nos. W-100, Sub 57 and W-100, Sub 62.

customers, and that other bills produced, such as final bills, late notices, re-bills, or other miscellaneous bills are not included in the NCUC Form W-1, Item 26 filing; and

17. That the Chief Clerk shall establish Docket No. W-354, Sub 364A as the single docket to be used for all future WSIC and SSIC filings, orders, and reporting requirements and shall close Docket No. W-354, Sub 360A.

ISSUED BY ORDER OF THE COMMISSION.

This the 31st day of March, 2020.

NORTH CAROLINA UTILITIES COMMISSION

Kimberley A. Campbell, Chief Clerk

SCHEDULE OF RATES

for

CAROLINA WATER SERVICE, INC. OF NORTH CAROLINA

for providing water and sewer utility service

in

ALL OF ITS SERVICE AREAS IN NORTH CAROLINA

(excluding Fairfield Harbour Service Area, Treasure Cove, Register Place Estates, North Hills, Glen Arbor/North Bend, Bradfield Farms, Silverton, Woodland Farms, and Larkhaven Subdivisions, and Hawthorne at the Green Apartments

WATER RATES AND CHARGES

Monthly Metered Water Service (Residential and Commercial):

Base Facility Charge (based on meter size with zero usage)

< 1” meter	$ 28.92
1” meter	$ 72.30
1 1/2” meter	$ 144.60
2” meter	$ 231.36
3” meter	$ 433.80
4” meter	$ 723.00
6” meter	$1,446.00

Usage Charge:

A. Treated Water/1,000 gallons $ 8.27

B. Untreated Water/1,000 gallons
(Brandywine Bay Irrigation Water) $ 4.23

C. Purchased Water for Resale, per 1,000 gallons:

Service Area	Bulk Provider		
Carolina Forest	Montgomery County	$	3.19
High Vista Estates	City of Hendersonville	$	3.40
Riverbend	Town of Franklin	$	7.50
Riverpointe	Charlotte Water	$	6.48
Whispering Pines	Town of Southern Pines	$	3.28
White Oak Plantation/ Lee Forest	Johnston County	$	2.65
Winston Plantation	Johnston County	$	2.65
Winston Point	Johnston County	$	2.65
Woodrun	Montgomery County	$	3.19
Yorktown	City of Winston Salem	$	5.79
Zemosa Acres	City of Concord	$	5.41
Carolina Trace	City of Sanford	$	2.21

Commercial customers, including condominiums or other property owner associations who bill their members directly, shall have a separate account set up for each meter and each meter shall be billed separately based on the size of the meter and usage associated with the meter.

When because of the method of water line installation utilized by the developer or owner, it is impractical to meter each unit or other structure separately, the following will apply:

Sugar Mountain Service Area:
Where service to multiple units or other structures is provided through a single meter, the average usage for each unit or structure served by that meter will be calculated. Each unit or structure will be billed based upon that average usage plus the base monthly charge for a <1" meter.

Mount Mitchell Service Area:
Service will be billed based upon the Commission-approved monthly flat rate.

Monthly Flat Rate Service: (Billed in Arrears)	$ 58.54
Availability Rate: (Semiannual)	
Applicable only to property owners in Carolina Forest and Woodrun Subdivisions in Montgomery County	$ 27.15
Availability Rate: (Monthly)	
Applicable only to property owners in Linville Ridge Subdivision	$ 13.60

Availability Rate: (Monthly rate, billed semiannually)

Applicable only to property owners in Fairfield Sapphire Valley Service Area	$ 10.05

Availability Rate: (Monthly rate, billed quarterly))

Applicable only to property owners in Connestee Falls	$ 5.30

Meter Testing Fee: [1/]	$ 20.00
New Water Customer Charge:	$ 27.00

Reconnection Charge: [2/]

If water service is cut off by utility for good cause	$ 42.00
If water service is discontinued at customer's request	$ 42.00

Reconnection Charge: [3/](Flat-rate water customers)

If water service is cut off by utility for good cause	Actual Cost

Management Fee: (in the following subdivisions only)

(Per connection)

Wolf Laurel	$150.00
Covington Cross Subdivision (Phases 1 & 2)	$100.00

Oversizing Fee: (in the following subdivision only)

(One-time charge per single-family equivalent)

Winghurst	$400.00

Meter Fee:

For <1" meters	$ 50.00
For meters 1" or larger	Actual Cost

Irrigation Meter Installation:	Actual Cost

SEWER RATES AND CHARGES

Monthly Metered Sewer Service:

A. Base Facility Charge:

Residential (zero usage)	$ 58.91
Commercial (based on meter size with zero usage)	
< 1” meter	$ 58.91
1” meter	$ 147.28
1 1/2” meter	$ 294.55
2” meter	$ 471.28
3” meter	$ 883.65
4” meter	$1,472.75
6” meter	$2,945.50

B. Usage charge, per 1,000 gallons $ 4.59

Commercial customers, including condominiums or other property owner associations who bill their members directly, shall have a separate account set up for each meter and each meter shall be billed separately based on the size of the meter and usage associated with the meter.

Monthly Metered Purchased Sewer Service:

Collection Charge (Residential and Commercial) $ 41.24

Usage charge, per 1,000 gallons
(based on purchased water consumption)

Service Area	Bulk Provider	
White Oak Plantation/ Lee Forest/Winston Pt.	Johnston County	$ 5.57
Kings Grant	Two Rivers Utilities	$ 3.98
College Park	Town of Dallas	$ 7.33

Monthly Flat Rate Service: $ 73.73

Multi-residential customers who are served by a master meter shall be charged the flat rate per unit. $ 73.73

Mt. Carmel Subdivision Service Area:

Monthly Base Facility Charge	$ 7.29
Monthly Collection Charge (Residential and Commercial)	$ 41.24
Usage Charge, per 1,000 gallons (based on metered water from the water supplier)	$ 6.32

Regalwood and White Oak Estates Subdivision Service Area:

Monthly Flat Rate Sewer Service	
Residential Service	$ 73.73
White Oak High School	$2,187.33
Child Castle Daycare	$ 280.41
Pantry	$ 153.76

Fairfield Mountain/Apple Valley (a.k.a. Rumbling Bald) Service Area, and Highland Shores Subdivision:

Monthly Sewer Rates:

Residential	
Collection charge/dwelling unit	$ 41.24
Treatment charge/dwelling unit	$ 69.50
Total monthly flat rate/dwelling unit	$ 110.74
Commercial and Other:	
Minimum monthly collection and treatment charge	$ 110.74
Monthly collection and treatment charge for customers who do not take water service	$ 110.74
Treatment charge per dwelling unit	
Small (less than 2,500 gallons per month)	$ 78.50
Medium (2,500 to 10,000 gallons per month)	$ 139.50
Large (over 10,000 gallons per month)	$ 219.50
Collection Charge (per 1,000 gallons)	$ 13.93

The Ridges at Mountain Harbour:

Monthly Sewer Rates:

Collection charge (Residential and Commercial)	$ 41.24
Treatment charge (Residential and Commercial)	
< 1" meter	$ 18.42
2" meter	$ 147.36

Availability Rate: (Monthly rate, billed semiannually)

Applicable only to property owners in Fairfield Sapphire Valley Service Area	$ 10.20

Availability Rate: (Monthly rate, billed quarterly)

Applicable only to property owners in Connestee Falls	$ 5.75

New Sewer Customer Charge: [4/] $ 27.00

Reconnection Charge: [5/]

If sewer service is cut off by utility for good cause: Actual Cost

MISCELLANEOUS UTILITY MATTERS

Charge for processing NSF Checks:	$ 25.00
Bills Due:	On billing date
Bills Past Due:	21 days after billing date
Billing Frequency:	Bills shall be rendered monthly in all service areas, except for Mt. Carmel, which will be billed bimonthly. Availability rates will be billed quarterly in advance for Connestee Falls, semiannually in advance for Carolina Forest, Woodrun, and Fairfield Sapphire Valley, and monthly for Linville Ridge.

Finance Charge for Late Payment:	1% per month will be applied to the unpaid balance of all bills still past due 25 days after billing date.

Notes:

1/ If a customer requests a test of a water meter more frequently than once in a 24-month period, the Company will collect a $20.00 service charge to defray the cost of the test. If the meter is found to register in excess of the prescribed accuracy limits, the meter testing charge will be waived. If the meter is found to register accurately or below prescribed accuracy limits, the charge shall be retained by the Company. Regardless of the test results, customers may request a meter test once in a 24-month period without charge.

2/ Customers who request to be reconnected within nine months of disconnection at the same address shall be charged the base facility charge for the service period they were disconnected.

3/ The utility shall itemize the estimated cost of disconnecting and reconnecting service and shall furnish this estimate to customer with cut-off notice.

4/ This charge shall be waived if customer is also a water customer within the same service area.

5/ The utility shall itemize the estimated cost of disconnecting and reconnecting service and shall furnish this estimate to customer with cut-off notice. This charge will be waived if customer also receives water service from Carolina Water Service within the same service area. Customers who request to be reconnected within nine months of disconnection at the same address shall be charged the base facility charge for the service period they were disconnected.

SCHEDULE OF RATES

for

CAROLINA WATER SERVICE, INC. OF NORTH CAROLINA

for providing water and sewer utility service

in

TREASURE COVE, REGISTER PLACE ESTATES, NORTH HILLS, GLEN ARBOR/NORTH BEND SUBDIVISIONS, FAIRFIELD HARBOUR SERVICE AREA, BRADFIELD FARMS SUBDIVISION, LARKHAVEN SUBDIVISION, SILVERTON, AND WOODLAND FARMS SUBDIVISIONS, AND HAWTHORNE AT THE GREEN APARTMENTS

WATER RATES AND CHARGES

Monthly Metered Water Service (Residential and Commercial):

Base Facility Charge (based on meter size with zero usage)

< 1” meter	$ 17.30
1” meter	$ 43.25
1 1/2” meter	$ 86.50
2” meter	$138.40

Usage Charge, per 1,000 gallons	$ 4.20

Availability Rate: (Monthly rate, billed semiannually)

Applicable only to property owners in Fairfield Harbour Service Area	$ 3.55

Connection Charge:

Treasure Cove Subdivision	$ 0.00
North Hills Subdivision	$ 100.00
Glen Arbor/North Bend Subdivision	$ 0.00
Register Place Estates	$ 500.00

Fairfield Harbor: [1/]

All Areas Except Harbor Pointe II Subdivision

Recoupment of capital fees per tap	$ 335.00
Connection charge per tap	$ 140.00

Harbor Pointe Subdivision and any area where mains have been installed after July 24, 1989

Recoupment of capital fee per tap	$ 650.00
Connection charge per tap	$ 320.00

Bradfield Farms:

Connection charge per tap	None

Meter Testing Fee: [2/]	$ 20.00
New Water Customer Charge:	$ 27.00

Reconnection Charge: [3/]

If water service is cut off by utility for good cause	$ 42.00
If water service is discontinued at customer's request	$ 42.00
New Meter Charge:	Actual Cost
Irrigation Meter Installation:	Actual Cost

SEWER RATES AND CHARGES

Monthly Sewer Service:

Residential:

Flat Rate, per dwelling unit	$ 53.91
Bulk Flat Rate, per REU	$ 53.91

Commercial and Other:

Monthly Flat Rate (Customers who do not take water service)	$ 53.91

Monthly Metered Rates
(based on meter size with zero usage)

<1" meter	$ 44.62
1" meter	$ 111.55
1 1/2" meter	$ 223.10
2" meter	$ 356.96
Usage Charge, per 1,000 gallons	$ 2.25

Bulk Sewer Service for Hawthorne at the Green Apartments: [4/]

Bulk Flat Rate, per REU	$ 53.91

(To be collected from Hawthorne and delivered to Carolina Water Service, Inc. of North Carolina for treatment of the Hawthorne wastewater pursuant to Docket No. W-218, Sub 291)

Availability Rate: (Monthly rate, billed semiannually)

Applicable only to property owners in Fairfield Harbour Service Area	$ 2.85

Connection Charge

Fairfield Harbour: [1/]

All Areas Except Harbor Pointe II Subdivision

Recoupment of capital fees per tap	$ 735.00
Connection charge per tap	$ 140.00

Harbor Pointe Subdivision and any area where mains have been installed after July 24, 1989

Recoupment of capital fee per tap	$ 2,215.00
Connection charge per tap	$ 310.00

Bradfield Farms:

Connection charge per tap	None

New Sewer Customer Charge: [5/] $ 27.00

Reconnection Charge: [6/]
If sewer service is cut off by utility for good cause: Actual Cost

MISCELLANEOUS UTILITY MATTERS

Charge for processing NSF Checks:	$ 25.00
Bills Due:	On billing date
Bills Past Due:	21 days after billing date
Billing Frequency:	Bills shall be monthly for service in arrears. Availability billings semiannually in advance.
Finance Charge for Late Payment:	1% per month will be applied to the unpaid balance of all bills still past due 25 days after billing date.

Notes:

1/ The recoupment of capital portion of the connection charges shall be due and payable at such time as the main water and sewer lines are installed in front of each lot, and the tap-on fee for water and sewer shall be payable upon request by the owner of each lot to be connected to the water and sewer lines. With written consent of the company, payment of the recoupment capital portion of the connection charge may be made payable over five-year period following the installation of the water and sewer mains in front of each lot, payment to be made in such a manner and in such installments as agreed upon between lot owner and the company, together with interest on the balance of the unpaid recoupment of capital fee from said time until payment in full at the rate of 6% per annum.

2/ If a customer requests a test of a water meter more frequently than once in a 24-month period, the Company will collect a $20.00 service charge to defray the cost of the test. If the meter is found to register in excess of the prescribed accuracy limits, the meter testing charge will be waived. If the meter is found to register accurately or below prescribed accuracy limits, the charge shall be retained by the Company. Regardless of the test results, customers may request a meter test once in a 24-month period without charge.

3/ Customers who request to be reconnected within nine months of disconnection at the same address shall be charged the base facility charge for the service period they were disconnected.

4/ Each Apartment building will be considered 92.42% occupied on an ongoing basis for billing purposes as soon as the certificate of occupancy is issued for that apartment building.

[5/] This charge shall be waived if customer is also a water customer within the same service area.

[6/] The utility shall itemize the estimated cost of disconnecting and reconnecting service and shall furnish this estimate to customer with cut-off notice. This charge will be waived if customer also receives water service from Carolina Water Service within the same service area. Customers who request to be reconnected within nine months of disconnection at the same address shall be charged the base facility charge for the service period they were disconnected.

Issued in Accordance with Authority Granted by the North Carolina Utilities Commission in Docket No. W-354, Sub 364, on this the 31st day of March, 2020.

CAROLINA WATER SERVICE, INC. OF NORTH CAROLINA

SCHEDULE OF CONNECTION FEES

FOR WATER UTILITY SERVICE UNDER UNIFORM RATES

Uniform Connection Fees: [1/]

The following uniform connection fees apply unless specified differently by contract approved by and on file with the North Carolina Utilities Commission.

Connection Charge (CC), per SFE (Single-Family Equivalent)	$ 100.00
Plant Modification Fee (PMF), per SFE	$ 400.00

The systems where connection fees other than the uniform fees have been approved and/or allowed to become effective by the North Carolina Utilities Commission are as follows. These fees are per SFE:

Subdivision	CC	PMF
Abington	$ 0.00	$ 0.00
Abington, Phase 14	$ 0.00	$ 0.00
Amherst	$ 250.00	$ 0.00
Bent Creek	$ 0.00	$ 0.00
Blue Mountain at Wolf Laurel	$ 925.00	$ 0.00
Buffalo Creek, Phase I, II, III, IV	$ 825.00	$ 0.00
Carolina Forest	$ 0.00	$ 0.00
Chapel Hills	$ 150.00	$ 400.00
Eagle Crossing	$ 0.00	$ 0.00
Elk River Development	$1,000.00	$ 0.00
Forest Brook/Old Lamp Place	$ 0.00	$ 0.00
Harbour	$ 75.00	$ 0.00
Hestron Park	$ 0.00	$ 0.00
Hound Ears	$ 300.00	$ 0.00
Kings Grant/Willow Run	$ 0.00	$ 0.00
Lemmond Acres	$ 0.00	$ 0.00
Linville Ridge	$ 400.00	$ 0.00
Monterrey (Monterrey LLC)	$ 0.00	$ 0.00
Quail Ridge	$ 750.00	$ 0.00
Queens Harbour/Yachtsman	$ 0.00	$ 0.00
Riverpointe	$ 300.00	$ 0.00
Riverpointe (Simonini Bldrs.)	$ 0.00	$ 0.00
Riverwood, Phase 6E (Johnston County)	$ 825.00	$ 0.00
Saddlewood/Oak Hollow (Summey Bldrs.)	$ 0.00	$ 0.00

Subdivision	CC	PMF
Sherwood Forest	$ 950.00	$ 0.00
Ski Country	$ 100.00	$ 0.00
The Ridges at Mountain Harbour	$2,500.00	$ 0.00
White Oak Plantation	$ 0.00	$ 0.00
Wildlife Bay	$ 870.00	$ 0.00
Willowbrook	$ 0.00	$ 0.00
Winston Plantation	$1,100.00	$ 0.00
Winston Pointe, Phase 1A	$1,080.00	$ 0.00
Wolf Laurel	$ 925.00	$ 0.00
Woodrun	$ 0.00	$ 0.00
Woodside Falls	$ 500.00	$ 0.00

Other Connection Fees:

The following connection fees apply unless specified differently by contract approved and/or filed with the North Carolina Utilities Commission.

Amber Acres, Amber Acres North, Amber Ridge, Ashley Hills North, Bishop Pointe, Carriage Manor, Country Crossing, Covington Cross, Heather Glen, Hidden Hollow, Jordan Woods, Lindsey Point, Neuse Woods, Oakes Plantation, Randsdell Forest, Rutledge Landing, Sandy Trails, Stewart's Ridge, Tuckahoe, Wilder's Village and Forest Hill Subdivisions

Connection Charge:

A. 5/8" meter	$ 500.00
B. All other meter sizes	Actual cost of meter and installation

The systems where other connection fees have been approved and/or allowed to become effective by the North Carolina Utilities Commission are as follows:

Subdivision	CC
Lindsey Point Subdivision	$ 0.00
Amber Acres North, Sections II & IV	$ 570.00
Fairfield Mountain/Apple Valley (a.ka.a Rumbing Bald) Service Area	$ 500.00
Highland Shores Subdivision	$ 500.00
Laurel Mountain Estates	$ 0.00
Carolina Trace	$ 605.00
Connestee Falls	$ 600.00

The following connection fees apply unless specified differently by contract approved and/or filed with the North Carolina Utilities Commission.

All Areas Except Holly Forest XI, Holly Forest XIV, Holly Forest XV, Whisper Lake I, Whisper Lake II, Whisper Lake III, Deer Run, Lonesome Valley Phases I and II, and Chattooga Ridge

Recoupment of Capital Fee (RCF) [2/]	$ 0.00
Connection charge	$ 400.00

The systems where other connection fees have been approved and/or allowed to become effective by the North Carolina Utilities Commission are as follows.

Subdivision	CC	RCF
Holly Forest XI	$ 400.00	$2,400.00
Holly Forest XIV	$ 400.00	$ 250.00
Holly Forest XV	$ 400.00	$ 500.00
Whispering Lake Phase I	$ 400.00	$1,250.00
Whispering Lake Phases II and III	$ 400.00	$2,450.00
Deer Run	$ 400.00	$1,900.00
Lonesome Valley Phases I and II	$ 0.00	$ 0.00
Chattooga Ridge	$ 0.00	$ 0.00

[1/] These fees are only applicable one time, when the unit is initially connected to the system.
[2/] The recoupment of capital portion of the connection charges shall be due and payable at such time as the main water and sewer lines are installed in front of each lot, and the tap-on fee for water and sewer shall be payable upon request by the owner of each lot to be connected to the water and sewer lines. With written consent of the company, payment of the recoupment capital portion of the connection charge may be made payable over five-year period following the installation of the water and sewer mains in front of each lot, payment to be made in such a manner and in such installments as agreed upon between lot owner and the company, together with interest on the balance of the unpaid recoupment of capital fee from said time until payment in full at the rate of 6% per annum.

CAROLINA WATER SERVICE, INC. OF NORTH CAROLINA

SCHEDULE OF CONNECTION FEES FOR

SEWER UTILITY SERVICE UNDER UNIFROM RATES

Uniform Connection Fees: [1/]

The following uniform connection fees apply unless specified differently by contract approved by and on file with the North Carolina Utilities Commission.

Connection Charge (CC), per SFE (Single-Family Equivalent)	$ 100.00
Plant Modification Fee (PMF), per SFE	$1,000.00

The systems where connection fees other than the uniform fees have been approved and/or allowed to become effective by the North Carolina Utilities Commission are as follows. These fees are per SFE:

Subdivision	CC	PMF
Abington	$ 0.00	$ 0.00
Abington, Phase 14	$ 0.00	$ 0.00
Amber Acres North (Phases II & IV)	$ 815.00	$ 0.00
Ashley Hills	$ 0.00	$ 0.00
Amherst	$ 500.00	$ 0.00
Bent Creek	$ 0.00	$ 0.00
Brandywine Bay	$ 100.00	$1,456.00
Camp Morehead by the Sea	$ 100.00	$1,456.00
Elk River Development	$1,200.00	$ 0.00
Hammock Place	$ 100.00	$1,456.00
Hestron Park	$ 0.00	$ 0.00
Hound Ears	$ 30.00	$ 0.00
Independent/Hemby Acres/Beacon Hills (Griffin Bldrs.)	$ 0.00	$ 0.00
Kings Grant/Willow Run	$ 0.00	$ 0.00
Kynwood	$ 0.00	$ 0.00
Mt. Carmel/Section 5A	$ 500.00	$ 0.00
Queens Harbor/Yachtsman	$ 0.00	$ 0.00
Riverpointe	$ 300.00	$ 0.00
Riverpointe (Simonini Bldrs.)	$ 0.00	$ 0.00
Steeplechase (Spartabrook)	$ 0.00	$ 0.00
The Ridges at Mountain Harbour	$2,500.00	$ 0.00
White Oak Plantation	$ 0.00	$ 0.00
Willowbrook	$ 0.00	$ 0.00

Willowbrook (Phase 3)	$ 0.00	$ 0.00
Winston pointe (Phase 1A)	$1,400.00	$ 0.00
Woodside Falls	$ 0.00	$ 0.00

Other Connection Fees:

The systems where other connection fees have been approved and/or allowed to become effective by the North Carolina Utilities Commission are as follows.

Subdivision	
Carolina Pines	
Residential	$1,350.00 per unit (including single-family homes, condominiums, apartments, and mobile homes)
Hotels	$750.00 per unit
Nonresidential	$3.57 per gallon of daily design of discharge or $900.00 per unit, whichever is greater

Subdivision	CC
Fairfield Mountain/Apply Valley (a.k.a. Rumbling Bald) Service Area	$ 550.00
Highland Shores	$ 550.00
Carolina Trace	$ 533.00
Connestee Falls	$ 400.00

The following connection fees apply unless specified differently by contract approved and/or filed with the North Carolina Utilities Commission.

All Areas Except Holly Forest XIV, Holly Forest XV, Deer Run, and Lonesome Valley Phases I and II

Recoupment of Capital Fee (RCF) [2/]	$ 0.00
Connection charge	$ 550.00

The systems where other connection fees have been approved and/or allowed to become effective by the North Carolina Utilities Commission are as follows:

Subdivision	CC	RCF
Holly Forest XIV	$ 550.00	$1,650.00
Holly Forest XV	$ 550.00	$ 475.00
Deer Run	$ 550.00	$1,650.00
Lonesome Valley Phases I and II	$ 0.00	$ 0.00

[1/] These fees are only applicable one time, when the unit is initially connected to the system.
[2/] The recoupment of capital portion of the connection charges shall be due and payable at such time as the main water and sewer lines are installed in front of each lot, and the tap-on fee for water and sewer shall be payable upon request by the owner of each lot to be connected to the water and sewer lines. With written consent of the company, payment of the recoupment capital portion of the connection charge may be made payable over five-year period following the installation of the water and sewer mains in front of each lot, payment to be made in such a manner and in such installments as agreed upon between lot owner and the company, together with interest on the balance of the unpaid recoupment of capital fee from said time until payment in full at the rate of 6% per annum.

STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. W-354, SUB 364

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of		
Application by Carolina Water Service, Inc. of North Carolina, 4944 Parkway Plaza Boulevard, Suite 375, Charlotte, North Carolina 28217, for Authority to Adjust and Increase Rates for Water and Sewer Utility Service in All of its Service Areas in North Carolina	)	NOTICE TO CUSTOMERS

NOTICE IS HEREBY GIVEN that the North Carolina Utilities Commission has issued an Order authorizing Carolina Water Service, Inc. of North Carolina (CWSNC) to increase rates for water and sewer utility service in all of its service areas in North Carolina. The new approved rates are as follows:

WATER RATES AND CHARGES

(Excluding Fairfield Harbour Service Area and Treasure Cove, Register Place Estates, North Hills, Glen Arbor/North Bend, Bradfield Farms, Larkhaven, Silverton, and Woodland Farms Subdivisions, and Hawthorne at the Green Apartments

Uniform Water Customers:

Monthly Metered Water Service (Residential and Commercial):

Base Facility Charge (based on meter size with zero usage)

< 1” meter	$ 28.92
1” meter	$ 72.30
1 1/2” meter	$ 144.60
2” meter	$ 231.36
3” meter	$ 433.80
4” meter	$ 723.00
6” meter	$1,446.00

Usage Charge:

A. Treated Water/1,000 gallons	$ 8.27	
B. Untreated Water/1,000 gallons (Brandywine Bay Irrigation Water)		$ 4.23

C. Purchased Water for Resale, per1,000 gallons:

Service Area	Bulk Provider		
Carolina Forest	Montgomery County	$	3.19
High Vista Estates	City of Hendersonville	$	3.40
Riverbend	Town of Franklin	$	7.50
Riverpointe	Charlotte Water	$	6.48
Whispering Pines	Town of Southern Pines	$	3.28
White Oak Plantation/ Lee Forest	Johnston County	$	2.65
Winston Plantation	Johnston County	$	2.65
Winston Point	Johnston County	$	2.65
Woodrun	Montgomery County	$	3.19
Yorktown	City of Winston Salem	$	5.79
Zemosa Acres	City of Concord	$	5.41
Carolina Trace	City of Sanford	$	2.21

Commercial customers, including condominiums or other property owner associations who bill their members directly, shall have a separate account set up for each meter and each meter shall be billed separately based on the size of the meter and usage associated with the meter.

When because of the method of water line installation utilized by the developer or owner, it is impractical to meter each unit or other structure separately, the following will apply:

Sugar Mountain Service Area:

Where service to multiple units or other structures is provided through a single meter, the average usage for each unit or structure served by that meter will be calculated. Each unit or structure will be billed based upon that average usage plus the base monthly charge for a <1" meter.

Mount Mitchell Service Area:
Service will be billed based upon the Commission-approved monthly flat rate.

Monthly Flat Rate Service: (Billed in Arrears)	$ 58.54
Availability Rate: (Semiannual)	
Applicable only to property owners in Carolina Forest and Woodrun Subdivisions in Montgomery County	$ 27.15
Availability Rate: (Monthly)	
Applicable only to property owners in Linville Ridge Subdivision	$ 13.60

Availability Rate: (Monthly rate, billed semiannually)

Applicable only to property owners in Fairfield Sapphire Valley Service Area	$ 10.05

Availability Rate: (Monthly rate, billed quarterly)

Applicable only to property owners in Connestee Falls	$ 5.30

SEWER RATES AND CHARGES

(Excluding Fairfield Harbour Service Area, Treasure Cove, Register Place Estates, North Hills and Glen Arbor/North Bend Subdivisions, Bradfield Farms, Larkhaven, Silverton, and Woodland Farms Subdivisions, and Hawthorne at the Green Apartments

Uniform Sewer Customers:

Monthly Metered Sewer Service:

Base Facility Charge:

Residential (zero usage)	$ 58.91

Commercial (based on meter size with zero usage)

< 1” meter	$ 58.91
1” meter	$ 147.28
1 1/2” meter	$ 294.55
2” meter	$ 471.28
3” meter	$ 883.65
4” meter	$1,472.75
6” meter	$2,945.50

Usage charge, per 1,000 gallons	$ 4.59

Commercial customers, including condominiums or other property owner associations who bill their members directly, shall have a separate account set up for each meter and each meter shall be billed separately based on the size of the meter and usage associated with the meter.

Monthly Metered Purchased Sewer Service:

Collection Charge (residential and commercial)	$ 41.24

Usage charge, per 1,000 gallons based on purchased water consumption

Service Area	Bulk Provider	
White Oak Plantation/		
Lee Forest/Winston Pt.	Johnston County	$ 5.57
Kings Grant	Two Rivers Utilities	$ 3.98
College Park	Town of Dallas	$ 7.33

Monthly Flat Rate Service: $ 73.73

Multi-residential customers who are served by a master meter shall be charged the flat rate per unit. $ 73.73

Mt. Carmel Subdivision Service Area:

Monthly Base Facility Charge	$ 7.29
Monthly Collection Charge (Residential and commercial)	$ 41.24
Usage Charge/1,000 gallons based on purchased water	$ 6.32

Regalwood and White Oak Estates Subdivision Service Area:

Monthly Flat Rate Sewer Service	
Residential Service	$ 73.73
White Oak High School	$2,187.33
Child Castle Daycare	$ 280.41
Pantry	$ 153.76

Fairfield Mountain/Apple Valley (a.k.a. Rumbling Bald) Service Area, Highland Shores Subdivisions and Laurel Mountain Estates
Monthly Sewer Rates:

Residential:	
Collection charge/dwelling unit	$ 41.24
Treatment charge/dwelling unit	$ 69.50
Total monthly flat rate/dwelling unit	$ 110.74
Commercial and Other:	
Minimum monthly collection and treatment charge	$ 110.74
Monthly collection and treatment charge for customers Who do not take water service (per single family unit)	$ 110.74

Treatment charge per dwelling unit

Small (less than 2,500 gallons per month)	$ 78.50
Medium (2,500 to 10,000 gallons per month)	$ 139.50
Large (over 10,000 gallons per month)	$ 219.50

Collection Charge (per 1,000 gallons) $ 13.93

The Ridges at Mountain Harbour:

Monthly Sewer Rates:

Collection charge (Residential and Commercial) $ 41.24

Treatment Charge (Residential and Commercial)

< 1 inch meter	$ 18.42
2 inch meter	$ 147.36

Availability Rate: (Monthly rate, billed semiannually)

Applicable only to property owners in Fairfield Sapphire Valley Service Area $ 10.20

Availability Rate: (Monthly rate, billed quarterly)

Applicable only to property owners in Connestee Falls $ 5.75

RATE ADJUSTMENT MECHANISM:

The Commission-authorized water and sewer system improvement charge (WSIC/SSIC) rate adjustment mechanism continues in effect and will now be applicable to all customers in CWSNC's North Carolina service areas. It has been reset at zero in the Docket No. W-354, Sub 364 rate case, but CWSNC may, under the Rules and Regulations of the Commission, next apply for a rate surcharge on July 31, 2020 to become effective October 1, 2020. The WSIC/SSIC mechanism is designed to recover, between rate case proceedings, the costs associated with investment in certain completed, eligible projects for system or water quality improvement. The WSIC/SSIC mechanism is subject to Commission approval and to audit and refund provisions. Any cumulative system improvement charge recovered pursuant to the WSIC/SSIC mechanism may not exceed 5% of the total annual service revenues approved by the Commission in this general rate case proceeding. Additional information regarding the WSIC/SSIC mechanism is contained in the Commission's Order and can be accessed from the Commission's website at www.ncuc.net, under Docket Information, using the Docket Search feature for docket number "W-354 Sub 360A" and "W-354, Sub 364A" .

CREDIT/REFUNDS DUE TO REDUCTION IN FEDERAL CORPORATE INCOME TAX RATE:

On December 22, 2017, President Donald J. Trump signed into law the Tax Cuts and Jobs Act (The Tax Act), which among other things, reduced the federal corporate income tax rate from 35% to 21%, effective for taxable years beginning after December 31, 2017.

With respect to excess deferred income taxes (EDIT) resulting from the reduction in the federal corporate income tax rate, the Commission is requiring that: (1) CWSNC shall continue to flow back the federal protected EDIT to customers in accordance with the Reverse South Georgia Method as ordered by the Commission in CWSNC's last rate case (Docket No. W-354, Sub 360), and (2) CWSNC shall refund the remaining federal unprotected EDIT to customers through a levelized rider over a period of 24 months as requested by CWSNC instead of the remaining 35-month period as originally ordered by the Commission in Docket No. W-354, Sub 360.

CWSNC will provide the applicable dollar amount concerning the federal EDIT rider (refund) shown as a separate line item on individual customers' monthly bills, along with explanatory information.

ISSUED BY ORDER OF THE COMMISSION.

This the 31st day of March, 2020.

NORTH CAROLINA UTILITIES COMMISSION

Kimberley A. Campbell, Chief Clerk

STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. W-354, SUB 364

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of		
Application by Carolina Water Service, Inc. of North Carolina, 4944 Parkway Plaza Boulevard, Suite 375, Charlotte, North Carolina 28217, for Authority to Adjust and Increase Rates for Water and Sewer Utility Service in All of its Service Areas in North Carolina	)	NOTICE TO CUSTOMERS IN TREASURE COVE, REGISTER PLACE ESTATES, NORTH HILLS, AND GLEN ARBOR/NORTH BEND SUBDIVISIONS, FAIRFIELD HARBOUR SERVICE AREA, BRADFIELD FARMS, LARKHAVEN, SILVERTON, AND WOODLAND FARMS SUBDIVISIONS, AND HAWTHORNE AT THE GREEN APARTMENTS

NOTICE IS HEREBY GIVEN that the North Carolina Utilities Commission has issued an Order authorizing Carolina Water Service, Inc. of North Carolina to charge the following new rates for water and sewer utility service in Treasure Cove, Register Place Estates, North Hills, and Glen Arbor/North Bend Subdivisions, Fairfield Harbour Service Area, Bradfield Farms, Larkhaven, Silverton, and Woodland Farms Subdivisions, and Hawthorne at the Green Apartments:

WATER RATES AND CHARGES

Monthly Metered Water Service (Residential and Commercial):

Base Facility Charge (based on meter size with zero usage)	
< 1” meter	$ 17.30
1” meter	$ 43.25
1 1/2” meter	$ 86.50
2” meter	$ 138.40
Usage Charge, per 1,000 gallons	$ 4.20

Availability Rate: (Monthly rate, billed semiannually)

Applicable only to property owners in Fairfield Harbour Service Area	$ 3.55

SEWER RATES AND CHARGES

Monthly Sewer Service:

Residential:

Flat Rate, per dwelling unit	$ 53.91
Bulk Flat Rate, per REU	$ 53.91

Commercial and Other:

Monthly Flat Rate (Customers who do not take water service)	$ 53.91

Monthly Metered Rates
(based on meter size with zero usage)

<1" meter	$ 44.62
1" meter	$111.55
1 1/2" meter	$223.10
2" meter	$356.96
Usage Charge, per 1,000 gallons	$ 2.25

Bulk Sewer Service for Hawthorne at the Green Apartments:

Bulk Flat Rate, per REU	$ 53.91

(To be collected from Hawthorne and delivered to Carolina Water Service, Inc. of North Carolina for treatment of the Hawthorne wastewater pursuant to Docket No. W-218, Sub 291)

Availability Rate: (Monthly rate, billed semiannually)

Applicable only to property owners in Fairfield Harbour Service Area	$ 2.85

RATE ADJUSTMENT MECHANISM:

The Commission-authorized water and sewer system improvement charge (WSIC/SSIC) rate adjustment mechanism continues in effect and will now be applicable to all customers in CWSNC's North Carolina service areas. It has been reset at zero in the Docket No. W-354, Sub 364 rate case, but CWSNC may, under the Rules and Regulations of the Commission, next apply for a rate surcharge on July 31, 2020, to become effective October 1, 2020. The WSIC/SSIC mechanism is designed to recover, between rate case

proceedings, the costs associated with investment in certain completed, eligible projects for system or water quality improvement. The WSIC/SSIC mechanism is subject to Commission approval and to audit and refund provisions. Any cumulative system improvement charge recovered pursuant to the WSIC/SSIC mechanism may not exceed 5% of the total annual service revenues approved by the Commission in this general rate case proceeding. Additional information regarding the WSIC/SSIC mechanism is contained in the Commission's Order and can be accessed from the Commission's website at www.ncuc.net, under Docket Information, using the Docket Search feature for docket number "W-354 Sub 360A" and "W-354 Sub 364A".

CREDIT/REFUNDS DUE TO REDUCTION IN FEDERAL CORPORATE INCOME TAX RATE:

On December 22, 2017, President Donald J. Trump signed into law the Tax Cuts and Jobs Act (The Tax Act), which among other things, reduced the federal corporate income tax rate from 35% to 21%, effective for taxable years beginning after December 31, 2017.

With respect to excess deferred income taxes (EDIT) resulting from the reduction in the federal corporate income tax rate, the Commission is requiring that: (1) CWSNC shall continue to flow back the federal protected EDIT to customers in accordance with the Reverse South Georgia Method as ordered by the Commission in CWSNC's last rate case (Docket No. W-354, Sub 360), and (2) CWSNC shall refund the remaining federal unprotected EDIT to customers through a levelized rider over a period of 24 months as requested by CWSNC instead of the remaining 35-month period as originally ordered by the Commission in Docket No. W-354, Sub 360.

CWSNC will provide the applicable dollar amount concerning the federal EDIT rider (refund) shown as a separate line item on individual customers' monthly bills, along with explanatory information.

ISSUED BY ORDER OF THE COMMISSION.

This the 31st day of March, 2020.

NORTH CAROLINA UTILITIES COMMISSION

Kimberley A. Campbell

Kimberley A. Campbell, Chief Clerk

CERTIFICATE OF SERVICE

I, _____, mailed with sufficient postage or hand delivered to all affected customers the attached Notices to Customers issued by the North Carolina Utilities Commission in Docket No. W-354, Subs 363, 364, and 365, and the Notices were mailed or hand delivered by the date specified in the Order.

This the _____ day of _____, 2020.

By:_____
Signature

_____
Name of Utility Company

The above named Applicant, _____, personally appeared before me this day and, being first duly sworn, says that the required Notices to Customers were mailed or hand delivered to all affected customers, as required by the Commission Order dated _____ in Docket No. W-354, Subs 363, 364, and 365.

Witness my hand and notarial seal, this the ___ day of _____, 2020.

_____
Notary Public

_____
Printed or Typed Name

(SEAL) My Commission Expires: _____
Date

DUFF & PHELPS
A KROLL BUSINESS

2021 SBBI® Yearbook

Stocks, Bonds, Bills, and Inflation®

U.S. Capital Markets Performance by
Asset Class 1926–2020

Appendix A-1

Large-Capitalization Stocks: Total Return
From 1926 to 2020

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Jan–Dec*
1926	0.0000	-0.0385	-0.0575	0.0253	0.0179	0.0457	0.0479	0.0248	0.0252	-0.0284	0.0347	0.0196	1926	0.1162
1927	-0.0193	0.0537	0.0087	0.0201	0.0607	-0.0067	0.0670	0.0515	0.0450	-0.0502	0.0721	0.0279	1927	0.3749
1928	-0.0040	-0.0125	0.1101	0.0345	0.0197	-0.0385	0.0141	0.0803	0.0259	0.0168	0.1292	0.0049	1928	0.4361
1929	0.0583	-0.0019	-0.0012	0.0176	-0.0362	0.1140	0.0471	0.1028	-0.0476	-0.1973	-0.1246	0.0282	1929	-0.0842
1930	0.0639	0.0259	0.0812	-0.0080	-0.0096	-0.1625	0.0386	0.0141	-0.1282	-0.0855	-0.0089	-0.0706	1930	-0.2490
1931	0.0502	0.1193	-0.0675	-0.0935	-0.1279	0.1421	-0.0722	0.0182	-0.2973	0.0896	-0.0798	-0.1400	1931	-0.4334
1932	-0.0271	0.0570	-0.1158	-0.1997	-0.2196	-0.0022	0.3815	0.3869	-0.0346	-0.1349	-0.0417	0.0565	1932	-0.0819
1933	0.0087	-0.1772	0.0353	0.4256	0.1683	0.1338	-0.0862	0.1206	-0.1118	-0.0855	0.1127	0.0253	1933	0.5399
1934	0.1069	-0.0322	0.0000	-0.0251	-0.0736	0.0229	-0.1132	0.0611	-0.0033	-0.0286	0.0942	-0.0010	1934	-0.0144
1935	-0.0411	-0.0341	-0.0286	0.0980	0.0409	0.0699	0.0850	0.0280	0.0256	0.0777	0.0474	0.0394	1935	0.4767
1936	0.0670	0.0224	0.0268	-0.0751	0.0545	0.0333	0.0701	0.0151	0.0031	0.0775	0.0134	-0.0029	1936	0.3392
1937	0.0390	0.0191	-0.0077	-0.0809	-0.0024	-0.0504	0.1045	-0.0483	-0.1403	-0.0981	-0.0866	-0.0459	1937	-0.3503
1938	0.0152	0.0674	-0.2487	0.1447	-0.0330	0.2503	0.0744	-0.0226	0.0166	0.0776	-0.0273	0.0401	1938	0.3112
1939	-0.0674	0.0390	-0.1339	-0.0027	0.0733	-0.0612	0.1105	-0.0648	0.1673	-0.0123	-0.0398	0.0270	1939	-0.0041
1940	-0.0336	0.0133	0.0124	-0.0024	-0.2289	0.0809	0.0341	0.0350	0.0123	0.0422	-0.0316	0.0009	1940	-0.0978
1941	-0.0463	-0.0060	0.0071	-0.0612	0.0183	0.0578	0.0579	0.0010	-0.0068	-0.0657	-0.0284	-0.0407	1941	-0.1159
1942	0.0161	-0.0159	-0.0652	-0.0400	0.0796	0.0221	0.0337	0.0164	0.0290	0.0678	-0.0021	0.0549	1942	0.2034
1943	0.0737	0.0583	0.0545	0.0035	0.0552	0.0223	-0.0526	0.0171	0.0263	-0.0108	-0.0654	0.0617	1943	0.2590
1944	0.0171	0.0042	0.0195	-0.0100	0.0505	0.0543	-0.0193	0.0157	-0.0008	0.0023	0.0133	0.0374	1944	0.1975
1945	0.0158	0.0683	-0.0441	0.0902	0.0195	-0.0007	-0.0180	0.0641	0.0438	0.0322	0.0396	0.0116	1945	0.3644
1946	0.0714	-0.0641	0.0480	0.0393	0.0288	-0.0370	-0.0239	-0.0674	-0.0997	-0.0060	-0.0027	0.0457	1946	-0.0807
1947	0.0255	-0.0077	-0.0149	-0.0363	0.0014	0.0554	0.0381	-0.0203	-0.0111	0.0238	-0.0175	0.0233	1947	0.0571
1948	-0.0379	-0.0388	0.0793	0.0292	0.0879	0.0054	-0.0508	0.0158	-0.0276	0.0710	-0.0961	0.0346	1948	0.0550
1949	0.0039	-0.0296	0.0328	-0.0179	-0.0258	0.0014	0.0650	0.0219	0.0263	0.0340	0.0175	0.0486	1949	0.1879
1950	0.0197	0.0199	0.0070	0.0486	0.0509	-0.0548	0.0119	0.0443	0.0592	0.0093	0.0169	0.0513	1950	0.3171
1951	0.0637	0.0157	-0.0156	0.0509	-0.0299	-0.0228	0.0711	0.0478	0.0013	-0.0103	0.0096	0.0424	1951	0.2402
1952	0.0181	-0.0282	0.0503	-0.0402	0.0343	0.0490	0.0196	-0.0071	-0.0176	0.0020	0.0571	0.0382	1952	0.1837
1953	-0.0049	-0.0106	-0.0212	-0.0237	0.0077	-0.0134	0.0273	-0.0501	0.0034	0.0540	0.0204	0.0053	1953	-0.0099
1954	0.0536	0.0111	0.0325	0.0516	0.0418	0.0031	0.0589	-0.0275	0.0851	-0.0167	0.0909	0.0534	1954	0.5262
1955	0.0197	0.0098	-0.0030	0.0396	0.0055	0.0841	0.0622	-0.0025	0.0130	-0.0284	0.0827	0.0015	1955	0.3156
1956	-0.0347	0.0413	0.0710	-0.0004	-0.0593	0.0409	0.0530	-0.0328	-0.0440	0.0066	-0.0050	0.0370	1956	0.0656

*Compound annual return

Appendix A-1

Large-Capitalization Stocks: Total Return
From 1926 to 2020

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Jan–Dec*
1957	-0.0401	-0.0264	0.0215	0.0388	0.0437	0.0004	0.0131	-0.0505	-0.0602	-0.0302	0.0231	-0.0395	1957	-0.1078
1958	0.0445	-0.0141	0.0328	0.0337	0.0212	0.0279	0.0449	0.0176	0.0501	0.0270	0.0284	0.0535	1958	0.4336
1959	0.0053	0.0049	0.0020	0.0402	0.0240	-0.0022	0.0363	-0.0102	-0.0443	0.0128	0.0186	0.0292	1959	0.1196
1960	-0.0700	0.0147	-0.0123	-0.0161	0.0326	0.0211	-0.0234	0.0317	-0.0590	-0.0007	0.0465	0.0479	1960	0.0047
1961	0.0645	0.0319	0.0270	0.0051	0.0239	-0.0275	0.0342	0.0243	-0.0184	0.0298	0.0447	0.0046	1961	0.2689
1962	-0.0366	0.0209	-0.0046	-0.0607	-0.0811	-0.0803	0.0652	0.0208	-0.0465	0.0064	0.1086	0.0153	1962	-0.0873
1963	0.0506	-0.0239	0.0370	0.0500	0.0193	-0.0188	-0.0022	0.0535	-0.0097	0.0339	-0.0046	0.0262	1963	0.2280
1964	0.0283	0.0147	0.0165	0.0075	0.0162	0.0178	0.0195	-0.0118	0.0301	0.0096	0.0005	0.0056	1964	0.1648
1965	0.0345	0.0031	-0.0133	0.0356	-0.0030	-0.0473	0.0147	0.0272	0.0334	0.0289	-0.0031	0.0106	1965	0.1245
1966	0.0062	-0.0131	-0.0205	0.0220	-0.0492	-0.0146	-0.0120	-0.0725	-0.0053	0.0494	0.0095	0.0002	1966	-0.1006
1967	0.0798	0.0072	0.0409	0.0437	-0.0477	0.0190	0.0468	-0.0070	0.0342	-0.0276	0.0065	0.0278	1967	0.2398
1968	-0.0425	-0.0261	0.0110	0.0834	0.0161	0.0105	-0.0172	0.0164	0.0400	0.0087	0.0531	-0.0402	1968	0.1106
1969	-0.0068	-0.0426	0.0359	0.0229	0.0026	-0.0542	-0.0587	0.0454	-0.0236	0.0459	-0.0297	-0.0177	1969	-0.0850
1970	-0.0743	0.0558	0.0044	-0.0875	-0.0578	-0.0466	0.0769	0.0478	0.0362	-0.0083	0.0506	0.0597	1970	0.0386
1971	0.0432	0.0117	0.0394	0.0389	-0.0391	0.0033	-0.0387	0.0388	-0.0044	-0.0392	0.0002	0.0888	1971	0.1430
1972	0.0206	0.0277	0.0083	0.0068	0.0197	-0.0194	0.0048	0.0369	-0.0025	0.0118	0.0481	0.0142	1972	0.1900
1973	-0.0149	-0.0352	0.0008	-0.0383	-0.0163	-0.0040	0.0407	-0.0341	0.0427	0.0017	-0.1109	0.0198	1973	-0.1469
1974	-0.0072	-0.0007	-0.0205	-0.0359	-0.0302	-0.0113	-0.0742	-0.0864	-0.1152	0.1681	-0.0488	-0.0156	1974	-0.2647
1975	0.1272	0.0638	0.0254	0.0510	0.0477	0.0477	-0.0644	-0.0176	-0.0312	0.0653	0.0282	-0.0081	1975	0.3723
1976	0.1217	-0.0084	0.0337	-0.0078	-0.0111	0.0443	-0.0048	-0.0018	0.0258	-0.0186	-0.0041	0.0561	1976	0.2393
1977	-0.0473	-0.0182	-0.0105	0.0042	-0.0196	0.0494	-0.0124	-0.0172	0.0016	-0.0390	0.0316	0.0075	1977	-0.0716
1978	-0.0574	-0.0203	0.0294	0.0902	0.0092	-0.0138	0.0583	0.0301	-0.0032	-0.0872	0.0215	0.0196	1978	0.0657
1979	0.0443	-0.0321	0.0596	0.0063	-0.0217	0.0435	0.0134	0.0577	0.0043	-0.0640	0.0475	0.0214	1979	0.1861
1980	0.0622	-0.0001	-0.0972	0.0462	0.0515	0.0316	0.0696	0.0101	0.0294	0.0202	0.1065	-0.0302	1980	0.3250
1981	-0.0418	0.0174	0.0400	-0.0193	0.0026	-0.0063	0.0021	-0.0577	-0.0493	0.0540	0.0413	-0.0256	1981	-0.0492
1982	-0.0131	-0.0559	-0.0052	0.0452	-0.0341	-0.0150	-0.0178	0.1214	0.0125	0.1151	0.0404	0.0193	1982	0.2155
1983	0.0372	0.0229	0.0369	0.0788	-0.0087	0.0389	-0.0295	0.0150	0.0138	-0.0116	0.0211	-0.0052	1983	0.2256
1984	-0.0056	-0.0352	0.0173	0.0095	-0.0554	0.0217	-0.0124	0.1104	0.0002	0.0039	-0.0112	0.0263	1984	0.0627
1985	0.0779	0.0122	0.0007	-0.0009	0.0578	0.0157	-0.0015	-0.0085	-0.0313	0.0462	0.0686	0.0484	1985	0.3173
1986	0.0056	0.0747	0.0558	-0.0113	0.0532	0.0169	-0.0559	0.0742	-0.0827	0.0577	0.0243	-0.0255	1986	0.1867
1987	0.1347	0.0395	0.0289	-0.0089	0.0087	0.0505	0.0507	0.0373	-0.0219	-0.2154	-0.0824	0.0761	1987	0.0525

*Compound annual return

Appendix A-1

Large-Capitalization Stocks: Total Return
From 1926 to 2020

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Jan–Dec*
1988	0.0421	0.0466	-0.0309	0.0111	0.0086	0.0459	-0.0038	-0.0339	0.0426	0.0278	-0.0143	0.0174	1988	0.1661
1989	0.0732	-0.0249	0.0233	0.0519	0.0405	-0.0057	0.0903	0.0195	-0.0041	-0.0232	0.0204	0.0240	1989	0.3169
1990	-0.0671	0.0129	0.0265	-0.0249	0.0975	-0.0067	-0.0032	-0.0904	-0.0487	-0.0043	0.0646	0.0279	1990	-0.0310
1991	0.0436	0.0715	0.0242	0.0024	0.0431	-0.0458	0.0466	0.0237	-0.0167	0.0134	-0.0403	0.1144	1991	0.3047
1992	-0.0186	0.0130	-0.0194	0.0294	0.0049	-0.0149	0.0409	-0.0205	0.0118	0.0035	0.0341	0.0123	1992	0.0762
1993	0.0084	0.0136	0.0211	-0.0242	0.0268	0.0029	-0.0040	0.0379	-0.0077	0.0207	-0.0095	0.0121	1993	0.1008
1994	0.0340	-0.0271	-0.0436	0.0128	0.0164	-0.0245	0.0328	0.0410	-0.0245	0.0225	-0.0364	0.0148	1994	0.0132
1995	0.0259	0.0390	0.0295	0.0294	0.0400	0.0232	0.0332	0.0025	0.0422	-0.0036	0.0439	0.0193	1995	0.3758
1996	0.0340	0.0093	0.0096	0.0147	0.0258	0.0038	-0.0442	0.0211	0.0563	0.0276	0.0756	-0.0198	1996	0.2296
1997	0.0625	0.0078	-0.0411	0.0597	0.0609	0.0448	0.0796	-0.0560	0.0548	-0.0334	0.0463	0.0172	1997	0.3336
1998	0.0111	0.0721	0.0512	0.0101	-0.0172	0.0406	-0.0106	-0.1446	0.0641	0.0813	0.0606	0.0576	1998	0.2858
1999	0.0418	-0.0311	0.0400	0.0387	-0.0236	0.0555	-0.0312	-0.0049	-0.0274	0.0633	0.0203	0.0589	1999	0.2104
2000	-0.0502	-0.0189	0.0978	-0.0301	-0.0205	0.0247	-0.0156	0.0621	-0.0528	-0.0042	-0.0788	0.0049	2000	-0.0910
2001	0.0355	-0.0912	-0.0634	0.0777	0.0067	-0.0243	-0.0098	-0.0626	-0.0808	0.0191	0.0767	0.0088	2001	-0.1189
2002	-0.0146	-0.0193	0.0376	-0.0606	-0.0074	-0.0712	-0.0780	0.0066	-0.1087	0.0880	0.0589	-0.0587	2002	-0.2210
2003	-0.0262	-0.0150	0.0097	0.0824	0.0527	0.0128	0.0176	0.0195	-0.0106	0.0566	0.0088	0.0524	2003	0.2868
2004	0.0184	0.0139	-0.0151	-0.0157	0.0137	0.0194	-0.0331	0.0040	0.0108	0.0153	0.0405	0.0340	2004	0.1088
2005	-0.0244	0.0210	-0.0177	-0.0190	0.0318	0.0014	0.0372	-0.0091	0.0081	-0.0167	0.0378	0.0003	2005	0.0491
2006	0.0265	0.0027	0.0124	0.0134	-0.0288	0.0014	0.0062	0.0238	0.0258	0.0326	0.0190	0.0140	2006	0.1579
2007	0.0151	-0.0196	0.0112	0.0443	0.0349	-0.0166	-0.0310	0.0150	0.0374	0.0159	-0.0418	-0.0069	2007	0.0549
2008	-0.0600	-0.0325	-0.0043	0.0487	0.0130	-0.0843	-0.0084	0.0145	-0.0891	-0.1679	-0.0718	0.0106	2008	-0.3700
2009	-0.0843	-0.1065	0.0876	0.0957	0.0559	0.0020	0.0756	0.0361	0.0373	-0.0186	0.0600	0.0193	2009	0.2646
2010	-0.0360	0.0310	0.0603	0.0158	-0.0799	-0.0523	0.0701	-0.0451	0.0892	0.0380	0.0001	0.0668	2010	0.1506
2011	0.0237	0.0343	0.0004	0.0296	-0.0113	-0.0167	-0.0203	-0.0543	-0.0703	0.1093	-0.0022	0.0102	2011	0.0211
2012	0.0448	0.0432	0.0329	-0.0063	-0.0601	0.0412	0.0139	0.0225	0.0258	-0.0185	0.0058	0.0091	2012	0.1600
2013	0.0518	0.0136	0.0375	0.0193	0.0234	-0.0134	0.0509	-0.0290	0.0314	0.0460	0.0305	0.0253	2013	0.3239
2014	-0.0346	0.0457	0.0084	0.0074	0.0235	0.0207	-0.0138	0.0400	-0.0140	0.0244	0.0269	-0.0025	2014	0.1369
2015	-0.0300	0.0575	-0.0158	0.0096	0.0129	-0.0194	0.0210	-0.0603	-0.0247	0.0844	0.0030	-0.0158	2015	0.0138
2016	-0.0496	-0.0013	0.0678	0.0039	0.0180	0.0026	0.0369	0.0014	0.0002	-0.0182	0.0370	0.0198	2016	0.1196
2017	0.0190	0.0397	0.0012	0.0103	0.0141	0.0062	0.0206	0.0031	0.0206	0.0233	0.0307	0.0111	2017	0.2183
2018	0.0573	-0.0369	-0.0254	0.0038	0.0241	0.0062	0.0372	0.0326	0.0057	-0.0684	0.0204	-0.0903	2018	-0.0438
2019	0.0801	0.0321	0.0194	0.0405	-0.0635	0.0705	0.0144	-0.0158	0.0187	0.0217	0.0363	0.0302	2019	0.3149
2020	-0.0004	-0.0823	-0.1235	0.1282	0.0476	0.0199	0.0564	0.0719	-0.0380	-0.0266	0.1095	0.0384	2020	0.1840

*Compound annual return

Appendix A-7

Long-term Government Bonds: Income Returns
From 1926 to 2020

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Jan–Dec*
1926	0.0031	0.0028	0.0032	0.0030	0.0028	0.0033	0.0031	0.0031	0.0030	0.0030	0.0031	0.0030	1926	0.0373
1927	0.0030	0.0027	0.0029	0.0027	0.0028	0.0027	0.0027	0.0029	0.0027	0.0028	0.0027	0.0027	1927	0.0341
1928	0.0027	0.0025	0.0027	0.0026	0.0027	0.0027	0.0027	0.0029	0.0027	0.0030	0.0027	0.0029	1928	0.0322
1929	0.0029	0.0027	0.0028	0.0034	0.0030	0.0029	0.0032	0.0030	0.0032	0.0031	0.0026	0.0031	1929	0.0347
1930	0.0029	0.0026	0.0029	0.0027	0.0027	0.0029	0.0028	0.0026	0.0029	0.0027	0.0026	0.0028	1930	0.0332
1931	0.0028	0.0026	0.0029	0.0027	0.0026	0.0028	0.0027	0.0027	0.0027	0.0029	0.0031	0.0032	1931	0.0333
1932	0.0032	0.0032	0.0031	0.0030	0.0028	0.0028	0.0028	0.0028	0.0026	0.0027	0.0026	0.0027	1932	0.0369
1933	0.0027	0.0023	0.0027	0.0025	0.0028	0.0025	0.0026	0.0026	0.0025	0.0026	0.0025	0.0028	1933	0.0312
1934	0.0029	0.0024	0.0027	0.0025	0.0025	0.0024	0.0024	0.0024	0.0023	0.0027	0.0025	0.0025	1934	0.0318
1935	0.0025	0.0021	0.0022	0.0023	0.0023	0.0022	0.0024	0.0023	0.0023	0.0023	0.0024	0.0024	1935	0.0281
1936	0.0024	0.0023	0.0024	0.0022	0.0022	0.0024	0.0023	0.0023	0.0021	0.0023	0.0022	0.0022	1936	0.0277
1937	0.0021	0.0020	0.0022	0.0023	0.0022	0.0025	0.0024	0.0023	0.0023	0.0023	0.0024	0.0023	1937	0.0266
1938	0.0023	0.0021	0.0023	0.0022	0.0022	0.0021	0.0021	0.0022	0.0021	0.0022	0.0021	0.0022	1938	0.0264
1939	0.0021	0.0019	0.0021	0.0019	0.0020	0.0018	0.0019	0.0018	0.0019	0.0023	0.0020	0.0019	1939	0.0240
1940	0.0020	0.0018	0.0019	0.0018	0.0019	0.0019	0.0020	0.0019	0.0018	0.0018	0.0018	0.0017	1940	0.0223
1941	0.0016	0.0016	0.0018	0.0017	0.0017	0.0016	0.0016	0.0016	0.0016	0.0016	0.0014	0.0016	1941	0.0194
1942	0.0021	0.0019	0.0021	0.0020	0.0019	0.0021	0.0021	0.0021	0.0020	0.0021	0.0020	0.0021	1942	0.0246
1943	0.0020	0.0019	0.0021	0.0020	0.0019	0.0021	0.0021	0.0021	0.0020	0.0020	0.0021	0.0021	1943	0.0244
1944	0.0021	0.0020	0.0021	0.0020	0.0022	0.0020	0.0021	0.0021	0.0020	0.0021	0.0020	0.0020	1944	0.0246
1945	0.0021	0.0018	0.0020	0.0019	0.0019	0.0019	0.0018	0.0019	0.0018	0.0019	0.0018	0.0018	1945	0.0234
1946	0.0017	0.0015	0.0016	0.0017	0.0018	0.0016	0.0019	0.0017	0.0018	0.0019	0.0018	0.0019	1946	0.0204
1947	0.0018	0.0016	0.0018	0.0017	0.0017	0.0019	0.0018	0.0017	0.0018	0.0018	0.0017	0.0021	1947	0.0213
1948	0.0020	0.0019	0.0022	0.0020	0.0018	0.0021	0.0019	0.0021	0.0020	0.0019	0.0021	0.0020	1948	0.0240
1949	0.0020	0.0018	0.0019	0.0018	0.0020	0.0019	0.0017	0.0019	0.0017	0.0018	0.0017	0.0017	1949	0.0225
1950	0.0018	0.0016	0.0018	0.0016	0.0019	0.0017	0.0018	0.0018	0.0017	0.0019	0.0018	0.0018	1950	0.0212
1951	0.0020	0.0017	0.0019	0.0020	0.0021	0.0020	0.0023	0.0021	0.0019	0.0023	0.0021	0.0022	1951	0.0238
1952	0.0023	0.0021	0.0023	0.0022	0.0020	0.0022	0.0022	0.0021	0.0023	0.0023	0.0021	0.0024	1952	0.0266
1953	0.0023	0.0021	0.0025	0.0024	0.0024	0.0027	0.0025	0.0025	0.0025	0.0023	0.0024	0.0024	1953	0.0284
1954	0.0023	0.0022	0.0025	0.0022	0.0020	0.0025	0.0022	0.0023	0.0022	0.0021	0.0023	0.0023	1954	0.0279
1955	0.0022	0.0022	0.0024	0.0022	0.0025	0.0023	0.0023	0.0027	0.0024	0.0025	0.0024	0.0024	1955	0.0275
1956	0.0025	0.0023	0.0023	0.0026	0.0026	0.0023	0.0026	0.0026	0.0025	0.0029	0.0027	0.0028	1956	0.0299

*Compound annual return

Appendix A-7

Long-term Government Bonds: Income Returns
From 1926 to 2020

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Jan–Dec*
1957	0.0029	0.0025	0.0026	0.0029	0.0029	0.0025	0.0033	0.0030	0.0031	0.0031	0.0029	0.0029	1957	0.0344
1958	0.0027	0.0025	0.0027	0.0026	0.0024	0.0027	0.0027	0.0027	0.0032	0.0032	0.0028	0.0033	1958	0.0327
1959	0.0031	0.0031	0.0035	0.0033	0.0033	0.0036	0.0035	0.0035	0.0034	0.0035	0.0035	0.0036	1959	0.0401
1960	0.0035	0.0037	0.0036	0.0032	0.0037	0.0034	0.0032	0.0034	0.0032	0.0033	0.0032	0.0033	1960	0.0426
1961	0.0033	0.0030	0.0031	0.0031	0.0034	0.0032	0.0033	0.0033	0.0032	0.0034	0.0032	0.0031	1961	0.0383
1962	0.0037	0.0032	0.0033	0.0033	0.0032	0.0030	0.0034	0.0034	0.0030	0.0035	0.0031	0.0032	1962	0.0400
1963	0.0032	0.0029	0.0031	0.0034	0.0033	0.0030	0.0036	0.0033	0.0034	0.0034	0.0032	0.0036	1963	0.0389
1964	0.0035	0.0032	0.0037	0.0035	0.0032	0.0038	0.0035	0.0035	0.0034	0.0034	0.0034	0.0035	1964	0.0415
1965	0.0033	0.0032	0.0038	0.0033	0.0033	0.0038	0.0034	0.0037	0.0035	0.0034	0.0037	0.0037	1965	0.0419
1966	0.0038	0.0034	0.0040	0.0036	0.0041	0.0039	0.0038	0.0043	0.0041	0.0040	0.0038	0.0039	1966	0.0449
1967	0.0040	0.0034	0.0039	0.0035	0.0043	0.0039	0.0043	0.0042	0.0040	0.0045	0.0045	0.0044	1967	0.0459
1968	0.0050	0.0042	0.0043	0.0049	0.0046	0.0042	0.0048	0.0042	0.0044	0.0045	0.0043	0.0049	1968	0.0550
1969	0.0050	0.0046	0.0047	0.0055	0.0047	0.0055	0.0052	0.0048	0.0055	0.0057	0.0049	0.0060	1969	0.0595
1970	0.0056	0.0052	0.0056	0.0054	0.0055	0.0064	0.0059	0.0057	0.0056	0.0055	0.0058	0.0053	1970	0.0674
1971	0.0051	0.0046	0.0056	0.0048	0.0047	0.0056	0.0052	0.0055	0.0050	0.0047	0.0051	0.0050	1971	0.0632
1972	0.0050	0.0047	0.0049	0.0048	0.0055	0.0049	0.0051	0.0049	0.0047	0.0052	0.0048	0.0045	1972	0.0587
1973	0.0054	0.0051	0.0056	0.0057	0.0058	0.0055	0.0061	0.0062	0.0055	0.0063	0.0056	0.0060	1973	0.0651
1974	0.0061	0.0055	0.0059	0.0068	0.0068	0.0061	0.0072	0.0065	0.0071	0.0070	0.0062	0.0067	1974	0.0727
1975	0.0068	0.0060	0.0066	0.0067	0.0067	0.0070	0.0068	0.0065	0.0073	0.0072	0.0061	0.0075	1975	0.0799
1976	0.0065	0.0061	0.0071	0.0064	0.0059	0.0073	0.0065	0.0069	0.0064	0.0061	0.0066	0.0063	1976	0.0789
1977	0.0059	0.0057	0.0065	0.0061	0.0067	0.0062	0.0059	0.0067	0.0061	0.0063	0.0063	0.0062	1977	0.0714
1978	0.0069	0.0060	0.0069	0.0063	0.0075	0.0069	0.0073	0.0070	0.0065	0.0073	0.0071	0.0068	1978	0.0790
1979	0.0079	0.0065	0.0074	0.0076	0.0077	0.0071	0.0076	0.0073	0.0068	0.0082	0.0083	0.0083	1979	0.0886
1980	0.0083	0.0084	0.0099	0.0100	0.0087	0.0086	0.0084	0.0081	0.0097	0.0097	0.0091	0.0108	1980	0.0997
1981	0.0094	0.0088	0.0111	0.0101	0.0104	0.0109	0.0109	0.0110	0.0114	0.0117	0.0113	0.0100	1981	0.1155
1982	0.0108	0.0103	0.0124	0.0112	0.0101	0.0120	0.0114	0.0112	0.0100	0.0091	0.0095	0.0093	1982	0.1350
1983	0.0087	0.0081	0.0089	0.0085	0.0091	0.0090	0.0088	0.0103	0.0096	0.0095	0.0094	0.0094	1983	0.1038
1984	0.0103	0.0092	0.0098	0.0104	0.0103	0.0106	0.0116	0.0106	0.0094	0.0108	0.0091	0.0098	1984	0.1174
1985	0.0096	0.0082	0.0094	0.0102	0.0097	0.0080	0.0094	0.0085	0.0088	0.0089	0.0081	0.0086	1985	0.1125
1986	0.0079	0.0073	0.0071	0.0063	0.0062	0.0070	0.0066	0.0063	0.0065	0.0069	0.0059	0.0070	1986	0.0898
1987	0.0064	0.0059	0.0066	0.0065	0.0066	0.0075	0.0073	0.0075	0.0075	0.0079	0.0075	0.0078	1987	0.0792

*Compound annual return

Appendix A-7

Long-term Government Bonds: Income Returns
From 1926 to 2020

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Jan–Dec*
1988	0.0072	0.0071	0.0072	0.0070	0.0078	0.0076	0.0071	0.0083	0.0076	0.0076	0.0070	0.0075	1988	0.0897
1989	0.0080	0.0069	0.0079	0.0070	0.0080	0.0070	0.0068	0.0066	0.0065	0.0072	0.0064	0.0064	1989	0.0881
1990	0.0073	0.0066	0.0071	0.0075	0.0075	0.0068	0.0074	0.0071	0.0069	0.0081	0.0071	0.0072	1990	0.0819
1991	0.0071	0.0064	0.0064	0.0076	0.0068	0.0063	0.0076	0.0068	0.0068	0.0065	0.0060	0.0068	1991	0.0822
1992	0.0061	0.0059	0.0067	0.0065	0.0061	0.0067	0.0063	0.0060	0.0058	0.0057	0.0061	0.0063	1992	0.0726
1993	0.0059	0.0055	0.0063	0.0057	0.0052	0.0062	0.0054	0.0056	0.0050	0.0049	0.0053	0.0055	1993	0.0717
1994	0.0055	0.0049	0.0058	0.0057	0.0063	0.0061	0.0060	0.0066	0.0061	0.0066	0.0064	0.0066	1994	0.0659
1995	0.0070	0.0059	0.0064	0.0058	0.0065	0.0054	0.0056	0.0057	0.0052	0.0057	0.0051	0.0049	1995	0.0760
1996	0.0054	0.0048	0.0052	0.0059	0.0058	0.0054	0.0062	0.0057	0.0060	0.0058	0.0052	0.0056	1996	0.0618
1997	0.0056	0.0051	0.0059	0.0059	0.0058	0.0059	0.0058	0.0049	0.0058	0.0054	0.0047	0.0054	1997	0.0664
1998	0.0048	0.0044	0.0052	0.0049	0.0048	0.0052	0.0049	0.0048	0.0044	0.0042	0.0045	0.0045	1998	0.0583
1999	0.0042	0.0040	0.0053	0.0048	0.0045	0.0055	0.0051	0.0054	0.0052	0.0050	0.0056	0.0055	1999	0.0557
2000	0.0057	0.0051	0.0054	0.0047	0.0056	0.0052	0.0052	0.0050	0.0046	0.0053	0.0048	0.0045	2000	0.0650
2001	0.0049	0.0042	0.0045	0.0047	0.0050	0.0047	0.0052	0.0046	0.0041	0.0048	0.0041	0.0046	2001	0.0553
2002	0.0048	0.0043	0.0043	0.0054	0.0049	0.0044	0.0051	0.0044	0.0042	0.0040	0.0040	0.0045	2002	0.0559
2003	0.0041	0.0038	0.0040	0.0040	0.0039	0.0036	0.0038	0.0042	0.0046	0.0041	0.0039	0.0047	2003	0.0480
2004	0.0042	0.0038	0.0043	0.0039	0.0040	0.0048	0.0043	0.0045	0.0040	0.0038	0.0041	0.0043	2004	0.0502
2005	0.0041	0.0035	0.0041	0.0039	0.0040	0.0036	0.0034	0.0040	0.0035	0.0039	0.0039	0.0039	2005	0.0469
2006	0.0040	0.0036	0.0039	0.0039	0.0048	0.0044	0.0045	0.0043	0.0039	0.0042	0.0039	0.0036	2006	0.0468
2007	0.0043	0.0038	0.0039	0.0042	0.0041	0.0040	0.0046	0.0042	0.0037	0.0043	0.0039	0.0037	2007	0.0486
2008	0.0040	0.0034	0.0037	0.0035	0.0037	0.0040	0.0039	0.0036	0.0039	0.0037	0.0036	0.0033	2008	0.0445
2009	0.0024	0.0030	0.0035	0.0029	0.0033	0.0038	0.0036	0.0036	0.0034	0.0033	0.0035	0.0034	2009	0.0347
2010	0.0036	0.0033	0.0040	0.0038	0.0034	0.0037	0.0031	0.0032	0.0026	0.0027	0.0032	0.0032	2010	0.0425
2011	0.0035	0.0032	0.0036	0.0034	0.0036	0.0032	0.0032	0.0034	0.0026	0.0022	0.0024	0.0022	2011	0.0382
2012	0.0021	0.0020	0.0022	0.0025	0.0023	0.0018	0.0020	0.0018	0.0017	0.0021	0.0019	0.0019	2012	0.0246
2013	0.0022	0.0022	0.0021	0.0026	0.0023	0.0024	0.0030	0.0028	0.0029	0.0029	0.0027	0.0031	2013	0.0288
2014	0.0032	0.0026	0.0029	0.0028	0.0028	0.0025	0.0027	0.0026	0.0023	0.0025	0.0023	0.0022	2014	0.0341
2015	0.0020	0.0015	0.0021	0.0019	0.0020	0.0023	0.0024	0.0022	0.0021	0.0021	0.0022	0.0022	2015	0.0247
2016	0.0021	0.0020	0.0018	0.0017	0.0020	0.0018	0.0014	0.0016	0.0015	0.0016	0.0018	0.0022	2016	0.0230
2017	0.0024	0.0021	0.0023	0.0021	0.0024	0.0021	0.0022	0.0022	0.0019	0.0022	0.0021	0.0020	2017	0.0267
2018	0.0024	0.0022	0.0024	0.0025	0.0025	0.0023	0.0025	0.0025	0.0022	0.0030	0.0028	0.0027	2018	0.0282
2019	0.0025	0.0022	0.0023	0.0023	0.0023	0.0018	0.0021	0.0019	0.0015	0.0016	0.0016	0.0018	2019	0.0255
2020	0.0020	0.0015	0.0013	0.0009	0.0009	0.0009	0.0010	0.0008	0.0000	0.0009	0.0011	0.0011	2020	0.0142

Compound annual return

THE COST OF CAPITAL –

A PRACTITIONER'S GUIDE

BY

DAVID C. PARCELL

PREPARED FOR THE SOCIETY OF UTILITY AND REGULATORY FINANCIAL ANALYSTS (SURFA)

2010 EDITION

Author's Note: This manual has been prepared as an educational reference on cost of capital concepts. Its purpose is to describe a broad array of cost of capital models and techniques. No cost of equity model or other concept is recommended or emphasized, nor is any procedure for employing any model recommended. Furthermore, no opinions or preferences are expressed by either the author or the Society of Utility and Regulatory Financial Analysts.

Among the considerations which help determine whether the utility vs parent capital structure is appropriate are:

1. Whether the subsidiary utility obtains all of its capital from its parent, or issues its own debt and preferred stock;

2. Whether the parent guarantees any of the securities issued by the subsidiary;

3. Whether the subsidiary's capital structure is independent of its parent (i.e., existence of double leverage, absence of proper relationship between risk and leverage of utility and non-utility subsidiaries); and,

4. Whether the parent (or consolidated enterprise) is diversified into non-utility operations.

Double Leverage

One of the more controversial elements of utility regulation revolves around the existence and recognition of double leverage. Double leverage is said to exist when a firm is owned by another firm and both the parent and subsidiary issue debt. Thus leverage exists at two levels, with the effect that the parent's common equity investment is financed with a combination of its own debt and common equity.

Advocates of double leverage argue that existence of holding company frameworks permits the parent company to earn higher levels of returns on its subsidiary investments than those authorized by regulatory commissions. It is thus maintained that the parent's cost of capital be utilized in calculating a subsidiary utility's cost of common stock or common equity (Backman and Kirsten, 1972; Copeland, 1977; Seeds, 1978).

Opponents of double leverage maintain, on the other hand, that such adjustments assume that dollars can be precisely traced and that all of the common stock (or common equity) on the books of the subsidiary was raised by the parent holding company. If these assumptions cannot be demonstrated, they maintain no double leverage adjustment is appropriate (Brennan and Humphreys, 1973; Lerner, 1973; Fitzpatrick, 1977).

The traditional "double leverage" adjustment involves determining the total cost of capital for the parent company (on a non-consolidated basis) and utilizing this as the cost of common equity for the subsidiary relative to the subsidiary capital structure.

An alternative double leverage adjustment is use of a consolidated capital structure and cost of capital for a subsidiary utility. This approach is more feasible in non-diversified holding companies where no risk differentials exist among subsidiaries.

A "modified" double leverage technique also has been proposed whereby the parent's cost of capital is used as the cost of the subsidiary's common stock account, but not retained earnings which is assigned the cost of equity capital (Rozeff, 1983). This modified technique has received better acceptance in circumstances where subsidiaries have equal risk than in circumstances where subsidiaries have different risk (Sweeney, 1985).

Hypothetical Capital Structure

There are circumstances where a hypothetical capital structure is used for a utility, rather than the utility's own capital structure. The most common reasons for utilizing a hypothetical capital structure are:

1. The utility's capital structure is deemed to be substantially different from the typical or "proper" utility capital structure.
2. The utility is funded as part of a diversified organization whose overall capital structure reflects its diversified nature rather than its utility operations only.

In both cases, a "reasonableness test" is generally applied in order to determine if the actual capital structure is unreasonable or produces an excessive cost of capital.

Optimal Capital Structure

Is there an optimal capital structure? An optimal capital structure can be described as one which results in the lowest cost of capital (Morin, 206, 455).

The Regulation of Public Utilities

Theory and Practice

CHARLES F. PHILLIPS, JR.

Robert G. Brown
Professor of Economics
Washington and Lee University

1993
PUBLIC UTILITIES REPORTS, INC.
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And the District of Columbia commission rejected a telephone company's actual capital structure of 15 percent debt and 85 percent equity as being unrealistic, adopting for rate-making purposes a hypothetical capital structure of 40 percent debt and 60 percent equity. "In our judgment," said the commission, "this capital structure, when applied to the cost of debt and equity, will amply afford sufficient earnings to pay a reasonable dividend and allow an increment for surplus."[76]

During this same period, other commissions adopted the actual capitalization. The New York commission declared that to disregard the "actual historic structure" created with the commission's approval "would unsettle investors" and remove from management control over the capital structure. It added that "having approved a company's capital structure . . . the company and the public have the right to rely upon our using the capital structure which we have approved as the basis for determining its rate of return."[77] The commission later indicated, however, that it would disregard the actual capital structure when it was "wasteful."[78] The Colorado commission said that it "could adopt a hypothetical structure for rate making in the event that applicants' actual financial structure is not in the long run public interest. . .keeping in mind that responsibility for financial decisions rests with management."[79] The Arizona commission rejected the use of hypothetical capital structures on the grounds that they involve "pure speculation," while actual capitalizations are "more realistic."[80] The Florida commission held that capital structures "fall within the prerogatives of management" and that "invasion of the field of management in such a sensitive area is justified only when the public interest requires the exercise of extreme measures for its protection and benefit."[81] Finally, the FCC rejected the adoption of a hypothetical capital structure for AT&T in a 1967 decision, but noted that in fixing the allowable rate of return it would take into account the "extraordinary amount of risk insurance respondents have given its stockholders by its low debt ratio policy."[82]

Debt ratios began to rise during the late 1960s and early 1970s, and the financial condition of the public utility sector began to deteriorate. It became the common practice to use actual or expected capitalizations; actual where a historic test year is used, expected when a projected or future test year is used.[83] The objective, in short, shifted from minimization of the short-term cost of capital to protection of a utility's ability "to raise capital at all times. This objective requires that a public utility make every effort to keep indebtedness at a prudent and conservative level."[84] A hypothetical capital structure is used only where a utility's actual capitalization is clearly out of line with those of other utilities in its industry or where a utility is diversified.[85]

Consolidated Capital Structure and Double Leverage. Where a utility is a wholly owned subsidiary that obtains its equity capital through its parent corporation, commissions commonly use the capital structure of the consolidated system.[86] When (1) no substantial minority interest exists and (2) risks

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Apple Inc. (AAPL)
(Real Time Quote from BATS)

$142.91 USD

+0.08 (0.06%)

Updated Sep 30, 2021 10:25 AM ET

Zacks Rank:
3-Hold

Style Scores:
C Value | A Growth | C Momentum | B VGM

Industry Rank:
Top 7% (18 out of 251)

Industry: Computer - Mini computers

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Apple Inc. (AAPL) Quote Overview » Estimates » Apple Inc. (AAPL) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	*AMC10/28/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	1.30	Next Year	NA
Last EPS Surprise	30.00%	EPS (TTM)	5.11
ABR	1.33	P/E (F1)	25.57

*BMO = Before Market Open *AMC = After Market Close

Growth Estimates	AAPL	IND	S&P
Current Qtr (09/2021)	67.95	60.82	NA
Next Qtr (12/2021)	12.90	8.89	NA
Current Year (09/2021)	70.30	68.40	55.60
Next Year (09/2022)	2.10	-3.60	15.50
Past 5 Years	10.30	7.80	2.80
Next 5 Years	12.50	21.20	NA
PE	25.57	44.30	22.90
PEG Ratio	2.05	2.09	NA

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Zacks Rank	▼ Hold 3
Zacks Industry Rank	Top 7% (18 out of 251)
Zacks Sector Rank	Bottom 19% (13 out of 16)
Style Scores	C Value | A Growth | C Momentum | B VGM
Earnings ESP	0.00%
Research Reports for AAPL	Analyst | Snapshot

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Research for AAPL

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

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Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
Zacks Consensus Estimate	84.95B	120.39B	367.23B	383.90B
# of Estimates	7	5	8	8
High Estimate	87.50B	122.87B	369.96B	396.35B
Low Estimate	83.58B	118.25B	366.01B	374.46B
Year ago Sales	64.70B	111.44B	274.52B	367.23B
Year over Year Growth Est.	31.30%	8.03%	33.77%	4.54%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
Zacks Consensus Estimate	1.23	1.90	5.59	5.71
# of Estimates	10	6	11	11
Most Recent Consensus	1.24	1.93	5.62	5.83

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
Year ago EPS	0.73	1.68	3.28	5.59
Year over Year Growth Est.	67.95%	12.90%	70.32%	2.15%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.23	1.90	5.59	5.71
Zacks Consensus Estimate	1.23	1.90	5.59	5.71
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	1.30	1.40	1.68	0.73	NA
Estimate	1.00	1.00	1.41	0.69	NA
Difference	0.30	0.40	0.27	0.04	0.25
Surprise	30.00%	40.00%	19.15%	5.80%	23.74%

Quarterly Estimates By Analyst

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Assurant, Inc. (AIZ)
(Real Time Quote from BATS)

$161.24 USD

+0.63 (0.39%)

Updated Sep 30, 2021 10:25 AM ET

Zacks Rank:
3-Hold

Style Scores:
A Value | C Growth | F Momentum | B VGM

Industry Rank:
Bottom 32% (171 out of 251)

Industry: Insurance - Multi-line

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Detailed Estimates

Estimates

Next Report Date	11/1/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	2.99	Next Year	NA
Last EPS Surprise	20.08%	EPS (TTM)	8.69
ABR	1.13	P/E (F1)	16.67

Growth Estimates	AIZ	IND	S&P
Current Qtr (09/2021)	27.48	-48.62	NA
Next Qtr (12/2021)	31.68	-59.12	NA
Current Year (12/2021)	11.70	13.00	55.60
Next Year (12/2022)	26.00	15.40	15.50
Past 5 Years	8.70	9.10	2.80
Next 5 Years	17.80	13.20	NA
PE	16.67	21.50	22.90
PEG Ratio	0.94	1.63	NA

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Zacks Rank	Hold 3
Zacks Industry Rank	Bottom 32% (171 out of 251)
Zacks Sector Rank	Top 25% (4 out of 16)
Style Scores	A Value | C Growth | F Momentum | B VGM
Earnings ESP	0.00%
Research Reports for AIZ	Analyst | Snapshot

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Research for AIZ

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	2.48B	2.52B	9.99B	10.57B
# of Estimates	2	2	3	3
High Estimate	2.50B	2.53B	10.02B	10.72B
Low Estimate	2.46B	2.51B	9.94B	10.36B
Year ago Sales	2.48B	2.51B	10.10B	9.99B
Year over Year Growth Est.	-0.07%	0.22%	-1.13%	5.87%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.80	2.40	9.64	12.15
# of Estimates	4	3	4	4
Most Recent Consensus	2.10	2.46	10.20	12.25

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Year ago EPS	1.41	1.82	8.63	9.64
Year over Year Growth Est.	27.48%	31.68%	11.67%	26.02%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.80	2.40	9.64	12.15
Zacks Consensus Estimate	1.80	2.40	9.64	12.15
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	2.99	2.47	1.82	1.41	NA
Estimate	2.49	1.96	2.08	0.94	NA
Difference	0.50	0.51	-0.26	0.47	0.31
Surprise	20.08%	26.02%	-12.50%	50.00%	20.90%

Quarterly Estimates By Analyst

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ANSYS, Inc. (ANSS)
(Real Time Quote from BATS)

$341.97 USD

+1.01 (0.30%)

Updated Sep 30, 2021 10:25 AM ET

Zacks Rank:
3-Hold

Style Scores:
D Value | D Growth | D Momentum | D VGM

Industry Rank:
Bottom 37% (159 out of 251)

Industry: Computer - Software

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Detailed Estimates

Estimates

Next Report Date	11/3/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	1.38	Next Year	NA
Last EPS Surprise	22.12%	EPS (TTM)	7.29

Growth Estimates	ANSS	IND	S&P
Current Qtr (09/2021)	-9.71	1.20	NA
Next Qtr (12/2021)	-7.86	-3.02	NA
Current Year (12/2021)	8.90	1.30	55.60
Next Year (12/2022)	14.90	17.40	15.50
Past 5 Years	9.10	10.10	2.80
Next 5 Years	12.30	14.50	NA
PE	48.40	48.70	22.90
PEG Ratio	3.92	3.36	NA

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See Earnings Report Transcript

Premium Research for ANSS

Zacks Rank	**Hold 3**
Zacks Industry Rank	Bottom 37% (159 out of 251)
Zacks Sector Rank	Bottom 19% (13 out of 16)
Style Scores	**D Value | D Growth | D Momentum | D VGM**
Earnings ESP	0.00%
Research Reports for ANSS	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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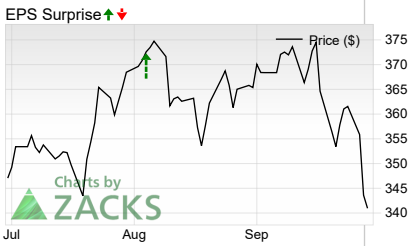
Research for ANSS

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
# of Estimates	4	4	4	4
High Estimate	417.10M	638.10M	1.88B	2.07B
Low Estimate	411.12M	623.90M	1.86B	2.01B
Year ago Sales	369.13M	627.77M	1.70B	1.87B
Year over Year Growth Est.	12.42%	0.28%	10.25%	9.60%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.93	2.29	5.48	6.30
# of Estimates	4	4	3	2
Most Recent Consensus	1.32	2.77	7.06	8.03
High Estimate	0.97	2.35	5.58	6.57
Low Estimate	0.85	2.19	5.41	6.02
Year ago EPS	1.03	2.48	5.03	5.48
Year over Year Growth Est.	-9.71%	-7.86%	8.95%	14.87%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.93	2.29	5.48	6.30
Zacks Consensus Estimate	0.93	2.29	5.48	6.30
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	1.38	0.81	2.48	1.03	NA
Estimate	1.13	0.46	2.17	0.97	NA
Difference	0.25	0.35	0.31	0.06	0.24
Surprise	22.12%	76.09%	14.29%	6.19%	29.67%

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Booz Allen Hamilton Holding Corporation (BAH)
(Real Time Quote from BATS)

$80.24 USD
+0.79 (0.99%)
Updated Sep 30, 2021 10:26 AM ET

Zacks Rank:
3-Hold
Style Scores:
B Value | C Growth | F Momentum | C VGM
Industry Rank:
Top 21% (52 out of 251)
Industry: Government Services

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Booz Allen Hamilton Holding Corporation (BAH) Quote Overview » Estimates » Booz Allen Hamilton Holding Corporation (BAH) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	*BMO 10/29/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	1.07	Next Year	NA
Last EPS Surprise	11.46%	EPS (TTM)	4.03
ABR	1.80	P/E (F1)	18.92

*BMO = Before Market Open *AMC = After Market Close

Growth Estimates	BAH	IND	S&P
Current Qtr (09/2021)	3.76	1.01	NA
Next Qtr (12/2021)	0.64	-0.41	NA
Current Year (03/2022)	7.70	19.20	55.60
Next Year (03/2023)	10.20	5.10	15.50
Past 5 Years	18.30	11.90	2.80
Next 5 Years	8.30	8.30	NA
PE	18.92	18.80	22.90
PEG Ratio	2.29	2.27	NA

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See Brokerage Recommendations

Premium Research for BAH

Zacks Rank	▼ Hold 3
Zacks Industry Rank	Top 21% (52 out of 251)
Zacks Sector Rank	Bottom 31% (11 out of 16)
Style Scores	B Value | C Growth | F Momentum | C VGM
Earnings ESP	0.00%
Research Reports for BAH	Analyst | Snapshot

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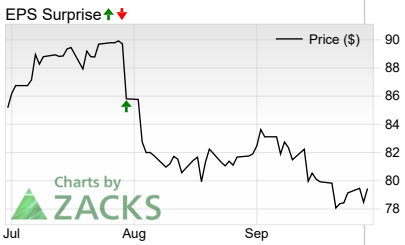
Research for BAH

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (3/2022)	Next Year (3/2023)
Zacks Consensus Estimate	2.13B	2.11B	8.45B	8.99B
# of Estimates	5	5	6	6
High Estimate	2.17B	2.15B	8.56B	9.15B
Low Estimate	2.07B	2.05B	8.28B	8.70B
Year ago Sales	2.02B	1.90B	7.86B	8.45B
Year over Year Growth Est.	5.54%	10.78%	7.54%	6.32%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (3/2022)	Next Year (3/2023)
Zacks Consensus Estimate	1.07	1.05	4.20	4.63
# of Estimates	8	6	8	7

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (3/2022)	Next Year (3/2023)
Low Estimate	1.02	0.99	4.15	4.38
Year ago EPS	1.03	1.04	3.90	4.20
Year over Year Growth Est.	3.76%	0.64%	7.69%	10.20%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.07	1.05	4.20	4.63
Zacks Consensus Estimate	1.07	1.05	4.20	4.63
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	1.07	0.89	1.04	1.03	NA
Estimate	0.96	0.82	0.92	0.92	NA
Difference	0.11	0.07	0.12	0.11	0.10
Surprise	11.46%	8.54%	13.04%	11.96%	11.25%

Quarterly Estimates By Analyst

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Ball Corporation (BLL)

(Real Time Quote from BATS)

$90.42 USD

+0.68 (0.76%)

Updated Sep 30, 2021 10:26 AM ET

Zacks Rank:
2-Buy

Style Scores:
C Value | B Growth | F Momentum | C VGM

Industry Rank:
Bottom 12% (220 out of 251)

Industry: Containers - Metal and Glass

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Ball Corporation (BLL) Quote Overview » Estimates » Ball Corporation (BLL) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	11/4/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.86	Next Year	NA
Last EPS Surprise	3.61%	EPS (TTM)	3.28

Growth Estimates	BLL	IND	S&P
Current Qtr (09/2021)	10.24	19.91	NA
Next Qtr (12/2021)	20.83	28.89	NA
Current Year (12/2021)	19.20	19.90	55.60
Next Year (12/2022)	18.30	7.70	15.50
Past 5 Years	10.40	21.90	2.80
Next 5 Years	5.00	6.00	NA
PE	25.35	15.60	22.90
PEG Ratio	5.07	2.60	NA

Learn More About Estimate Research

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Premium Research for BLL

Zacks Rank	▲ Buy 2
Zacks Industry Rank	Bottom 12% (220 out of 251)
Zacks Sector Rank	Top 44% (7 out of 16)
Style Scores	C Value | B Growth | F Momentum | C VGM
Earnings ESP	0.00%
Research Reports for BLL	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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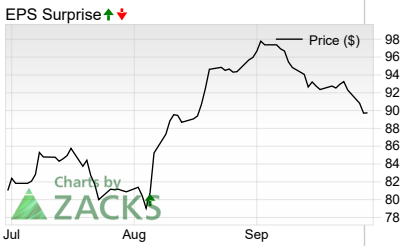
Research for BLL

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
# of Estimates	7	7	8	8
High Estimate	3.73B	3.70B	14.01B	15.54B
Low Estimate	3.47B	3.46B	13.53B	14.49B
Year ago Sales	3.09B	3.10B	11.78B	13.69B
Year over Year Growth Est.	15.62%	14.32%	16.21%	8.62%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.98	0.98	3.54	4.19
# of Estimates	9	8	9	9
Most Recent Consensus	0.98	0.97	3.54	3.92
High Estimate	1.00	1.01	3.58	4.41
Low Estimate	0.95	0.96	3.50	3.92
Year ago EPS	0.89	0.81	2.97	3.54
Year over Year Growth Est.	10.24%	20.83%	19.19%	18.33%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.98	0.98	3.54	4.19
Zacks Consensus Estimate	0.98	0.98	3.54	4.19
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.86	0.72	0.81	0.89	NA
Estimate	0.83	0.67	0.78	0.77	NA
Difference	0.03	0.05	0.03	0.12	0.06
Surprise	3.61%	7.46%	3.85%	15.58%	7.63%

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CACI International, Inc. (CACI)
(Real Time Quote from BATS)

$267.33 USD

+2.37 (0.89%)

Updated Sep 30, 2021 10:31 AM ET

Add to portfo | Trades from $1

Zacks Rank:
3-Hold

Style Scores:
A Value | B Growth | D Momentum | B VGM

Industry Rank:
Bottom 20% (202 out of 251)

Industry: Computer - Services

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CACI International, Inc. (CACI) Quote Overview » Estimates » CACI International, Inc. (CACI) Detailed Estimates

Detailed Estimates

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Estimates

Next Report Date	*AMC 10/27/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	6.26	Next Year	NA
Last EPS Surprise	9.06%	EPS (TTM)	19.39

Growth Estimates	CACI	IND	S&P
Current Qtr (09/2021)	9.50	123.16	NA
Next Qtr (12/2021)	6.02	-23.42	NA
Current Year (06/2022)	-8.90	11.50	55.60
Next Year (06/2023)	4.50	17.30	15.50
Past 5 Years	27.90	11.00	2.80
Next 5 Years	5.40	9.70	NA
PE	14.33	21.10	22.90
PEG Ratio	2.63	2.18	NA

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Premium Research for CACI

Zacks Rank	**Hold 3**
Zacks Industry Rank	Bottom 20% (202 out of 251)
Zacks Sector Rank	Bottom 19% (13 out of 16)
Style Scores	**A Value | B Growth | D Momentum | B VGM**
Earnings ESP	0.00%
Research Reports for CACI	Analyst | Snapshot

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Research for CACI

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (6/2022)	Next Year (6/2023)
Zacks Consensus Estimate	1.49B	1.53B	6.30B	6.56B
# of Estimates	5	5	6	6
High Estimate	1.50B	1.54B	6.35B	6.67B
Low Estimate	1.48B	1.52B	6.26B	6.44B
Year ago Sales	1.46B	1.47B	6.04B	6.30B
Year over Year Growth Est.	2.39%	4.20%	4.25%	4.11%

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (6/2022)	Next Year (6/2023)
Zacks Consensus Estimate	4.02	4.43	18.49	19.33
# of Estimates	8	6	7	7
Most Recent Consensus	3.96	4.65	18.70	20.60
High Estimate	4.48	4.65	18.70	20.60
Low Estimate	3.55	4.17	18.29	17.04
Year ago EPS	3.67	4.18	20.29	18.49
Year over Year Growth Est.	9.50%	6.02%	-8.85%	4.53%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	4.02	4.43	18.49	19.33
Zacks Consensus Estimate	4.02	4.43	18.49	19.33
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	6.26	5.28	4.18	3.67	NA
Estimate	5.74	3.69	3.57	3.15	NA
Difference	0.52	1.59	0.61	0.52	0.81
Surprise	9.06%	43.09%	17.09%	16.51%	21.44%

Quarterly Estimates By Analyst

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Caseys General Stores, Inc. (CASY)

(Real Time Quote from BATS)

$190.51 USD

-1.40 (-0.73%)

Updated Sep 30, 2021 10:31 AM ET

Zacks Rank:
1-Strong Buy 1

Style Scores:
B Value | B Growth | B Momentum | A VGM

Industry Rank:
Top 2% (5 out of 251)

Industry: Retail - Convenience Stores

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Caseys General Stores, Inc. (CASY) Quote Overview » Estimates » Caseys General Stores, Inc. (CASY) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	12/6/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	3.19	Next Year	NA

Growth Estimates	CASY	IND	S&P
Current Qtr (10/2021)	-7.25	-7.21	NA
Next Qtr (01/2022)	43.51	62.77	NA
Current Year (04/2022)	1.80	1.80	55.60
Next Year (04/2023)	9.70	-16.40	15.50
Past 5 Years	11.10	11.10	2.80
Next 5 Years	NA	NA	NA
PE	22.50	23.00	22.90
PEG Ratio	NA	NA	NA

Learn More About Estimate Research

See Brokerage Recommendations

See Earnings Report Transcript

Premium Research for CASY

Zacks Rank	▲ **Strong Buy** 1
Zacks Industry Rank	Top 2% (5 out of 251)
Zacks Sector Rank	Top 19% (3 out of 16)
Style Scores	**B Value | B Growth | B Momentum | A VGM**
Earnings ESP	0.00%
Research Reports for CASY	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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Research for CASY

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (10/2021)	Next Qtr (1/2022)	Current Year (4/2022)	Next Year (4/2023)
Zacks Consensus Estimate	3.15B	2.87B	12.02B	12.75B
# of Estimates	4	4	4	3
High Estimate	3.24B	3.08B	12.50B	13.26B
Low Estimate	2.97B	2.66B	11.59B	11.90B
Year ago Sales	2.22B	2.01B	8.71B	12.02B
Year over Year Growth Est.	42.05%	42.93%	38.05%	6.09%

Earnings Estimates

	Current Qtr (10/2021)	Next Qtr (1/2022)	Current Year (4/2022)	Next Year (4/2023)
Zacks Consensus Estimate	2.78	1.49	8.53	9.36
# of Estimates	4	4	5	4
Most Recent Consensus	3.11	1.72	9.41	9.65
High Estimate	3.11	1.72	9.41	9.71
Low Estimate	2.57	1.15	7.55	8.44
Year ago EPS	3.00	1.04	8.38	8.53
Year over Year Growth Est.	-7.25%	43.51%	1.79%	9.67%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	2.78	1.49	8.53	9.36
Zacks Consensus Estimate	2.78	1.49	8.53	9.36
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (7/2021)	Quarter Ending (4/2021)	Quarter Ending (1/2021)	Quarter Ending (10/2020)	Average Surprise
Reported	3.19	1.12	1.04	3.00	NA
Estimate	2.83	0.67	0.93	2.66	NA
Difference	0.36	0.45	0.11	0.34	0.32
Surprise	12.72%	67.16%	11.83%	12.78%	26.12%

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CSW Industrials, Inc. (CSWI)
(Real Time Quote from BATS)

$129.18 USD

+0.48 (0.37%)

Updated Sep 30, 2021 10:40 AM ET

Zacks Rank:
2-Buy

Style Scores:
D Value | C Growth | F Momentum | D VGM

Industry Rank:
Top 30% (76 out of 251)

Industry: Chemical - Specialty

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CSW Industrials, Inc. (CSWI) Quote Overview » Estimates » CSW Industrials, Inc. (CSWI) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	10/29/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	1.46	Next Year	NA
Last EPS Surprise	25.86%	EPS (TTM)	4.03
ABR	1.00	P/E (F1)	25.84

Growth Estimates	CSWI	IND	S&P
Current Qtr (09/2021)	34.55	179.91	NA
Next Qtr (12/2021)	50.85	-8.66	NA
Current Year (03/2022)	47.80	28.30	55.60
Next Year (03/2023)	14.70	12.20	15.50
Past 5 Years	NA	2.40	2.80
Next 5 Years	NA	20.20	NA
PE	25.84	59.90	22.90
PEG Ratio	NA	2.97	NA

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See Earnings Report Transcript

Zacks Rank	Buy 2
Zacks Industry Rank	Top 30% (76 out of 251)
Zacks Sector Rank	Bottom 44% (9 out of 16)
Style Scores	D Value | C Growth | F Momentum | D VGM
Earnings ESP	0.00%
Research Report for CSWI	Snapshot

(▲▼ = Change in last 30 days)

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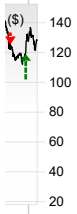
Research for CSWI

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (3/2022)	Next Year (3/2023)
Zacks Consensus Estimate	162.88M	149.85M	632.83M	670.80M
# of Estimates	1	1	1	1
High Estimate	162.88M	149.85M	632.83M	670.80M
Low Estimate	162.88M	149.85M	632.83M	670.80M
Year ago Sales	104.94M	89.93M	419.20M	632.83M
Year over Year Growth Est.	55.21%	66.63%	50.96%	6.00%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (3/2022)	Next Year (3/2023)
Zacks Consensus Estimate	1.48	0.89	4.98	5.71
# of Estimates	1	1	1	1
Most Recent Consensus	1.48	0.89	4.98	5.71

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (3/2022)	Next Year (3/2023)
Year ago EPS	1.10	0.59	3.37	4.98
Year over Year Growth Est.	34.55%	50.85%	47.77%	14.66%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.48	0.89	4.98	5.71
Zacks Consensus Estimate	1.48	0.89	4.98	5.71
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	1.46	0.88	0.59	1.10	NA
Estimate	1.16	0.95	0.35	NA	NA
Difference	0.30	-0.07	0.24	NA	0.16
Surprise	25.86%	-7.37%	68.57%	NA	29.02%

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Quest Diagnostics Incorporated (DGX)

(Real Time Quote from BATS)

$147.76 USD

+0.08 (0.05%)

Updated Sep 30, 2021 10:57 AM ET

Zacks Rank:
2-Buy

Style Scores:
A Value | C Growth | A Momentum | A VGM

Industry Rank:
Top 35% (88 out of 251)

Industry: Medical - Outpatient and Home Healthcare

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Quest Diagnostics Incorporated (DGX) Quote Overview » Estimates » Quest Diagnostics Incorporated (DGX) Detailed Estimates

Detailed Estimates

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Estimates

Next Report Date	*BMO 10/21/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	3.18	Next Year	NA
Last EPS Surprise	10.80%	EPS (TTM)	15.73
ABR	1.67	P/E (F1)	12.50

*BMO = Before Market Open *AMC = After Market Close

Growth Estimates	DGX	IND	S&P
Current Qtr (09/2021)	-37.91	-47.50	NA
Next Qtr (12/2021)	-51.24	-37.66	NA
Current Year (12/2021)	7.70	-1.80	55.60
Next Year (12/2022)	-32.40	16.70	15.50
Past 5 Years	18.80	17.30	2.80
Next 5 Years	26.50	20.80	NA
PE	12.50	13.70	22.90
PEG Ratio	0.47	0.66	NA

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Premium Research for DGX

Zacks Rank	▲ Buy 2
Zacks Industry Rank	Top 35% (88 out of 251)
Zacks Sector Rank	Bottom 0% (16 out of 16)
Style Scores	A Value | C Growth | A Momentum | A VGM
Earnings ESP	0.00%
Research Reports for DGX	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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Research for DGX

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	2.44B	2.26B	10.01B	8.51B
# of Estimates	6	6	5	7
High Estimate	2.67B	2.40B	10.29B	8.71B
Low Estimate	2.24B	2.16B	9.67B	8.00B
Year ago Sales	2.79B	3.00B	9.44B	10.01B
Year over Year Growth Est.	-12.57%	-24.70%	6.04%	-14.93%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	2.68	2.18	12.04	8.14
# of Estimates	8	7	4	8
Most Recent Consensus	2.76	2.28	12.01	8.15
High Estimate	3.44	2.46	12.17	8.31
Low Estimate	2.09	1.90	11.84	7.97
Year ago EPS	4.31	4.48	11.18	12.04
Year over Year Growth Est.	-37.91%	-51.24%	7.69%	-32.36%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	2.68	2.18	12.04	8.14
Zacks Consensus Estimate	2.68	2.18	12.04	8.14
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	3.18	3.76	4.48	4.31	NA
Estimate	2.87	3.77	4.28	3.75	NA
Difference	0.31	-0.01	0.20	0.56	0.27
Surprise	10.80%	-0.27%	4.67%	14.93%	7.53%

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eBay Inc. (EBAY)
(Real Time Quote from BATS)

$70.39 USD

+0.42 (0.60%)

Updated Sep 30, 2021 10:40 AM ET

Zacks Rank:
3-Hold

Style Scores:
B Value | D Growth | A Momentum | C VGM

Industry Rank:
Bottom 15% (214 out of 251)

Industry: Internet - Commerce

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eBay Inc. (EBAY) Quote Overview » Estimates » eBay Inc. (EBAY) Detailed Estimates

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Estimates

Next Report Date	10/27/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.82	Next Year	NA
Last EPS Surprise	-1.20%	EPS (TTM)	3.79
ABR	2.33	P/E (F1)	17.66

Growth Estimates	EBAY	IND	S&P
Current Qtr (09/2021)	0.35	-16.73	NA
Next Qtr (12/2021)	11.81	-34.13	NA
Current Year (12/2021)	14.20	13.30	55.60
Next Year (12/2022)	12.30	20.90	15.50
Past 5 Years	9.60	6.90	2.80
Next 5 Years	10.70	21.20	NA
PE	17.66	155.10	22.90
PEG Ratio	1.66	7.32	NA

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Premium Research for EBAY

Zacks Rank	Hold 3
Zacks Industry Rank	Bottom 15% (214 out of 251)
Zacks Sector Rank	Top 19% (3 out of 16)
Style Scores	B Value | D Growth | A Momentum | C VGM
Earnings ESP	0.00%
Research Reports for EBAY	Analyst | Snapshot

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Price and EPS Surprise Chart

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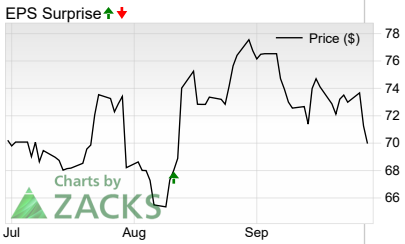

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	2.45B	2.65B	10.41B	11.10B
# of Estimates	8	8	8	8
High Estimate	2.47B	2.76B	10.53B	11.37B
Low Estimate	2.44B	2.56B	10.30B	10.69B
Year ago Sales	2.61B	2.87B	10.71B	10.41B
Year over Year Growth Est.	-5.79%	-7.62%	-2.82%	6.64%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.72	0.81	3.35	3.76
# of Estimates	8	6	8	5
Most Recent Consensus	0.88	0.94	3.88	4.32
High Estimate	0.75	0.89	3.56	3.86
Low Estimate	0.71	0.74	3.26	3.62

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Year ago EPS	0.72	0.72	2.93	3.35
Year over Year Growth Est.	0.35%	11.81%	14.16%	12.29%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.72	0.81	3.35	3.76
Zacks Consensus Estimate	0.72	0.81	3.35	3.76
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.82	0.94	0.72	0.72	NA
Estimate	0.83	0.92	0.69	0.62	NA
Difference	-0.01	0.02	0.03	0.10	0.04
Surprise	-1.20%	2.17%	4.35%	16.13%	5.36%

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The Estee Lauder Companies Inc. (EL)

(Real Time Quote from BATS)

$304.28 USD

-2.12 (-0.69%)

Updated Sep 30, 2021 10:41 AM ET

Zacks Rank:
3-Hold

Style Scores:
D Value | B Growth | B Momentum | B VGM

Industry Rank:
Top 38% (95 out of 251)

Industry: Cosmetics

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The Estee Lauder Companies Inc. (EL) Quote Overview » Estimates » The Estee Lauder Companies Inc. (EL) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	11/1/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.78	Next Year	NA
Last EPS Surprise	52.94%	EPS (TTM)	6.45
ABR	1.53	P/E (F1)	40.80

Growth Estimates	EL	IND	S&P
Current Qtr (09/2021)	15.63	-18.42	NA
Next Qtr (12/2021)	7.28	69.20	NA
Current Year (06/2022)	16.40	9.10	55.60
Next Year (06/2023)	13.10	20.30	15.50
Past 5 Years	14.60	1.50	2.80
Next 5 Years	9.50	8.90	NA
PE	40.80	43.70	22.90
PEG Ratio	4.30	4.91	NA

Learn More About Estimate Research

See Brokerage Recommendations

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Premium Research for EL

Zacks Rank	Hold 3
Zacks Industry Rank	Top 38% (95 out of 251)
Zacks Sector Rank	Top 31% (5 out of 16)
Style Scores	D Value | B Growth | B Momentum | B VGM
Earnings ESP	0.00%
Research Reports for EL	Analyst | Snapshot

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Research for EL

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (6/2022)	Next Year (6/2023)

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (6/2022)	Next Year (6/2023)
Zacks Consensus Estimate	4.23B	5.50B	18.81B	20.38B
# of Estimates	7	7	8	8
High Estimate	4.28B	5.85B	18.99B	21.00B
Low Estimate	4.19B	5.04B	18.60B	19.90B
Year ago Sales	3.56B	4.85B	16.22B	18.81B
Year over Year Growth Est.	18.79%	13.43%	16.01%	8.32%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (6/2022)	Next Year (6/2023)
Zacks Consensus Estimate	1.67	2.80	7.51	8.49
# of Estimates	10	9	11	9
Most Recent Consensus	1.65	2.78	8.22	8.18
High Estimate	1.70	3.01	8.22	9.06
Low Estimate	1.60	2.53	7.30	8.05
Year ago EPS	1.44	2.61	6.45	7.51
Year over Year Growth Est.	15.63%	7.28%	16.42%	13.11%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.67	2.80	7.51	8.49
Zacks Consensus Estimate	1.67	2.80	7.51	8.49
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.78	1.62	2.61	1.44	NA
Estimate	0.51	1.29	1.67	0.90	NA
Difference	0.27	0.33	0.94	0.54	0.52
Surprise	52.94%	25.58%	56.29%	60.00%	48.70%

Quarterly Estimates By Analyst

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Exponent, Inc. (EXPO)
(Real Time Quote from BATS)

$115.64 USD

+0.47 (0.41%)

Updated Sep 30, 2021 10:41 AM ET

Zacks Rank:
2-Buy

Style Scores:
F Value | A Growth | F Momentum | D VGM

Industry Rank:
Top 6% (16 out of 251)

Industry: Consulting Services

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Exponent, Inc. (EXPO) Quote Overview » Estimates » Exponent, Inc. (EXPO) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	11/4/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.48	Next Year	NA
Last EPS Surprise	14.29%	EPS (TTM)	1.81
ABR	2.00	P/E (F1)	64.52

Growth Estimates	EXPO	IND	S&P
Current Qtr (09/2021)	16.18	13.34	NA
Next Qtr (12/2021)	-17.07	9.69	NA
Current Year (12/2021)	15.20	25.40	55.60
Next Year (12/2022)	7.60	7.80	15.50
Past 5 Years	14.70	8.40	2.80
Next 5 Years	NA	16.10	NA
PE	64.52	36.80	22.90
PEG Ratio	NA	2.29	NA

Learn More About Estimate Research
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See Earnings Report Transcript

Premium Research for EXPO

Zacks Rank	▲ Buy 2
Zacks Industry Rank	Top 6% (16 out of 251)
Zacks Sector Rank	Bottom 31% (11 out of 16)
Style Scores	F Value | A Growth | F Momentum | D VGM
Earnings ESP	0.00%
Research Report for EXPO	Snapshot

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Research for EXPO

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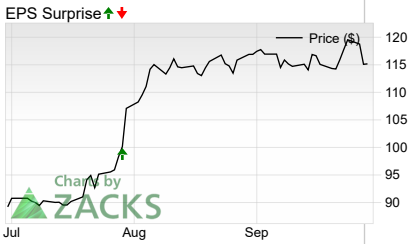

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	104.47M	99.03M	425.52M	458.58M
# of Estimates	2	2	2	2
High Estimate	105.30M	99.76M	425.60M	459.20M
Low Estimate	103.64M	98.30M	425.44M	457.96M
Year ago Sales	93.50M	97.33M	378.41M	425.52M
Year over Year Growth Est.	11.73%	1.75%	12.45%	7.77%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.40	0.34	1.78	1.92
# of Estimates	2	2	2	2
Most Recent Consensus	0.40	0.34	1.79	1.97
High Estimate	0.40	0.34	1.79	1.97
Low Estimate	0.39	0.34	1.78	1.87

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Year ago EPS	0.34	0.41	1.55	1.78
Year over Year Growth Est.	16.18%	-17.07%	15.16%	7.56%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.40	0.34	1.78	1.92
Zacks Consensus Estimate	0.40	0.34	1.78	1.92
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.48	0.58	0.41	0.34	NA
Estimate	0.42	0.43	0.28	0.27	NA
Difference	0.06	0.15	0.13	0.07	0.10
Surprise	14.29%	34.88%	46.43%	25.93%	30.38%

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Fastenal Company (FAST)

(Real Time Quote from BATS)

$52.49 USD

-0.33 (-0.63%)

Updated Sep 30, 2021 10:41 AM ET

Zacks Rank:
2-Buy

Style Scores:
D Value | C Growth | B Momentum | C VGM

Industry Rank:
Top 17% (42 out of 251)

Industry: Building Products - Retail

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Detailed Estimates

Estimates

Next Report Date	*BMO 10/12/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.42	Next Year	NA
Last EPS Surprise	2.44%	EPS (TTM)	1.51
ABR	2.94	P/E (F1)	33.96

*BMO = Before Market Open *AMC = After Market Close

Growth Estimates	FAST	IND	S&P
Current Qtr (09/2021)	8.77	26.78	NA
Next Qtr (12/2021)	5.88	7.14	NA
Current Year (12/2021)	4.40	25.40	55.60
Next Year (12/2022)	9.60	2.90	15.50
Past 5 Years	11.50	12.70	2.80
Next 5 Years	9.00	13.20	NA
PE	33.96	17.30	22.90
PEG Ratio	3.77	1.31	NA

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Premium Research for FAST

Zacks Rank	▲ Buy 2
Zacks Industry Rank	Top 17% (42 out of 251)
Zacks Sector Rank	Top 19% (3 out of 16)
Style Scores	D Value | C Growth | B Momentum | C VGM
Earnings ESP	0.00%
Research Reports for FAST	Analyst | Snapshot

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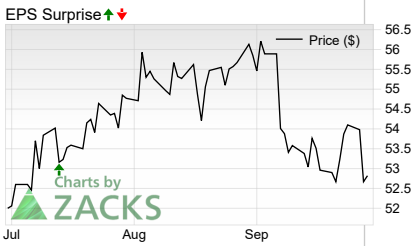

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Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.54B	1.43B	5.90B	6.36B

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
# of Estimates	5	5	7	7
High Estimate	1.55B	1.47B	5.94B	6.43B
Low Estimate	1.52B	1.41B	5.88B	6.30B
Year ago Sales	1.41B	1.36B	5.65B	5.90B
Year over Year Growth Est.	8.82%	5.58%	4.43%	7.91%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.41	0.36	1.56	1.71
# of Estimates	6	6	9	9
Most Recent Consensus	0.41	0.37	1.54	1.68
High Estimate	0.42	0.37	1.58	1.75
Low Estimate	0.41	0.35	1.54	1.67
Year ago EPS	0.38	0.34	1.49	1.56
Year over Year Growth Est.	8.77%	5.88%	4.40%	9.64%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.41	0.36	1.56	1.71
Zacks Consensus Estimate	0.41	0.36	1.56	1.71
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.42	0.37	0.34	0.38	NA
Estimate	0.41	0.37	0.33	0.37	NA
Difference	0.01	0.00	0.01	0.01	0.01
Surprise	2.44%	0.00%	3.03%	2.70%	2.04%

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First Cash, Inc. (FCFS)
(Real Time Quote from BATS)

$87.84 USD

+0.75 (0.86%)

Updated Sep 30, 2021 10:43 AM ET

Zacks Rank:
2-Buy

Style Scores:
C Value | D Growth | C Momentum | C VGM

Industry Rank:
Top 21% (52 out of 251)

Industry: Financial - Consumer Loans

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First Cash, Inc. (FCFS) Quote Overview » Estimates » First Cash, Inc. (FCFS) Detailed Estimates

Detailed Estimates

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Estimates

Next Report Date	*BMO 10/20/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.71	Next Year	NA
Last EPS Surprise	31.48%	EPS (TTM)	2.99
ABR	2.20	P/E (F1)	26.47

*BMO = Before Market Open *AMC = After Market Close

Growth Estimates	FCFS	IND	S&P
Current Qtr (09/2021)	30.51	2.80	NA
Next Qtr (12/2021)	10.32	-14.48	NA
Current Year (12/2021)	9.30	5.50	55.60
Next Year (12/2022)	14.90	-6.50	15.50
Past 5 Years	3.00	10.50	2.80
Next 5 Years	NA	27.10	NA
PE	26.47	9.60	22.90
PEG Ratio	NA	0.35	NA

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Premium Research for FCFS

Zacks Rank	Buy 2
Zacks Industry Rank	Top 21% (52 out of 251)
Zacks Sector Rank	Top 25% (4 out of 16)
Style Scores	C Value | D Growth | C Momentum | C VGM
Earnings ESP	0.00%
Research Report for FCFS	Snapshot

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Research for FCFS

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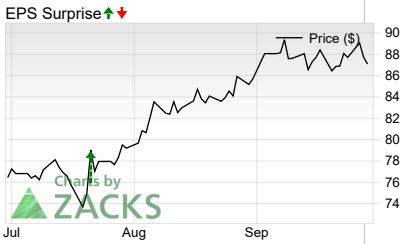

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	403.53M	421.13M	1.62B	1.70B
# of Estimates	3	3	3	3
High Estimate	412.90M	429.90M	1.64B	1.72B
Low Estimate	396.65M	406.31M	1.60B	1.66B
Year ago Sales	359.89M	392.16M	1.63B	1.62B
Year over Year Growth Est.	12.13%	7.39%	-0.56%	4.90%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.77	0.93	3.29	3.78
# of Estimates	3	3	4	4
Most Recent Consensus	0.74	0.98	3.28	3.70
High Estimate	0.84	0.98	3.40	3.92
Low Estimate	0.73	0.89	3.18	3.70

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Year ago EPS	0.59	0.84	3.01	3.29
Year over Year Growth Est.	30.51%	10.32%	9.30%	14.89%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.77	0.93	3.29	3.78
Zacks Consensus Estimate	0.77	0.93	3.29	3.78
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.71	0.85	0.84	0.59	NA
Estimate	0.54	0.63	0.82	0.50	NA
Difference	0.17	0.22	0.02	0.09	0.13
Surprise	31.48%	34.92%	2.44%	18.00%	21.71%

Quarterly Estimates By Analyst

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Annual Estimates By Analyst

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Franklin Electric Co., Inc. (FELE)
(Real Time Quote from BATS)

$81.96 USD

-0.55 (-0.67%)

Updated Sep 30, 2021 10:43 AM ET

Zacks Rank:
3-Hold

Style Scores:
B Value | B Growth | D Momentum | C VGM

Industry Rank:
Top 39% (98 out of 251)

Industry: Manufacturing - Electronics

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Franklin Electric Co., Inc. (FELE) Quote Overview » Estimates » Franklin Electric Co., Inc. (FELE) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	10/26/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.83	Next Year	NA
Last EPS Surprise	-2.35%	EPS (TTM)	2.82
ABR	2.33	P/E (F1)	27.41

Growth Estimates	FELE	IND	S&P
Current Qtr (09/2021)	10.24	71.88	NA
Next Qtr (12/2021)	15.79	3.29	NA
Current Year (12/2021)	38.10	18.60	55.60
Next Year (12/2022)	7.30	18.50	15.50
Past 5 Years	6.00	3.90	2.80
Next 5 Years	NA	15.30	NA
PE	27.41	16.20	22.90
PEG Ratio	NA	1.06	NA

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Premium Research for FELE

Zacks Rank	Hold 3
Zacks Industry Rank	Top 39% (98 out of 251)
Zacks Sector Rank	Top 44% (7 out of 16)
Style Scores	B Value | B Growth | D Momentum | C VGM
Earnings ESP	0.00%
Research Report for FELE	Snapshot

(▲▼ = Change in last 30 days)

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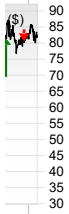
Research for FELE

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	430.30M	373.70M	1.57B	1.66B
# of Estimates	1	1	1	1
High Estimate	430.30M	373.70M	1.57B	1.66B
Low Estimate	430.30M	373.70M	1.57B	1.66B
Year ago Sales	351.19M	321.11M	1.25B	1.57B
Year over Year Growth Est.	22.53%	16.38%	26.19%	5.21%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.92	0.66	3.01	3.23
# of Estimates	2	1	2	2
Most Recent Consensus	0.92	0.66	3.01	3.23
High Estimate	0.92	0.66	3.02	3.23
Low Estimate	0.91	0.66	3.00	3.23

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Year ago EPS	0.83	0.57	2.18	3.01
Year over Year Growth Est.	10.24%	15.79%	38.07%	7.31%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.92	0.66	3.01	3.23
Zacks Consensus Estimate	0.92	0.66	3.01	3.23
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.83	0.59	0.57	0.83	NA
Estimate	0.85	0.39	0.52	0.66	NA
Difference	-0.02	0.20	0.05	0.17	0.10
Surprise	-2.35%	51.28%	9.62%	25.76%	21.08%

Quarterly Estimates By Analyst

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GATX Corporation (GATX)
(Real Time Quote from BATS)

$90.93 USD

+0.02 (0.02%)

Updated Sep 30, 2021 10:43 AM ET

Zacks Rank:
2-Buy

Style Scores:
C Value | D Growth | F Momentum | D VGM

Industry Rank:
Top 9% (23 out of 251)

Industry: Transportation - Equipment and Leasing

View All Zacks #1 Ranked Stocks
GATX Corporation (GATX) Quote Overview » Estimates » GATX Corporation (GATX) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	10/19/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	1.35	Next Year	NA
Last EPS Surprise	33.66%	EPS (TTM)	3.90
ABR	1.00	P/E (F1)	20.66

Growth Estimates	GATX	IND	S&P
Current Qtr (09/2021)	-2.91	48.89	NA
Next Qtr (12/2021)	NA	78.66	NA
Current Year (12/2021)	-4.10	21.60	55.60
Next Year (12/2022)	20.50	19.80	15.50
Past 5 Years	-2.50	-1.80	2.80
Next 5 Years	NA	11.50	NA
PE	20.66	16.70	22.90
PEG Ratio	NA	1.45	NA

Learn More About Estimate Research
See Brokerage Recommendations
See Earnings Report Transcript

Premium Research for GATX

Zacks Rank	**Buy** 2
Zacks Industry Rank	Top 9% (23 out of 251)
Zacks Sector Rank	Top 13% (2 out of 16)
Style Scores	**C Value | D Growth | F Momentum | D VGM**
Earnings ESP	0.00%
Research Reports for GATX	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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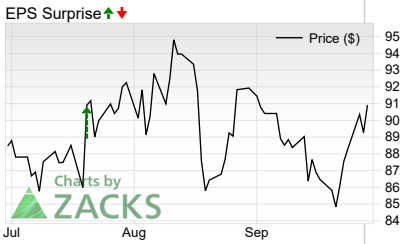
Research for GATX

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.00M	NA	NA	NA
# of Estimates	NA	NA	NA	NA
High Estimate	NA	NA	NA	NA
Low Estimate	NA	NA	NA	NA
Year ago Sales	304.40M	304.90M	1.22B	NA
Year over Year Growth Est.	NA	NA	NA	NA

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.00	NA	4.40	5.30
# of Estimates	1	0	2	2
Most Recent Consensus	NA	NA	NA	NA
High Estimate	1.00	NA	4.45	5.75
Low Estimate	1.00	NA	4.35	4.85

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Year ago EPS	1.03	0.50	4.59	4.40
Year over Year Growth Est.	-2.91%	NA	-4.14%	20.45%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.00	NA	4.40	5.30
Zacks Consensus Estimate	1.00	NA	4.40	5.30
Earnings ESP	0.00%	NA	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	1.35	1.02	0.50	1.03	NA
Estimate	1.01	0.86	0.86	0.86	NA
Difference	0.34	0.16	-0.36	0.17	0.08
Surprise	33.66%	18.60%	-41.86%	19.77%	7.54%

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International Flavors & Fragrances Inc. (IFF)

(Real Time Quote from BATS)

$135.48 USD

+1.40 (1.04%)

Updated Sep 30, 2021 10:47 AM ET

Zacks Rank:
3-Hold

Style Scores:
C Value | B Growth | D Momentum | C VGM

Industry Rank:
Bottom 10% (227 out of 251)

Industry: Consumer Products - Staples

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International Flavors & Fragrances Inc. (IFF) Quote Overview » Estimates » International Flavors & Fragrances Inc. (IFF) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	11/8/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	1.50	Next Year	NA
Last EPS Surprise	-0.66%	EPS (TTM)	5.82
ABR	1.36	P/E (F1)	23.13

Growth Estimates	IFF	IND	S&P
Current Qtr (09/2021)	1.25	74.55	NA
Next Qtr (12/2021)	-4.80	153.88	NA
Current Year (12/2021)	1.70	8.70	55.60
Next Year (12/2022)	12.60	17.30	15.50
Past 5 Years	1.50	3.40	2.80
Next 5 Years	9.50	11.50	NA
PE	23.13	43.90	22.90
PEG Ratio	2.43	3.82	NA

Learn More About Estimate Research

See Brokerage Recommendations

See Earnings Report Transcript

Premium Research for IFF

Zacks Rank	**Hold 3**
Zacks Industry Rank	Bottom 10% (227 out of 251)
Zacks Sector Rank	Top 31% (5 out of 16)
Style Scores	**C Value | B Growth | D Momentum | C VGM**
Earnings ESP	0.00%
Research Reports for IFF	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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Research for IFF

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	3.00B	2.96B	11.52B	12.34B
# of Estimates	4	4	4	5
High Estimate	3.03B	2.98B	11.56B	12.52B
Low Estimate	2.94B	2.92B	11.42B	12.15B
Year ago Sales	1.27B	1.27B	5.08B	11.52B
Year over Year Growth Est.	136.54%	133.37%	126.53%	7.13%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.42	1.26	5.80	6.53
# of Estimates	4	3	5	5
Most Recent Consensus	1.50	1.32	5.88	6.70
High Estimate	1.50	1.32	5.94	6.77
Low Estimate	1.34	1.19	5.60	6.19
Year ago EPS	1.40	1.32	5.70	5.80
Year over Year Growth Est.	1.25%	-4.80%	1.68%	12.63%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.42	1.26	5.80	6.53
Zacks Consensus Estimate	1.42	1.26	5.80	6.53
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	1.50	1.60	1.32	1.40	NA
Estimate	1.51	1.51	1.19	1.45	NA
Difference	-0.01	0.09	0.13	-0.05	0.04
Surprise	-0.66%	5.96%	10.92%	-3.45%	3.19%

Quarterly Estimates By Analyst

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At the center of everything we do is a strong commitment to independent research and sharing its profitable discoveries with investors. This dedication to giving investors a trading advantage led to the creation of our proven Zacks Rank stock-rating system. Since 1988 it has more than doubled the S&P 500 with an average gain of +25.60% per year. These returns cover a period from January 1, 1988 through June 28, 2021. Zacks Rank stock-rating system returns are computed monthly based on the beginning of the month and end of the month Zacks Rank stock prices plus any dividends received during that particular month. A simple, equally-weighted average return of all Zacks Rank stocks is calculated to determine the monthly return. The monthly returns are then compounded to arrive at the annual return. Only Zacks Rank stocks included in Zacks hypothetical portfolios at the beginning of each month are included in the return calculations. Zacks Ranks stocks can, and often do, change throughout the month. Certain Zacks Rank stocks for which no month-end price was available, pricing information was not collected, or for certain other reasons have been excluded from these return calculations.

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Ingredion Incorporated (INGR)

(Real Time Quote from BATS)

$90.36 USD

-0.55 (-0.61%)

Updated Sep 30, 2021 10:47 AM ET

Zacks Rank:
3-Hold

Style Scores:
A Value | B Growth | D Momentum | A VGM

Industry Rank:
Bottom 30% (175 out of 251)

Industry: Food - Miscellaneous

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Ingredion Incorporated (INGR) Quote Overview » Estimates » Ingredion Incorporated (INGR) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	11/1/21	Earnings ESP	NA
Current Quarter	NA	Current Year	NA
EPS Last Quarter	2.05	Next Year	NA
Last EPS Surprise	NA	EPS (TTM)	7.42
ABR	3.00	P/E (F1)	13.77

Growth Estimates	INGR	IND	S&P
Current Qtr (09/2021)	NA	7.58	NA
Next Qtr (12/2021)	NA	10.41	NA
Current Year (12/2021)	5.90	6.20	55.60
Next Year (12/2022)	5.50	16.50	15.50
Past 5 Years	0.50	3.40	2.80
Next 5 Years	NA	10.90	NA
PE	13.77	10.10	22.90
PEG Ratio	NA	0.93	NA

Learn More About Estimate Research

See Brokerage Recommendations

See Earnings Report Transcript

Premium Research for INGR

Zacks Rank	**Hold 3**
Zacks Industry Rank	Bottom 30% (175 out of 251)
Zacks Sector Rank	Top 31% (5 out of 16)
Style Scores	**A Value | B Growth | D Momentum | A VGM**
Earnings ESP	NA
Research Report for INGR	Snapshot

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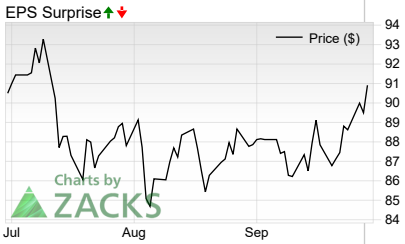
Research for INGR

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.00M	NA	NA	NA

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
# of Estimates	NA	NA	NA	NA
High Estimate	NA	NA	NA	NA
Low Estimate	NA	NA	NA	NA
Year ago Sales	1.50B	1.59B	5.99B	NA
Year over Year Growth Est.	NA	NA	NA	NA

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	NA	NA	6.60	6.96
# of Estimates	0	0	1	1
Most Recent Consensus	NA	NA	NA	NA
High Estimate	NA	NA	6.60	6.96
Low Estimate	NA	NA	6.60	6.96
Year ago EPS	1.77	1.75	6.23	6.60
Year over Year Growth Est.	NA	NA	5.94%	5.45%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	NA	NA	6.60	6.96
Zacks Consensus Estimate	NA	NA	6.60	6.96
Earnings ESP	NA	NA	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	2.05	1.85	1.75	1.77	NA
Estimate	NA	NA	NA	NA	NA
Difference	NA	NA	NA	NA	NA
Surprise	NA	NA	NA	NA	NA

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Iron Mountain Incorporated (IRM)

(Real Time Quote from BATS)

$44.28 USD

-0.03 (-0.07%)

Updated Sep 30, 2021 10:47 AM ET

Zacks Rank:
3-Hold

Style Scores:
B Value | C Growth | C Momentum | B VGM

Industry Rank:
Top 41% (104 out of 251)

Industry: REIT and Equity Trust - Other

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Iron Mountain Incorporated (IRM) Quote Overview » Estimates » Iron Mountain Incorporated (IRM) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	11/4/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.85	Next Year	NA
Last EPS Surprise	32.81%	EPS (TTM)	2.93
ABR	2.67	P/E (F1)	16.08

Growth Estimates	IRM	IND	S&P
Current Qtr (09/2021)	14.43	285.51	NA
Next Qtr (12/2021)	9.09	150.47	NA

Growth Estimates	IRM	IND	S&P
Current Year (12/2021)	-10.30	2.90	55.60
Next Year (12/2022)	6.50	9.80	15.50
Past 5 Years	7.90	-1.70	2.80
Next 5 Years	3.80	7.50	NA
PE	16.08	51.70	22.90
PEG Ratio	4.18	6.89	NA

Learn More About Estimate Research

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See Earnings Report Transcript

Premium Research for IRM

Zacks Rank	Hold 3
Zacks Industry Rank	Top 41% (104 out of 251)
Zacks Sector Rank	Top 25% (4 out of 16)
Style Scores	B Value | C Growth | C Momentum | B VGM
Earnings ESP	0.00%
Research Reports for IRM	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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Research for IRM

Price and EPS Surprise Chart

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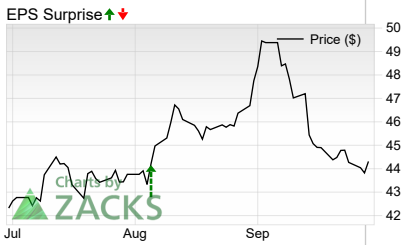

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.13B	1.14B	4.48B	4.64B
# of Estimates	5	5	5	5
High Estimate	1.14B	1.16B	4.50B	4.68B
Low Estimate	1.13B	1.13B	4.46B	4.62B
Year ago Sales	1.04B	1.06B	4.15B	4.48B
Year over Year Growth Est.	9.16%	8.02%	7.98%	3.72%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.70	0.72	2.76	2.94
# of Estimates	5	4	6	6

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Recent Consensus	0.71	0.72	2.74	3.04
High Estimate	0.73	0.75	2.88	3.05
Low Estimate	0.65	0.67	2.64	2.74
Year ago EPS	0.61	0.66	3.07	2.76
Year over Year Growth Est.	14.43%	9.09%	-10.26%	6.53%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.70	0.72	2.76	2.94
Zacks Consensus Estimate	0.70	0.72	2.76	2.94
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.85	0.81	0.66	0.61	NA
Estimate	0.64	0.64	0.60	0.55	NA
Difference	0.21	0.17	0.06	0.06	0.13
Surprise	32.81%	26.56%	10.00%	10.91%	20.07%

Quarterly Estimates By Analyst

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J.B. Hunt Transport Services, Inc. (JBHT)

(Real Time Quote from BATS)

$170.12 USD

+0.04 (0.02%)

Updated Sep 30, 2021 10:47 AM ET

Zacks Rank:
3-Hold

Style Scores:
B Value | A Growth | D Momentum | B VGM

Industry Rank:
Top 9% (23 out of 251)

Industry: Transportation - Truck

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J.B. Hunt Transport Services, Inc. (JBHT) Quote Overview » Estimates » J.B. Hunt Transport Services, Inc. (JBHT) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	10/15/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	1.61	Next Year	NA
Last EPS Surprise	3.87%	EPS (TTM)	5.60
ABR	2.13	P/E (F1)	25.48

Growth Estimates	JBHT	IND	S&P
Current Qtr (09/2021)	51.57	42.91	NA
Next Qtr (12/2021)	32.22	31.22	NA
Current Year (12/2021)	40.80	39.80	55.60
Next Year (12/2022)	14.80	8.10	15.50
Past 5 Years	6.10	7.70	2.80
Next 5 Years	15.00	18.70	NA
PE	25.48	17.90	22.90
PEG Ratio	1.70	0.96	NA

Learn More About Estimate Research

See Brokerage Recommendations

Premium Research for JBHT

Zacks Rank	Hold 3
Zacks Industry Rank	Top 9% (23 out of 251)
Zacks Sector Rank	Top 13% (2 out of 16)
Style Scores	B Value | A Growth | D Momentum | B VGM
Earnings ESP	0.00%
Research Reports for JBHT	Analyst | Snapshot

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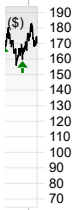
Research for JBHT

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	3.00B	3.14B	11.73B	12.68B

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
# of Estimates	4	4	6	6
High Estimate	3.10B	3.24B	11.99B	13.19B
Low Estimate	2.90B	3.07B	11.50B	11.80B
Year ago Sales	2.47B	2.74B	9.64B	11.73B
Year over Year Growth Est.	21.45%	14.86%	21.71%	8.12%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.79	1.90	6.67	7.66
# of Estimates	7	5	9	9
Most Recent Consensus	1.75	1.87	6.60	7.55
High Estimate	1.85	1.99	6.80	8.00
Low Estimate	1.71	1.81	6.50	7.21
Year ago EPS	1.18	1.44	4.74	6.67
Year over Year Growth Est.	51.57%	32.22%	40.81%	14.78%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.79	1.90	6.67	7.66
Zacks Consensus Estimate	1.79	1.90	6.67	7.66
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	1.61	1.37	1.44	1.18	NA
Estimate	1.55	1.18	1.27	1.26	NA
Difference	0.06	0.19	0.17	-0.08	0.09
Surprise	3.87%	16.10%	13.39%	-6.35%	6.75%

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J & J Snack Foods Corp. (JJSF)

(Real Time Quote from BATS)

$153.97 USD

-1.28 (-0.82%)

Updated Sep 30, 2021 10:48 AM ET

Zacks Rank:
3-Hold

Style Scores:
C Value | A Growth | D Momentum | B VGM

Industry Rank:
Bottom 30% (175 out of 251)

Industry: Food - Miscellaneous

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J & J Snack Foods Corp. (JJSF) Quote Overview » Estimates » J & J Snack Foods Corp. (JJSF) Detailed Estimates

Detailed Estimates

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Estimates

Next Report Date	11/4/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	1.51	Next Year	NA
Last EPS Surprise	91.14%	EPS (TTM)	2.27
ABR	2.00	P/E (F1)	49.65

Growth Estimates	JJSF	IND	S&P
Current Qtr (09/2021)	243.81	7.58	NA
Next Qtr (12/2021)	933.33	10.41	NA
Current Year (09/2021)	181.70	6.20	55.60
Next Year (09/2022)	50.90	16.50	15.50
Past 5 Years	-22.50	3.40	2.80
Next 5 Years	NA	10.90	NA
PE	49.65	10.10	22.90
PEG Ratio	NA	0.93	NA

Learn More About Estimate Research

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See Earnings Report Transcript

Premium Research for JJSF

Zacks Rank	▼ Hold 3
Zacks Industry Rank	Bottom 30% (175 out of 251)
Zacks Sector Rank	Top 31% (5 out of 16)
Style Scores	C Value | A Growth | D Momentum | B VGM
Earnings ESP	0.00%
Research Report for JJSF	Snapshot

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Research for JJSF

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
Zacks Consensus Estimate	312.67M	NA	1.13B	1.24B
# of Estimates	3	NA	3	3
High Estimate	320.00M	NA	1.14B	1.26B
Low Estimate	306.60M	NA	1.13B	1.22B
Year ago Sales	252.54M	241.00M	1.02B	1.13B
Year over Year Growth Est.	23.81%	NA	11.00%	9.09%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
Zacks Consensus Estimate	1.20	0.93	3.13	4.72
# of Estimates	3	1	3	3
Most Recent Consensus	1.21	0.93	3.14	5.07
High Estimate	1.28	0.93	3.20	5.07
Low Estimate	1.12	0.93	3.04	4.18
Year ago EPS	0.35	0.09	1.11	3.13
Year over Year Growth Est.	243.81%	933.33%	181.68%	50.85%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.20	0.93	3.13	4.72
Zacks Consensus Estimate	1.20	0.93	3.13	4.72
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	1.51	0.32	0.09	0.35	NA
Estimate	0.79	0.13	0.14	0.05	NA
Difference	0.72	0.19	-0.05	0.30	0.29
Surprise	91.14%	146.15%	-35.71%	600.00%	200.40%

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Jack Henry & Associates, Inc. (JKHY)
(Real Time Quote from BATS)

$165.69 USD

-0.47 (-0.28%)

Updated Sep 30, 2021 10:48 AM ET

Zacks Rank:
2-Buy

Style Scores:
D Value | A Growth | D Momentum | C VGM

Industry Rank:
Top 21% (52 out of 251)

Industry: Electronics - Miscellaneous Services

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Jack Henry & Associates, Inc. (JKHY) Quote Overview » Estimates » Jack Henry & Associates, Inc. (JKHY) Detailed Estimates

Detailed Estimates

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Estimates

Next Report Date	11/3/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	1.04	Next Year	NA
Last EPS Surprise	11.83%	EPS (TTM)	4.12
ABR	2.17	P/E (F1)	36.20

Growth Estimates	JKHY	IND	S&P
Current Qtr (09/2021)	12.61	7.64	NA
Next Qtr (12/2021)	17.55	-75.09	NA
Current Year (06/2022)	11.40	-7.10	55.60
Next Year (06/2023)	10.90	23.50	15.50
Past 5 Years	6.90	6.90	2.80
Next 5 Years	11.00	11.00	NA
PE	36.20	12.60	22.90
PEG Ratio	3.29	1.15	NA

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Premium Research for JKHY

Zacks Rank	▲ Buy 2
Zacks Industry Rank	Top 21% (52 out of 251)
Zacks Sector Rank	Bottom 19% (13 out of 16)
Style Scores	D Value | A Growth | D Momentum | C VGM
Earnings ESP	0.00%
Research Reports for JKHY	Analyst | Snapshot

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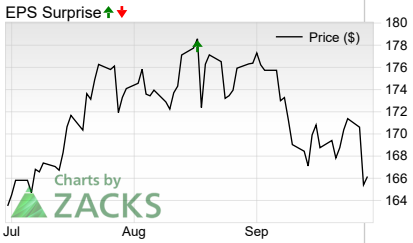
Research for JKHY

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (6/2022)	Next Year (6/2023)
Zacks Consensus Estimate	490.10M	466.15M	1.90B	2.03B
# of Estimates	2	2	2	1
High Estimate	491.20M	471.30M	1.91B	2.03B
Low Estimate	489.00M	461.00M	1.90B	2.03B
Year ago Sales	451.80M	422.36M	1.76B	1.90B
Year over Year Growth Est.	8.48%	10.37%	8.20%	6.73%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (6/2022)	Next Year (6/2023)
Zacks Consensus Estimate	1.34	1.11	4.59	5.09
# of Estimates	2	2	2	1
Most Recent Consensus	1.32	1.05	4.58	5.09
High Estimate	1.36	1.16	4.60	5.09
Low Estimate	1.32	1.05	4.58	5.09

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (6/2022)	Next Year (6/2023)
Year ago EPS	1.19	0.94	4.12	4.59
Year over Year Growth Est.	12.61%	17.55%	11.41%	10.89%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.34	1.11	4.59	5.09
Zacks Consensus Estimate	1.34	1.11	4.59	5.09
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	1.04	0.95	0.94	1.19	NA
Estimate	0.93	0.86	0.88	1.07	NA
Difference	0.11	0.09	0.06	0.12	0.10
Surprise	11.83%	10.47%	6.82%	11.21%	10.08%

Quarterly Estimates By Analyst

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Juniper Networks, Inc. (JNPR)
(Real Time Quote from BATS)

$28.16 USD
-0.20 (-0.71%)
Updated Sep 30, 2021 10:48 AM ET

Zacks Rank:
3-Hold

Style Scores:
B Value | C Growth | F Momentum | C VGM

Industry Rank:
Top 24% (61 out of 251)

Industry: Wireless Equipment

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Juniper Networks, Inc. (JNPR) Quote Overview » Estimates » Juniper Networks, Inc. (JNPR) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	*AMC 10/26/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.31	Next Year	NA
Last EPS Surprise	19.23%	EPS (TTM)	1.71
ABR	2.66	P/E (F1)	16.45

*BMO = Before Market Open *AMC = After Market Close

Growth Estimates	JNPR	IND	S&P
Current Qtr (09/2021)	9.17	-8.46	NA
Next Qtr (12/2021)	-3.17	614.97	NA
Current Year (12/2021)	13.70	11.30	55.60
Next Year (12/2022)	13.90	27.10	15.50
Past 5 Years	-5.10	0.80	2.80
Next 5 Years	8.40	13.80	NA
PE	16.45	154.10	22.90
PEG Ratio	1.96	11.17	NA

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Premium Research for JNPR

Zacks Rank	▼ Hold 3
Zacks Industry Rank	Top 24% (61 out of 251)
Zacks Sector Rank	Bottom 19% (13 out of 16)
Style Scores	B Value | C Growth | F Momentum | C VGM
Earnings ESP	0.00%
Research Reports for JNPR	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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Research for JNPR

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.20B	1.27B	4.71B	4.90B

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
# of Estimates	4	4	5	5
High Estimate	1.21B	1.28B	4.73B	4.98B
Low Estimate	1.20B	1.26B	4.70B	4.77B
Year ago Sales	1.14B	1.22B	4.45B	4.71B
Year over Year Growth Est.	5.68%	3.78%	6.07%	3.98%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.33	0.41	1.21	1.37
# of Estimates	4	3	4	4
Most Recent Consensus	0.46	0.54	1.73	1.93
High Estimate	0.33	0.42	1.23	1.44
Low Estimate	0.32	0.39	1.18	1.31
Year ago EPS	0.30	0.42	1.06	1.21
Year over Year Growth Est.	9.17%	-3.17%	13.68%	13.90%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.33	0.41	1.21	1.37
Zacks Consensus Estimate	0.33	0.41	1.21	1.37
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.31	0.15	0.42	0.30	NA
Estimate	0.26	0.13	0.40	0.32	NA
Difference	0.05	0.02	0.02	-0.02	0.02
Surprise	19.23%	15.38%	5.00%	-6.25%	8.34%

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ManTech International Corporation (MANT)

(Real Time Quote from BATS)

$77.09 USD

-0.31 (-0.40%)

Updated Sep 30, 2021 10:53 AM ET

Zacks Rank:
3-Hold

Style Scores:
B Value | C Growth | F Momentum | C VGM

Industry Rank:
Bottom 20% (202 out of 251)

Industry: Computer - Services

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ManTech International Corporation (MANT) Quote Overview » Estimates » ManTech International Corporation (MANT) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	11/4/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.99	Next Year	NA
Last EPS Surprise	13.79%	EPS (TTM)	3.59
ABR	2.14	P/E (F1)	21.50

Growth Estimates	MANT	IND	S&P
Current Qtr (09/2021)	2.89	123.16	NA
Next Qtr (12/2021)	0.37	-23.42	NA

Growth Estimates	MANT	IND	S&P
Current Year (12/2021)	7.10	11.50	55.60
Next Year (12/2022)	4.60	17.30	15.50
Past 5 Years	19.50	11.00	2.80
Next 5 Years	5.10	9.70	NA
PE	21.50	21.10	22.90
PEG Ratio	4.25	2.18	NA

Learn More About Estimate Research

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Premium Research for MANT

Zacks Rank	**Hold 3**
Zacks Industry Rank	Bottom 20% (202 out of 251)
Zacks Sector Rank	Bottom 19% (13 out of 16)
Style Scores	**B Value | C Growth | F Momentum | C VGM**
Earnings ESP	0.00%
Research Report for MANT	Snapshot

(▲▼ = Change in last 30 days)

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Research for MANT

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	681.05M	698.00M	2.66B	2.80B
# of Estimates	2	2	3	3
High Estimate	687.70M	706.10M	2.68B	2.83B
Low Estimate	674.40M	689.90M	2.65B	2.78B
Year ago Sales	636.20M	638.78M	2.52B	2.66B
Year over Year Growth Est.	7.05%	9.27%	5.71%	5.01%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.85	0.89	3.60	3.76
# of Estimates	5	3	5	5
Most Recent Consensus	0.83	0.92	3.62	3.74
High Estimate	0.89	0.92	3.62	3.86
Low Estimate	0.83	0.87	3.59	3.68
Year ago EPS	0.83	0.89	3.36	3.60
Year over Year Growth Est.	2.89%	0.37%	7.14%	4.56%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.85	0.89	3.60	3.76
Zacks Consensus Estimate	0.85	0.89	3.60	3.76
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.99	0.88	0.89	0.83	NA
Estimate	0.87	0.83	0.79	0.76	NA
Difference	0.12	0.05	0.10	0.07	0.09
Surprise	13.79%	6.02%	12.66%	9.21%	10.42%

Quarterly Estimates By Analyst

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Monster Beverage Corporation (MNST)

(Real Time Quote from BATS)

$89.72 USD

+0.39 (0.44%)

Updated Sep 30, 2021 10:53 AM ET

Zacks Rank:
3-Hold

Style Scores:
D Value | D Growth | F Momentum | F VGM

Industry Rank:
Top 46% (116 out of 251)

Industry: Beverages - Soft drinks

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Monster Beverage Corporation (MNST) Quote Overview » Estimates » Monster Beverage Corporation (MNST) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	11/4/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.75	Next Year	NA
Last EPS Surprise	11.94%	EPS (TTM)	2.61
ABR	1.57	P/E (F1)	34.10

Growth Estimates	MNST	IND	S&P
Current Qtr (09/2021)	0.96	44.57	NA
Next Qtr (12/2021)	0.00	63.09	NA
Current Year (12/2021)	10.50	25.20	55.60
Next Year (12/2022)	14.90	16.80	15.50
Past 5 Years	16.80	-4.80	2.80
Next 5 Years	14.70	13.10	NA
PE	34.10	7.00	22.90
PEG Ratio	2.31	0.53	NA

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Premium Research for MNST

Zacks Rank	Hold 3
Zacks Industry Rank	Top 46% (116 out of 251)
Zacks Sector Rank	Top 31% (5 out of 16)
Style Scores	D Value | D Growth | F Momentum | F VGM
Earnings ESP	0.00%
Research Reports for MNST	Analyst | Snapshot

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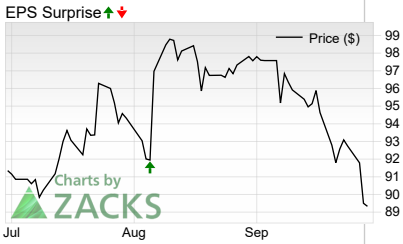
Research for MNST

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.38B	1.30B	5.41B	5.99B
# of Estimates	5	5	6	6
High Estimate	1.40B	1.33B	5.48B	6.17B
Low Estimate	1.34B	1.28B	5.34B	5.91B
Year ago Sales	1.25B	1.20B	4.60B	5.41B
Year over Year Growth Est.	10.97%	8.93%	17.58%	10.81%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.66	0.62	2.62	3.01
# of Estimates	8	6	8	8
Most Recent Consensus	0.67	0.67	2.69	3.05
High Estimate	0.68	0.67	2.70	3.20
Low Estimate	0.62	0.55	2.54	2.86
Year ago EPS	0.65	0.62	2.37	2.62
Year over Year Growth Est.	0.96%	0.00%	10.55%	14.89%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.66	0.62	2.62	3.01
Zacks Consensus Estimate	0.66	0.62	2.62	3.01
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.75	0.59	0.62	0.65	NA
Estimate	0.67	0.61	0.59	0.63	NA
Difference	0.08	-0.02	0.03	0.02	0.03
Surprise	11.94%	-3.28%	5.08%	3.17%	4.23%

Quarterly Estimates By Analyst

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At the center of everything we do is a strong commitment to independent research and sharing its profitable discoveries with investors. This dedication to giving investors a trading advantage led to the creation of our proven Zacks Rank stock-rating system. Since 1988 it has more than doubled the S&P 500 with an average gain of +25.60% per year. These returns cover a period from January 1, 1988 through June 28, 2021. Zacks Rank stock-rating system returns are computed monthly based on the beginning of the month and end of the month Zacks Rank stock prices plus any dividends received during that particular month. A simple, equally-weighted average return of all Zacks Rank stocks is calculated to determine the monthly return. The monthly returns are then compounded to arrive at the annual return. Only Zacks Rank stocks included in Zacks hypothetical portfolios at the beginning of each month are included in the return calculations. Zacks Ranks stocks can, and often do, change throughout the month. Certain Zacks Rank stocks for which no month-end price was available, pricing information was not collected, or for certain other reasons have been excluded from these return calculations.

Visit Performance Disclosure for information about the performance numbers displayed above.

Visit www.zacksdata.com to get our data and content for your mobile app or website.

Real time prices by BATS. Delayed quotes by Sungard.

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Altria Group, Inc. (MO)

(Real Time Quote from BATS)

$47.12 USD

-1.62 (-3.32%)

Updated Sep 30, 2021 10:23 AM ET

Zacks Rank:
3-Hold

Style Scores:
B Value | C Growth | C Momentum | C VGM

Industry Rank:
Top 25% (63 out of 251)

Industry: Tobacco

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Altria Group, Inc. (MO) Quote Overview » Estimates » Altria Group, Inc. (MO) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	*BMO 10/28/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	1.23	Next Year	NA
Last EPS Surprise	5.13%	EPS (TTM)	4.48
ABR	1.77	P/E (F1)	10.56

*BMO = Before Market Open *AMC = After Market Close

Growth Estimates	MO	IND	S&P

Growth Estimates	MO	IND	S&P
Current Year (12/2021)	6.10	6.40	55.60
Next Year (12/2022)	4.80	3.20	15.50
Past 5 Years	9.20	5.60	2.80
Next 5 Years	4.00	5.60	NA
PE	10.56	7.10	22.90
PEG Ratio	2.64	1.27	NA

Learn More About Estimate Research

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See Earnings Report Transcript

Premium Research for MO

Zacks Rank	Hold 3
Zacks Industry Rank	Top 25% (63 out of 251)
Zacks Sector Rank	Top 31% (5 out of 16)
Style Scores	B Value | C Growth | C Momentum | C VGM
Earnings ESP	0.00%
Research Reports for MO	Analyst | Snapshot

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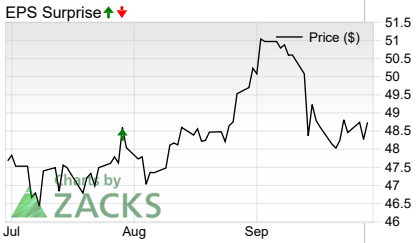
Research for MO

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	5.79B	5.06B	21.32B	21.51B
# of Estimates	3	3	4	4
High Estimate	5.84B	5.28B	21.53B	21.90B
Low Estimate	5.76B	4.95B	21.16B	21.03B
Year ago Sales	5.68B	5.06B	20.84B	21.32B
Year over Year Growth Est.	1.92%	0.12%	2.30%	0.88%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Recent Consensus	1.27	1.03	4.60	4.83
High Estimate	1.31	1.08	4.70	4.93
Low Estimate	1.24	1.03	4.60	4.75
Year ago EPS	1.19	0.99	4.36	4.63
Year over Year Growth Est.	6.96%	6.46%	6.13%	4.76%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.27	1.05	4.63	4.85
Zacks Consensus Estimate	1.27	1.05	4.63	4.85
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	1.23	1.07	0.99	1.19	NA
Estimate	1.17	1.04	1.01	1.15	NA
Difference	0.06	0.03	-0.02	0.04	0.03
Surprise	5.13%	2.88%	-1.98%	3.48%	2.38%

Quarterly Estimates By Analyst

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At the center of everything we do is a strong commitment to independent research and sharing its profitable discoveries with investors. This dedication to giving investors a trading advantage led to the creation of our proven Zacks Rank stock-rating system. Since 1988 it has more than doubled the S&P 500 with an average gain of +25.60% per year. These returns cover a period from January 1, 1988 through June 28, 2021. Zacks Rank stock-rating system returns are computed monthly based on the beginning of the month and end of the month Zacks Rank stock prices plus any dividends received during that particular month. A simple, equally-weighted average return of all Zacks Rank stocks is calculated to determine the monthly return. The monthly returns are then compounded to arrive at the annual return. Only Zacks Rank stocks included in Zacks hypothetical portfolios at the beginning of each month are included in the return calculations. Zacks Ranks stocks can, and often do, change throughout the month. Certain Zacks Rank stocks for which no month-end price was available, pricing information was not collected, or for certain other reasons have been excluded from these return calculations.

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MSA Safety Incorporated (MSA)

(Real Time Quote from BATS)

$146.28 USD

+0.15 (0.10%)

Updated Sep 30, 2021 10:56 AM ET

Zacks Rank:
4-Sell

Style Scores:
C Value | A Growth | F Momentum | B VGM

Industry Rank:
Bottom 20% (202 out of 251)

Industry: Security and Safety Services

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MSA Safety Incorporated (MSA) Quote Overview » Estimates » MSA Safety Incorporated (MSA) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	10/27/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	1.06	Next Year	NA
Last EPS Surprise	-4.50%	EPS (TTM)	4.22
ABR	2.33	P/E (F1)	31.77

Growth Estimates	MSA	IND	S&P
Current Qtr (09/2021)	17.55	15.21	NA
Next Qtr (12/2021)	16.93	24.86	NA
Current Year (12/2021)	2.20	14.10	55.60
Next Year (12/2022)	19.60	25.90	15.50
Past 5 Years	11.40	9.70	2.80
Next 5 Years	NA	10.80	NA
PE	31.77	0.70	22.90
PEG Ratio	NA	0.06	NA

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Premium Research for MSA

Zacks Rank	▼ Sell 4
Zacks Industry Rank	Bottom 20% (202 out of 251)
Zacks Sector Rank	Top 44% (7 out of 16)
Style Scores	C Value | A Growth | F Momentum | B VGM
Earnings ESP	0.00%
Research Report for MSA	Snapshot

(▲▼ = Change in last 30 days)

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Research for MSA

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	341.25M	426.95M	1.42B	1.53B
# of Estimates	2	2	2	2
High Estimate	348.30M	446.20M	1.44B	1.57B
Low Estimate	334.20M	407.70M	1.39B	1.48B
Year ago Sales	304.39M	388.25M	1.35B	1.42B
Year over Year Growth Est.	12.11%	9.97%	5.17%	7.80%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.11	1.49	4.60	5.50
# of Estimates	2	2	2	2
Most Recent Consensus	1.09	1.40	4.50	5.25
High Estimate	1.12	1.57	4.70	5.75
Low Estimate	1.09	1.40	4.50	5.25
Year ago EPS	0.94	1.27	4.50	4.60
Year over Year Growth Est.	17.55%	16.93%	2.22%	19.57%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.11	1.49	4.60	5.50
Zacks Consensus Estimate	1.11	1.49	4.60	5.50
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	1.06	0.95	1.27	0.94	NA
Estimate	1.11	0.94	1.03	1.10	NA
Difference	-0.05	0.01	0.24	-0.16	0.01
Surprise	-4.50%	1.06%	23.30%	-14.55%	1.33%

Quarterly Estimates By Analyst

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MSCI Inc (MSCI)

(Real Time Quote from BATS)

$612.12 USD

+1.42 (0.23%)

Updated Sep 30, 2021 10:56 AM ET

Zacks Rank:
2-Buy

Style Scores:
F Value | C Growth | B Momentum | D VGM

Industry Rank:
Top 40% (101 out of 251)

Industry: Business - Software Services

View All Zacks #1 Ranked Stocks
MSCI Inc (MSCI) Quote Overview » Estimates » MSCI Inc (MSCI) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	10/26/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	2.45	Next Year	NA
Last EPS Surprise	6.06%	EPS (TTM)	9.07
ABR	2.00	P/E (F1)	62.59

Growth Estimates	MSCI	IND	S&P
Current Qtr (09/2021)	7.84	18.55	NA
Next Qtr (12/2021)	26.28	26.38	NA

Growth Estimates	MSCI	IND	S&P
Current Year (12/2021)	24.60	1.00	55.60
Next Year (12/2022)	12.90	11.90	15.50
Past 5 Years	25.80	9.70	2.80
Next 5 Years	NA	10.10	NA
PE	62.59	36.40	22.90
PEG Ratio	NA	3.60	NA

Learn More About Estimate Research

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Premium Research for MSCI

Zacks Rank	▲ Buy 2
Zacks Industry Rank	Top 40% (101 out of 251)
Zacks Sector Rank	Bottom 19% (13 out of 16)
Style Scores	F Value | C Growth | B Momentum | D VGM
Earnings ESP	0.00%
Research Reports for MSCI	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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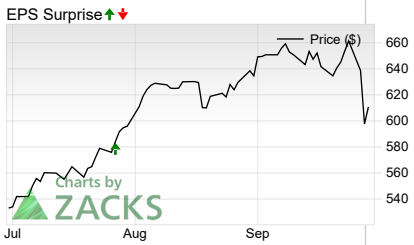
Research for MSCI

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	502.19M	517.80M	2.00B	2.23B
# of Estimates	3	3	4	4
High Estimate	506.00M	519.00M	2.01B	2.29B
Low Estimate	496.58M	517.00M	1.99B	2.20B
Year ago Sales	425.33M	443.66M	1.70B	2.00B
Year over Year Growth Est.	18.07%	16.71%	17.96%	11.41%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	2.37	2.48	9.76	11.02
# of Estimates	4	4	4	4

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Recent Consensus	2.39	2.46	9.76	10.94
High Estimate	2.42	2.53	9.83	11.27
Low Estimate	2.32	2.43	9.69	10.90
Year ago EPS	2.20	1.96	7.83	9.76
Year over Year Growth Est.	7.84%	26.28%	24.62%	12.91%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	2.37	2.48	9.76	11.02
Zacks Consensus Estimate	2.37	2.48	9.76	11.02
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	2.45	2.46	1.96	2.20	NA
Estimate	2.31	2.29	1.98	1.83	NA
Difference	0.14	0.17	-0.02	0.37	0.17
Surprise	6.06%	7.42%	-1.01%	20.22%	8.17%

Quarterly Estimates By Analyst

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ACCREDITED BUSINESS BBB Rating: A+ As of 9/28/2021 Click for Profile

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Real time prices by BATS. Delayed quotes by Sungard.

NYSE and AMEX data is at least 20 minutes delayed. NASDAQ data is at least 15 minutes delayed.

Vail Resorts, Inc. (MTN)
(Real Time Quote from BATS)

$339.87 USD
-2.72 (-0.79%)
Updated Sep 30, 2021 11:07 AM ET

Zacks Rank:
3-Hold

Style Scores:
C Value | F Growth | C Momentum | D VGM

Industry Rank:
Bottom 23% (193 out of 251)

Industry: Leisure and Recreation Services

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Vail Resorts, Inc. (MTN) Quote Overview » Estimates » Vail Resorts, Inc. (MTN) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	12/9/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	-3.49	Next Year	NA
Last EPS Surprise	4.12%	EPS (TTM)	3.22
ABR	2.45	P/E (F1)	44.40

Growth Estimates	MTN	IND	S&P
Current Qtr (10/2021)	-1.81	54.43	NA
Next Qtr (01/2022)	57.04	68.68	NA
Current Year (07/2022)	146.50	27.30	55.60
Next Year (07/2023)	24.70	26.00	15.50
Past 5 Years	-5.10	-14.50	2.80
Next 5 Years	NA	18.00	NA
PE	44.40	18.40	22.90
PEG Ratio	NA	1.02	NA

Learn More About Estimate Research

See Brokerage Recommendations

See Earnings Report Transcript

Premium Research for MTN

Zacks Rank	▲ Hold 3
Zacks Industry Rank	Bottom 23% (193 out of 251)
Zacks Sector Rank	Bottom 38% (10 out of 16)
Style Scores	C Value | F Growth | C Momentum | D VGM
Earnings ESP	0.00%
Research Reports for MTN	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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Research for MTN

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (10/2021)	Next Qtr (1/2022)	Current Year (7/2022)	Next Year (7/2023)
Zacks Consensus Estimate	196.07M	966.05M	2.52B	2.73B

	Current Qtr (10/2021)	Next Qtr (1/2022)	Current Year (7/2022)	Next Year (7/2023)
# of Estimates	6	6	8	8
High Estimate	217.79M	1.02B	2.58B	2.81B
Low Estimate	167.50M	904.92M	2.45B	2.65B
Year ago Sales	131.79M	684.64M	1.91B	2.52B
Year over Year Growth Est.	48.77%	41.10%	32.18%	8.11%

Earnings Estimates

	Current Qtr (10/2021)	Next Qtr (1/2022)	Current Year (7/2022)	Next Year (7/2023)
Zacks Consensus Estimate	-3.70	5.68	7.72	9.62
# of Estimates	7	6	9	9
Most Recent Consensus	-3.71	5.65	7.60	9.16
High Estimate	-3.59	6.09	8.07	10.55
Low Estimate	-3.82	5.16	7.15	8.35
Year ago EPS	-3.63	3.62	3.13	7.72
Year over Year Growth Est.	-1.81%	57.04%	146.54%	24.72%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	-3.70	5.68	7.72	9.62
Zacks Consensus Estimate	-3.70	5.68	7.72	9.62
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (7/2021)	Quarter Ending (4/2021)	Quarter Ending (1/2021)	Quarter Ending (10/2020)	Average Surprise
Reported	-3.49	6.71	3.62	-3.63	NA
Estimate	-3.64	6.67	2.19	-3.59	NA
Difference	0.15	0.04	1.43	-0.04	0.40
Surprise	4.12%	0.60%	65.30%	-1.11%	17.23%

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Northrop Grumman Corporation (NOC)

(Real Time Quote from BATS)

$361.96 USD

-1.02 (-0.28%)

Updated Sep 30, 2021 10:56 AM ET

Zacks Rank:
3-Hold

Style Scores:
A Value | B Growth | B Momentum | A VGM

Industry Rank:
Bottom 30% (175 out of 251)

Industry: Aerospace - Defense

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Northrop Grumman Corporation (NOC) Quote Overview » Estimates » Northrop Grumman Corporation (NOC) Detailed Estimates

Detailed Estimates

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Estimates

Next Report Date	*BMO 10/28/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	6.42	Next Year	NA
Last EPS Surprise	11.65%	EPS (TTM)	25.47
ABR	1.70	P/E (F1)	14.62

*BMO = Before Market Open *AMC = After Market Close

Growth Estimates	NOC	IND	S&P
Current Qtr (09/2021)	0.71	41.67	NA
Next Qtr (12/2021)	-8.80	337.10	NA
Current Year (12/2021)	5.00	11.10	55.60
Next Year (12/2022)	3.60	23.40	15.50
Past 5 Years	19.20	7.30	2.80
Next 5 Years	9.00	11.30	NA
PE	14.62	-60.40	22.90
PEG Ratio	1.63	-5.35	NA

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Premium Research for NOC

Zacks Rank	**Hold 3**
Zacks Industry Rank	Bottom 30% (175 out of 251)
Zacks Sector Rank	Top 50% (8 out of 16)
Style Scores	**A Value | B Growth | B Momentum | A VGM**
Earnings ESP	0.00%
Research Reports for NOC	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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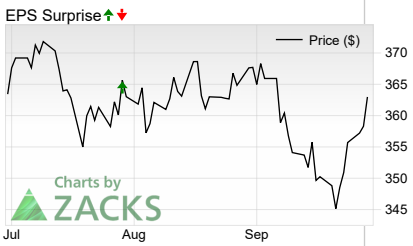
Research for NOC

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

EPS Surprise▲▼



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	8.84B	8.99B	36.05B	38.15B
# of Estimates	3	3	4	4
High Estimate	8.90B	9.05B	36.27B	38.43B
Low Estimate	8.79B	8.92B	35.60B	37.91B
Year ago Sales	9.08B	10.21B	36.80B	36.05B
Year over Year Growth Est.	-2.64%	-12.00%	-2.03%	5.83%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	5.93	6.01	24.83	25.72
# of Estimates	6	4	6	6
Most Recent Consensus	5.83	5.87	24.70	25.80
High Estimate	6.14	6.11	25.25	28.10
Low Estimate	5.83	5.87	24.45	24.15
Year ago EPS	5.89	6.59	23.65	24.83
Year over Year Growth Est.	0.71%	-8.80%	5.00%	3.56%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	5.93	6.01	24.83	25.72
Zacks Consensus Estimate	5.93	6.01	24.83	25.72
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	6.42	6.57	6.59	5.89	NA
Estimate	5.75	5.48	5.70	5.60	NA
Difference	0.67	1.09	0.89	0.29	0.74
Surprise	11.65%	19.89%	15.61%	5.18%	13.08%

Quarterly Estimates By Analyst

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Old Dominion Freight Line, Inc. (ODFL)

(Real Time Quote from BATS)

$294.64 USD

+1.47 (0.50%)

Updated Sep 30, 2021 10:56 AM ET

Zacks Rank:
2-Buy

Style Scores:
D Value | **B** Growth | **A** Momentum | **B** VGM

Industry Rank:
Top 9% (23 out of 251)

Industry: Transportation - Truck

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Old Dominion Freight Line, Inc. (ODFL) Quote Overview » Estimates » Old Dominion Freight Line, Inc. (ODFL) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	*BMO 10/27/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	2.31	Next Year	NA
Last EPS Surprise	6.45%	EPS (TTM)	7.33
ABR	2.27	P/E (F1)	34.58

*BMO = Before Market Open *AMC = After Market Close

Growth Estimates	ODFL	IND	S&P
Current Qtr (09/2021)	36.74	42.91	NA
Next Qtr (12/2021)	33.07	31.22	NA
Current Year (12/2021)	49.30	39.80	55.60
Next Year (12/2022)	13.50	8.10	15.50
Past 5 Years	19.80	7.70	2.80
Next 5 Years	22.70	18.70	NA
PE	34.58	17.90	22.90
PEG Ratio	1.52	0.96	NA

Learn More About Estimate Research

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See Earnings Report Transcript

Premium Research for ODFL

Zacks Rank	▲ Buy 2
Zacks Industry Rank	Top 9% (23 out of 251)
Zacks Sector Rank	Top 13% (2 out of 16)
Style Scores	D Value | B Growth | A Momentum | B VGM
Earnings ESP	0.00%
Research Reports for ODFL	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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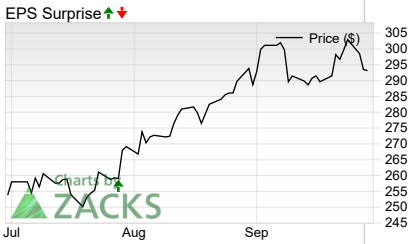
Research for ODFL

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.34B	1.29B	5.10B	5.57B
# of Estimates	3	3	5	5
High Estimate	1.38B	1.32B	5.15B	5.65B
Low Estimate	1.32B	1.25B	5.01B	5.51B
Year ago Sales	1.06B	1.07B	4.02B	5.10B
Year over Year Growth Est.	27.10%	20.29%	27.06%	9.21%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	2.34	2.14	8.48	9.62
# of Estimates	6	4	8	8
Most Recent Consensus	2.40	2.19	8.60	9.60
High Estimate	2.40	2.22	8.60	10.00
Low Estimate	2.30	2.07	8.25	9.35
Year ago EPS	1.71	1.61	5.68	8.48
Year over Year Growth Est.	36.74%	33.07%	49.25%	13.52%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	2.34	2.14	8.48	9.62
Zacks Consensus Estimate	2.34	2.14	8.48	9.62
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	2.31	1.70	1.61	1.71	NA
Estimate	2.17	1.58	1.57	1.51	NA
Difference	0.14	0.12	0.04	0.20	0.13
Surprise	6.45%	7.59%	2.55%	13.25%	7.46%

Quarterly Estimates By Analyst

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Packaging Corporation of America (PKG)

(Real Time Quote from BATS)

$140.67 USD

-0.71 (-0.50%)

Updated Sep 30, 2021 10:57 AM ET

Zacks Rank:
3-Hold

Style Scores:
B Value | C Growth | F Momentum | C VGM

Industry Rank:
Top 43% (108 out of 251)

Industry: Containers - Paper and Packaging

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Packaging Corporation of America (PKG) Quote Overview » Estimates » Packaging Corporation of America (PKG) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	*AMC 10/25/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	2.17	Next Year	NA
Last EPS Surprise	24.00%	EPS (TTM)	6.84
ABR	3.00	P/E (F1)	16.63

*BMO = Before Market Open *AMC = After Market Close

Growth Estimates	PKG	IND	S&P
Current Qtr (09/2021)	52.44	24.62	NA
Next Qtr (12/2021)	63.61	51.49	NA
Current Year (12/2021)	47.10	16.30	55.60
Next Year (12/2022)	10.40	18.40	15.50
Past 5 Years	4.30	7.30	2.80
Next 5 Years	5.00	9.70	NA
PE	16.63	23.60	22.90
PEG Ratio	3.33	2.43	NA

Learn More About Estimate Research

See Brokerage Recommendations

See Earnings Report Transcript

Premium Research for PKG

Zacks Rank	▼ Hold 3
Zacks Industry Rank	Top 43% (108 out of 251)
Zacks Sector Rank	Top 44% (7 out of 16)
Style Scores	B Value | C Growth | F Momentum | C VGM
Earnings ESP	0.00%
Research Reports for PKG	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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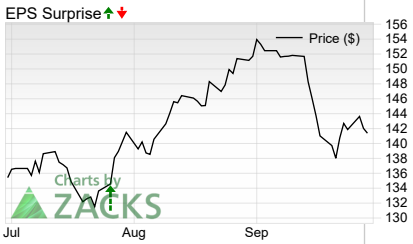
Research for PKG

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.95B	1.94B	7.57B	7.83B
# of Estimates	4	4	5	5
High Estimate	2.01B	1.99B	7.67B	8.06B
Low Estimate	1.91B	1.86B	7.52B	7.55B
Year ago Sales	1.69B	1.71B	6.66B	7.57B
Year over Year Growth Est.	15.33%	12.90%	13.70%	3.41%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	2.39	2.18	8.50	9.38
# of Estimates	6	5	7	7
Most Recent Consensus	2.42	2.34	8.70	10.55
High Estimate	2.42	2.47	8.81	10.55
Low Estimate	2.37	1.86	8.20	8.61
Year ago EPS	1.57	1.33	5.78	8.50
Year over Year Growth Est.	52.44%	63.61%	47.11%	10.37%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	2.39	2.18	8.50	9.38
Zacks Consensus Estimate	2.39	2.18	8.50	9.38
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	2.17	1.77	1.33	1.57	NA
Estimate	1.75	1.47	1.42	1.36	NA
Difference	0.42	0.30	-0.09	0.21	0.21
Surprise	24.00%	20.41%	-6.34%	15.44%	13.38%

Quarterly Estimates By Analyst

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PerkinElmer, Inc. (PKI)

(Real Time Quote from BATS)

$176.73 USD

+1.68 (0.96%)

Updated Sep 30, 2021 10:57 AM ET

Zacks Rank:
3-Hold

Style Scores:
B Value | B Growth | A Momentum | A VGM

Industry Rank:
Top 37% (93 out of 251)

Industry: Instruments - Scientific

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PerkinElmer, Inc. (PKI) Quote Overview » Estimates » PerkinElmer, Inc. (PKI) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	10/27/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	2.83	Next Year	NA
Last EPS Surprise	17.92%	EPS (TTM)	12.60
ABR	2.14	P/E (F1)	17.67

Growth Estimates	PKI	IND	S&P
Current Qtr (09/2021)	-20.97	13.76	NA
Next Qtr (12/2021)	-56.94	-18.29	NA
Current Year (12/2021)	19.40	26.90	55.60
Next Year (12/2022)	-38.80	7.20	15.50
Past 5 Years	26.30	9.50	2.80
Next 5 Years	37.90	20.60	NA
PE	17.67	27.50	22.90
PEG Ratio	0.47	1.33	NA

Learn More About Estimate Research

See Brokerage Recommendations

See Earnings Report Transcript

Premium Research for PKI

Zacks Rank	**Hold 3**
Zacks Industry Rank	Top 37% (93 out of 251)
Zacks Sector Rank	Bottom 19% (13 out of 16)
Style Scores	**B Value | B Growth | A Momentum | A VGM**
Earnings ESP	0.00%
Research Reports for PKI	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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More Premium Research » »

Research for PKI

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.00B	1.03B	4.57B	3.92B

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
# of Estimates	4	4	4	4
High Estimate	1.01B	1.05B	4.59B	4.21B
Low Estimate	1.00B	1.01B	4.55B	3.70B
Year ago Sales	964.03M	1.35B	3.78B	4.57B
Year over Year Growth Est.	4.17%	-23.78%	20.92%	-14.32%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.65	1.71	9.91	6.06
# of Estimates	6	4	6	6
Most Recent Consensus	1.62	1.71	9.86	6.28
High Estimate	1.76	1.75	10.01	6.70
Low Estimate	1.58	1.66	9.77	5.64
Year ago EPS	2.09	3.96	8.30	9.91
Year over Year Growth Est.	-20.97%	-56.94%	19.36%	-38.81%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.65	1.71	9.91	6.06
Zacks Consensus Estimate	1.65	1.71	9.91	6.06
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	2.83	3.72	3.96	2.09	NA
Estimate	2.40	3.03	3.61	1.42	NA
Difference	0.43	0.69	0.35	0.67	0.54
Surprise	17.92%	22.77%	9.70%	47.18%	24.39%

Quarterly Estimates By Analyst

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Philip Morris International Inc. (PM)

(Real Time Quote from BATS)

$95.85 USD

-3.64 (-3.66%)

Updated Sep 30, 2021 10:57 AM ET

Zacks Rank:
3-Hold

Style Scores:
C Value | C Growth | C Momentum | C VGM

Industry Rank:
Top 25% (63 out of 251)

Industry: Tobacco

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Philip Morris International Inc. (PM) Quote Overview » Estimates » Philip Morris International Inc. (PM) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	*BMO 10/19/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	1.57	Next Year	NA
Last EPS Surprise	1.95%	EPS (TTM)	5.82
ABR	1.77	P/E (F1)	16.35

*BMO = Before Market Open *AMC = After Market Close

Growth Estimates	PM	IND	S&P
Current Qtr (09/2021)	8.63	151.31	NA

Growth Estimates	PM	IND	S&P
Next Qtr (12/2021)	9.68	-9.06	NA
Current Year (12/2021)	17.40	6.40	55.60
Next Year (12/2022)	9.90	3.20	15.50
Past 5 Years	1.10	5.60	2.80
Next 5 Years	8.70	5.60	NA
PE	16.35	7.10	22.90
PEG Ratio	1.88	1.27	NA

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Premium Research for PM

Zacks Rank	Hold 3
Zacks Industry Rank	Top 25% (63 out of 251)
Zacks Sector Rank	Top 31% (5 out of 16)
Style Scores	C Value | C Growth | C Momentum | C VGM
Earnings ESP	0.00%
Research Reports for PM	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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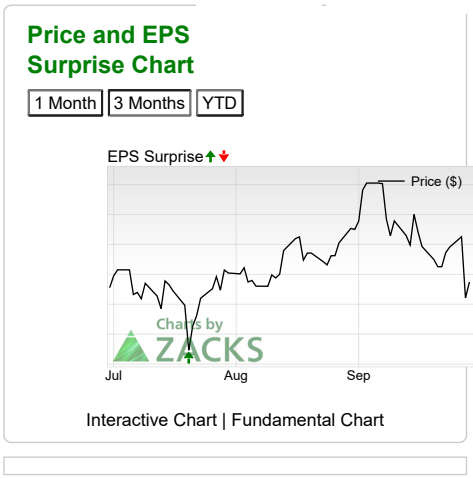
Research for PM



Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	7.87B	7.92B	31.17B	32.93B
# of Estimates	3	3	4	4
High Estimate	7.98B	7.99B	31.30B	33.53B
Low Estimate	7.74B	7.82B	31.07B	32.49B
Year ago Sales	7.45B	7.44B	28.69B	31.17B
Year over Year Growth Est.	5.73%	6.34%	8.64%	5.65%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.54	1.38	6.07	6.67

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
# of Estimates	4	5	5	8
Most Recent Consensus	1.52	1.42	6.09	6.75
High Estimate	1.55	1.43	6.09	6.97
Low Estimate	1.52	1.29	6.05	6.40
Year ago EPS	1.42	1.26	5.17	6.07
Year over Year Growth Est.	8.63%	9.68%	17.37%	9.90%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.54	1.38	6.07	6.67
Zacks Consensus Estimate	1.54	1.38	6.07	6.67
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	1.57	1.57	1.26	1.42	NA
Estimate	1.54	1.40	1.23	1.36	NA
Difference	0.03	0.17	0.03	0.06	0.07
Surprise	1.95%	12.14%	2.44%	4.41%	5.24%

Quarterly Estimates By Analyst

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Pool Corporation (POOL)
(Real Time Quote from BATS)

$444.37 USD
-2.46 (-0.55%)
Updated Sep 30, 2021 10:57 AM ET

Zacks Rank:
2-Buy
Style Scores:
D Value | A Growth | C Momentum | C VGM
Industry Rank:
Top 12% (31 out of 251)
Industry: Leisure and Recreation Products

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Pool Corporation (POOL) Quote Overview » Estimates » Pool Corporation (POOL) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	10/28/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	6.37	Next Year	NA
Last EPS Surprise	18.62%	EPS (TTM)	12.95
ABR	1.67	P/E (F1)	31.60

Growth Estimates	POOL	IND	S&P
Current Qtr (09/2021)	42.68	-37.25	NA
Next Qtr (12/2021)	1.38	-7.94	NA
Current Year (12/2021)	67.90	32.20	55.60
Next Year (12/2022)	4.50	6.20	15.50
Past 5 Years	23.10	18.80	2.80
Next 5 Years	NA	20.30	NA
PE	31.60	3.30	22.90
PEG Ratio	NA	0.16	NA

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See Brokerage Recommendations
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Premium Research for POOL

Zacks Rank	Buy 2
Zacks Industry Rank	Top 12% (31 out of 251)
Zacks Sector Rank	Bottom 38% (10 out of 16)
Style Scores	D Value | A Growth | C Momentum | C VGM
Earnings ESP	0.00%
Research Reports for POOL	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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Research for POOL

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.37B	857.54M	5.07B	5.40B
# of Estimates	3	3	3	3
High Estimate	1.38B	898.62M	5.11B	5.50B
Low Estimate	1.36B	818.00M	5.04B	5.23B
Year ago Sales	1.14B	839.26M	3.94B	5.07B
Year over Year Growth Est.	20.05%	2.18%	28.89%	6.49%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	3.87	1.47	14.14	14.78
# of Estimates	3	3	1	4
Most Recent Consensus	3.83	1.38	14.14	14.23
High Estimate	3.92	1.54	14.14	15.25
Low Estimate	3.83	1.38	14.14	14.23

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Year ago EPS	2.71	1.45	8.42	14.14
Year over Year Growth Est.	42.68%	1.38%	67.93%	4.53%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	3.87	1.47	14.14	14.78
Zacks Consensus Estimate	3.87	1.47	14.14	14.78
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	6.37	2.42	1.45	2.71	NA
Estimate	5.37	1.20	0.77	2.14	NA
Difference	1.00	1.22	0.68	0.57	0.87
Surprise	18.62%	101.67%	88.31%	26.64%	58.81%

Quarterly Estimates By Analyst

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Post Holdings, Inc. (POST)

(Real Time Quote from BATS)

$111.24 USD

-0.78 (-0.70%)

Updated Sep 30, 2021 10:57 AM ET

Zacks Rank:
4-Sell

Style Scores:
A Value | **B** Growth | **D** Momentum | **B** VGM

Industry Rank:
Bottom 30% (175 out of 251)

Industry: Food - Miscellaneous

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Post Holdings, Inc. (POST) Quote Overview » Estimates » Post Holdings, Inc. (POST) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	11/18/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.93	Next Year	NA
Last EPS Surprise	-1.06%	EPS (TTM)	2.52
ABR	1.33	P/E (F1)	39.90

Growth Estimates	POST	IND	S&P
Current Qtr (09/2021)	49.57	7.58	NA
Next Qtr (12/2021)	31.94	10.41	NA
Current Year (09/2021)	3.60	6.20	55.60
Next Year (09/2022)	56.80	16.50	15.50
Past 5 Years	23.50	3.40	2.80
Next 5 Years	NA	10.90	NA
PE	39.90	10.10	22.90
PEG Ratio	NA	0.93	NA

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Premium Research for POST

Zacks Rank	▲ Sell 4
Zacks Industry Rank	Bottom 30% (175 out of 251)
Zacks Sector Rank	Top 31% (5 out of 16)
Style Scores	A Value | B Growth | D Momentum | B VGM
Earnings ESP	0.00%
Research Reports for POST	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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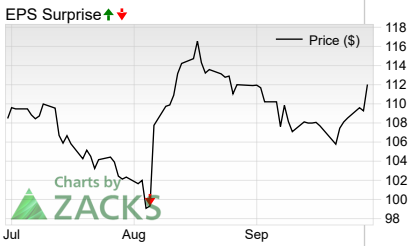
Research for POST

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
Zacks Consensus Estimate	1.67B	1.65B	6.20B	6.67B

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
# of Estimates	4	3	4	4
High Estimate	1.75B	1.66B	6.28B	6.76B
Low Estimate	1.60B	1.65B	6.13B	6.44B
Year ago Sales	1.41B	1.46B	5.70B	6.20B
Year over Year Growth Est.	18.10%	13.46%	8.76%	7.59%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
Zacks Consensus Estimate	0.87	0.95	2.81	4.40
# of Estimates	4	4	4	4
Most Recent Consensus	0.79	0.82	2.75	4.50
High Estimate	1.15	1.18	3.06	5.25
Low Estimate	0.62	0.75	2.57	3.59
Year ago EPS	0.58	0.72	2.71	2.81
Year over Year Growth Est.	49.57%	31.94%	3.60%	56.81%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.87	0.95	2.81	4.40
Zacks Consensus Estimate	0.87	0.95	2.81	4.40
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.93	0.29	0.72	0.58	NA
Estimate	0.94	0.55	0.64	0.74	NA
Difference	-0.01	-0.26	0.08	-0.16	-0.09
Surprise	-1.06%	-47.27%	12.50%	-21.62%	-14.36%

Quarterly Estimates By Analyst

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RLI Corp. (RLI)
(Real Time Quote from BATS)

$101.92 USD
-0.44 (-0.43%)
Updated Sep 30, 2021 10:59 AM ET

Zacks Rank:
2-Buy
Style Scores:
D Value | C Growth | D Momentum | D VGM
Industry Rank:
Top 46% (116 out of 251)
Industry: Insurance - Property and Casualty

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RLI Corp. (RLI) Quote Overview » Estimates » RLI Corp. (RLI) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	10/20/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	1.09	Next Year	NA
Last EPS Surprise	49.32%	EPS (TTM)	3.13
ABR	2.00	P/E (F1)	30.33

Growth Estimates	RLI	IND	S&P
Current Qtr (09/2021)	57.14	-79.70	NA
Next Qtr (12/2021)	-8.00	-83.83	NA
Current Year (12/2021)	30.30	15.80	55.60
Next Year (12/2022)	0.70	7.50	15.50
Past 5 Years	1.50	2.10	2.80
Next 5 Years	NA	9.40	NA
PE	30.33	-24.60	22.90
PEG Ratio	NA	-2.62	NA

Learn More About Estimate Research

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See Earnings Report Transcript

Premium Research for RLI

Zacks Rank	▼ Buy 2
Zacks Industry Rank	Top 46% (116 out of 251)
Zacks Sector Rank	Top 25% (4 out of 16)
Style Scores	D Value | C Growth | D Momentum | D VGM
Earnings ESP	0.00%
Research Reports for RLI	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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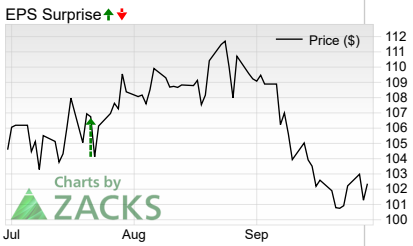
Research for RLI

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	267.34M	275.77M	1.05B	1.15B

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
# of Estimates	1	1	1	1
High Estimate	267.34M	275.77M	1.05B	1.15B
Low Estimate	267.34M	275.77M	1.05B	1.15B
Year ago Sales	233.17M	241.46M	933.64M	1.05B
Year over Year Growth Est.	14.65%	14.21%	12.01%	10.42%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.66	0.69	3.38	3.40
# of Estimates	1	1	2	2
Most Recent Consensus	0.66	0.69	3.45	3.35
High Estimate	0.66	0.69	3.45	3.45
Low Estimate	0.66	0.69	3.30	3.35
Year ago EPS	0.42	0.75	2.59	3.38
Year over Year Growth Est.	57.14%	-8.00%	30.31%	0.74%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.66	0.69	3.38	3.40
Zacks Consensus Estimate	0.66	0.69	3.38	3.40
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	1.09	0.87	0.75	0.42	NA
Estimate	0.73	0.74	0.56	-0.10	NA
Difference	0.36	0.13	0.19	0.52	0.30
Surprise	49.32%	17.57%	33.93%	520.00%	155.21%

Quarterly Estimates By Analyst

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Rollins, Inc. (ROL)
(Real Time Quote from BATS)

$36.03 USD

-0.02 (-0.06%)

Updated Sep 30, 2021 10:59 AM ET

Zacks Rank:
3-Hold

Style Scores:
D Value | A Growth | B Momentum | B VGM

Industry Rank:
Bottom 17% (208 out of 251)

Industry: Building Products - Maintenance Service

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Rollins, Inc. (ROL) Quote Overview » Estimates » Rollins, Inc. (ROL) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	10/27/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.20	Next Year	NA
Last EPS Surprise	11.11%	EPS (TTM)	0.64
ABR	2.50	P/E (F1)	51.99

Growth Estimates	ROL	IND	S&P
Current Qtr (09/2021)	15.38	25.30	NA
Next Qtr (12/2021)	12.82	6.76	NA

Growth Estimates	ROL	IND	S&P
Current Year (12/2021)	28.40	19.70	55.60
Next Year (12/2022)	6.30	22.00	15.50
Past 5 Years	11.60	9.80	2.80
Next 5 Years	NA	12.00	NA
PE	51.99	18.20	22.90
PEG Ratio	NA	1.52	NA

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Premium Research for ROL

Zacks Rank	▼ Hold 3
Zacks Industry Rank	Bottom 17% (208 out of 251)
Zacks Sector Rank	Bottom 31% (11 out of 16)
Style Scores	D Value | A Growth | B Momentum | B VGM
Earnings ESP	0.00%
Research Reports for ROL	Analyst | Snapshot

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Research for ROL

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	641.80M	580.60M	2.41B	2.56B
# of Estimates	2	2	3	3
High Estimate	643.00M	585.00M	2.43B	2.58B
Low Estimate	640.60M	576.20M	2.39B	2.52B
Year ago Sales	583.70M	536.29M	2.16B	2.41B
Year over Year Growth Est.	9.95%	8.26%	11.35%	6.17%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.20	0.15	0.69	0.74
# of Estimates	3	3	3	3
Most Recent Consensus	0.20	0.15	0.70	0.75
High Estimate	0.20	0.15	0.70	0.76
Low Estimate	0.20	0.14	0.69	0.72
Year ago EPS	0.17	0.13	0.54	0.69
Year over Year Growth Est.	15.38%	12.82%	28.40%	6.25%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.20	0.15	0.69	0.74
Zacks Consensus Estimate	0.20	0.15	0.69	0.74
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.20	0.14	0.13	0.17	NA
Estimate	0.18	0.11	0.11	0.15	NA
Difference	0.02	0.03	0.02	0.02	0.02
Surprise	11.11%	27.27%	18.18%	13.33%	17.47%

Quarterly Estimates By Analyst

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Selective Insurance Group, Inc. (SIGI)

(Real Time Quote from BATS)

$76.85 USD

-0.20 (-0.26%)

Updated Sep 30, 2021 10:59 AM ET

Zacks Rank:
3-Hold

Style Scores:
A Value | B Growth | F Momentum | B VGM

Industry Rank:
Top 46% (116 out of 251)

Industry: Insurance - Property and Casualty

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Selective Insurance Group, Inc. (SIGI) Quote Overview » Estimates » Selective Insurance Group, Inc. (SIGI) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	*AMC 10/27/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	1.85	Next Year	NA
Last EPS Surprise	36.03%	EPS (TTM)	6.45
ABR	3.00	P/E (F1)	12.63

*BMO = Before Market Open *AMC = After Market Close

Growth Estimates	SIGI	IND	S&P
Current Qtr (09/2021)	11.64	-79.70	NA
Next Qtr (12/2021)	-25.82	-83.83	NA
Current Year (12/2021)	47.00	15.80	55.60
Next Year (12/2022)	-11.50	7.50	15.50
Past 5 Years	10.20	2.10	2.80
Next 5 Years	12.40	9.40	NA
PE	12.63	-24.60	22.90
PEG Ratio	1.02	-2.62	NA

Learn More About Estimate Research

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Premium Research for SIGI

Zacks Rank	▼ Hold 3
Zacks Industry Rank	Top 46% (116 out of 251)
Zacks Sector Rank	Top 25% (4 out of 16)
Style Scores	A Value | B Growth | F Momentum | B VGM
Earnings ESP	0.00%
Research Reports for SIGI	Analyst | Snapshot

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Research for SIGI

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	835.93M	851.16M	3.32B	3.61B
# of Estimates	2	2	2	2
High Estimate	841.40M	862.50M	3.33B	3.71B
Low Estimate	830.45M	839.81M	3.31B	3.52B
Year ago Sales	768.80M	778.30M	2.93B	3.32B
Year over Year Growth Est.	8.73%	9.36%	13.58%	8.70%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.18	1.37	6.10	5.40
# of Estimates	3	2	3	3
Most Recent Consensus	0.95	1.32	5.90	5.30
High Estimate	1.48	1.41	6.35	5.50
Low Estimate	0.95	1.32	5.90	5.30
Year ago EPS	1.06	1.84	4.15	6.10
Year over Year Growth Est.	11.64%	-25.82%	46.99%	-11.48%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.18	1.37	6.10	5.40
Zacks Consensus Estimate	1.18	1.37	6.10	5.40
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	1.85	1.70	1.84	1.06	NA
Estimate	1.36	0.97	1.10	1.18	NA
Difference	0.49	0.73	0.74	-0.12	0.46
Surprise	36.03%	75.26%	67.27%	-10.17%	42.10%

Quarterly Estimates By Analyst

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NYSE and AMEX data is at least 20 minutes delayed. NASDAQ data is at least 15 minutes delayed.

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Sirius XM Holdings Inc. (SIRI)

(Real Time Quote from BATS)

$6.12 USD

+0.02 (0.33%)

Updated Sep 30, 2021 11:02 AM ET

Zacks Rank:
3-Hold

Style Scores:
B Value | A Growth | C Momentum | A VGM

Industry Rank:
Bottom 37% (159 out of 251)

Industry: Broadcast Radio and Television

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Sirius XM Holdings Inc. (SIRI) Quote Overview » Estimates » Sirius XM Holdings Inc. (SIRI) Detailed Estimates

Detailed Estimates

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Estimates

Next Report Date	10/28/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.10	Next Year	NA
Last EPS Surprise	42.86%	EPS (TTM)	0.30
ABR	1.71	P/E (F1)	20.61

Growth Estimates	SIRI	IND	S&P
Current Qtr (09/2021)	16.67	1,069.24	NA
Next Qtr (12/2021)	-3.57	-3.21	NA
Current Year (12/2021)	18.40	5.60	55.60
Next Year (12/2022)	11.50	12.50	15.50
Past 5 Years	17.60	19.80	2.80
Next 5 Years	12.20	18.20	NA
PE	20.61	22.80	22.90
PEG Ratio	1.69	1.25	NA

Learn More About Estimate Research

See Brokerage Recommendations

See Earnings Report Transcript

Premium Research for SIRI

Zacks Rank	▼ Hold 3
Zacks Industry Rank	Bottom 37% (159 out of 251)
Zacks Sector Rank	Bottom 38% (10 out of 16)
Style Scores	B Value | A Growth | C Momentum | A VGM
Earnings ESP	0.00%
Research Reports for SIRI	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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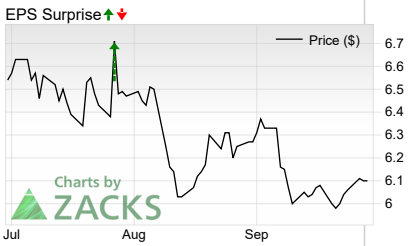
Research for SIRI

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	2.17B	2.22B	8.62B	9.04B

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
# of Estimates	3	3	4	4
High Estimate	2.19B	2.24B	8.68B	9.15B
Low Estimate	2.15B	2.20B	8.57B	8.96B
Year ago Sales	2.03B	2.19B	8.04B	8.62B
Year over Year Growth Est.	7.06%	1.40%	7.26%	4.81%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.07	0.07	0.30	0.33
# of Estimates	5	4	5	5
Most Recent Consensus	NA	NA	NA	NA
High Estimate	0.07	0.07	0.30	0.34
Low Estimate	0.07	0.06	0.29	0.32
Year ago EPS	0.06	0.07	0.25	0.30
Year over Year Growth Est.	16.67%	-3.57%	18.40%	11.49%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.07	0.07	0.30	0.33
Zacks Consensus Estimate	0.07	0.07	0.30	0.33
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.10	0.07	0.07	0.06	NA
Estimate	0.07	0.06	0.05	0.06	NA
Difference	0.03	0.01	0.02	0.00	0.02
Surprise	42.86%	16.67%	40.00%	0.00%	24.88%

Quarterly Estimates By Analyst

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Synopsys, Inc. (SNPS)
(Real Time Quote from BATS)

$303.44 USD

+0.82 (0.27%)

Updated Sep 30, 2021 11:03 AM ET

Zacks Rank:
3-Hold

Style Scores:
D Value | B Growth | C Momentum | C VGM

Industry Rank:
Bottom 37% (159 out of 251)

Industry: Computer - Software

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Synopsys, Inc. (SNPS) Quote Overview » Estimates » Synopsys, Inc. (SNPS) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	12/1/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	1.27	Next Year	NA
Last EPS Surprise	-5.22%	EPS (TTM)	6.61
ABR	1.33	P/E (F1)	44.42

Growth Estimates	SNPS	IND	S&P
Current Qtr (10/2021)	-11.11	1.20	NA
Next Qtr (01/2022)	26.21	-3.02	NA
Current Year (10/2021)	9.10	1.30	55.60
Next Year (10/2022)	12.40	17.40	15.50
Past 5 Years	18.80	10.10	2.80
Next 5 Years	16.00	14.50	NA
PE	44.42	48.70	22.90
PEG Ratio	2.78	3.36	NA

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Premium Research for SNPS

Zacks Rank	**Hold 3**
Zacks Industry Rank	Bottom 37% (159 out of 251)
Zacks Sector Rank	Bottom 19% (13 out of 16)
Style Scores	**D Value | B Growth | C Momentum | C VGM**
Earnings ESP	0.00%
Research Reports for SNPS	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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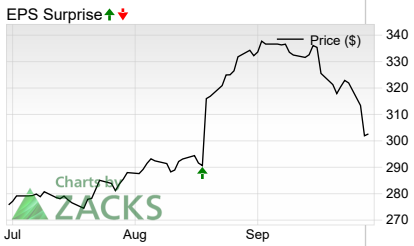
Research for SNPS

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (10/2021)	Next Qtr (1/2022)	Current Year (10/2021)	Next Year (10/2022)
Zacks Consensus Estimate	1.15B	1.11B	4.20B	4.59B

	Current Qtr (10/2021)	Next Qtr (1/2022)	Current Year (10/2021)	Next Year (10/2022)
# of Estimates	3	2	3	3
High Estimate	1.16B	1.13B	4.21B	4.61B
Low Estimate	1.15B	1.10B	4.20B	4.56B
Year ago Sales	1.03B	970.32M	3.69B	4.20B
Year over Year Growth Est.	12.29%	14.73%	14.06%	9.23%

Earnings Estimates

	Current Qtr (10/2021)	Next Qtr (1/2022)	Current Year (10/2021)	Next Year (10/2022)
Zacks Consensus Estimate	1.12	1.30	4.66	5.24
# of Estimates	2	1	2	2
Most Recent Consensus	1.78	1.85	6.81	7.54
High Estimate	1.15	1.30	4.69	5.27
Low Estimate	1.09	1.30	4.63	5.21
Year ago EPS	1.26	1.03	4.27	4.66
Year over Year Growth Est.	-11.11%	26.21%	9.13%	12.45%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.12	1.30	4.66	5.24
Zacks Consensus Estimate	1.12	1.30	4.66	5.24
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (7/2021)	Quarter Ending (4/2021)	Quarter Ending (1/2021)	Quarter Ending (10/2020)	Average Surprise
Reported	1.27	1.24	1.03	1.26	NA
Estimate	1.34	1.01	1.07	1.15	NA
Difference	-0.07	0.23	-0.04	0.11	0.06
Surprise	-5.22%	22.77%	-3.74%	9.57%	5.85%

Quarterly Estimates By Analyst

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TriMas Corporation (TRS)

(Real Time Quote from BATS)

$31.82 USD

+0.40 (1.27%)

Updated Sep 30, 2021 11:04 AM ET

Zacks Rank:
4-Sell

Style Scores:
B Value | A Growth | D Momentum | A VGM

Industry Rank:
Bottom 6% (237 out of 251)

Industry: Metal Products - Procurement and Fabrication

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TriMas Corporation (TRS) Quote Overview » Estimates » TriMas Corporation (TRS) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	11/4/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.62	Next Year	NA
Last EPS Surprise	8.77%	EPS (TTM)	1.83
ABR	2.00	P/E (F1)	13.66

Growth Estimates	TRS	IND	S&P
Current Qtr (09/2021)	39.53	892.50	NA
Next Qtr (12/2021)	52.63	-68.82	NA
Current Year (12/2021)	46.50	16.90	55.60
Next Year (12/2022)	14.30	22.90	15.50
Past 5 Years	1.10	-0.50	2.80
Next 5 Years	NA	12.30	NA
PE	13.66	19.40	22.90
PEG Ratio	NA	1.58	NA

Learn More About Estimate Research

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See Earnings Report Transcript

Premium Research for TRS

Zacks Rank	▼ Sell 4
Zacks Industry Rank	Bottom 6% (237 out of 251)
Zacks Sector Rank	Top 44% (7 out of 16)
Style Scores	B Value | A Growth | D Momentum | A VGM
Earnings ESP	0.00%
Research Reports for TRS	Analyst | Snapshot

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Research for TRS

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	224.97M	213.31M	864.04M	914.15M
# of Estimates	2	2	2	2
High Estimate	231.65M	216.72M	874.08M	937.40M
Low Estimate	218.30M	209.90M	854.00M	890.90M
Year ago Sales	199.46M	188.17M	769.97M	864.04M
Year over Year Growth Est.	12.79%	13.36%	12.22%	5.80%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.60	0.58	2.30	2.63
# of Estimates	2	2	2	2
Most Recent Consensus	0.58	0.54	2.25	2.51
High Estimate	0.62	0.62	2.35	2.75
Low Estimate	0.58	0.54	2.25	2.51
Year ago EPS	0.43	0.38	1.57	2.30
Year over Year Growth Est.	39.53%	52.63%	46.50%	14.35%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.60	0.58	2.30	2.63
Zacks Consensus Estimate	0.60	0.58	2.30	2.63
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.62	0.40	0.38	0.43	NA
Estimate	0.57	0.38	0.31	0.39	NA
Difference	0.05	0.02	0.07	0.04	0.05
Surprise	8.77%	5.26%	22.58%	10.26%	11.72%

Quarterly Estimates By Analyst

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Tetra Tech, Inc. (TTEK)
(Real Time Quote from BATS)

$151.08 USD

+1.48 (0.99%)

Updated Sep 30, 2021 11:03 AM ET

Zacks Rank:
3-Hold

Style Scores:
C Value | A Growth | F Momentum | C VGM

Industry Rank:
Bottom 33% (167 out of 251)

Industry: Pollution Control

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Tetra Tech, Inc. (TTEK) Quote Overview » Estimates » Tetra Tech, Inc. (TTEK) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	11/10/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.95	Next Year	NA
Last EPS Surprise	9.20%	EPS (TTM)	3.65
ABR	1.80	P/E (F1)	40.49

Growth Estimates	TTEK	IND	S&P
Current Qtr (09/2021)	8.79	22.13	NA
Next Qtr (12/2021)	NA	-38.81	NA
Current Year (09/2021)	13.30	2.10	55.60
Next Year (09/2022)	6.50	23.60	15.50
Past 5 Years	13.50	17.50	2.80
Next 5 Years	15.00	13.40	NA
PE	40.49	19.90	22.90
PEG Ratio	2.70	1.49	NA

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Premium Research for TTEK

Zacks Rank	▼ Hold 3
Zacks Industry Rank	Bottom 33% (167 out of 251)
Zacks Sector Rank	Top 44% (7 out of 16)
Style Scores	C Value | A Growth | F Momentum | C VGM
Earnings ESP	0.00%
Research Reports for TTEK	Analyst | Snapshot

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Research for TTEK

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
Zacks Consensus Estimate	674.15M	NA	2.51B	2.68B

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
# of Estimates	2	NA	2	2
High Estimate	677.00M	NA	2.51B	2.71B
Low Estimate	671.30M	NA	2.51B	2.65B
Year ago Sales	589.81M	605.17M	2.35B	2.51B
Year over Year Growth Est.	14.30%	NA	6.91%	6.63%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
Zacks Consensus Estimate	0.99	NA	3.70	3.94
# of Estimates	2	0	2	3
Most Recent Consensus	0.99	NA	3.66	3.92
High Estimate	0.99	NA	3.73	4.09
Low Estimate	0.99	NA	3.66	3.80
Year ago EPS	0.91	0.96	3.26	3.70
Year over Year Growth Est.	8.79%	NA	13.34%	6.54%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.99	NA	3.70	3.94
Zacks Consensus Estimate	0.99	NA	3.70	3.94
Earnings ESP	0.00%	NA	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.95	0.83	0.96	0.91	NA
Estimate	0.87	0.75	0.82	0.81	NA
Difference	0.08	0.08	0.14	0.10	0.10
Surprise	9.20%	10.67%	17.07%	12.35%	12.32%

Annual Estimates By Analyst

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NYSE and AMEX data is at least 20 minutes delayed. NASDAQ data is at least 15 minutes delayed.

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Waters Corporation (WAT)

(Real Time Quote from BATS)

$364.59 USD

-0.58 (-0.16%)

Updated Sep 30, 2021 11:10 AM ET

Zacks Rank:
2-Buy

Style Scores:
D Value | **B** Growth | **A** Momentum | **C** VGM

Industry Rank:
Top 37% (93 out of 251)

Industry: Instruments - Scientific

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Waters Corporation (WAT) Quote Overview » Estimates » Waters Corporation (WAT) Detailed Estimates

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Estimates

Next Report Date	10/26/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	2.60	Next Year	NA
Last EPS Surprise	16.07%	EPS (TTM)	10.70
ABR	2.92	P/E (F1)	34.25

Growth Estimates	WAT	IND	S&P
Current Qtr (09/2021)	9.06	13.76	NA
Next Qtr (12/2021)	-6.68	-18.29	NA
Current Year (12/2021)	17.80	26.90	55.60
Next Year (12/2022)	9.20	7.20	15.50
Past 5 Years	8.50	9.50	2.80
Next 5 Years	9.40	20.60	NA
PE	34.25	27.50	22.90
PEG Ratio	3.65	1.33	NA

Learn More About Estimate Research

See Brokerage Recommendations

See Earnings Report Transcript

Premium Research for WAT

Zacks Rank	**Buy 2**
Zacks Industry Rank	Top 37% (93 out of 251)
Zacks Sector Rank	Bottom 19% (13 out of 16)
Style Scores	**D Value | B Growth | A Momentum | C VGM**
Earnings ESP	0.00%
Research Reports for WAT	Analyst | Snapshot

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Research for WAT

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	652.28M	820.21M	2.76B	2.91B

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
# of Estimates	5	5	5	4
High Estimate	653.30M	832.46M	2.78B	2.93B
Low Estimate	650.92M	802.21M	2.74B	2.88B
Year ago Sales	593.78M	786.66M	2.37B	2.76B
Year over Year Growth Est.	9.85%	4.27%	16.80%	5.27%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	2.36	3.41	10.66	11.64
# of Estimates	7	5	7	6
Most Recent Consensus	2.34	3.43	10.65	11.55
High Estimate	2.45	3.48	10.83	12.14
Low Estimate	2.28	3.29	10.52	11.45
Year ago EPS	2.16	3.65	9.05	10.66
Year over Year Growth Est.	9.06%	-6.68%	17.81%	9.18%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	2.36	3.41	10.66	11.64
Zacks Consensus Estimate	2.36	3.41	10.66	11.64
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	2.60	2.29	3.65	2.16	NA
Estimate	2.24	1.57	2.87	1.91	NA
Difference	0.36	0.72	0.78	0.25	0.53
Surprise	16.07%	45.86%	27.18%	13.09%	25.55%

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Encore Wire Corporation (WIRE)

(Real Time Quote from BATS)

$98.67 USD

-0.57 (-0.57%)

Updated Sep 30, 2021 10:41 AM ET

Zacks Rank:
3-Hold

Style Scores:
A Value | A Growth | B Momentum | A VGM

Industry Rank:
Top 2% (5 out of 251)

Industry: Wire and Cable Products

View All Zacks #1 Ranked Stocks

Encore Wire Corporation (WIRE) Quote Overview » Estimates » Encore Wire Corporation (WIRE) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	10/26/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	8.82	Next Year	NA
Last EPS Surprise	673.68%	EPS (TTM)	13.00
ABR	2.00	P/E (F1)	6.23

Growth Estimates	WIRE	IND	S&P
Current Qtr (09/2021)	176.47	166.27	NA
Next Qtr (12/2021)	NA	31.41	NA
Current Year (12/2021)	332.60	63.50	55.60
Next Year (12/2022)	-42.00	-16.30	15.50
Past 5 Years	13.80	1.50	2.80
Next 5 Years	NA	NA	NA
PE	6.23	9.80	22.90
PEG Ratio	NA	NA	NA

Learn More About Estimate Research

See Brokerage Recommendations

See Earnings Report Transcript

Premium Research for WIRE

Zacks Rank	Hold 3
Zacks Industry Rank	Top 2% (5 out of 251)
Zacks Sector Rank	Top 44% (7 out of 16)
Style Scores	A Value | A Growth | B Momentum | A VGM
Earnings ESP	0.00%
Research Report for WIRE	Snapshot

(▲▼ = Change in last 30 days)

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More Premium Research » »

Research for WIRE

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.00M	NA	NA	NA

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
# of Estimates	NA	NA	NA	NA
High Estimate	NA	NA	NA	NA
Low Estimate	NA	NA	NA	NA
Year ago Sales	339.70M	380.82M	1.28B	NA
Year over Year Growth Est.	NA	NA	NA	NA

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	2.82	NA	15.92	9.24
# of Estimates	1	0	1	1
Most Recent Consensus	2.82	NA	15.92	9.24
High Estimate	2.82	NA	15.92	9.24
Low Estimate	2.82	NA	15.92	9.24
Year ago EPS	1.02	1.17	3.68	15.92
Year over Year Growth Est.	176.47%	NA	332.61%	-41.96%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	2.82	NA	15.92	9.24
Zacks Consensus Estimate	2.82	NA	15.92	9.24
Earnings ESP	0.00%	NA	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	8.82	1.99	1.17	1.02	NA
Estimate	1.14	0.86	0.66	0.74	NA
Difference	7.68	1.13	0.51	0.28	2.40
Surprise	673.68%	131.40%	77.27%	37.84%	230.05%

Annual Estimates By Analyst

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West Pharmaceutical Services, Inc. (WST)
(Real Time Quote from BATS)

$436.95 USD

+4.54 (1.05%)

Updated Sep 30, 2021 11:10 AM ET

Zacks Rank:
2-Buy

Style Scores:
D Value | B Growth | B Momentum | B VGM

Industry Rank:
Top 45% (112 out of 251)

Industry: Medical - Dental Supplies

View All Zacks #1 Ranked Stocks

West Pharmaceutical Services, Inc. (WST) Quote Overview » Estimates » West Pharmaceutical Services, Inc. (WST) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	10/28/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	2.46	Next Year	NA
Last EPS Surprise	41.38%	EPS (TTM)	7.00
ABR	1.80	P/E (F1)	52.58

Growth Estimates	WST	IND	S&P
Current Qtr (09/2021)	57.83	211.60	NA
Next Qtr (12/2021)	40.80	797.92	NA
Current Year (12/2021)	72.80	21.30	55.60
Next Year (12/2022)	6.00	12.20	15.50
Past 5 Years	19.50	11.10	2.80
Next 5 Years	27.30	13.70	NA
PE	52.58	30.30	22.90
PEG Ratio	1.93	2.21	NA

Learn More About Estimate Research

See Brokerage Recommendations

See Earnings Report Transcript

Premium Research for WST

Zacks Rank	▼ Buy 2
Zacks Industry Rank	Top 45% (112 out of 251)
Zacks Sector Rank	Bottom 0% (16 out of 16)
Style Scores	D Value | B Growth | B Momentum | B VGM
Earnings ESP	0.00%
Research Reports for WST	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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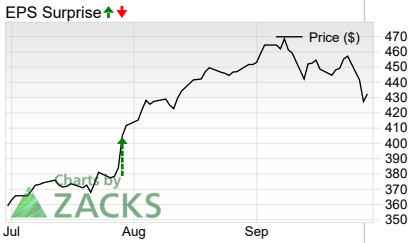
Research for WST

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	684.73M	702.43M	2.78B	3.04B
# of Estimates	3	3	3	3
High Estimate	687.70M	706.30M	2.78B	3.13B
Low Estimate	679.50M	699.00M	2.78B	2.96B
Year ago Sales	548.00M	580.20M	2.15B	2.78B
Year over Year Growth Est.	24.95%	21.07%	29.56%	9.22%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	1.82	1.89	8.22	8.71
# of Estimates	4	3	5	5
Most Recent Consensus	1.79	1.89	8.22	8.83
High Estimate	1.85	1.89	8.30	8.91
Low Estimate	1.77	1.88	8.17	8.40

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Year ago EPS	1.15	1.34	4.76	8.22
Year over Year Growth Est.	57.83%	40.80%	72.77%	5.96%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	1.82	1.89	8.22	8.71
Zacks Consensus Estimate	1.82	1.89	8.22	8.71
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	2.46	2.05	1.34	1.15	NA
Estimate	1.74	1.42	1.13	1.01	NA
Difference	0.72	0.63	0.21	0.14	0.43
Surprise	41.38%	44.37%	18.58%	13.86%	29.55%

Quarterly Estimates By Analyst

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Atmos Energy Corporation (ATO)

(Real Time Quote from BATS)

$88.98 USD

+0.07 (0.08%)

Updated Sep 30, 2021 11:20 AM ET

Zacks Rank:
2-Buy

Style Scores:
D Value | F Growth | C Momentum | F VGM

Industry Rank:
Top 35% (88 out of 251)

Industry: Utility - Gas Distribution

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Atmos Energy Corporation (ATO) Quote Overview » Estimates » Atmos Energy Corporation (ATO) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	11/10/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.78	Next Year	NA
Last EPS Surprise	5.41%	EPS (TTM)	5.32
ABR	1.64	P/E (F1)	17.47

Growth Estimates	ATO	IND	S&P
Current Qtr (09/2021)	-30.82	12.92	NA
Next Qtr (12/2021)	9.36	-1.41	NA
Current Year (09/2021)	7.90	10.70	55.60
Next Year (09/2022)	6.50	2.20	15.50
Past 5 Years	8.60	4.20	2.80
Next 5 Years	7.40	6.00	NA
PE	17.47	47.10	22.90
PEG Ratio	2.36	7.85	NA

Learn More About Estimate Research

See Brokerage Recommendations

See Earnings Report Transcript

Premium Research for ATO

Zacks Rank	▲ Buy 2
Zacks Industry Rank	Top 35% (88 out of 251)
Zacks Sector Rank	Bottom 6% (15 out of 16)
Style Scores	D Value | F Growth | C Momentum | F VGM
Earnings ESP	0.00%
Research Reports for ATO	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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Research for ATO

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
Zacks Consensus Estimate	622.75M	NA	3.47B	3.98B
# of Estimates	1	NA	2	2
High Estimate	622.75M	NA	3.48B	4.03B
Low Estimate	622.75M	NA	3.46B	3.93B
Year ago Sales	474.91M	914.48M	2.82B	3.47B
Year over Year Growth Est.	31.13%	NA	22.97%	14.71%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
Zacks Consensus Estimate	0.37	1.87	5.09	5.43
# of Estimates	3	1	4	5
Most Recent Consensus	NA	NA	5.05	5.40
High Estimate	0.39	1.87	5.12	5.47
Low Estimate	0.35	1.87	5.05	5.39
Year ago EPS	0.53	1.71	4.72	5.09
Year over Year Growth Est.	-30.82%	9.36%	7.89%	6.55%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.37	1.87	5.09	5.43
Zacks Consensus Estimate	0.37	1.87	5.09	5.43
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.78	2.30	1.71	0.53	NA
Estimate	0.74	2.05	1.58	0.52	NA
Difference	0.04	0.25	0.13	0.01	0.11
Surprise	5.41%	12.20%	8.23%	1.92%	6.94%

Annual Estimates By Analyst

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NewJersey Resources Corporation (NJR)

(Real Time Quote from BATS)

$35.40 USD

-0.10 (-0.28%)

Updated Sep 30, 2021 11:21 AM ET

Zacks Rank:
3-Hold

Style Scores:
B Value | F Growth | C Momentum | C VGM

Industry Rank:
Top 35% (88 out of 251)

Industry: Utility - Gas Distribution

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NewJersey Resources Corporation (NJR) Quote Overview » Estimates » NewJersey Resources Corporation (NJR) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	11/29/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	-0.15	Next Year	NA
Last EPS Surprise	-114.29%	EPS (TTM)	2.65
ABR	2.25	P/E (F1)	16.51

Growth Estimates	NJR	IND	S&P
Current Qtr (09/2021)	-88.89	12.92	NA
Next Qtr (12/2021)	6.52	-1.41	NA
Current Year (09/2021)	4.40	10.70	55.60
Next Year (09/2022)	5.10	2.20	15.50
Past 5 Years	2.50	4.20	2.80
Next 5 Years	7.10	6.00	NA
PE	16.51	47.10	22.90
PEG Ratio	2.33	7.85	NA

Learn More About Estimate Research

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Premium Research for NJR

Zacks Rank	Hold 3
Zacks Industry Rank	Top 35% (88 out of 251)
Zacks Sector Rank	Bottom 6% (15 out of 16)
Style Scores	B Value | F Growth | C Momentum | C VGM
Earnings ESP	0.00%
Research Report for NJR	Snapshot

(▲▼ = Change in last 30 days)

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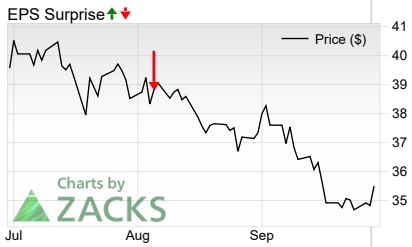
Research for NJR

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
Zacks Consensus Estimate	376.56M	466.00M	2.00B	2.02B
# of Estimates	2	1	2	2
High Estimate	380.00M	466.00M	2.00B	2.02B
Low Estimate	373.11M	466.00M	2.00B	2.01B
Year ago Sales	400.04M	454.31M	1.95B	2.00B
Year over Year Growth Est.	-5.87%	2.57%	2.40%	0.83%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
Zacks Consensus Estimate	0.06	0.49	2.15	2.26
# of Estimates	3	1	3	3
Most Recent Consensus	0.09	0.49	2.17	2.30
High Estimate	0.09	0.49	2.17	2.30
Low Estimate	0.03	0.49	2.12	2.24
Year ago EPS	0.57	0.46	2.06	2.15
Year over Year Growth Est.	-88.89%	6.52%	4.37%	5.12%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.06	0.49	2.15	2.26
Zacks Consensus Estimate	0.06	0.49	2.15	2.26
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	-0.15	1.77	0.46	0.57	NA
Estimate	-0.07	1.16	0.45	0.58	NA
Difference	-0.08	0.61	0.01	-0.01	0.13
Surprise	-114.29%	52.59%	2.22%	-1.72%	-15.30%

Quarterly Estimates By Analyst

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Northwest Natural Gas Company (NWN)
(Real Time Quote from BATS)

$46.30 USD

-0.33 (-0.71%)

Updated Sep 30, 2021 11:21 AM ET

Zacks Rank:
3-Hold

Style Scores:
B Value | C Growth | B Momentum | B VGM

Industry Rank:
Top 35% (88 out of 251)

Industry: Utility - Gas Distribution

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Northwest Natural Gas Company (NWN) Quote Overview » Estimates » Northwest Natural Gas Company (NWN) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	11/4/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	-0.02	Next Year	NA
Last EPS Surprise	84.62%	EPS (TTM)	2.81
ABR	1.75	P/E (F1)	18.07

Growth Estimates	NWN	IND	S&P
Current Qtr (09/2021)	-30.60	12.92	NA
Next Qtr (12/2021)	-3.33	-1.41	NA
Current Year (12/2021)	12.20	10.70	55.60
Next Year (12/2022)	3.40	2.20	15.50
Past 5 Years	0.80	4.20	2.80
Next 5 Years	4.90	6.00	NA
PE	18.07	47.10	22.90
PEG Ratio	3.67	7.85	NA

Learn More About Estimate Research

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See Earnings Report Transcript

Premium Research for NWN

Zacks Rank	Hold 3
Zacks Industry Rank	Top 35% (88 out of 251)
Zacks Sector Rank	Bottom 6% (15 out of 16)
Style Scores	B Value | C Growth | B Momentum | B VGM
Earnings ESP	0.00%
Research Report for NWN	Snapshot

(▲▼ = Change in last 30 days)

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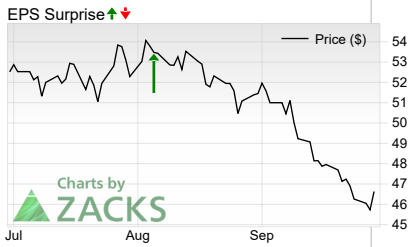
Research for NWN

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	106.50M	272.28M	843.64M	883.43M
# of Estimates	1	1	1	1
High Estimate	106.50M	272.28M	843.64M	883.43M
Low Estimate	106.50M	272.28M	843.64M	883.43M
Year ago Sales	93.28M	260.27M	773.68M	843.64M
Year over Year Growth Est.	14.17%	4.61%	9.04%	4.72%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	-0.80	1.45	2.58	2.67
# of Estimates	3	2	3	3
Most Recent Consensus	-0.72	1.53	2.60	2.75
High Estimate	-0.71	1.53	2.60	2.75
Low Estimate	-0.96	1.37	2.56	2.62
Year ago EPS	-0.61	1.50	2.30	2.58
Year over Year Growth Est.	-30.60%	-3.33%	12.17%	3.36%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	-0.80	1.45	2.58	2.67
Zacks Consensus Estimate	-0.80	1.45	2.58	2.67
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	-0.02	1.94	1.50	-0.61	NA
Estimate	-0.13	1.85	1.50	-0.72	NA
Difference	0.11	0.09	0.00	0.11	0.08
Surprise	84.62%	4.86%	0.00%	15.28%	26.19%

Annual Estimates By Analyst

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ONE Gas, Inc. (OGS)
(Real Time Quote from BATS)

$64.27 USD

-0.21 (-0.33%)

Updated Sep 30, 2021 11:21 AM ET

Zacks Rank:
3-Hold

Style Scores:
D Value | F Growth | B Momentum | F VGM

Industry Rank:
Top 35% (88 out of 251)

Industry: Utility - Gas Distribution

View All Zacks #1 Ranked Stocks
ONE Gas, Inc. (OGS) Quote Overview » Estimates » ONE Gas, Inc. (OGS) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	11/1/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.56	Next Year	NA
Last EPS Surprise	14.29%	EPS (TTM)	3.83
ABR	3.06	P/E (F1)	16.95

Growth Estimates	OGS	IND	S&P
Current Qtr (09/2021)	-3.42	12.92	NA
Next Qtr (12/2021)	4.13	-1.41	NA
Current Year (12/2021)	3.40	10.70	55.60
Next Year (12/2022)	6.90	2.20	15.50
Past 5 Years	9.60	4.20	2.80
Next 5 Years	5.00	6.00	NA
PE	16.95	47.10	22.90
PEG Ratio	3.39	7.85	NA

Learn More About Estimate Research

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Premium Research for OGS

Zacks Rank	▼ Hold 3
Zacks Industry Rank	Top 35% (88 out of 251)
Zacks Sector Rank	Bottom 6% (15 out of 16)
Style Scores	D Value | F Growth | B Momentum | F VGM
Earnings ESP	0.00%
Research Reports for OGS	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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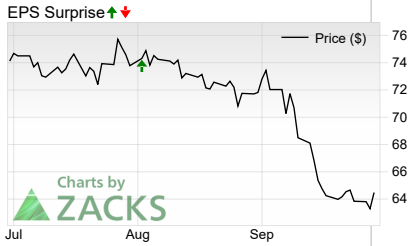
Research for OGS

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	261.22M	510.87M	1.68B	1.74B
# of Estimates	1	1	2	2
High Estimate	261.22M	510.87M	1.71B	1.78B
Low Estimate	261.22M	510.87M	1.66B	1.71B
Year ago Sales	244.64M	484.17M	1.53B	1.68B
Year over Year Growth Est.	6.78%	5.51%	10.11%	3.42%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.38	1.13	3.81	4.07
# of Estimates	3	2	4	4
Most Recent Consensus	NA	NA	3.80	4.00
High Estimate	0.41	1.17	3.83	4.14
Low Estimate	0.34	1.10	3.77	4.00
Year ago EPS	0.39	1.09	3.68	3.81
Year over Year Growth Est.	-3.42%	4.13%	3.40%	6.90%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.38	1.13	3.81	4.07
Zacks Consensus Estimate	0.38	1.13	3.81	4.07
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.56	1.79	1.09	0.39	NA
Estimate	0.49	1.78	1.06	0.36	NA
Difference	0.07	0.01	0.03	0.03	0.04
Surprise	14.29%	0.56%	2.83%	8.33%	6.50%

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South Jersey Industries, Inc. (SJI)

(Real Time Quote from BATS)

$21.50 USD

-0.42 (-1.92%)

Updated Sep 30, 2021 11:23 AM ET

Zacks Rank:
3-Hold

Style Scores:
A Value | D Growth | A Momentum | B VGM

Industry Rank:
Top 35% (88 out of 251)

Industry: Utility - Gas Distribution

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South Jersey Industries, Inc. (SJI) Quote Overview » Estimates » South Jersey Industries, Inc. (SJI) Detailed Estimates

Detailed Estimates

Estimates

Next Report Date	11/3/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.02	Next Year	NA
Last EPS Surprise	300.00%	EPS (TTM)	1.84
ABR	2.25	P/E (F1)	13.50

Growth Estimates	SJI	IND	S&P
Current Qtr (09/2021)	-210.00	12.92	NA
Next Qtr (12/2021)	-1.61	-1.41	NA
Current Year (12/2021)	-3.30	10.70	55.60
Next Year (12/2022)	4.10	2.20	15.50
Past 5 Years	3.00	4.20	2.80
Next 5 Years	5.40	6.00	NA
PE	13.50	47.10	22.90
PEG Ratio	2.49	7.85	NA

Learn More About Estimate Research

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See Earnings Report Transcript

Premium Research for SJI

Zacks Rank	Hold 3
Zacks Industry Rank	Top 35% (88 out of 251)
Zacks Sector Rank	Bottom 6% (15 out of 16)
Style Scores	A Value | D Growth | A Momentum | B VGM
Earnings ESP	0.00%
Research Report for SJI	Snapshot

(▲▼ = Change in last 30 days)

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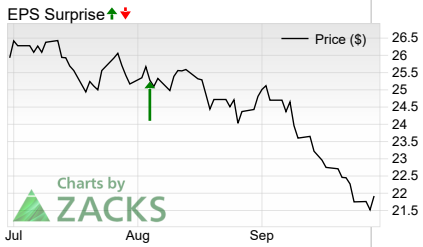
Research for SJI

Price and EPS Surprise Chart

1 Month | 3 Months | YTD



Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	285.31M	500.81M	1.67B	1.74B
# of Estimates	3	3	4	4
High Estimate	296.32M	520.00M	1.80B	2.00B
Low Estimate	268.61M	479.36M	1.35B	1.27B
Year ago Sales	261.55M	485.76M	1.54B	1.67B
Year over Year Growth Est.	9.08%	3.10%	8.10%	4.62%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	-0.19	0.61	1.62	1.69
# of Estimates	5	4	5	5
Most Recent Consensus	-0.12	0.49	1.64	1.74
High Estimate	-0.12	0.73	1.65	1.74
Low Estimate	-0.29	0.49	1.58	1.62
Year ago EPS	-0.06	0.62	1.68	1.62
Year over Year Growth Est.	-210.00%	-1.61%	-3.33%	4.06%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	-0.19	0.61	1.62	1.69
Zacks Consensus Estimate	-0.19	0.61	1.62	1.69
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.02	1.26	0.62	-0.06	NA
Estimate	-0.01	1.19	0.54	-0.23	NA
Difference	0.03	0.07	0.08	0.17	0.09
Surprise	300.00%	5.88%	14.81%	73.91%	98.65%

Quarterly Estimates By Analyst

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Southwest Gas Corporation (SWX)

(Real Time Quote from BATS)

$67.88 USD

-0.05 (-0.07%)

Updated Sep 30, 2021 11:23 AM ET

Zacks Rank:
3-Hold

Style Scores:
B Value | F Growth | D Momentum | D VGM

Industry Rank:
Top 35% (88 out of 251)

Industry: Utility - Gas Distribution

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Southwest Gas Corporation (SWX) Quote Overview » Estimates » Southwest Gas Corporation (SWX) Detailed Estimates

Detailed Estimates

Enter Symbol

Estimates

Next Report Date	11/4/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.43	Next Year	NA
Last EPS Surprise	-6.52%	EPS (TTM)	4.60
ABR	2.20	P/E (F1)	16.61

Growth Estimates	SWX	IND	S&P
Current Qtr (09/2021)	-40.63	12.92	NA

Growth Estimates	SWX	IND	S&P
Next Qtr (12/2021)	-13.74	-1.41	NA
Current Year (12/2021)	-1.20	10.70	55.60
Next Year (12/2022)	6.00	2.20	15.50
Past 5 Years	6.40	4.20	2.80
Next 5 Years	5.50	6.00	NA
PE	16.61	47.10	22.90
PEG Ratio	3.02	7.85	NA

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Premium Research for SWX

Zacks Rank	Hold 3
Zacks Industry Rank	Top 35% (88 out of 251)
Zacks Sector Rank	Bottom 6% (15 out of 16)
Style Scores	B Value | F Growth | D Momentum | D VGM
Earnings ESP	0.00%
Research Report for SWX	Snapshot

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Research for SWX

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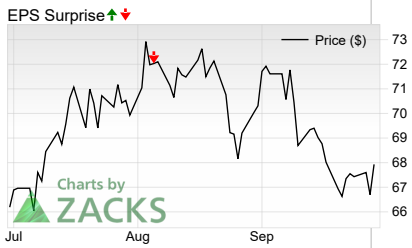

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	809.04M	933.49M	3.45B	3.55B
# of Estimates	1	1	1	1
High Estimate	809.04M	933.49M	3.45B	3.55B
Low Estimate	809.04M	933.49M	3.45B	3.55B
Year ago Sales	791.23M	914.08M	3.30B	3.45B
Year over Year Growth Est.	2.25%	2.12%	4.58%	2.91%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (12/2021)	Next Year (12/2022)
Zacks Consensus Estimate	0.19	1.57	4.09	4.34
# of Estimates	2	1	3	3
Most Recent Consensus	NA	NA	NA	4.30
High Estimate	0.21	1.57	4.22	4.40
Low Estimate	0.17	1.57	3.95	4.30
Year ago EPS	0.32	1.82	4.14	4.09
Year over Year Growth Est.	-40.63%	-13.74%	-1.21%	6.03%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	0.19	1.57	4.09	4.34
Zacks Consensus Estimate	0.19	1.57	4.09	4.34
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.43	2.03	1.82	0.32	NA
Estimate	0.46	1.83	1.62	0.19	NA
Difference	-0.03	0.20	0.20	0.13	0.13
Surprise	-6.52%	10.93%	12.35%	68.42%	21.30%

Annual Estimates By Analyst

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Spire Inc. (SR)
(Real Time Quote from BATS)

$61.87 USD

-0.18 (-0.29%)

Updated Sep 30, 2021 11:21 AM ET

Zacks Rank:
3-Hold

Style Scores:
B Value | F Growth | D Momentum | D VGM

Industry Rank:
Top 35% (88 out of 251)

Industry: Utility - Gas Distribution

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Detailed Estimates

Estimates

Next Report Date	11/17/21	Earnings ESP	0.00%
Current Quarter	NA	Current Year	NA
EPS Last Quarter	0.03	Next Year	NA
Last EPS Surprise	50.00%	EPS (TTM)	4.82
ABR	1.44	P/E (F1)	14.05

Growth Estimates	SR	IND	S&P
Current Qtr (09/2021)	-98.65	12.92	NA
Next Qtr (12/2021)	2.82	-1.41	NA
Current Year (09/2021)	17.50	10.70	55.60
Next Year (09/2022)	0.50	2.20	15.50
Past 5 Years	3.10	4.20	2.80
Next 5 Years	5.50	6.00	NA
PE	14.05	47.10	22.90
PEG Ratio	2.56	7.85	NA

Learn More About Estimate Research

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Premium Research for SR

Zacks Rank	▼ Hold 3
Zacks Industry Rank	Top 35% (88 out of 251)
Zacks Sector Rank	Bottom 6% (15 out of 16)
Style Scores	B Value | F Growth | D Momentum | D VGM
Earnings ESP	0.00%
Research Reports for SR	Analyst | Snapshot

(▲▼ = Change in last 30 days)

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Research for SR

Price and EPS Surprise Chart

1 Month | 3 Months | YTD

Interactive Chart | Fundamental Chart

Sales Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
Zacks Consensus Estimate	233.33M	NA	2.18B	2.00B
# of Estimates	2	NA	3	3
High Estimate	251.51M	NA	2.20B	2.25B
Low Estimate	215.15M	NA	2.16B	1.76B
Year ago Sales	251.90M	512.60M	1.86B	2.18B
Year over Year Growth Est.	-7.37%	NA	17.72%	-8.64%

Earnings Estimates

	Current Qtr (9/2021)	Next Qtr (12/2021)	Current Year (9/2021)	Next Year (9/2022)
Zacks Consensus Estimate	-0.74	1.46	4.42	4.44
# of Estimates	4	1	5	5
Most Recent Consensus	NA	NA	4.35	4.35
High Estimate	-0.72	1.46	4.46	4.56
Low Estimate	-0.76	1.46	4.35	4.35
Year ago EPS	-0.37	1.42	3.76	4.42
Year over Year Growth Est.	-98.65%	2.82%	17.50%	0.54%

Agreement - Estimate Revisions

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Up Last 7 Days	NA	NA	NA	NA
Up Last 30 Days	NA	NA	NA	NA
Up Last 60 Days	NA	NA	NA	NA
Down Last 7 Days	NA	NA	NA	NA
Down Last 30 Days	NA	NA	NA	NA
Down Last 60 Days	NA	NA	NA	NA

Magnitude - Consensus Estimate Trend

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Current	NA	NA	NA	NA
7 Days Ago	NA	NA	NA	NA
30 Days Ago	NA	NA	NA	NA
60 Days Ago	NA	NA	NA	NA
90 Days Ago	NA	NA	NA	NA

Upside - Most Accurate Estimate Versus Zacks Consensus

	Current Qtr (6/2021)	Next Qtr (9/2021)	Current Year (12/2021)	Next Year (12/2022)
Most Accurate Estimate	-0.74	1.46	4.42	4.44
Zacks Consensus Estimate	-0.74	1.46	4.42	4.44
Earnings ESP	0.00%	0.00%	0.00%	0.00%

Surprise - Reported Earnings History

	Quarter Ending (6/2021)	Quarter Ending (3/2021)	Quarter Ending (12/2020)	Quarter Ending (9/2020)	Average Surprise
Reported	0.03	3.71	1.42	-0.37	NA
Estimate	0.02	3.05	1.32	-0.41	NA
Difference	0.01	0.66	0.10	0.04	0.20
Surprise	50.00%	21.64%	7.58%	9.76%	22.25%

Annual Estimates By Analyst

Zacks Premium Subscription Required Learn more

U.S. markets open in 8 minutes

S&P Futures	Dow Futures	Nasdaq Futures	Russell 2000 Futures
4,360.25	34,344.00	14,786.00	2,230.70
+10.50 (+0.24%)	+79.00 (+0.23%)	+46.25 (+0.31%)	+8.80 (+0.40%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Apple Inc. (AAPL)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

142.83 +0.92 (+0.65%)
At close: September 29 4:00PM EDT

143.40 +0.57 (0.40%)
Pre-Market: 09:22AM EDT

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	28	22	41	40
Avg. Estimate	1.23	1.87	5.59	5.68
Low Estimate	1.05	1.68	5.38	5.05
High Estimate	1.34	2.09	5.73	6.33
Year Ago EPS	0.73	1.68	3.28	5.59

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	25	19	38	38
Avg. Estimate	84.69B	119.8B	366.48B	380.63B
Low Estimate	77.65B	110.11B	356.16B	354.03B
High Estimate	89.41B	126.43B	371.87B	399.86B
Year Ago Sales	64.7B	N/A	274.51B	366.48B
Sales Growth (year/est)	30.90%	N/A	33.50%	3.90%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.7	1.41	0.99	1.01
EPS Actual	0.73	1.68	1.4	1.3
Difference	0.03	0.27	0.41	0.29
Surprise %	4.30%	19.10%	41.40%	28.70%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	1.23	1.87	5.59	5.68
7 Days Ago	1.23	1.87	5.6	5.72
30 Days Ago	1.23	1.87	5.58	5.67
60 Days Ago	1.22	1.87	5.49	5.58
90 Days Ago	1.11	1.82	5.2	5.35

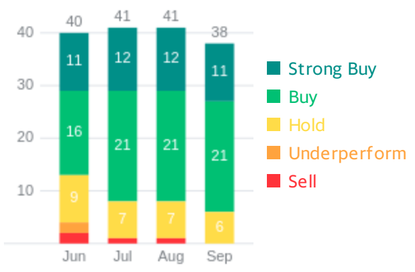
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	1	1	1	1
Up Last 30 Days	1	3	4	6
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	AAPL	Industry	Sector(s)	S&P 500
Current Qtr.	68.50%	N/A	N/A	N/A
Next Qtr.	11.30%	N/A	N/A	N/A
Current Year	70.40%	N/A	N/A	N/A
Next Year	1.60%	N/A	N/A	N/A
Next 5 Years (per annum)	19.86%	N/A	N/A	N/A
Past 5 Years (per annum)	8.42%	N/A	N/A	N/A

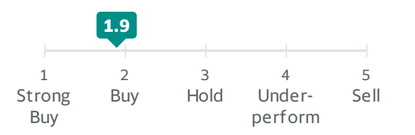
People Also Watch

Symbol	Last Price	Change	% Change
AMZN Amazon.com, Inc.	3,301.12	-14.84	-0.45%
TSLA Tesla, Inc.	781.31	+3.75	+0.48%
FB Facebook, Inc.	339.61	-1.04	-0.31%
GOOG Alphabet Inc.	2,690.42	-33.26	-1.22%
NFLX Netflix, Inc.	599.06	+15.21	+2.61%

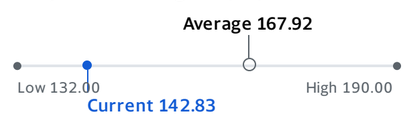
Recommendation Trends



Recommendation Rating



Analyst Price Targets (42)



Upgrades & Downgrades

Maintains	Tigress Financial: to Strong Buy	9/22/2021
Maintains	Piper Sandler: to Overweight	9/9/2021
Upgrade	Wolfe Research: Underperform to Peer Perform	9/1/2021
Maintains	Loop Capital: to Buy	7/28/2021
Maintains	Deutsche Bank: to Buy	7/28/2021
Maintains	Piper Sandler: to Overweight	7/28/2021

More Upgrades & Downgrades

U.S. markets open in 8 minutes

S&P Futures	Dow Futures	Nasdaq Futures	Russell 2000 Futures
4,360.25	34,341.00	14,786.00	2,230.80
+10.50 (+0.24%)	+76.00 (+0.22%)	+46.25 (+0.31%)	+8.90 (+0.40%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

Assurant, Inc. (AIZ)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

160.61 +1.21 (+0.76%)
At close: September 29 4:00PM EDT

159.59 -1.02 (-0.64%)
Pre-Market: 07:37AM EDT

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	7	6	2	7
Avg. Estimate	1.86	2.36	9.21	12.04
Low Estimate	0.92	2.06	9.15	11.7
High Estimate	2.29	2.57	9.27	12.28
Year Ago EPS	1.41	1.82	8.63	9.21

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	4	4	4	5
Avg. Estimate	2.52B	2.56B	9.99B	10.68B
Low Estimate	2.46B	2.51B	9.95B	10.36B
High Estimate	2.63B	2.66B	10.02B	11.14B
Year Ago Sales	2.5B	2.56B	10.09B	9.99B
Sales Growth (year/est)	0.60%	0.10%	-1.00%	6.90%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	1	2.08	1.96	2.5
EPS Actual	1.41	1.82	3.03	2.99
Difference	0.41	-0.26	1.07	0.49
Surprise %	41.00%	-12.50%	54.60%	19.60%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	1.86	2.36	9.21	12.04
7 Days Ago	1.86	2.36	9.21	12.04
30 Days Ago	2.12	2.36	9.82	12.05
60 Days Ago	2.32	2.52	10.17	12.03
90 Days Ago	2.45	2.63	10.68	12.19

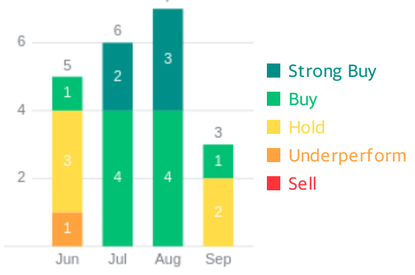
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	AIZ	Industry	Sector(s)	S&P 500
Current Qtr.	31.90%	N/A	N/A	N/A
Next Qtr.	29.70%	N/A	N/A	N/A
Current Year	6.70%	N/A	N/A	N/A
Next Year	30.70%	N/A	N/A	N/A
Next 5 Years (per annum)	17.80%	N/A	N/A	N/A
Past 5 Years (per annum)	8.78%	N/A	N/A	N/A

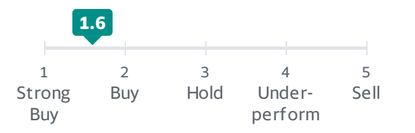
People Also Watch

Symbol	Last Price	Change	% Change
AON Aon plc	291.25	+2.00	+0.69%
AMP Ameriprise Financial, Inc.	270.71	-0.44	-0.16%
RE Everest Re Group, Ltd.	253.04	-1.35	-0.53%
ALLE Allegion plc	135.22	+0.63	+0.47%
AVY Avery Dennison Corporation	212.84	+0.32	+0.15%

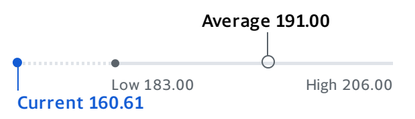
Recommendation Trends



Recommendation Rating



Analyst Price Targets (5)



Upgrades & Downgrades

Maintains	Morgan Stanley: to Overweight	8/16/2021
Initiated	William Blair: to Outperform	7/23/2021
Maintains	Morgan Stanley: to Overweight	5/27/2021
Initiated	B of A Securities: to Buy	5/21/2021
Maintains	Truist Securities: to Buy	4/19/2021
Maintains	Morgan Stanley: to Overweight	1/12/2021

More Upgrades & Downgrades

U.S. markets open in 7 minutes

S&P Futures	Dow Futures	Nasdaq Futures	Russell 2000 Futures
4,360.50	34,345.00	14,789.00	2,230.80
+10.75 (+0.25%)	+80.00 (+0.23%)	+49.25 (+0.33%)	+8.90 (+0.40%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

ANSYS, Inc. (ANSS)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

340.96 -2.65 (-0.77%)
At close: September 29 4:00PM EDT

341.64 +0.68 (0.20%)
Pre-Market: 09:06AM EDT

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	14	13	14	15
Avg. Estimate	1.35	2.76	7.07	7.84
Low Estimate	1.29	2.68	6.95	7.28
High Estimate	1.4	2.93	7.17	8.3
Year Ago EPS	1.36	2.96	6.7	7.07

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	13	12	16	16
Avg. Estimate	416.1M	633.62M	1.88B	2.07B
Low Estimate	403.4M	623.9M	1.86B	1.99B
High Estimate	423.94M	642.39M	1.9B	2.15B
Year Ago Sales	369.13M	627.77M	1.7B	1.88B
Sales Growth (year/est)	12.70%	0.90%	10.80%	10.00%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	1.26	2.54	0.84	1.56
EPS Actual	1.36	2.96	1.12	1.85
Difference	0.1	0.42	0.28	0.29
Surprise %	7.90%	16.50%	33.30%	18.60%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	1.35	2.76	7.07	7.84
7 Days Ago	1.35	2.76	7.07	7.84
30 Days Ago	1.35	2.76	7.07	7.84
60 Days Ago	1.33	2.97	6.96	7.86
90 Days Ago	1.33	2.97	6.96	7.86

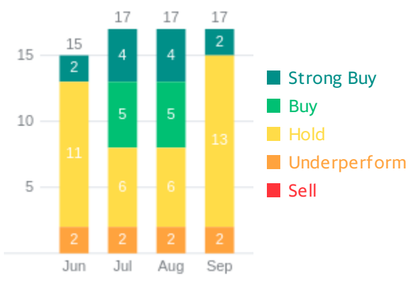
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	ANSS	Industry	Sector(s)	S&P 500
Current Qtr.	-0.70%	N/A	N/A	N/A
Next Qtr.	-6.80%	N/A	N/A	N/A
Current Year	5.50%	N/A	N/A	N/A
Next Year	10.90%	N/A	N/A	N/A
Next 5 Years (per annum)	12.14%	N/A	N/A	N/A
Past 5 Years (per annum)	15.00%	N/A	N/A	N/A

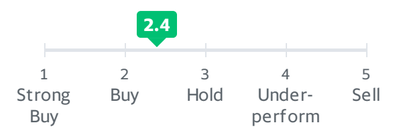
People Also Watch

Symbol	Last Price	Change	% Change
CDNS Cadence Design Systems, Inc.	152.25	-0.22	-0.14%
VRSK Verisk Analytics, Inc.	202.37	+0.63	+0.31%
SNPS Synopsys, Inc.	302.62	+0.69	+0.23%
APH Amphenol Corporation	74.54	-1.10	-1.45%
AME AMETEK, Inc.	126.83	-0.43	-0.34%

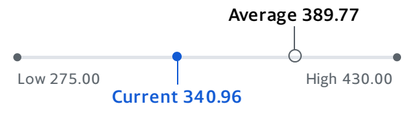
Recommendation Trends



Recommendation Rating



Analyst Price Targets (15)



Upgrades & Downgrades

Maintains	Credit Suisse: to Outperform	8/6/2021
Maintains	RBC Capital: to Sector Perform	8/6/2021
Maintains	Rosenblatt: to Neutral	8/6/2021
Initiated	Rosenblatt: to Neutral	6/8/2021
Initiated	B of A Securities: to Buy	4/12/2021
Maintains	RBC Capital: to Sector Perform	2/26/2021

More Upgrades & Downgrades

U.S. markets open in 6 minutes

S&P Futures	Dow Futures	Nasdaq Futures	Russell 2000 Futures
4,360.50	34,341.00	14,789.50	2,230.40
+10.75 (+0.25%)	+76.00 (+0.22%)	+49.75 (+0.34%)	+8.50 (+0.38%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

Booz Allen Hamilton Holding Corporation (BAH)

NYSE - NYSE Delayed Price. Currency in USD

Add to watchlist

Quote Lookup

79.45 +0.97 (+1.24%)

At close: September 29 4:00PM EDT

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
No. of Analysts	12	12	12	12
Avg. Estimate	1.07	1.06	4.2	4.63
Low Estimate	0.99	0.99	4.15	4.38
High Estimate	1.12	1.11	4.3	4.85
Year Ago EPS	1.03	1.04	3.9	4.2

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
No. of Analysts	10	10	12	12
Avg. Estimate	2.12B	2.13B	8.48B	9.03B
Low Estimate	2.07B	2.06B	8.28B	8.7B
High Estimate	2.16B	2.17B	8.56B	9.38B
Year Ago Sales	N/A	2B	7.86B	8.48B
Sales Growth (year/est)	N/A	6.20%	8.00%	6.40%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.92	0.93	0.82	0.97
EPS Actual	1.03	1.04	0.89	1.07
Difference	0.11	0.11	0.07	0.1
Surprise %	12.00%	11.80%	8.50%	10.30%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
Current Estimate	1.07	1.06	4.2	4.63
7 Days Ago	1.07	1.06	4.2	4.63
30 Days Ago	1.07	1.06	4.21	4.63
60 Days Ago	1.06	1.08	4.19	4.59
90 Days Ago	1.05	1.09	4.18	4.59

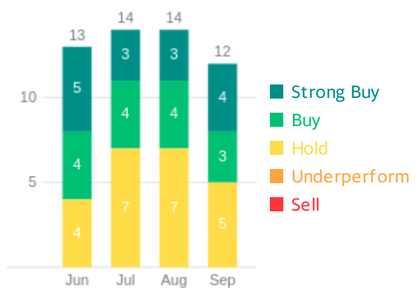
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	1	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	BAH	Industry	Sector(s)	S&P 500
Current Qtr.	3.90%	N/A	N/A	N/A
Next Qtr.	1.90%	N/A	N/A	N/A
Current Year	7.70%	N/A	N/A	N/A
Next Year	10.20%	N/A	N/A	N/A
Next 5 Years (per annum)	8.80%	N/A	N/A	N/A
Past 5 Years (per annum)	17.34%	N/A	N/A	N/A

People Also Watch

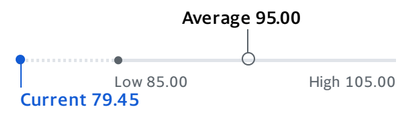
Symbol	Last Price	Change	% Change
LDOS Leidos Holdings, Inc.	97.95	+1.39	+1.44%
CACI CACI International Inc	264.96	+4.94	+1.90%
SAIC Science Applications International Corp...	86.65	+0.45	+0.52%
CDW CDW Corporation	185.39	-0.75	-0.40%
MANT ManTech International Corporation	77.40	+1.04	+1.36%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (10)



Upgrades & Downgrades

Maintains	Cowen & Co.: to Outperform	9/16/2021
Maintains	Truist Securities: to Hold	8/2/2021
Maintains	Morgan Stanley: to Overweight	6/18/2021
Maintains	Morgan Stanley: to Overweight	6/9/2021
Initiated	Wells Fargo: to Overweight	5/13/2021
Maintains	Barclays: to Equal-Weight	5/12/2021

More Upgrades & Downgrades

U.S. markets open in 7 minutes

S&P Futures	Dow Futures	Nasdaq Futures	Russell 2000 Futures
4,360.75	34,343.00	14,790.25	2,230.80
+11.00 (+0.25%)	+78.00 (+0.23%)	+50.50 (+0.34%)	+8.90 (+0.40%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

Ball Corporation (BLL)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

89.74 +0.03 (+0.03%)
At close: September 29 4:00PM EDT

89.74 0.00 (0.00%)
Pre-Market: 08:36AM EDT

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	17	17	18	18
Avg. Estimate	0.99	0.99	3.56	4.18
Low Estimate	0.94	0.94	3.5	3.51
High Estimate	1.04	1.05	3.65	4.5
Year Ago EPS	0.89	0.81	2.97	3.56

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	15	15	19	19
Avg. Estimate	3.55B	3.53B	13.63B	14.75B
Low Estimate	3.27B	3.28B	13.14B	13.74B
High Estimate	3.83B	3.8B	14.21B	16.25B
Year Ago Sales	3.01B	3.1B	11.78B	13.63B
Sales Growth (year/est)	17.80%	13.80%	15.70%	8.20%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.77	0.78	0.67	0.83
EPS Actual	0.89	0.81	0.72	0.86
Difference	0.12	0.03	0.05	0.03
Surprise %	15.60%	3.80%	7.50%	3.60%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.99	0.99	3.56	4.18
7 Days Ago	0.99	0.99	3.56	4.18
30 Days Ago	1	0.99	3.57	4.19
60 Days Ago	1.01	0.96	3.51	4.05
90 Days Ago	1.01	0.96	3.5	4.04

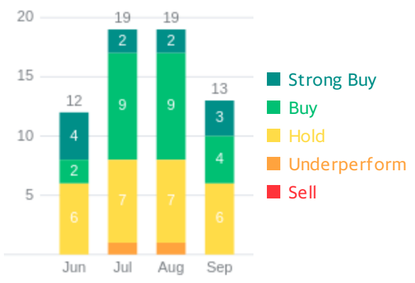
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	1
Up Last 30 Days	N/A	N/A	N/A	1
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	1	1	1	N/A

Growth Estimates	BLL	Industry	Sector(s)	S&P 500
Current Qtr.	11.20%	N/A	N/A	N/A
Next Qtr.	22.20%	N/A	N/A	N/A
Current Year	19.90%	N/A	N/A	N/A
Next Year	17.40%	N/A	N/A	N/A
Next 5 Years (per annum)	15.05%	N/A	N/A	N/A
Past 5 Years (per annum)	7.83%	N/A	N/A	N/A

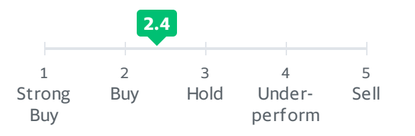
People Also Watch

Symbol	Last Price	Change	% Change
AVY Avery Dennison Corporation	212.84	+0.32	+0.15%
SEE Sealed Air Corporation	55.87	-0.54	-0.96%
APH Amphenol Corporation	74.54	-1.10	-1.45%
AIZ Assurant, Inc.	160.61	+1.21	+0.76%
AME AMETEK, Inc.	126.83	-0.43	-0.34%

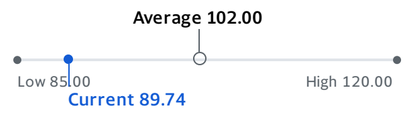
Recommendation Trends



Recommendation Rating



Analyst Price Targets (15)



Upgrades & Downgrades

Maintains	Barclays: to Equal-Weight	9/20/2021
Initiated	Truist Securities: to Hold	9/14/2021
Maintains	Wells Fargo: to Equal-Weight	8/9/2021
Upgrade	Atlantic Equities: Neutral to Overweight	6/22/2021
Downgrade	BMO Capital: Outperform to Market Perform	5/26/2021
Initiated	Longbow Research: to Buy	5/20/2021

More Upgrades & Downgrades

U.S. markets open in 6 minutes

S&P Futures	Dow Futures	Nasdaq Futures	Russell 2000 Futures
4,360.50	34,337.00	14,789.50	2,230.60
+10.75 (+0.25%)	+72.00 (+0.21%)	+49.75 (+0.34%)	+8.70 (+0.39%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

CACI International Inc (CACI)

NYSE - NYSE Delayed Price. Currency in USD

Add to watchlist

Quote Lookup

264.96 +4.94 (+1.90%)

At close: September 29 4:00PM EDT

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
No. of Analysts	10	10	11	10
Avg. Estimate	3.85	4.29	17.43	18.95
Low Estimate	3.31	3.84	16.2	17.58
High Estimate	4.48	4.92	19.36	22.45
Year Ago EPS	3.67	4.18	18.3	17.43

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
No. of Analysts	10	10	12	11
Avg. Estimate	1.49B	1.53B	6.31B	6.58B
Low Estimate	1.48B	1.52B	6.26B	6.44B
High Estimate	1.51B	1.56B	6.39B	6.71B
Year Ago Sales	1.45B	N/A	6.04B	6.31B
Sales Growth (year/est)	2.90%	N/A	4.40%	4.30%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	3.11	3.6	3.7	5.58
EPS Actual	3.67	4.18	4.78	5.74
Difference	0.56	0.58	1.08	0.16
Surprise %	18.00%	16.10%	29.20%	2.90%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
Current Estimate	3.85	4.29	17.43	18.95
7 Days Ago	3.78	4.27	17.23	18.75
30 Days Ago	3.79	4.3	17.44	19.32
60 Days Ago	3.89	4.26	17.06	18.56
90 Days Ago	3.92	4.23	17.01	18.5

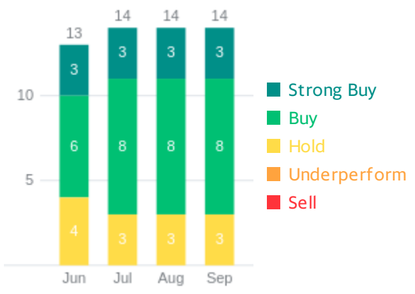
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
Up Last 7 Days	N/A	N/A	1	1
Up Last 30 Days	N/A	N/A	1	1
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	CACI	Industry	Sector(s)	S&P 500
Current Qtr.	4.90%	N/A	N/A	N/A
Next Qtr.	2.60%	N/A	N/A	N/A
Current Year	-4.80%	N/A	N/A	N/A
Next Year	8.70%	N/A	N/A	N/A
Next 5 Years (per annum)	5.10%	N/A	N/A	N/A
Past 5 Years (per annum)	18.13%	N/A	N/A	N/A

People Also Watch

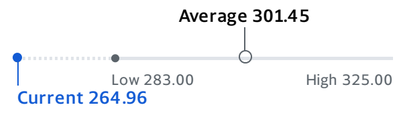
Symbol	Last Price	Change	% Change
MANT ManTech International Corporation	77.40	+1.04	+1.36%
SAIC Science Applications International Corp...	86.65	+0.45	+0.52%
BAH Booz Allen Hamilton Holding Corporation	79.45	+0.97	+1.24%
LDOS Leidos Holdings, Inc.	97.95	+1.39	+1.44%
CHE Chemed Corporation	469.30	+3.01	+0.65%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (11)



Upgrades & Downgrades

Maintains	Morgan Stanley: to Equal-Weight	9/28/2021
Maintains	Morgan Stanley: to Equal-Weight	6/14/2021
Initiated	Wells Fargo: to Overweight	5/13/2021
Maintains	Barclays: to Overweight	4/26/2021
Maintains	Morgan Stanley: to Equal-Weight	2/22/2021
Maintains	Morgan Stanley: to Equal-Weight	2/19/2021

More Upgrades & Downgrades

U.S. markets open in 6 minutes

S&P Futures	Dow Futures	Nasdaq Futures	Russell 2000 Futures
4,360.25	34,339.00	14,789.75	2,230.60
+10.50 (+0.24%)	+74.00 (+0.22%)	+50.00 (+0.34%)	+8.70 (+0.39%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Casey's General Stores, Inc. (CASY)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

191.91 +1.10 (+0.58%)

At close: September 29 4:00PM EDT

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Oct 2021)	Next Qtr. (Jan 2022)	Current Year (2022)	Next Year (2023)
No. of Analysts	11	11	12	12
Avg. Estimate	2.76	1.47	8.84	9.49
Low Estimate	2.46	1.15	7.55	7.6
High Estimate	3.11	1.77	9.63	10.42
Year Ago EPS	3	1.04	8.38	8.84

Revenue Estimate	Current Qtr. (Oct 2021)	Next Qtr. (Jan 2022)	Current Year (2022)	Next Year (2023)
No. of Analysts	9	9	11	10
Avg. Estimate	3.16B	2.84B	11.9B	12.47B
Low Estimate	2.97B	2.66B	11.43B	11.42B
High Estimate	3.24B	3.08B	12.5B	13.26B
Year Ago Sales	N/A	2.01B	8.71B	11.9B
Sales Growth (year/est)	N/A	41.40%	36.70%	4.80%

Earnings History	10/30/2020	1/30/2021	4/29/2021	7/30/2021
EPS Est.	2.8	0.97	0.88	2.98
EPS Actual	3	1.04	1.12	3.19
Difference	0.2	0.07	0.24	0.21
Surprise %	7.10%	7.20%	27.30%	7.00%

EPS Trend	Current Qtr. (Oct 2021)	Next Qtr. (Jan 2022)	Current Year (2022)	Next Year (2023)
Current Estimate	2.76	1.47	8.84	9.49
7 Days Ago	2.76	1.47	8.84	9.49
30 Days Ago	2.72	1.32	8.04	9.23
60 Days Ago	2.67	1.3	7.9	9.14
90 Days Ago	2.67	1.3	7.9	9.14

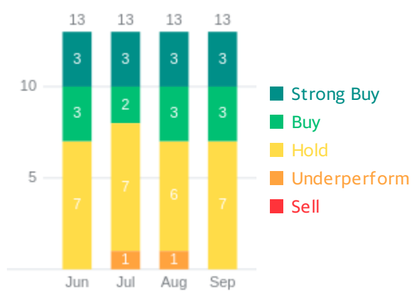
EPS Revisions	Current Qtr. (Oct 2021)	Next Qtr. (Jan 2022)	Current Year (2022)	Next Year (2023)
Up Last 7 Days	N/A	N/A	1	N/A
Up Last 30 Days	3	8	10	6
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	1

Growth Estimates	CASY	Industry	Sector(s)	S&P 500
Current Qtr.	-8.00%	N/A	N/A	N/A
Next Qtr.	41.30%	N/A	N/A	N/A
Current Year	5.50%	N/A	N/A	N/A
Next Year	7.40%	N/A	N/A	N/A
Next 5 Years (per annum)	7.40%	N/A	N/A	N/A
Past 5 Years (per annum)	-2.46%	N/A	N/A	N/A

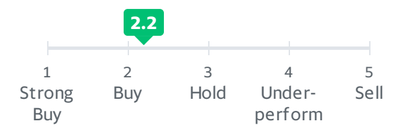
People Also Watch

Symbol	Last Price	Change	% Change
CRI Carter's, Inc.	101.09	+0.08	+0.08%
CBRL Cracker Barrel Old Country Store, Inc.	142.20	-1.04	-0.73%
CBSH Commerce Bancshares, Inc.	71.08	+0.60	+0.85%
BCPC Balchem Corporation	146.24	-4.37	-2.90%
ATR AptarGroup, Inc.	120.38	+0.35	+0.29%

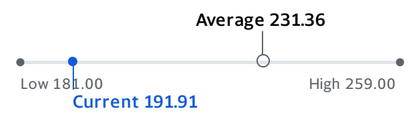
Recommendation Trends



Recommendation Rating



Analyst Price Targets (11)



Upgrades & Downgrades

Upgrade	Northcoast Research: Neutral to Buy	9/14/2021
Maintains	Deutsche Bank: to Buy	9/9/2021
Maintains	Deutsche Bank: to Buy	9/2/2021
Maintains	RBC Capital: to Sector Perform	8/31/2021
Upgrade	BMO Capital: Market Perform to Outperform	7/26/2021
Downgrade	Goldman Sachs: Buy to Neutral	6/22/2021

More Upgrades & Downgrades

U.S. markets open in 2 minutes

S&P Futures	Dow Futures	Nasdaq Futures	Russell 2000 Futures
4,360.50	34,341.00	14,787.75	2,229.60
+10.75 (+0.25%)	+76.00 (+0.22%)	+48.00 (+0.33%)	+7.70 (+0.35%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

CSW Industrials, Inc. (CSWI)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

128.70 +0.68 (+0.53%)

At close: September 29 4:00PM EDT

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
No. of Analysts	2	2	2	2
Avg. Estimate	1.37	0.79	4.57	5.27
Low Estimate	1.23	0.58	4.52	5.23
High Estimate	1.51	1	4.63	5.31
Year Ago EPS	1.1	0.16	2.66	4.57

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
No. of Analysts	1	1	1	1
Avg. Estimate	139.99M	127.97M	542M	580.5M
Low Estimate	139.99M	127.97M	542M	580.5M
High Estimate	139.99M	127.97M	542M	580.5M
Year Ago Sales	N/A	N/A	419.2M	542M
Sales Growth (year/est)	N/A	N/A	29.30%	7.10%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.95	0.34	0.97	1.3
EPS Actual	1.1	0.16	0.61	1.46
Difference	0.15	-0.18	-0.36	0.16
Surprise %	15.80%	-52.90%	-37.10%	12.30%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
Current Estimate	1.37	0.79	4.57	5.27
7 Days Ago	1.37	0.79	4.57	5.27
30 Days Ago	1.37	0.79	4.57	5.27
60 Days Ago	1.23	0.88	4.45	5.16
90 Days Ago	1.23	0.88	4.45	5.16

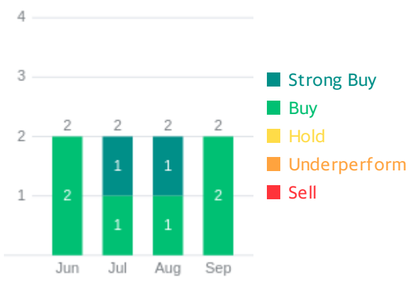
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	CSWI	Industry	Sector(s)	S&P 500
Current Qtr.	24.50%	N/A	N/A	N/A
Next Qtr.	393.80%	N/A	N/A	N/A
Current Year	71.80%	N/A	N/A	N/A
Next Year	15.30%	N/A	N/A	N/A
Next 5 Years (per annum)	12.00%	N/A	N/A	N/A
Past 5 Years (per annum)	31.68%	N/A	N/A	N/A

People Also Watch

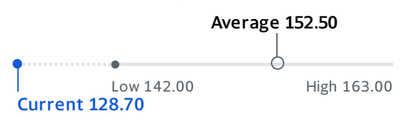
Symbol	Last Price	Change	% Change
CNXN PC Connection, Inc.	44.74	-0.12	-0.27%
EQBK Equity Bancshares, Inc.	34.23	-0.05	-0.15%
FRPH FRP Holdings, Inc.	57.45	-0.18	-0.31%
HLNE Hamilton Lane Incorporated	87.24	-0.95	-1.08%
CRVL CorVel Corporation	186.73	+3.30	+1.80%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (2)



Upgrades & Downgrades

Initiated	Barrington Research: to Outperform	1/19/2021
Maintains	Sidoti & Co.: to Neutral	5/14/2020
Maintains	Sidoti & Co.: to Neutral	1/28/2020
Maintains	B. Riley FBR: Buy to Buy	8/2/2018
Initiated	Wunderlich: to Buy	6/16/2016

U.S. markets close in 6 hours 13 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,374.57	34,448.55	14,583.09	2,231.34
+15.11 (+0.35%)	+57.83 (+0.17%)	+70.65 (+0.49%)	+6.03 (+0.27%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Quest Diagnostics Incorporated (DGX)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

147.93 +0.25 (+0.17%)

As of 9:46AM EDT. Market open.

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	15	15	17	17
Avg. Estimate	2.67	2.15	11.71	8.25
Low Estimate	2.05	1.9	10.96	7.85
High Estimate	3.44	2.46	12.85	10.1
Year Ago EPS	4.31	4.48	11.18	11.71

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	13	13	17	17
Avg. Estimate	2.42B	2.25B	9.91B	8.83B
Low Estimate	2.13B	2.1B	9.49B	8.42B
High Estimate	2.67B	2.4B	10.29B	9.91B
Year Ago Sales	N/A	3B	9.44B	9.91B
Sales Growth (year/est)	N/A	-25.10%	5.10%	-11.00%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	3.73	4.24	3.71	2.87
EPS Actual	4.31	4.48	3.76	3.18
Difference	0.58	0.24	0.05	0.31
Surprise %	15.50%	5.70%	1.30%	10.80%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	2.67	2.15	11.71	8.25
7 Days Ago	2.55	2.12	11.59	8.22
30 Days Ago	2.25	2.01	11.22	8.18
60 Days Ago	2.2	2.01	11.16	8.24
90 Days Ago	2.32	2.15	11.13	8

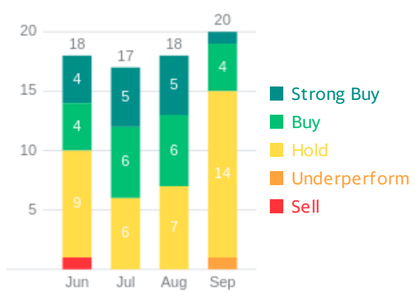
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	2	2	2	2
Up Last 30 Days	6	6	6	6
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	DGX	Industry	Sector(s)	S&P 500
Current Qtr.	-38.10%	N/A	N/A	N/A
Next Qtr.	-52.00%	N/A	N/A	N/A
Current Year	4.70%	N/A	N/A	N/A
Next Year	-29.50%	N/A	N/A	N/A
Next 5 Years (per annum)	-8.60%	N/A	N/A	N/A
Past 5 Years (per annum)	9.20%	N/A	N/A	N/A

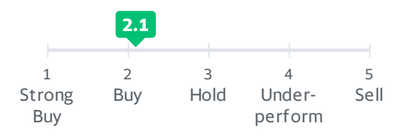
People Also Watch

Symbol	Last Price	Change	% Change
LH Laboratory Corporation of America Hold...	287.97	+1.06	+0.37%
ABC AmerisourceBergen Corporation	123.00	+0.50	+0.41%
DVA DaVita Inc.	120.84	-0.35	-0.29%
PKI PerkinElmer, Inc.	176.99	+1.94	+1.11%
BDX Becton, Dickinson and Company	252.05	+0.26	+0.10%

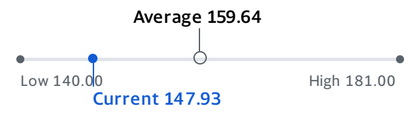
Recommendation Trends



Recommendation Rating



Analyst Price Targets (14)



Upgrades & Downgrades

Maintains	Keybanc: to Overweight	9/1/2021
Maintains	Morgan Stanley: to Equal-Weight	8/31/2021
Maintains	Mizuho: to Buy	8/19/2021
Maintains	Credit Suisse: to Neutral	8/13/2021
Maintains	Mizuho: to Buy	5/12/2021
Upgrade	UBS: Neutral to Buy	5/4/2021

More Upgrades & Downgrades

U.S. markets open in 2 minutes

S&P Futures	Dow Futures	Nasdaq Futures	Russell 2000 Futures
4,361.25	34,347.00	14,791.50	2,230.00
+11.50 (+0.26%)	+82.00 (+0.24%)	+51.75 (+0.35%)	+8.10 (+0.36%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

eBay Inc. (EBAY)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

69.97 -1.29 (-1.81%)
At close: September 29 4:00PM EDT

69.98 +0.01 (0.01%)
Pre-Market: 09:25AM EDT

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	23	23	24	27
Avg. Estimate	0.89	0.99	3.95	4.45
Low Estimate	0.86	0.8	3.74	3.58
High Estimate	0.92	1.25	4.18	5.34
Year Ago EPS	0.85	0.86	3.41	3.95

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	24	24	25	25
Avg. Estimate	2.46B	2.65B	10.43B	10.98B
Low Estimate	2.42B	2.4B	10.15B	9.35B
High Estimate	2.47B	2.76B	10.78B	11.67B
Year Ago Sales	2.61B	2.87B	10.27B	10.43B
Sales Growth (year/est)	-5.80%	-7.50%	1.60%	5.30%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.77	0.83	1.07	0.95
EPS Actual	0.85	0.86	1.08	0.99
Difference	0.08	0.03	0.01	0.04
Surprise %	10.40%	3.60%	0.90%	4.20%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.89	0.99	3.95	4.45
7 Days Ago	0.89	0.98	3.95	4.45
30 Days Ago	0.89	0.98	3.94	4.44
60 Days Ago	0.9	0.99	3.95	4.53
90 Days Ago	0.9	0.99	3.95	4.52

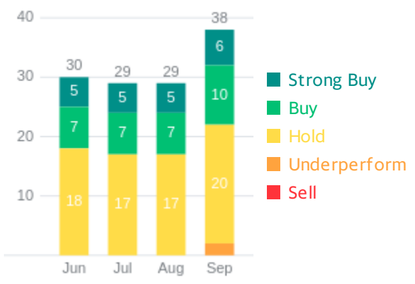
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	1	1	1
Up Last 30 Days	N/A	3	4	3
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	EBAY	Industry	Sector(s)	S&P 500
Current Qtr.	4.70%	N/A	N/A	N/A
Next Qtr.	15.10%	N/A	N/A	N/A
Current Year	15.80%	N/A	N/A	N/A
Next Year	12.70%	N/A	N/A	N/A
Next 5 Years (per annum)	11.87%	N/A	N/A	N/A
Past 5 Years (per annum)	-0.52%	N/A	N/A	N/A

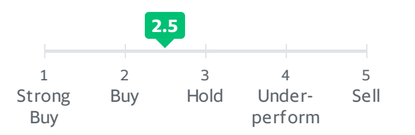
People Also Watch

Symbol	Last Price	Change	% Change
DELL Dell Technologies Inc.	105.38	+0.09	+0.09%
ORCL Oracle Corporation	91.25	+0.76	+0.84%
CSCO Cisco Systems, Inc.	55.48	-0.04	-0.07%
QCOM QUALCOMM Incorporated	129.28	-0.62	-0.48%
IBM International Business Machines Corpor...	139.18	+1.71	+1.24%

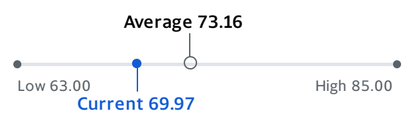
Recommendation Trends



Recommendation Rating



Analyst Price Targets (25)



Upgrades & Downgrades

Maintains	Benchmark: to Buy	8/12/2021
Maintains	Credit Suisse: to Outperform	8/12/2021
Maintains	Credit Suisse: to Outperform	8/9/2021
Maintains	Piper Sandler: to Overweight	7/1/2021
Maintains	BMO Capital: to Market Perform	5/3/2021
Downgrade	Susquehanna: Positive to Neutral	4/29/2021

More Upgrades & Downgrades

U.S. markets close in 6 hours 24 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,379.80	34,488.30	14,625.82	2,225.31
+20.34 (+0.47%)	+97.57 (+0.28%)	+113.38 (+0.78%)	-4.47 (-0.20%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

The Estée Lauder Companies Inc. (EL)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist | Visitors trend 2W ↓ 10W ↑ 9M ↑

Quote Lookup

307.05 +0.65 (+0.21%)

As of 9:36AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
No. of Analysts	21	21	26	25
Avg. Estimate	1.69	2.8	7.44	8.48
Low Estimate	1.6	2.53	7.27	7.94
High Estimate	1.95	3.01	7.75	9.47
Year Ago EPS	1.44	2.61	6.45	7.44

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
No. of Analysts	16	16	25	25
Avg. Estimate	4.25B	5.58B	18.83B	20.45B
Low Estimate	4.19B	5.04B	18.59B	18.71B
High Estimate	4.34B	5.85B	19.27B	21.76B
Year Ago Sales	N/A	N/A	16.23B	18.83B
Sales Growth (year/est)	N/A	N/A	16.00%	8.60%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.9	1.69	1.32	0.5
EPS Actual	1.44	2.61	1.62	0.78
Difference	0.54	0.92	0.3	0.28
Surprise %	60.00%	54.40%	22.70%	56.00%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
Current Estimate	1.69	2.8	7.44	8.48
7 Days Ago	1.69	2.8	7.44	8.5
30 Days Ago	1.69	2.8	7.44	8.51
60 Days Ago	1.84	2.74	7.15	8.28
90 Days Ago	1.85	2.74	7.14	8.27

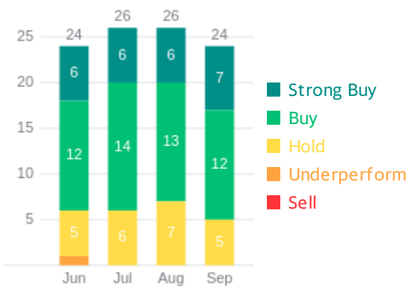
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
Up Last 7 Days	N/A	N/A	1	N/A
Up Last 30 Days	N/A	N/A	4	2
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	EL	Industry	Sector(s)	S&P 500
Current Qtr.	17.40%	N/A	N/A	N/A
Next Qtr.	7.30%	N/A	N/A	N/A
Current Year	15.30%	N/A	N/A	N/A
Next Year	14.00%	N/A	N/A	N/A
Next 5 Years (per annum)	18.71%	N/A	N/A	N/A
Past 5 Years (per annum)	15.08%	N/A	N/A	N/A

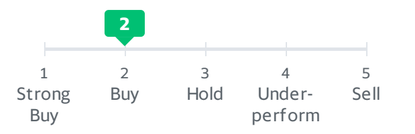
People Also Watch

Symbol	Last Price	Change	% Change
ECL Ecolab Inc.	213.59	+0.89	+0.42%
ULTA Ulta Beauty, Inc.	372.80	-5.55	-1.47%
RL Ralph Lauren Corporation	116.06	-0.83	-0.71%
CHD Church & Dwight Co., Inc.	84.04	-0.22	-0.26%
DHR Danaher Corporation	309.97	+3.36	+1.10%

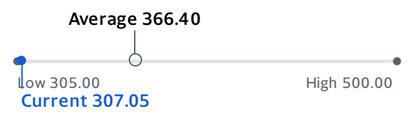
Recommendation Trends



Recommendation Rating



Analyst Price Targets (25)



Upgrades & Downgrades

Maintains	Berenberg: to Buy	8/23/2021
Maintains	Morgan Stanley: to Overweight	8/23/2021
Maintains	RBC Capital: to Outperform	8/20/2021
Maintains	Credit Suisse: to Outperform	8/20/2021
Maintains	DA Davidson: to Buy	8/20/2021
Maintains	Wells Fargo: to Overweight	8/20/2021

More Upgrades & Downgrades

U.S. markets close in 6 hours 25 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,379.00	34,484.68	14,621.04	2,225.31
+19.54 (+0.45%)	+93.96 (+0.27%)	+108.59 (+0.75%)	-4.47 (-0.20%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Exponent, Inc. (EXPO)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

116.27 +1.10 (+0.96%)

As of 9:31AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	2	2	2	2
Avg. Estimate	0.39	0.34	1.78	1.92
Low Estimate	0.39	0.34	1.78	1.87
High Estimate	0.4	0.34	1.79	1.97
Year Ago EPS	0.34	0.41	1.55	1.78

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	1	1	1	1
Avg. Estimate	103.64M	99.75M	425.44M	457.96M
Low Estimate	103.64M	99.75M	425.44M	457.96M
High Estimate	103.64M	99.75M	425.44M	457.96M
Year Ago Sales	N/A	103.24M	399.9M	425.44M
Sales Growth (year/est)	N/A	-3.40%	6.40%	7.60%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.31	0.28	0.42	0.42
EPS Actual	0.34	0.41	0.58	0.48
Difference	0.03	0.13	0.16	0.06
Surprise %	9.70%	46.40%	38.10%	14.30%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.39	0.34	1.78	1.92
7 Days Ago	0.39	0.34	1.78	1.92
30 Days Ago	0.39	0.34	1.78	1.92
60 Days Ago	0.37	0.34	1.72	1.86
90 Days Ago	0.37	0.34	1.72	1.86

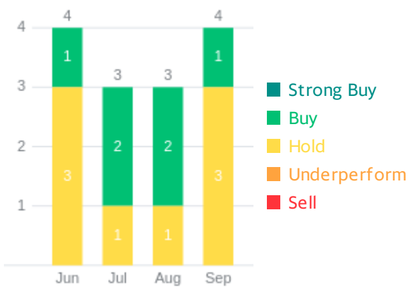
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	EXPO	Industry	Sector(s)	S&P 500
Current Qtr.	14.70%	N/A	N/A	N/A
Next Qtr.	-17.10%	N/A	N/A	N/A
Current Year	14.80%	N/A	N/A	N/A
Next Year	7.90%	N/A	N/A	N/A
Next 5 Years (per annum)	15.00%	N/A	N/A	N/A
Past 5 Years (per annum)	17.85%	N/A	N/A	N/A

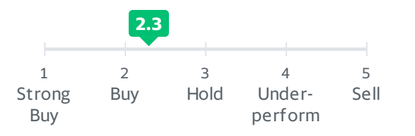
People Also Watch

Symbol	Last Price	Change	% Change
EXLS ExlService Holdings, Inc.	126.93	+0.69	+0.55%
AAON AAON, Inc.	67.06	+0.78	+1.17%
FORR Forrester Research, Inc.	50.92	-0.08	-0.16%
NEOG Neogen Corporation	44.25	+0.30	+0.68%
ROLL RBC Bearings Incorporated	216.80	+1.90	+0.88%

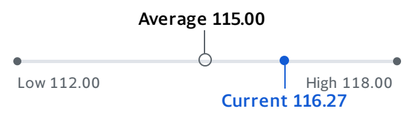
Recommendation Trends



Recommendation Rating



Analyst Price Targets (2)



Upgrades & Downgrades

Maintains	Truist Securities: to Buy	8/2/2021
Maintains	Sidoti & Co.: to Buy	6/2/2020
Upgrade	Sidoti & Co.: Neutral to Buy	5/13/2020
Maintains	Sidoti & Co.: to Neutral	5/1/2020
Upgrade	Sidoti & Co.: Neutral to Buy	3/19/2020
Maintains	Sidoti & Co.: to Neutral	2/7/2020

More Upgrades & Downgrades

U.S. markets close in 6 hours 25 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,378.78	34,484.09	14,615.67	2,225.31
+19.32 (+0.44%)	+93.37 (+0.27%)	+103.23 (+0.71%)	-4.47 (-0.20%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Fastenal Company (FAST)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

52.91 +0.09 (+0.17%)

As of 9:35AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	14	14	18	18
Avg. Estimate	0.42	0.36	1.56	1.71
Low Estimate	0.41	0.35	1.54	1.64
High Estimate	0.43	0.37	1.58	1.8
Year Ago EPS	0.38	0.34	1.49	1.56

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	13	13	16	16
Avg. Estimate	1.54B	1.43B	5.9B	6.41B
Low Estimate	1.52B	1.41B	5.87B	6.3B
High Estimate	1.56B	1.47B	5.94B	6.58B
Year Ago Sales	N/A	1.36B	5.65B	5.9B
Sales Growth (year/est)	N/A	5.60%	4.50%	8.70%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.37	0.33	0.36	0.41
EPS Actual	0.38	0.34	0.37	0.42
Difference	0.01	0.01	0.01	0.01
Surprise %	2.70%	3.00%	2.80%	2.40%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.42	0.36	1.56	1.71
7 Days Ago	0.42	0.36	1.56	1.71
30 Days Ago	0.41	0.36	1.56	1.71
60 Days Ago	0.41	0.36	1.56	1.71
90 Days Ago	0.41	0.36	1.55	1.71

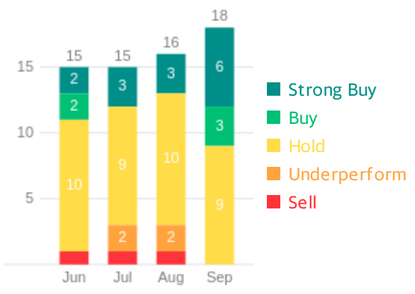
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	1	N/A	1	N/A
Up Last 30 Days	2	N/A	4	2
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	FAST	Industry	Sector(s)	S&P 500
Current Qtr.	10.50%	N/A	N/A	N/A
Next Qtr.	5.90%	N/A	N/A	N/A
Current Year	4.70%	N/A	N/A	N/A
Next Year	9.60%	N/A	N/A	N/A
Next 5 Years (per annum)	6.33%	N/A	N/A	N/A
Past 5 Years (per annum)	11.86%	N/A	N/A	N/A

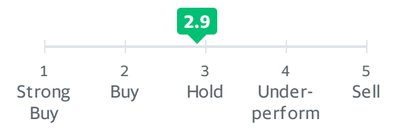
People Also Watch

Symbol	Last Price	Change	% Change
EXPD Expeditors International of Washington, ...	121.59	+0.53	+0.44%
CHRW C.H. Robinson Worldwide, Inc.	88.79	+0.35	+0.39%
CTAS Cintas Corporation	390.84	+1.58	+0.41%
GWW W.W. Grainger, Inc.	401.74	-0.99	-0.25%
FISV Fiserv, Inc.	111.35	+0.68	+0.61%

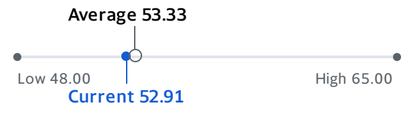
Recommendation Trends



Recommendation Rating



Analyst Price Targets (9)



Upgrades & Downgrades

Initiated	Loop Capital: to Hold	8/3/2021
Downgrade	Morgan Stanley: Equal-Weight to Underweight	6/15/2021
Maintains	Morgan Stanley: to Equal-Weight	4/14/2021
Maintains	Morgan Stanley: to Equal-Weight	1/21/2021
Maintains	Morgan Stanley: to Equal-Weight	10/14/2020
Initiated	UBS: to Neutral	9/16/2020

More Upgrades & Downgrades

U.S. markets close in 6 hours 25 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,377.67	34,479.38	14,614.20	2,225.31
+18.21 (+0.42%)	+88.66 (+0.26%)	+101.76 (+0.70%)	-4.47 (-0.20%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

FirstCash, Inc. (FCFS)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

89.10 +2.01 (+2.31%)

As of 9:31AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	6	6	5	6
Avg. Estimate	0.84	0.99	3.36	3.95
Low Estimate	0.73	0.89	3.18	3.7
High Estimate	0.95	1.15	3.65	4.33
Year Ago EPS	0.59	0.84	3.01	3.36

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	5	5	6	6
Avg. Estimate	414.7M	434.28M	1.65B	1.76B
Low Estimate	396.65M	406.31M	1.6B	1.66B
High Estimate	448.8M	477.1M	1.72B	1.92B
Year Ago Sales	384.54M	392.16M	1.63B	1.65B
Sales Growth (year/est)	7.80%	10.70%	0.90%	6.80%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.53	0.81	0.71	0.61
EPS Actual	0.59	0.84	0.85	0.71
Difference	0.06	0.03	0.14	0.1
Surprise %	11.30%	3.70%	19.70%	16.40%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.84	0.99	3.36	3.95
7 Days Ago	0.84	0.99	3.36	3.95
30 Days Ago	0.83	1	3.36	3.95
60 Days Ago	0.8	1.02	3.37	3.81
90 Days Ago	0.69	0.99	3.12	3.7

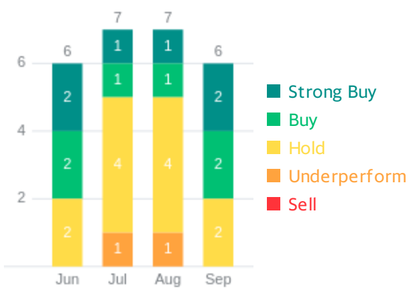
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	1	N/A	1	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	FCFS	Industry	Sector(s)	S&P 500
Current Qtr.	42.40%	N/A	N/A	N/A
Next Qtr.	17.90%	N/A	N/A	N/A
Current Year	11.60%	N/A	N/A	N/A
Next Year	17.60%	N/A	N/A	N/A
Next 5 Years (per annum)	23.00%	N/A	N/A	N/A
Past 5 Years (per annum)	8.24%	N/A	N/A	N/A

People Also Watch

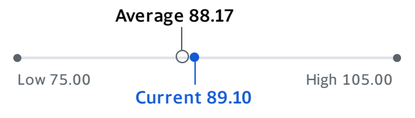
Symbol	Last Price	Change	% Change
EZPW EZCORP, Inc.	7.67	-0.02	-0.25%
WRLD World Acceptance Corporation	195.43	+2.26	+1.17%
CACC Credit Acceptance Corporation	588.21	-1.79	-0.30%
ECPG Encore Capital Group, Inc.	49.86	+0.29	+0.59%
FFIN First Financial Bankshares, Inc.	45.88	+0.06	+0.14%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (6)



Upgrades & Downgrades

Maintains	Wedbush: to Neutral	9/8/2021
Maintains	Barclays: to Overweight	8/17/2021
Downgrade	Credit Suisse: Outperform to Underperform	6/22/2021
Downgrade	Janney Montgomery Scott: Buy to Neutral	5/24/2021
Upgrade	Credit Suisse: Neutral to Outperform	9/3/2020
Upgrade	Barclays: Equal-Weight to Overweight	8/12/2020

More Upgrades & Downgrades

U.S. markets close in 6 hours 24 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,379.15	34,480.64	14,625.82	2,225.31
+19.69 (+0.45%)	+89.92 (+0.26%)	+113.38 (+0.78%)	-4.47 (-0.20%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Franklin Electric Co., Inc. (FELE)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

83.16 +0.65 (+0.79%)

As of 9:30AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	4	4	5	5
Avg. Estimate	0.92	0.68	3.03	3.32
Low Estimate	0.91	0.66	3	3.23
High Estimate	0.93	0.69	3.05	3.52
Year Ago EPS	0.83	0.57	2.18	3.03

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	4	4	4	4
Avg. Estimate	434.89M	376.39M	1.58B	1.68B
Low Estimate	430M	361.3M	1.56B	1.66B
High Estimate	440.16M	388.47M	1.6B	1.72B
Year Ago Sales	N/A	321.11M	1.25B	1.58B
Sales Growth (year/est)	N/A	17.20%	26.80%	6.20%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.63	0.52	0.36	0.8
EPS Actual	0.83	0.57	0.59	0.83
Difference	0.2	0.05	0.23	0.03
Surprise %	31.70%	9.60%	63.90%	3.70%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.92	0.68	3.03	3.32
7 Days Ago	0.92	0.68	3.03	3.32
30 Days Ago	0.92	0.68	3.03	3.32
60 Days Ago	0.92	0.68	3.03	3.32
90 Days Ago	0.91	0.69	2.99	3.23

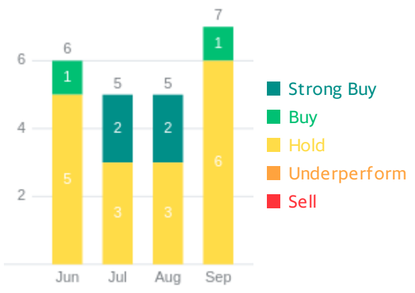
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	FELE	Industry	Sector(s)	S&P 500
Current Qtr.	10.80%	N/A	N/A	N/A
Next Qtr.	19.30%	N/A	N/A	N/A
Current Year	39.00%	N/A	N/A	N/A
Next Year	9.60%	N/A	N/A	N/A
Next 5 Years (per annum)	13.40%	N/A	N/A	N/A
Past 5 Years (per annum)	9.53%	N/A	N/A	N/A

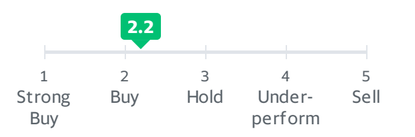
People Also Watch

Symbol	Last Price	Change	% Change
BMI Badger Meter, Inc.	106.78	+0.43	+0.40%
GRC The Gorman-Rupp Company	36.36	+0.46	+1.28%
FWRD Forward Air Corporation	86.30	+0.55	+0.64%
MGRC McGrath RentCorp	73.78	+0.42	+0.57%
UMBF UMB Financial Corporation	98.21	-0.44	-0.45%

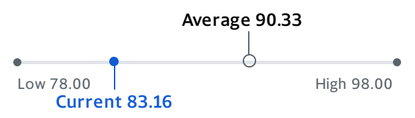
Recommendation Trends



Recommendation Rating



Analyst Price Targets (3)



Upgrades & Downgrades

Upgrade	Baird: Neutral to Outperform	9/29/2020
Downgrade	DA Davidson: Buy to Neutral	7/2/2020
Upgrade	DA Davidson: Neutral to Buy	3/9/2020
Maintains	Baird: to Neutral	7/24/2019
Initiated	DA Davidson: to Neutral	6/12/2018
Maintains	Baird: to Neutral	10/25/2017

More Upgrades & Downgrades

U.S. markets close in 6 hours 25 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,377.71	34,484.37	14,613.90	2,225.31
+18.25 (+0.42%)	+93.65 (+0.27%)	+101.46 (+0.70%)	-4.47 (-0.20%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

GATX Corporation (GATX)

NYSE - NYSE Delayed Price. Currency in USD

Add to watchlist

Quote Lookup

90.91 +1.64 (+1.84%)

As of September 29 4:00PM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	5	5	5	5
Avg. Estimate	1.06	1.04	4.46	5.16
Low Estimate	0.97	1.01	4.35	4.85
High Estimate	1.15	1.09	4.55	5.75
Year Ago EPS	1.7	0.5	4.62	4.46

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	5	5	5	5
Avg. Estimate	315.42M	317.46M	1.26B	1.32B
Low Estimate	302M	303M	1.23B	1.25B
High Estimate	323.3M	327.8M	1.27B	1.36B
Year Ago Sales	304.4M	304.9M	1.21B	1.26B
Sales Growth (year/est)	3.60%	4.10%	3.80%	5.00%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.92	0.88	0.85	1.02
EPS Actual	1.7	0.5	1.02	1.35
Difference	0.78	-0.38	0.17	0.33
Surprise %	84.80%	-43.20%	20.00%	32.40%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	1.06	1.04	4.46	5.16
7 Days Ago	1.06	1.04	4.46	5.16
30 Days Ago	1.06	1.04	4.46	5.16
60 Days Ago	1.02	1.06	4.33	5.23
90 Days Ago	1.06	1.08	4.19	5.04

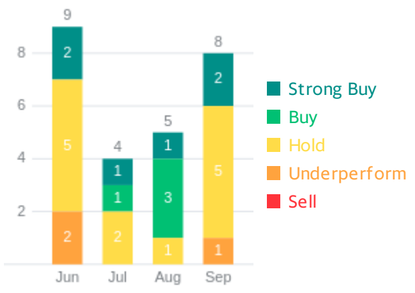
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	GATX	Industry	Sector(s)	S&P 500
Current Qtr.	-37.60%	N/A	N/A	N/A
Next Qtr.	108.00%	N/A	N/A	N/A
Current Year	-3.50%	N/A	N/A	N/A
Next Year	15.70%	N/A	N/A	N/A
Next 5 Years (per annum)	12.00%	N/A	N/A	N/A
Past 5 Years (per annum)	-1.84%	N/A	N/A	N/A

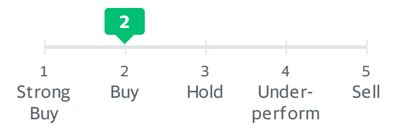
People Also Watch

Symbol	Last Price	Change	% Change
NBHC National Bank Holdings Corporation	40.26	+0.24	+0.59%
ATGE Adtalem Global Education Inc.	38.31	0.00	0.00%
GWB Great Western Bancorp, Inc.	32.67	+0.14	+0.43%
HUBB Hubbell Incorporated	185.46	+0.63	+0.34%
WAFD Washington Federal, Inc.	34.68	-0.04	-0.12%

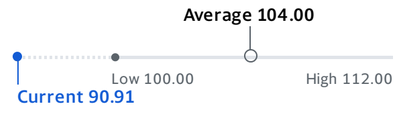
Recommendation Trends



Recommendation Rating



Analyst Price Targets (5)



Upgrades & Downgrades

Upgrade	Susquehanna: Neutral to Positive	7/26/2021
Upgrade	Cowen & Co.: Market Perform to Outperform	7/16/2021
Maintains	Wells Fargo: to Overweight	3/29/2021
Maintains	Sidoti & Co.: to Neutral	9/18/2020
Upgrade	Stephens & Co.: Equal-Weight to Overweight	6/16/2020
Maintains	Cowen & Co.: to Market Perform	4/15/2020

More Upgrades & Downgrades

U.S. markets close in 6 hours 18 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,370.73	34,392.84	14,594.81	2,225.31
+11.27 (+0.26%)	+2.12 (+0.01%)	+82.37 (+0.57%)	-4.47 (-0.20%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

International Flavors & Fragrances Inc. (IFF)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

134.98 +0.90 (+0.67%)

As of 9:42AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	3	3	3	4
Avg. Estimate	1.14	1.04	4.81	5.22
Low Estimate	1.14	1.02	4.75	4.88
High Estimate	1.15	1.08	4.88	5.37
Year Ago EPS	N/A	N/A	N/A	4.81

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	3	3	5	5
Avg. Estimate	2.58B	2.55B	9.87B	10.56B
Low Estimate	2.58B	2.54B	9.81B	10.47B
High Estimate	2.59B	2.55B	9.89B	10.71B
Year Ago Sales	N/A	N/A	N/A	9.87B
Sales Growth (year/est)	N/A	N/A	N/A	7.00%

Earnings History	Invalid Date	Invalid Date	Invalid Date	6/29/2021
EPS Est.	N/A	N/A	N/A	1.28
EPS Actual	N/A	N/A	N/A	1.28
Difference	N/A	N/A	N/A	0
Surprise %	N/A	N/A	N/A	0.00%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	1.14	1.04	4.81	5.22
7 Days Ago	1.39	1.27	5.62	6.18
30 Days Ago	0	0	7	8.7
60 Days Ago	0	0	7	8.7
90 Days Ago	0	0	7	8.7

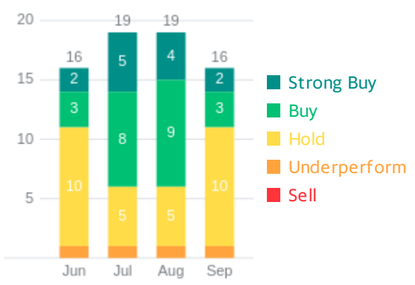
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	1	1	1	1

Growth Estimates	IFF	Industry	Sector(s)	S&P 500
Current Qtr.	N/A	N/A	N/A	N/A
Next Qtr.	N/A	N/A	N/A	N/A
Current Year	N/A	N/A	N/A	N/A
Next Year	8.50%	N/A	N/A	N/A
Next 5 Years (per annum)	4.35%	N/A	N/A	N/A
Past 5 Years (per annum)	4.94%	N/A	N/A	N/A

People Also Watch

Symbol	Last Price	Change	% Change
IPG The Interpublic Group of Companies, Inc.	37.44	-0.05	-0.13%
EMN Eastman Chemical Company	104.00	+0.00	+0.00%
GWW W.W. Grainger, Inc.	404.14	+2.40	+0.60%
SEE Sealed Air Corporation	56.07	+0.20	+0.36%
BLL Ball Corporation	90.15	+0.41	+0.46%

Recommendation Trends



Upgrades & Downgrades

Maintains	Wells Fargo: to Overweight	8/9/2021
Maintains	Wells Fargo: to Overweight	6/28/2021
Maintains	Jefferies: to Buy	5/13/2021
Maintains	Wells Fargo: to Overweight	5/12/2021

U.S. markets close in 6 hours 17 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,372.33	34,415.97	14,594.76	2,225.31
+12.87 (+0.30%)	+25.25 (+0.07%)	+82.32 (+0.57%)	-4.47 (-0.20%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Ingredion Incorporated (INGR)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

91.15 +0.23 (+0.26%)

As of 9:42AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	4	4	5	5
Avg. Estimate	1.39	1.37	6.64	7.12
Low Estimate	1.27	1.23	6.55	6.96
High Estimate	1.63	1.47	6.76	7.46
Year Ago EPS	1.77	1.75	6.23	6.64

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	4	4	5	5
Avg. Estimate	1.71B	1.73B	6.78B	7.05B
Low Estimate	1.68B	1.68B	6.66B	6.81B
High Estimate	1.77B	1.82B	6.96B	7.51B
Year Ago Sales	1.47B	1.59B	5.99B	6.78B
Sales Growth (year/est)	16.60%	8.40%	13.30%	3.90%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	1.45	1.46	1.62	1.59
EPS Actual	1.77	1.75	1.85	2.05
Difference	0.32	0.29	0.23	0.46
Surprise %	22.10%	19.90%	14.20%	28.90%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	1.39	1.37	6.64	7.12
7 Days Ago	1.39	1.36	6.63	7.1
30 Days Ago	1.39	1.36	6.63	7.1
60 Days Ago	1.58	1.58	6.58	7.07
90 Days Ago	1.57	1.58	6.53	7.06

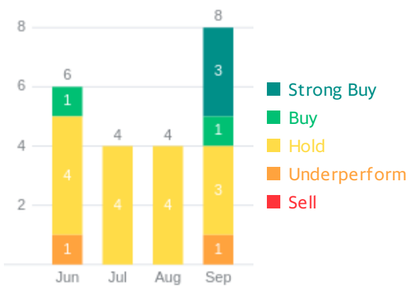
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	1	1	1	1
Up Last 30 Days	1	1	1	1
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	INGR	Industry	Sector(s)	S&P 500
Current Qtr.	-21.50%	N/A	N/A	N/A
Next Qtr.	-21.70%	N/A	N/A	N/A
Current Year	6.60%	N/A	N/A	N/A
Next Year	7.20%	N/A	N/A	N/A
Next 5 Years (per annum)	1.90%	N/A	N/A	N/A
Past 5 Years (per annum)	3.70%	N/A	N/A	N/A

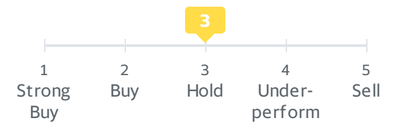
People Also Watch

Symbol	Last Price	Change	% Change
POST Post Holdings, Inc.	112.58	+0.57	+0.50%
FLO Flowers Foods, Inc.	23.90	-0.09	-0.38%
THS TreeHouse Foods, Inc.	40.39	-0.40	-0.98%
JJSF J & J Snack Foods Corp.	155.66	+0.41	+0.26%
LANC Lancaster Colony Corporation	171.38	+0.35	+0.20%

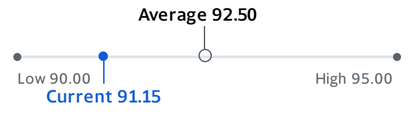
Recommendation Trends



Recommendation Rating



Analyst Price Targets (4)



Upgrades & Downgrades

Downgrade	Stephens & Co.: Overweight to Equal-Weight	5/5/2021
Maintains	Credit Suisse: to Neutral	2/4/2021
Maintains	BMO Capital: to Market Perform	5/6/2020
Maintains	Credit Suisse: to Neutral	5/6/2020
Upgrade	Goldman Sachs: Sell to Neutral	3/26/2020
Maintains	BMO Capital: to Market Perform	2/12/2020

More Upgrades & Downgrades

U.S. markets close in 6 hours 17 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,371.72	34,405.69	14,591.61	2,225.31
+12.26 (+0.28%)	+14.97 (+0.04%)	+79.17 (+0.55%)	-4.47 (-0.20%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Iron Mountain Incorporated (IRM)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

44.46 +0.15 (+0.34%)

As of 9:42AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	6	6	6	6
Avg. Estimate	0.4	0.4	1.5	1.64
Low Estimate	0.36	0.34	1.4	1.35
High Estimate	0.43	0.42	1.56	1.79
Year Ago EPS	0.31	0.29	1.19	1.5

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	6	6	7	7
Avg. Estimate	1.13B	1.14B	4.48B	4.63B
Low Estimate	1.13B	1.13B	4.46B	4.52B
High Estimate	1.13B	1.16B	4.5B	4.68B
Year Ago Sales	997.16M	1.06B	4.15B	4.48B
Sales Growth (year/est)	13.40%	8.00%	8.00%	3.40%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.25	0.31	0.25	0.35
EPS Actual	0.31	0.29	0.32	0.38
Difference	0.06	-0.02	0.07	0.03
Surprise %	24.00%	-6.50%	28.00%	8.60%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.4	0.4	1.5	1.64
7 Days Ago	0.4	0.4	1.5	1.64
30 Days Ago	0.4	0.4	1.5	1.64
60 Days Ago	0.37	0.37	1.41	1.54
90 Days Ago	0.37	0.37	1.41	1.54

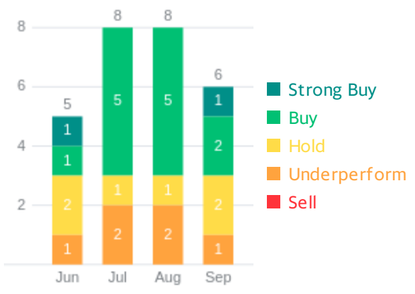
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	IRM	Industry	Sector(s)	S&P 500
Current Qtr.	29.00%	N/A	N/A	N/A
Next Qtr.	37.90%	N/A	N/A	N/A
Current Year	26.10%	N/A	N/A	N/A
Next Year	9.30%	N/A	N/A	N/A
Next 5 Years (per annum)	6.41%	N/A	N/A	N/A
Past 5 Years (per annum)	-4.51%	N/A	N/A	N/A

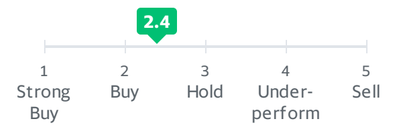
People Also Watch

Symbol	Last Price	Change	% Change
WPC W. P. Carey Inc.	73.62	-0.33	-0.45%
VTR Ventas, Inc.	55.97	+0.01	+0.02%
O Realty Income Corporation	65.78	-0.03	-0.05%
DLR Digital Realty Trust, Inc.	147.46	+0.70	+0.48%
MPW Medical Properties Trust, Inc.	20.60	-0.08	-0.36%

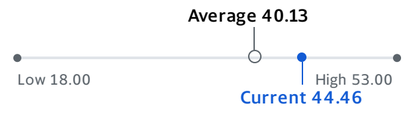
Recommendation Trends



Recommendation Rating



Analyst Price Targets (8)



Upgrades & Downgrades

Maintains	Goldman Sachs: to Buy	5/7/2021
Maintains	Credit Suisse: to Underperform	2/25/2021
Maintains	Credit Suisse: to Underperform	11/26/2019
Upgrade	Baird: Underperform to Neutral	8/2/2019
Downgrade	Bank of America: Neutral to Underperform	7/11/2019
Initiated	Wells Fargo: to Outperform	7/10/2019

More Upgrades & Downgrades

U.S. markets close in 6 hours 24 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,378.60	34,473.47	14,624.87	2,225.31
+19.14 (+0.44%)	+82.75 (+0.24%)	+112.43 (+0.77%)	-4.47 (-0.20%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

J.B. Hunt Transport Services, Inc. (JBHT)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

171.23 +1.15 (+0.68%)

As of 9:35AM EDT. Market open.

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	19	19	24	24
Avg. Estimate	1.8	1.93	6.68	7.77
Low Estimate	1.7	1.78	6.16	6.98
High Estimate	1.86	2.09	6.95	8.45
Year Ago EPS	1.18	1.44	4.74	6.68

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	16	16	21	21
Avg. Estimate	3.01B	3.16B	11.74B	12.74B
Low Estimate	2.89B	3.04B	11.49B	11.8B
High Estimate	3.1B	3.27B	12B	13.39B
Year Ago Sales	2.47B	2.74B	9.64B	11.74B
Sales Growth (year/est)	21.70%	15.40%	21.80%	8.50%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	1.28	1.29	1.16	1.57
EPS Actual	1.18	1.44	1.37	1.61
Difference	-0.1	0.15	0.21	0.04
Surprise %	-7.80%	11.60%	18.10%	2.50%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	1.8	1.93	6.68	7.77
7 Days Ago	1.8	1.93	6.68	7.77
30 Days Ago	1.8	1.93	6.68	7.77
60 Days Ago	1.79	1.92	6.68	7.78
90 Days Ago	1.75	1.88	6.58	7.65

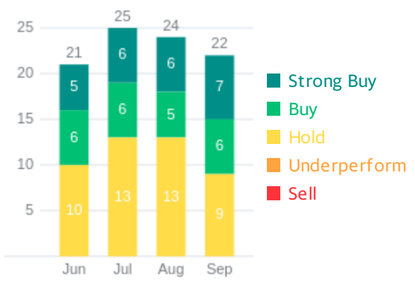
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	1
Up Last 30 Days	N/A	N/A	1	2
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	1	1	1	N/A

Growth Estimates	JBHT	Industry	Sector(s)	S&P 500
Current Qtr.	52.50%	N/A	N/A	N/A
Next Qtr.	34.00%	N/A	N/A	N/A
Current Year	40.90%	N/A	N/A	N/A
Next Year	16.30%	N/A	N/A	N/A
Next 5 Years (per annum)	20.50%	N/A	N/A	N/A
Past 5 Years (per annum)	10.72%	N/A	N/A	N/A

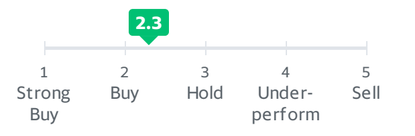
People Also Watch

Symbol	Last Price	Change	% Change
LSTR Landstar System, Inc.	161.29	+1.09	+0.68%
CHRW C.H. Robinson Worldwide, Inc.	88.67	+0.23	+0.26%
ODFL Old Dominion Freight Line, Inc.	295.27	+2.10	+0.72%
EXPD Expeditors International of Washington, ...	121.59	+0.53	+0.44%
WERN Werner Enterprises, Inc.	45.67	+0.17	+0.37%

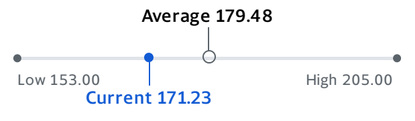
Recommendation Trends >



Recommendation Rating >



Analyst Price Targets (21) >



Upgrades & Downgrades >

Maintains	Deutsche Bank: to Hold	7/21/2021
Maintains	BMO Capital: to Market Perform	7/20/2021
Maintains	Raymond James: to Outperform	7/20/2021
Maintains	Citigroup: to Buy	7/14/2021
Maintains	Wells Fargo: to Overweight	7/13/2021
Maintains	Morgan Stanley: to Equal-Weight	7/8/2021

More Upgrades & Downgrades

U.S. markets close in 6 hours 18 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,371.75	34,400.42	14,598.05	2,225.31
+12.29 (+0.28%)	+9.70 (+0.03%)	+85.61 (+0.59%)	-4.47 (-0.20%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

J & J Snack Foods Corp. (JJSF)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

155.66 +0.41 (+0.26%)

As of 9:30AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	4	3	4	4
Avg. Estimate	1.26	0.9	3.19	4.77
Low Estimate	1.12	0.85	3.04	4.18
High Estimate	1.45	0.93	3.37	5.07
Year Ago EPS	0.4	0.09	1.37	3.19

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	4	3	4	4
Avg. Estimate	311.81M	282.92M	1.13B	1.23B
Low Estimate	306.63M	278.1M	1.13B	1.22B
High Estimate	320M	290M	1.14B	1.26B
Year Ago Sales	252.54M	228.45M	1.02B	1.13B
Sales Growth (year/est)	23.50%	23.80%	10.90%	8.70%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.05	0.09	0.13	0.77
EPS Actual	0.4	0.09	0.32	1.51
Difference	0.35	0	0.19	0.74
Surprise %	700.00%	0.00%	146.20%	96.10%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	1.26	0.9	3.19	4.77
7 Days Ago	1.25	0.9	3.18	4.75
30 Days Ago	1.27	0.9	3.19	4.74
60 Days Ago	1.23	0.85	2.84	4.54
90 Days Ago	1.21	0.82	2.41	4.44

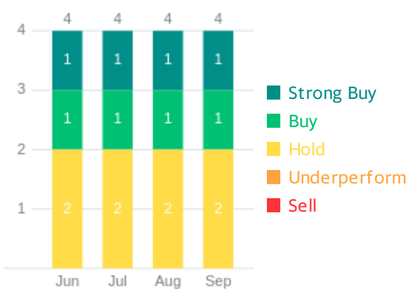
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	1	1
Up Last 30 Days	1	N/A	1	2
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	JJSF	Industry	Sector(s)	S&P 500
Current Qtr.	215.00%	N/A	N/A	N/A
Next Qtr.	900.00%	N/A	N/A	N/A
Current Year	132.80%	N/A	N/A	N/A
Next Year	49.50%	N/A	N/A	N/A
Next 5 Years (per annum)	6.00%	N/A	N/A	N/A
Past 5 Years (per annum)	8.32%	N/A	N/A	N/A

People Also Watch

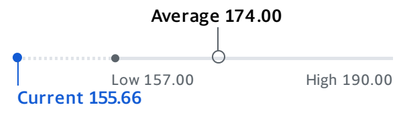
Symbol	Last Price	Change	% Change
LANC Lancaster Colony Corporation	171.38	+0.35	+0.20%
JBSS John B. Sanfilippo & Son, Inc.	83.04	+0.42	+0.51%
IPAR Inter Parfums, Inc.	74.82	+0.89	+1.21%
CVGW Calavo Growers, Inc.	38.61	-0.11	-0.28%
MNRO Monro, Inc.	59.17	-0.62	-1.05%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (3)



Upgrades & Downgrades

Upgrade	CL King: Neutral to Buy	5/12/2020
Upgrade	Consumer Edge: Equal-Weight to Overweight	8/9/2019
Initiated	KeyBanc: to Sector Weight	3/28/2018
Initiated	CL King: to Buy	12/19/2017
Downgrade	DA Davidson: Buy to Neutral	1/4/2017
Initiated	DA Davidson: to Buy	10/5/2016

More Upgrades & Downgrades

U.S. markets close in 6 hours 17 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,371.89	34,410.95	14,599.21	2,225.31
+12.43 (+0.29%)	+20.23 (+0.06%)	+86.77 (+0.60%)	-4.47 (-0.20%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Jack Henry & Associates, Inc. (JKHY)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist | Visitors trend 2W ↑ 10W ↑ 9M ↑

Quote Lookup

167.11 +0.95 (+0.57%)

As of 9:42AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
No. of Analysts	10	10	11	11
Avg. Estimate	1.32	1.08	4.59	5.08
Low Estimate	1.28	1.03	4.55	5
High Estimate	1.38	1.15	4.65	5.2
Year Ago EPS	1.19	0.94	4.12	4.59

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
No. of Analysts	9	9	10	9
Avg. Estimate	488.76M	460.08M	1.9B	2.05B
Low Estimate	481M	454M	1.86B	1.99B
High Estimate	497.1M	470.42M	1.91B	2.08B
Year Ago Sales	N/A	N/A	1.76B	1.9B
Sales Growth (year/est)	N/A	N/A	8.00%	7.80%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	1.05	0.87	0.86	0.93
EPS Actual	1.19	0.94	0.95	1.04
Difference	0.14	0.07	0.09	0.11
Surprise %	13.30%	8.00%	10.50%	11.80%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
Current Estimate	1.32	1.08	4.59	5.08
7 Days Ago	1.32	1.08	4.59	5.08
30 Days Ago	1.32	1.08	4.59	5.08
60 Days Ago	1.3	1.1	4.53	5.04
90 Days Ago	1.3	1.1	4.53	5.04

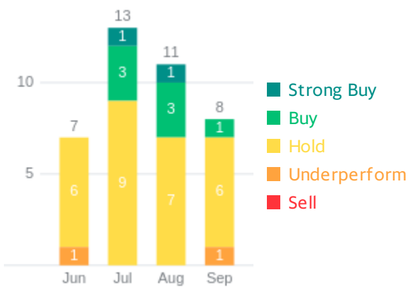
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2022)	Next Year (2023)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	1	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	JKHY	Industry	Sector(s)	S&P 500
Current Qtr.	10.90%	N/A	N/A	N/A
Next Qtr.	14.90%	N/A	N/A	N/A
Current Year	11.40%	N/A	N/A	N/A
Next Year	10.70%	N/A	N/A	N/A
Next 5 Years (per annum)	9.64%	N/A	N/A	N/A
Past 5 Years (per annum)	8.58%	N/A	N/A	N/A

People Also Watch

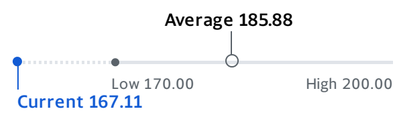
Symbol	Last Price	Change	% Change
ANSS ANSYS, Inc.	342.98	+2.02	+0.59%
ROL Rollins, Inc.	36.19	+0.14	+0.37%
IT Gartner, Inc.	308.49	+0.64	+0.21%
IEX IDEX Corporation	212.44	-0.56	-0.26%
MKTX MarketAxess Holdings Inc.	426.61	+2.95	+0.70%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (8)



Upgrades & Downgrades

Maintains	Compass Point: to Buy	8/19/2021
Maintains	Raymond James: to Outperform	8/19/2021
Maintains	Raymond James: to Outperform	5/5/2021
Maintains	Credit Suisse: to Neutral	2/10/2021
Upgrade	Evercore ISI Group: Underperform to In-Line	1/11/2021
Initiated	Credit Suisse: to Neutral	12/7/2020

More Upgrades & Downgrades

U.S. markets close in 6 hours 18 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,371.08	34,392.84	14,594.81	2,225.31
+11.62 (+0.27%)	+2.12 (+0.01%)	+82.37 (+0.57%)	-4.47 (-0.20%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Juniper Networks, Inc. (JNPR)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

28.49 +0.13 (+0.44%)

As of 9:42AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	18	18	19	19
Avg. Estimate	0.46	0.54	1.72	1.93
Low Estimate	0.44	0.5	1.69	1.76
High Estimate	0.47	0.57	1.75	2.2
Year Ago EPS	0.43	0.55	1.55	1.72

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	16	16	18	18
Avg. Estimate	1.2B	1.26B	4.71B	4.89B
Low Estimate	1.17B	1.24B	4.69B	4.77B
High Estimate	1.22B	1.28B	4.73B	4.98B
Year Ago Sales	N/A	1.22B	4.45B	4.71B
Sales Growth (year/est)	N/A	3.40%	6.10%	3.60%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.43	0.53	0.25	0.39
EPS Actual	0.43	0.55	0.3	0.43
Difference	0	0.02	0.05	0.04
Surprise %	0.00%	3.80%	20.00%	10.30%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.46	0.54	1.72	1.93
7 Days Ago	0.46	0.54	1.72	1.93
30 Days Ago	0.46	0.54	1.72	1.93
60 Days Ago	0.46	0.54	1.72	1.93
90 Days Ago	0.46	0.56	1.71	1.89

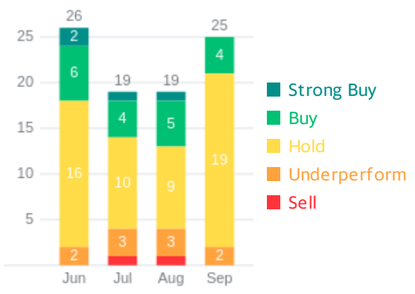
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	1
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	JNPR	Industry	Sector(s)	S&P 500
Current Qtr.	7.00%	N/A	N/A	N/A
Next Qtr.	-1.80%	N/A	N/A	N/A
Current Year	11.00%	N/A	N/A	N/A
Next Year	12.20%	N/A	N/A	N/A
Next 5 Years (per annum)	9.56%	N/A	N/A	N/A
Past 5 Years (per annum)	-0.59%	N/A	N/A	N/A

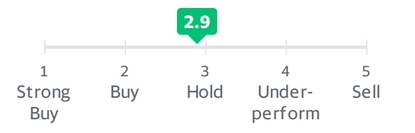
People Also Watch

Symbol	Last Price	Change	% Change
CIEN Ciena Corporation	51.66	+0.34	+0.67%
NTAP NetApp, Inc.	91.29	+0.96	+1.06%
EXTR Extreme Networks, Inc.	9.83	+0.03	+0.31%
VRSN VeriSign, Inc.	206.80	+1.07	+0.52%
SUNW Sunworks, Inc.	6.05	+0.08	+1.34%

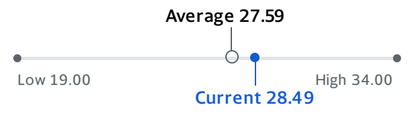
Recommendation Trends



Recommendation Rating



Analyst Price Targets (17)



Upgrades & Downgrades

Maintains	Wells Fargo: to Equal-Weight	8/19/2021
Upgrade	MKM Partners: Neutral to Buy	7/28/2021
Maintains	Raymond James: to Outperform	7/28/2021
Upgrade	Wolfe Research: Peer Perform to Outperform	7/14/2021
Maintains	Credit Suisse: to Underperform	4/28/2021
Maintains	Raymond James: to Outperform	4/28/2021

More Upgrades & Downgrades

U.S. markets close in 6 hours 15 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,372.61	34,407.72	14,598.31	2,225.31
+13.15 (+0.30%)	+17.00 (+0.05%)	+85.87 (+0.59%)	-4.47 (-0.20%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

ManTech International Corporation (MANT)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist | Visitors trend 2W ↑ 10W ↑ 9M ↑

Quote Lookup

77.20 -0.20 (-0.26%)

As of 9:31AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	7	7	7	7
Avg. Estimate	0.86	0.88	3.61	3.77
Low Estimate	0.83	0.83	3.59	3.68
High Estimate	0.9	0.92	3.68	3.86
Year Ago EPS	0.83	0.89	2.91	3.61

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	7	7	8	8
Avg. Estimate	680.42M	696.58M	2.66B	2.79B
Low Estimate	668M	670.7M	2.62B	2.75B
High Estimate	693M	722M	2.7B	2.83B
Year Ago Sales	636.2M	638.78M	2.52B	2.66B
Sales Growth (year/est)	7.00%	9.00%	5.60%	4.90%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.76	0.79	0.83	0.87
EPS Actual	0.83	0.89	0.88	0.99
Difference	0.07	0.1	0.05	0.12
Surprise %	9.20%	12.70%	6.00%	13.80%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.86	0.88	3.61	3.77
7 Days Ago	0.86	0.88	3.61	3.77
30 Days Ago	0.87	0.88	3.62	3.77
60 Days Ago	0.88	0.89	3.53	3.73
90 Days Ago	0.88	0.89	3.53	3.73

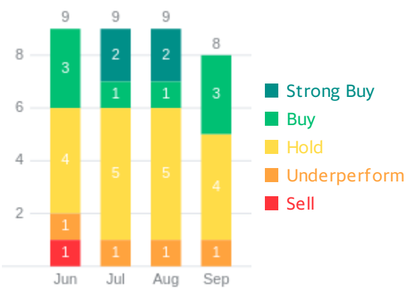
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	1	1	1	1

Growth Estimates	MANT	Industry	Sector(s)	S&P 500
Current Qtr.	3.60%	N/A	N/A	N/A
Next Qtr.	-1.10%	N/A	N/A	N/A
Current Year	24.10%	N/A	N/A	N/A
Next Year	4.40%	N/A	N/A	N/A
Next 5 Years (per annum)	5.38%	N/A	N/A	N/A
Past 5 Years (per annum)	12.47%	N/A	N/A	N/A

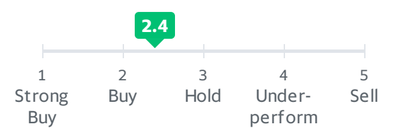
People Also Watch

Symbol	Last Price	Change	% Change
CACI CACI International Inc	266.40	+1.44	+0.54%
SAIC Science Applications International Corp...	86.55	-0.10	-0.12%
BLKB Blackbaud, Inc.	72.00	+0.28	+0.39%
MATW Matthews International Corporation	35.46	+0.22	+0.62%
CSGS CSG Systems International, Inc.	48.80	+0.40	+0.83%

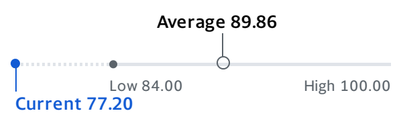
Recommendation Trends



Recommendation Rating



Analyst Price Targets (7)



Upgrades & Downgrades

Maintains	Alliance Global Partners: to Neutral	8/4/2021
Maintains	Morgan Stanley: to Equal-Weight	6/15/2021
Initiated	Wells Fargo: to Equal-Weight	5/13/2021
Maintains	Credit Suisse: to Underperform	5/5/2021
Maintains	Morgan Stanley: to Equal-Weight	2/22/2021
Maintains	Morgan Stanley: to Equal-Weight	2/19/2021

More Upgrades & Downgrades

U.S. markets close in 6 hours 15 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,372.40	34,404.01	14,596.43	2,226.74
+12.94 (+0.30%)	+13.29 (+0.04%)	+83.99 (+0.58%)	+1.43 (+0.06%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

Monster Beverage Corporation (MNST)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

89.87 +0.54 (+0.60%)

As of 9:45AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	18	18	20	19
Avg. Estimate	0.68	0.63	2.65	3.01
Low Estimate	0.62	0.55	2.54	2.85
High Estimate	0.76	0.7	2.75	3.2
Year Ago EPS	0.65	0.62	2.37	2.65

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	14	14	18	18
Avg. Estimate	1.39B	1.32B	5.41B	5.96B
Low Estimate	1.34B	1.27B	5.31B	5.72B
High Estimate	1.46B	1.39B	5.54B	6.23B
Year Ago Sales	N/A	1.2B	4.6B	5.41B
Sales Growth (year/est)	N/A	10.00%	17.70%	10.20%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.63	0.62	0.61	0.68
EPS Actual	0.65	0.62	0.59	0.75
Difference	0.02	0	-0.02	0.07
Surprise %	3.20%	0.00%	-3.30%	10.30%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.68	0.63	2.65	3.01
7 Days Ago	0.67	0.63	2.65	3.02
30 Days Ago	0.67	0.63	2.65	3.01
60 Days Ago	0.71	0.63	2.62	3
90 Days Ago	0.71	0.63	2.63	3.01

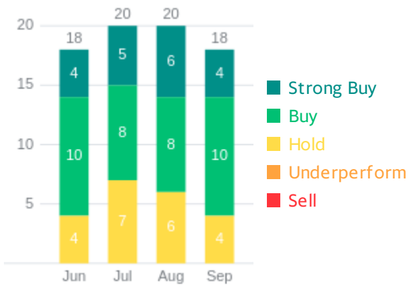
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	1	N/A	N/A	N/A
Up Last 30 Days	1	N/A	2	2
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	1	1	1	1

Growth Estimates	MNST	Industry	Sector(s)	S&P 500
Current Qtr.	4.60%	N/A	N/A	N/A
Next Qtr.	1.60%	N/A	N/A	N/A
Current Year	11.80%	N/A	N/A	N/A
Next Year	13.60%	N/A	N/A	N/A
Next 5 Years (per annum)	14.84%	N/A	N/A	N/A
Past 5 Years (per annum)	19.72%	N/A	N/A	N/A

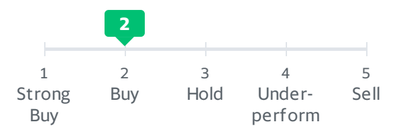
People Also Watch

Symbol	Last Price	Change	% Change
ROST Ross Stores, Inc.	111.62	-3.35	-2.91%
ORLY O'Reilly Automotive, Inc.	618.88	-7.12	-1.14%
ULTA Ulta Beauty, Inc.	370.68	-7.67	-2.03%
DLTR Dollar Tree, Inc.	97.13	-3.38	-3.36%
MDLZ Mondelez International, Inc.	59.21	+0.16	+0.27%

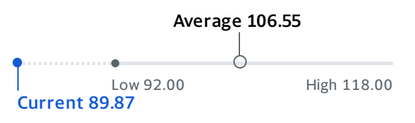
Recommendation Trends



Recommendation Rating



Analyst Price Targets (19)



Upgrades & Downgrades

Maintains	Deutsche Bank: to Buy	7/30/2021
Upgrade	Citigroup: Neutral to Buy	7/23/2021
Maintains	Morgan Stanley: to Overweight	4/19/2021
Maintains	Credit Suisse: to Outperform	3/16/2021
Maintains	Morgan Stanley: to Overweight	3/9/2021
Maintains	Argus Research: to Buy	3/1/2021

More Upgrades & Downgrades

U.S. markets open in 7 minutes

S&P Futures	Dow Futures	Nasdaq Futures	Russell 2000 Futures
4,361.00	34,345.00	14,791.25	2,231.10
+11.25 (+0.26%)	+80.00 (+0.23%)	+51.50 (+0.35%)	+9.20 (+0.41%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Altria Group, Inc. (MO)

NYSE - NYSE Delayed Price. Currency in USD

Add to watchlist

Quote Lookup

48.74 +0.47 (+0.97%)
At close: September 29 4:03PM EDT

48.56 -0.19 (-0.38%)
Pre-Market: 09:22AM EDT

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	13	13	16	17
Avg. Estimate	1.26	1.06	4.62	4.85
Low Estimate	1.2	1.03	4.56	4.64
High Estimate	1.31	1.13	4.7	4.96
Year Ago EPS	1.19	0.99	4.36	4.62

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	8	8	15	15
Avg. Estimate	5.76B	5.06B	21.29B	21.58B
Low Estimate	5.58B	4.86B	20.94B	20.77B
High Estimate	5.87B	5.28B	21.66B	22.56B
Year Ago Sales	N/A	5.05B	20.84B	21.29B
Sales Growth (year/est)	N/A	0.00%	2.20%	1.40%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	1.16	1.02	1.05	1.18
EPS Actual	1.19	0.99	1.07	1.23
Difference	0.03	-0.03	0.02	0.05
Surprise %	2.60%	-2.90%	1.90%	4.20%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	1.26	1.06	4.62	4.85
7 Days Ago	1.27	1.06	4.62	4.84
30 Days Ago	1.27	1.06	4.62	4.84
60 Days Ago	1.27	1.08	4.59	4.82
90 Days Ago	1.27	1.09	4.59	4.82

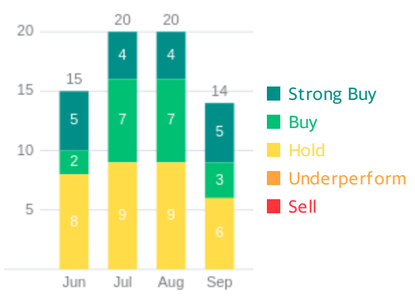
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	1	1	1
Up Last 30 Days	N/A	1	1	1
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	1	N/A	N/A	N/A

Growth Estimates	MO	Industry	Sector(s)	S&P 500
Current Qtr.	5.90%	N/A	N/A	N/A
Next Qtr.	7.10%	N/A	N/A	N/A
Current Year	6.00%	N/A	N/A	N/A
Next Year	5.00%	N/A	N/A	N/A
Next 5 Years (per annum)	4.67%	N/A	N/A	N/A
Past 5 Years (per annum)	11.39%	N/A	N/A	N/A

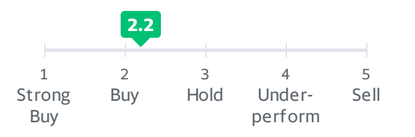
People Also Watch

Symbol	Last Price	Change	% Change
PM Philip Morris International Inc.	99.49	+1.07	+1.09%
PG The Procter & Gamble Company	142.02	+1.43	+1.02%
JNJ Johnson & Johnson	164.02	+1.21	+0.74%
MRK Merck & Co., Inc.	75.09	+1.77	+2.41%
XOM Exxon Mobil Corporation	59.88	-0.04	-0.07%

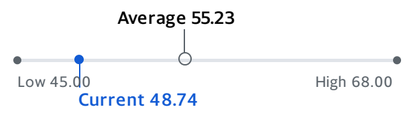
Recommendation Trends >



Recommendation Rating >



Analyst Price Targets (19) >



Upgrades & Downgrades >

Initiated	Redburn Partners: to Neutral	6/17/2021
Maintains	Morgan Stanley: to Overweight	5/10/2021
Downgrade	Argus Research: Buy to Hold	5/5/2021
Upgrade	Jefferies: Hold to Buy	3/26/2021
Downgrade	Citigroup: Buy to Neutral	3/16/2021
Maintains	Deutsche Bank: to Buy	1/22/2021

More Upgrades & Downgrades

U.S. markets close in 6 hours 15 minutes

^GSPC	^DJI	^IXIC	^RUT
4,372.85	34,413.45	14,597.96	2,225.31
+13.39 (+0.31%)	+22.73 (+0.07%)	+85.52 (+0.59%)	-4.47 (-0.20%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

MSA Safety Incorporated (MSA)

Add to watchlist

NYSE - NYSE Delayed Price. Currency in USD

Quote Lookup

146.13 0.00 (0.00%)

As of September 29 4:00PM EDT. Market open.

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	5	5	5	5
Avg. Estimate	1.12	1.43	4.56	5.53
Low Estimate	1.03	1.34	4.38	5.25
High Estimate	1.24	1.57	4.7	5.75
Year Ago EPS	0.94	1.27	4.5	4.56

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	5	5	5	5
Avg. Estimate	349.72M	418.31M	1.42B	1.54B
Low Estimate	334.18M	400M	1.39B	1.48B
High Estimate	366.4M	446.2M	1.44B	1.57B
Year Ago Sales	N/A	388.25M	1.35B	1.42B
Sales Growth (year/est)	N/A	7.70%	5.20%	8.90%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	1.07	1.05	0.95	1.04
EPS Actual	0.94	1.27	0.95	1.06
Difference	-0.13	0.22	0	0.02
Surprise %	-12.10%	21.00%	0.00%	1.90%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	1.12	1.43	4.56	5.53
7 Days Ago	1.21	1.47	4.69	5.7
30 Days Ago	1.21	1.47	4.69	5.7
60 Days Ago	1.24	1.49	4.73	5.66
90 Days Ago	1.22	1.45	4.71	5.56

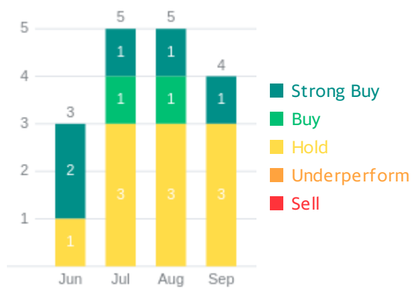
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	1	1	1	1

Growth Estimates	MSA	Industry	Sector(s)	S&P 500
Current Qtr.	19.10%	N/A	N/A	N/A
Next Qtr.	12.60%	N/A	N/A	N/A
Current Year	1.30%	N/A	N/A	N/A
Next Year	21.30%	N/A	N/A	N/A
Next 5 Years (per annum)	18.00%	N/A	N/A	N/A
Past 5 Years (per annum)	18.25%	N/A	N/A	N/A

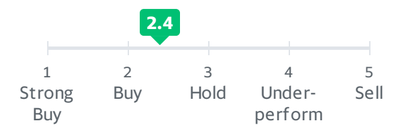
People Also Watch

Symbol	Last Price	Change	% Change
NDSN Nordson Corporation	243.53	+0.62	+0.26%
LANC Lancaster Colony Corporation	172.00	+0.97	+0.57%
MPX Marine Products Corporation	12.85	+0.08	+0.63%
TNC Tennant Company	74.89	+0.26	+0.34%
BRC Brady Corporation	51.35	-0.17	-0.33%

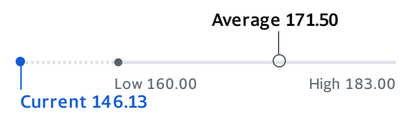
Recommendation Trends



Recommendation Rating



Analyst Price Targets (4)



Upgrades & Downgrades

Maintains	Stifel Nicolaus: to Buy	2/21/2020
Maintains	Sidoti & Co.: to Neutral	1/29/2020
Initiated	William Blair: to Market Perform	1/10/2019
Downgrade	Baird: Outperform to Neutral	12/21/2018
Maintains	Stifel Nicolaus: Buy to Buy	7/27/2018
Maintains	Baird: Outperform to Outperform	4/25/2018

More Upgrades & Downgrades

U.S. markets close in 6 hours 15 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,372.85	34,413.45	14,597.96	2,225.31
+13.39 (+0.31%)	+22.73 (+0.07%)	+85.52 (+0.59%)	-4.47 (-0.20%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

MSCI Inc. (MSCI)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

621.39 +10.69 (+1.75%)

As of 9:42AM EDT. Market open.

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	10	10	12	12
Avg. Estimate	2.39	2.5	9.79	11.07
Low Estimate	2.32	2.43	9.69	10.55
High Estimate	2.46	2.64	9.99	11.44
Year Ago EPS	2.2	1.96	7.83	9.79

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	8	8	12	12
Avg. Estimate	507.16M	525.63M	2.01B	2.26B
Low Estimate	496.6M	517M	1.99B	2.2B
High Estimate	515M	550M	2.04B	2.38B
Year Ago Sales	423.29M	443.66M	1.7B	2.01B
Sales Growth (year/est)	19.80%	18.50%	18.60%	12.30%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	1.81	1.95	2.26	2.3
EPS Actual	2.2	1.96	2.46	2.45
Difference	0.39	0.01	0.2	0.15
Surprise %	21.50%	0.50%	8.80%	6.50%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	2.39	2.5	9.79	11.07
7 Days Ago	2.4	2.49	9.79	11.06
30 Days Ago	2.4	2.49	9.78	10.98
60 Days Ago	2.41	2.49	9.73	10.99
90 Days Ago	2.38	2.45	9.63	10.81

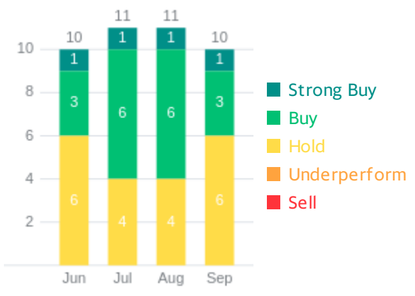
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	1	1	2
Up Last 30 Days	2	3	4	4
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	2	1	1	N/A

Growth Estimates	MSCI	Industry	Sector(s)	S&P 500
Current Qtr.	8.60%	N/A	N/A	N/A
Next Qtr.	27.60%	N/A	N/A	N/A
Current Year	25.00%	N/A	N/A	N/A
Next Year	13.10%	N/A	N/A	N/A
Next 5 Years (per annum)	17.79%	N/A	N/A	N/A
Past 5 Years (per annum)	29.79%	N/A	N/A	N/A

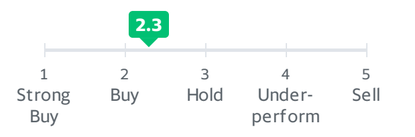
People Also Watch

Symbol	Last Price	Change	% Change
SPGI S&P Global Inc.	430.58	+3.96	+0.93%
MKTX MarketAxess Holdings Inc.	426.61	+2.95	+0.70%
VRSK Verisk Analytics, Inc.	202.85	+0.48	+0.23%
MTD Mettler-Toledo International Inc.	1,421.23	+12.80	+0.91%
INFO IHS Markit Ltd.	118.25	+1.22	+1.04%

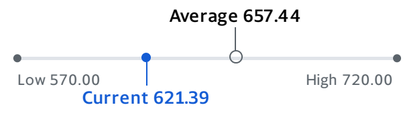
Recommendation Trends



Recommendation Rating



Analyst Price Targets (9)



Upgrades & Downgrades

Maintains	Morgan Stanley: to Equal-Weight	9/23/2021
Maintains	RBC Capital: to Outperform	9/21/2021
Maintains	Deutsche Bank: to Buy	7/28/2021
Maintains	Morgan Stanley: to Equal-Weight	7/28/2021
Maintains	Oppenheimer: to Outperform	7/28/2021
Initiated	RBC Capital: to Outperform	7/8/2021

More Upgrades & Downgrades

U.S. Markets close in 6 hrs 10 mins

S&P 500	Dow 30	Nasdaq	Russell 2000
4,382.05	34,482.27	14,611.46	2,232.90
+22.59 (+0.52%)	+91.55 (+0.27%)	+99.02 (+0.68%)	+7.60 (+0.34%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Vail Resorts, Inc. (MTN)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

340.10 -2.49 (-0.73%)

As of 9:50AM EDT. Market open.

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Jul 2021)	Next Qtr. (Oct 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	11	8	13	13
Avg. Estimate	-3.46	-3.26	3.13	7.94
Low Estimate	-3.86	-3.74	2.71	7.09
High Estimate	-2.56	-2.76	4.04	9.88
Year Ago EPS	-3.82	-3.82	2.42	3.13

Revenue Estimate	Current Qtr. (Jul 2021)	Next Qtr. (Oct 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	12	8	13	13
Avg. Estimate	185.9M	255.35M	1.89B	2.58B
Low Estimate	144M	217.55M	1.85B	2.45B
High Estimate	205.09M	286.05M	1.91B	2.74B
Year Ago Sales	77.21M	N/A	1.96B	1.89B
Sales Growth (year/est)	140.80%	N/A	-3.80%	36.50%

Earnings History	7/30/2020	10/30/2020	1/30/2021	4/29/2021
EPS Est.	-3.43	-3.54	2.26	6.54
EPS Actual	-3.82	-3.82	3.62	6.72
Difference	-0.39	-0.28	1.36	0.18
Surprise %	-11.40%	-7.90%	60.20%	2.80%

EPS Trend	Current Qtr. (Jul 2021)	Next Qtr. (Oct 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	-3.46	-3.26	3.13	7.94
7 Days Ago	-3.46	-3.26	3.13	7.94
30 Days Ago	-3.46	-3.26	3.13	7.94
60 Days Ago	-3.46	-3.26	3.16	7.94
90 Days Ago	-3.46	-3.26	3.16	7.94

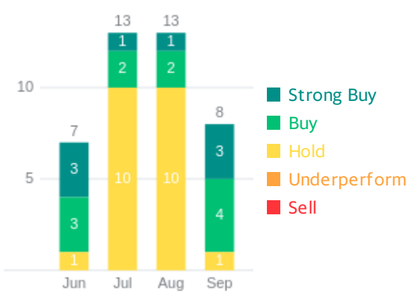
EPS Revisions	Current Qtr. (Jul 2021)	Next Qtr. (Oct 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	MTN	Industry	Sector(s)	S&P 500
Current Qtr.	9.40%	N/A	N/A	N/A
Next Qtr.	14.70%	N/A	N/A	N/A
Current Year	29.30%	N/A	N/A	N/A
Next Year	153.70%	N/A	N/A	N/A
Next 5 Years (per annum)	56.46%	N/A	N/A	N/A
Past 5 Years (per annum)	52.04%	N/A	N/A	N/A

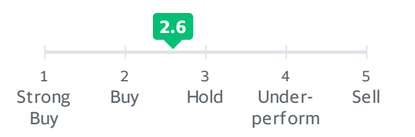
People Also Watch

Symbol	Last Price	Change	% Change
MASI Masimo Corporation	274.37	+3.94	+1.46%
IDXX IDEXX Laboratories, Inc.	637.94	+8.39	+1.33%
TTC The Toro Company	99.72	+0.19	+0.19%
FICO Fair Isaac Corporation	402.55	+2.80	+0.70%
PAYC Paycom Software, Inc.	500.79	+5.79	+1.17%

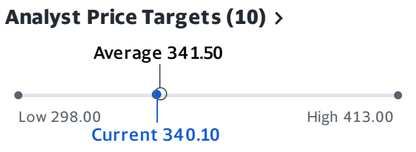
Recommendation Trends



Recommendation Rating



Analyst Price Targets (10)



Upgrades & Downgrades

Maintains	B of A Securities: to Buy	6/8/2021
Maintains	Credit Suisse: to Outperform	6/8/2021
Maintains	Deutsche Bank: to Hold	6/8/2021
Maintains	Keybanc: to Overweight	5/10/2021
Maintains	Deutsche Bank: to Hold	4/23/2021
Upgrade	B of A Securities: Neutral to Buy	3/25/2021

More Upgrades & Downgrades

U.S. markets close in 6 hours 15 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,371.81	34,404.21	14,594.97	2,235.24
+12.35 (+0.28%)	+13.49 (+0.04%)	+82.53 (+0.57%)	+9.93 (+0.45%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Northrop Grumman Corporation (NOC)

Add to watchlist

NYSE - Nasdaq Real Time Price. Currency in USD

Quote Lookup

363.78 +0.79 (+0.22%)

As of 9:45AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	16	15	18	17
Avg. Estimate	5.95	5.98	24.95	25.99
Low Estimate	5.57	5.8	24.59	24.15
High Estimate	6.17	6.19	25.25	28.1
Year Ago EPS	5.89	6.59	23.65	24.95

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	13	13	18	18
Avg. Estimate	8.93B	9B	36.26B	38.07B
Low Estimate	8.54B	8.73B	36.04B	37.08B
High Estimate	9.16B	9.19B	36.6B	38.68B
Year Ago Sales	N/A	10.21B	36.8B	36.26B
Sales Growth (year/est)	N/A	-11.90%	-1.50%	5.00%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	5.62	5.76	5.48	5.84
EPS Actual	5.89	6.59	6.57	6.42
Difference	0.27	0.83	1.09	0.58
Surprise %	4.80%	14.40%	19.90%	9.90%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	5.95	5.98	24.95	25.99
7 Days Ago	5.95	5.98	24.95	25.99
30 Days Ago	5.95	5.98	24.95	25.97
60 Days Ago	6.04	6.1	24.58	25.61
90 Days Ago	6.04	6.1	24.58	25.58

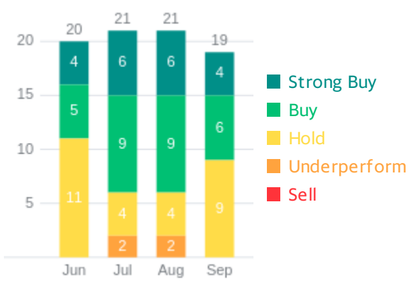
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	1	1
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	NOC	Industry	Sector(s)	S&P 500
Current Qtr.	1.00%	N/A	N/A	N/A
Next Qtr.	-9.30%	N/A	N/A	N/A
Current Year	5.50%	N/A	N/A	N/A
Next Year	4.20%	N/A	N/A	N/A
Next 5 Years (per annum)	6.70%	N/A	N/A	N/A
Past 5 Years (per annum)	20.00%	N/A	N/A	N/A

People Also Watch

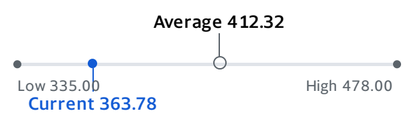
Symbol	Last Price	Change	% Change
LMT Lockheed Martin Corporation	350.89	+0.60	+0.17%
GD General Dynamics Corporation	198.46	+0.07	+0.04%
HON Honeywell International Inc.	215.30	+0.38	+0.18%
HII Huntington Ingalls Industries, Inc.	197.12	-0.21	-0.11%
RTX Raytheon Technologies Corporation	86.74	-0.25	-0.29%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (19)



Upgrades & Downgrades

Upgrade	Goldman Sachs: Sell to Neutral	9/23/2021
Maintains	Wells Fargo: to Underweight	8/2/2021
Maintains	Seaport Global: to Buy	7/19/2021
Upgrade	Stifel: Hold to Buy	6/4/2021
Initiated	Wells Fargo: to Underweight	5/13/2021
Maintains	Susquehanna: to Positive	4/30/2021

More Upgrades & Downgrades

U.S. markets close in 6 hours 16 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,373.16	34,414.65	14,598.15	2,225.31
+13.70 (+0.31%)	+23.93 (+0.07%)	+85.71 (+0.59%)	-4.47 (-0.20%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

Old Dominion Freight Line, Inc. (ODFL)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

295.91 +2.74 (+0.93%)

As of 9:44AM EDT. Market open.

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	15	15	19	19
Avg. Estimate	2.34	2.09	8.43	9.54
Low Estimate	2.25	1.9	8	8.8
High Estimate	2.43	2.23	8.62	10.3
Year Ago EPS	1.71	1.61	5.68	8.43

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	11	11	16	16
Avg. Estimate	1.34B	1.29B	5.09B	5.55B
Low Estimate	1.31B	1.23B	5B	5.36B
High Estimate	1.41B	1.35B	5.21B	5.9B
Year Ago Sales	1.05B	1.07B	4.02B	5.09B
Sales Growth (year/est)	27.40%	19.80%	26.80%	9.10%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	1.53	1.57	1.58	2.16
EPS Actual	1.71	1.61	1.7	2.31
Difference	0.18	0.04	0.12	0.15
Surprise %	11.80%	2.50%	7.60%	6.90%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	2.34	2.09	8.43	9.54
7 Days Ago	2.34	2.09	8.43	9.54
30 Days Ago	2.34	2.1	8.43	9.53
60 Days Ago	2.2	1.99	8.06	9.14
90 Days Ago	2.1	1.92	7.78	8.92

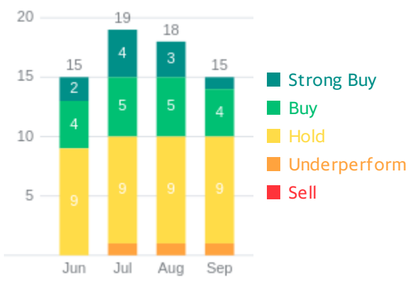
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	1	1	N/A	N/A
Up Last 30 Days	1	1	2	2
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	ODFL	Industry	Sector(s)	S&P 500
Current Qtr.	36.80%	N/A	N/A	N/A
Next Qtr.	29.80%	N/A	N/A	N/A
Current Year	48.40%	N/A	N/A	N/A
Next Year	13.20%	N/A	N/A	N/A
Next 5 Years (per annum)	22.70%	N/A	N/A	N/A
Past 5 Years (per annum)	23.61%	N/A	N/A	N/A

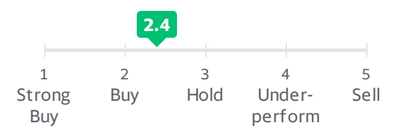
People Also Watch

Symbol	Last Price	Change	% Change
JBHT J.B. Hunt Transport Services, Inc.	171.35	+1.27	+0.75%
SAIA Saia, Inc.	240.33	+1.89	+0.79%
LSTR Landstar System, Inc.	162.07	+1.87	+1.17%
KNX Knight-Swift Transportation Holdings Inc.	52.29	+0.12	+0.24%
WERN Werner Enterprises, Inc.	45.60	+0.10	+0.22%

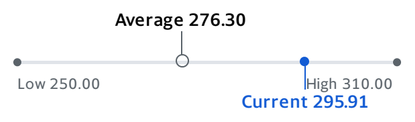
Recommendation Trends



Recommendation Rating



Analyst Price Targets (16)



Upgrades & Downgrades

Maintains	Raymond James: to Outperform	9/29/2021
Maintains	Keybanc: to Overweight	9/2/2021
Maintains	Keybanc: to Overweight	8/19/2021
Maintains	Morgan Stanley: to Overweight	8/12/2021
Downgrade	Goldman Sachs: Buy to Neutral	8/3/2021
Maintains	Wells Fargo: to Equal-Weight	7/29/2021

More Upgrades & Downgrades

U.S. markets close in 6 hours 15 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,372.38	34,404.87	14,596.43	2,226.74
+12.92 (+0.30%)	+14.15 (+0.04%)	+83.99 (+0.58%)	+1.43 (+0.06%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

Packaging Corporation of America (PKG)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

141.96 +0.58 (+0.41%)

As of 9:44AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	10	10	11	11
Avg. Estimate	2.39	2.16	8.45	9.4
Low Estimate	2.37	1.86	8.04	8.56
High Estimate	2.42	2.47	8.81	10.65
Year Ago EPS	1.57	1.33	5.78	8.45

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	9	9	11	11
Avg. Estimate	1.94B	1.93B	7.54B	7.84B
Low Estimate	1.86B	1.85B	7.41B	7.55B
High Estimate	2.01B	1.99B	7.67B	8.13B
Year Ago Sales	N/A	1.71B	6.66B	7.54B
Sales Growth (year/est)	N/A	12.30%	13.30%	4.00%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	1.42	1.42	1.46	1.78
EPS Actual	1.57	1.33	1.77	2.17
Difference	0.15	-0.09	0.31	0.39
Surprise %	10.60%	-6.30%	21.20%	21.90%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	2.39	2.16	8.45	9.4
7 Days Ago	2.39	2.16	8.45	9.4
30 Days Ago	2.39	2.16	8.45	9.39
60 Days Ago	2.31	2.06	8.11	9.04
90 Days Ago	2.08	1.9	7.49	8.43

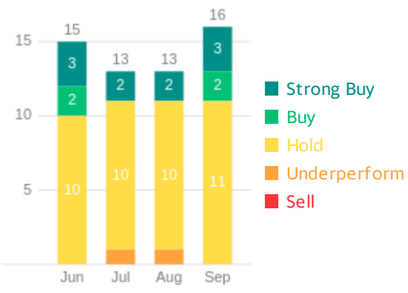
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	1	1	1	1
Up Last 30 Days	1	1	1	2
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	PKG	Industry	Sector(s)	S&P 500
Current Qtr.	52.20%	N/A	N/A	N/A
Next Qtr.	62.40%	N/A	N/A	N/A
Current Year	46.20%	N/A	N/A	N/A
Next Year	11.20%	N/A	N/A	N/A
Next 5 Years (per annum)	16.86%	N/A	N/A	N/A
Past 5 Years (per annum)	15.88%	N/A	N/A	N/A

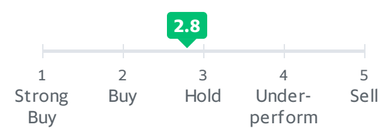
People Also Watch

Symbol	Last Price	Change	% Change
WRK WestRock Company	51.90	+0.02	+0.04%
SEE Sealed Air Corporation	56.10	+0.23	+0.41%
BLL Ball Corporation	90.12	+0.38	+0.42%
AVY Avery Dennison Corporation	214.49	+1.65	+0.78%
FBHS Fortune Brands Home & Security, Inc.	92.22	+0.44	+0.48%

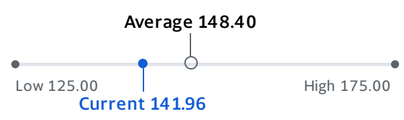
Recommendation Trends



Recommendation Rating



Analyst Price Targets (10)



Upgrades & Downgrades

Maintains	Wells Fargo: to Equal-Weight	6/21/2021
Maintains	Morgan Stanley: to Equal-Weight	4/29/2021
Maintains	Wells Fargo: to Equal-Weight	4/28/2021
Maintains	Deutsche Bank: to Hold	4/19/2021
Maintains	Morgan Stanley: to Equal-Weight	2/1/2021
Initiated	UBS: to Sell	1/13/2021

More Upgrades & Downgrades

U.S. markets close in 6 hours 15 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,371.27	34,405.71	14,587.98	2,234.83
+11.81 (+0.27%)	+14.99 (+0.04%)	+75.54 (+0.52%)	+9.52 (+0.43%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

PerkinElmer, Inc. (PKI)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

176.51 +1.46 (+0.83%)

As of 9:45AM EDT. Market open.

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	12	12	13	13
Avg. Estimate	1.66	1.73	9.94	6.31
Low Estimate	1.58	1.66	9.77	5.64
High Estimate	1.76	1.78	10.17	7.27
Year Ago EPS	2.09	3.96	8.3	9.94

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	10	10	12	12
Avg. Estimate	1.01B	1.05B	4.6B	4.01B
Low Estimate	1B	1.01B	4.55B	3.7B
High Estimate	1.06B	1.13B	4.7B	4.44B
Year Ago Sales	841.19M	1.36B	3.78B	4.6B
Sales Growth (year/est)	20.50%	-22.20%	21.70%	-12.80%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	1.5	3	3.07	2.41
EPS Actual	2.09	3.96	3.72	2.83
Difference	0.59	0.96	0.65	0.42
Surprise %	39.30%	32.00%	21.20%	17.40%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	1.66	1.73	9.94	6.31
7 Days Ago	1.66	1.72	9.94	6.31
30 Days Ago	1.65	1.72	9.93	6.32
60 Days Ago	1.67	1.71	9.66	6.45
90 Days Ago	1.72	1.65	9.32	6.12

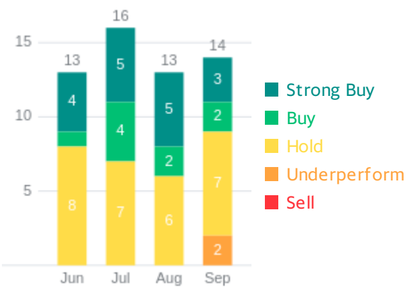
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	1	1	1	N/A
Up Last 30 Days	2	2	2	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	PKI	Industry	Sector(s)	S&P 500
Current Qtr.	-20.60%	N/A	N/A	N/A
Next Qtr.	-56.30%	N/A	N/A	N/A
Current Year	19.80%	N/A	N/A	N/A
Next Year	-36.50%	N/A	N/A	N/A
Next 5 Years (per annum)	37.90%	N/A	N/A	N/A
Past 5 Years (per annum)	10.49%	N/A	N/A	N/A

People Also Watch

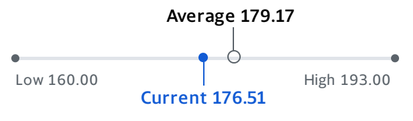
Symbol	Last Price	Change	% Change
WAT Waters Corporation	369.38	+4.21	+1.15%
MTD Mettler-Toledo International Inc.	1,422.74	+14.30	+1.02%
RHI Robert Half International Inc.	102.58	+0.04	+0.04%
LH Laboratory Corporation of America Hold...	287.97	+1.06	+0.37%
XRAY DENTSPLY SIRONA Inc.	58.97	+0.53	+0.92%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (12)



Upgrades & Downgrades

Upgrade	Wells Fargo: Equal-Weight to Overweight	1/7/2021
Initiated	KeyBanc: to Sector Weight	11/10/2020
Maintains	Needham: to Buy	11/9/2020
Maintains	Wells Fargo: to Equal-Weight	10/29/2020
Upgrade	Needham: Hold to Buy	9/11/2020
Maintains	JP Morgan: to Neutral	7/29/2020

More Upgrades & Downgrades

U.S. markets close in 6 hours 16 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,373.13	34,413.83	14,598.15	2,225.31
+13.67 (+0.31%)	+23.11 (+0.07%)	+85.71 (+0.59%)	-4.47 (-0.20%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Philip Morris International Inc. (PM)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

97.21 -2.28 (-2.29%)

As of 9:44AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	11	11	13	14
Avg. Estimate	1.56	1.4	6.1	6.72
Low Estimate	1.52	1.33	6.05	6.53
High Estimate	1.63	1.45	6.21	6.97
Year Ago EPS	1.42	1.26	5.17	6.1

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	7	7	11	15
Avg. Estimate	7.91B	7.96B	31.26B	33.11B
Low Estimate	7.68B	7.82B	30.82B	32.49B
High Estimate	8.24B	8.43B	31.59B	33.88B
Year Ago Sales	7.45B	7.44B	28.69B	31.26B
Sales Growth (year/est)	6.30%	6.90%	9.00%	5.90%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	1.36	1.21	1.4	1.55
EPS Actual	1.42	1.26	1.57	1.57
Difference	0.06	0.05	0.17	0.02
Surprise %	4.40%	4.10%	12.10%	1.30%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	1.56	1.4	6.1	6.72
7 Days Ago	1.56	1.4	6.1	6.73
30 Days Ago	1.56	1.4	6.1	6.72
60 Days Ago	1.56	1.4	6.1	6.72
90 Days Ago	1.61	1.41	6.09	6.72

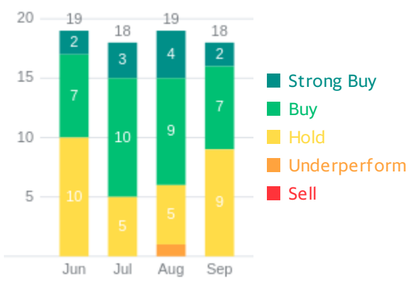
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	1	1	2
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	1	N/A	2	2

Growth Estimates	PM	Industry	Sector(s)	S&P 500
Current Qtr.	9.90%	N/A	N/A	N/A
Next Qtr.	11.10%	N/A	N/A	N/A
Current Year	18.00%	N/A	N/A	N/A
Next Year	10.20%	N/A	N/A	N/A
Next 5 Years (per annum)	12.57%	N/A	N/A	N/A
Past 5 Years (per annum)	3.91%	N/A	N/A	N/A

People Also Watch

Symbol	Last Price	Change	% Change
MO Altria Group, Inc.	47.33	-1.41	-2.89%
MDLZ Mondelez International, Inc.	59.19	+0.14	+0.23%
KHC The Kraft Heinz Company	37.51	-0.02	-0.07%
PEP PepsiCo, Inc.	152.73	+0.43	+0.28%
KMB Kimberly-Clark Corporation	135.00	-0.78	-0.57%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (16)

Upgrades & Downgrades

Maintains	Deutsche Bank: to Buy	8/19/2021
Maintains	Morgan Stanley: to Overweight	5/6/2021
Maintains	Morgan Stanley: to Overweight	4/21/2021
Upgrade	JP Morgan: Neutral to Overweight	4/9/2021
Maintains	Morgan Stanley: to Overweight	2/25/2021
Initiated	Bernstein: to Market Perform	1/20/2021

More Upgrades & Downgrades

U.S. markets close in 6 hours 15 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,371.81	34,404.21	14,594.97	2,235.24
+12.35 (+0.28%)	+13.49 (+0.04%)	+82.53 (+0.57%)	+9.93 (+0.45%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

Pool Corporation (POOL)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

446.72 -0.11 (-0.02%)

As of 9:44AM EDT. Market open.

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	7	7	6	7
Avg. Estimate	3.82	1.46	14.03	14.86
Low Estimate	3.68	1.38	13.85	14.21
High Estimate	3.98	1.54	14.25	15.3
Year Ago EPS	2.92	1.45	9.13	14.03

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	8	8	9	9
Avg. Estimate	1.37B	860.08M	5.08B	5.35B
Low Estimate	1.34B	818.35M	5.03B	5.16B
High Estimate	1.4B	918.6M	5.16B	5.5B
Year Ago Sales	1B	839.26M	3.94B	5.08B
Sales Growth (year/est)	36.50%	2.50%	28.90%	5.50%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	2.18	0.76	1.15	5.48
EPS Actual	2.92	1.45	2.42	6.37
Difference	0.74	0.69	1.27	0.89
Surprise %	33.90%	90.80%	110.40%	16.20%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	3.82	1.46	14.03	14.86
7 Days Ago	3.82	1.46	14.03	14.86
30 Days Ago	3.79	1.46	14.02	14.84
60 Days Ago	3.79	1.46	14.02	14.77
90 Days Ago	3.32	1.21	12.41	13.25

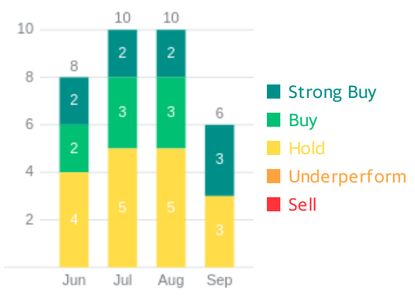
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	POOL	Industry	Sector(s)	S&P 500
Current Qtr.	30.80%	N/A	N/A	N/A
Next Qtr.	0.70%	N/A	N/A	N/A
Current Year	53.70%	N/A	N/A	N/A
Next Year	5.90%	N/A	N/A	N/A
Next 5 Years (per annum)	17.00%	N/A	N/A	N/A
Past 5 Years (per annum)	32.34%	N/A	N/A	N/A

People Also Watch

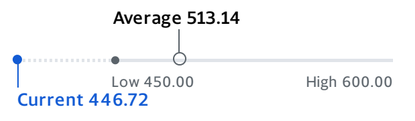
Symbol	Last Price	Change	% Change
MKTX MarketAxess Holdings Inc.	426.61	+2.95	+0.70%
WST West Pharmaceutical Services, Inc.	437.94	+5.53	+1.28%
MPWR Monolithic Power Systems, Inc.	492.05	+7.44	+1.54%
ODFL Old Dominion Freight Line, Inc.	295.91	+2.74	+0.93%
ROL Rollins, Inc.	36.17	+0.12	+0.32%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (7)



Upgrades & Downgrades

Maintains	Keybanc: to Overweight	6/8/2021
Maintains	Loop Capital: to Buy	6/4/2021
Initiated	Goldman Sachs: to Buy	5/18/2021
Maintains	Loop Capital: to Hold	4/20/2021
Maintains	KeyBanc: to Overweight	11/25/2020
Maintains	Sidoti & Co.: to Neutral	10/8/2020

More Upgrades & Downgrades

U.S. markets close in 6 hours 15 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,371.40	34,404.09	14,589.21	2,235.09
+11.94 (+0.27%)	+13.37 (+0.04%)	+76.77 (+0.53%)	+9.78 (+0.44%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Post Holdings, Inc. (POST)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

112.59 +0.57 (+0.50%)

As of 9:35AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	10	6	9	11
Avg. Estimate	0.97	1.01	2.94	4.85
Low Estimate	0.62	0.75	2.57	3.59
High Estimate	1.28	1.18	3.2	5.71
Year Ago EPS	0.58	0.72	2.71	2.94

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	7	6	9	9
Avg. Estimate	1.66B	1.63B	6.18B	6.66B
Low Estimate	1.59B	1.55B	6.08B	6.4B
High Estimate	1.75B	1.7B	6.28B	6.87B
Year Ago Sales	1.41B	N/A	5.7B	6.18B
Sales Growth (year/est)	17.50%	N/A	8.40%	7.70%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.77	0.71	0.55	0.97
EPS Actual	0.58	0.72	0.29	0.93
Difference	-0.19	0.01	-0.26	-0.04
Surprise %	-24.70%	1.40%	-47.30%	-4.10%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.97	1.01	2.94	4.85
7 Days Ago	0.96	1.01	2.94	4.85
30 Days Ago	0.99	1.01	2.97	4.95
60 Days Ago	1.16	1.23	3.15	5.3
90 Days Ago	1.18	1.24	3.17	5.32

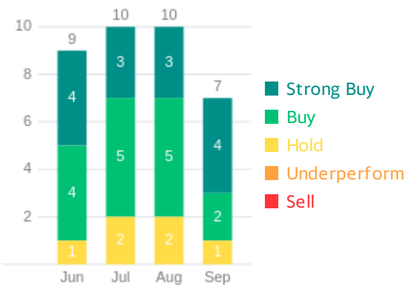
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	1
Up Last 30 Days	N/A	N/A	N/A	1
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	POST	Industry	Sector(s)	S&P 500
Current Qtr.	67.20%	N/A	N/A	N/A
Next Qtr.	40.30%	N/A	N/A	N/A
Current Year	8.50%	N/A	N/A	N/A
Next Year	65.00%	N/A	N/A	N/A
Next 5 Years (per annum)	24.70%	N/A	N/A	N/A
Past 5 Years (per annum)	48.24%	N/A	N/A	N/A

People Also Watch

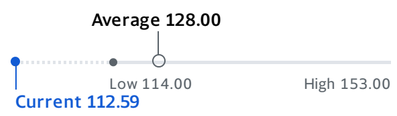
Symbol	Last Price	Change	% Change
THS TreeHouse Foods, Inc.	40.38	-0.41	-1.01%
EPC Edgewell Personal Care Company	37.45	-0.23	-0.61%
SPB Spectrum Brands Holdings, Inc.	96.44	-0.13	-0.13%
INGR Ingredion Incorporated	91.10	+0.18	+0.20%
LW Lamb Weston Holdings, Inc.	61.66	+0.05	+0.08%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (10)



Upgrades & Downgrades

Maintains	Citigroup: to Buy	5/11/2021
Maintains	Truist Securities: to Buy	5/10/2021
Maintains	BMO Capital: to Market Perform	5/10/2021
Maintains	Citigroup: to Buy	2/10/2021
Maintains	BMO Capital: to Market Perform	8/10/2020
Maintains	Piper Sandler: to Overweight	8/10/2020

More Upgrades & Downgrades

U.S. markets close in 6 hours 13 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,375.80	34,453.12	14,584.39	2,231.34
+16.34 (+0.37%)	+62.40 (+0.18%)	+71.95 (+0.50%)	+6.03 (+0.27%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

RLI Corp. (RLI)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

102.41 +0.05 (+0.05%)

As of 9:42AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	7	6	7	7
Avg. Estimate	0.68	0.79	3.41	3.5
Low Estimate	0.4	0.69	3	3.35
High Estimate	0.8	0.94	3.7	3.8
Year Ago EPS	0.42	0.75	2.59	3.41

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	3	3	3	3
Avg. Estimate	269.12M	260.53M	1.05B	1.14B
Low Estimate	264.37M	255.57M	1.04B	1.12B
High Estimate	273.57M	265.23M	1.06B	1.15B
Year Ago Sales	N/A	229.85M	892.09M	1.05B
Sales Growth (year/est)	N/A	13.30%	17.40%	8.60%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0	0.65	0.65	0.78
EPS Actual	0.42	0.75	0.87	1.09
Difference	0.42	0.1	0.22	0.31
Surprise %	N/A	15.40%	33.80%	39.70%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.68	0.79	3.41	3.5
7 Days Ago	0.68	0.79	3.41	3.5
30 Days Ago	0.74	0.79	3.46	3.48
60 Days Ago	0.72	0.78	3.39	3.44
90 Days Ago	0.69	0.74	2.99	3.18

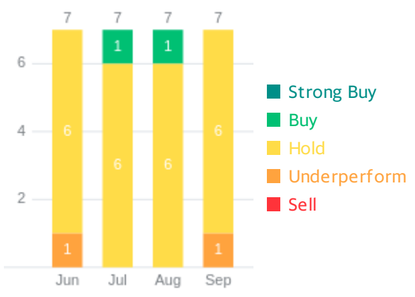
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	1	N/A	1
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	RLI	Industry	Sector(s)	S&P 500
Current Qtr.	61.90%	N/A	N/A	N/A
Next Qtr.	5.30%	N/A	N/A	N/A
Current Year	31.70%	N/A	N/A	N/A
Next Year	2.60%	N/A	N/A	N/A
Next 5 Years (per annum)	9.80%	N/A	N/A	N/A
Past 5 Years (per annum)	-4.20%	N/A	N/A	N/A

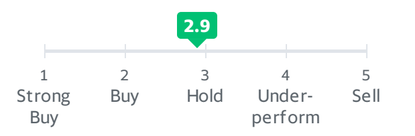
People Also Watch

Symbol	Last Price	Change	% Change
SIGI Selective Insurance Group, Inc.	77.73	+0.68	+0.88%
RNR RenaissanceRe Holdings Ltd.	140.68	+1.10	+0.78%
PRA ProAssurance Corporation	24.08	-0.04	-0.17%
SCL Stepan Company	115.71	+0.62	+0.53%
ERIE Erie Indemnity Company	178.35	+0.56	+0.31%

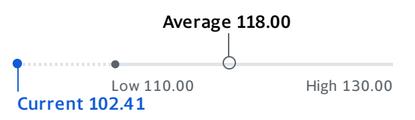
Recommendation Trends



Recommendation Rating



Analyst Price Targets (4)



Upgrades & Downgrades

Maintains	RBC Capital: to Sector Perform	9/30/2021
Initiated	Compass Point: to Neutral	9/18/2020
Maintains	RBC Capital: to Sector Perform	4/8/2020
Upgrade	B. Riley FBR: Neutral to Buy	3/23/2020
Maintains	Keefe Bruyette & Woods: to Market Perform	7/19/2019
Initiated	Compass Point: to Sell	1/15/2019

More Upgrades & Downgrades

U.S. markets close in 6 hours 13 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,375.80	34,453.12	14,584.39	2,231.34
+16.34 (+0.37%)	+62.40 (+0.18%)	+71.95 (+0.50%)	+6.03 (+0.27%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Rollins, Inc. (ROL)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

36.13 +0.08 (+0.22%)

As of 9:46AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	4	4	3	4
Avg. Estimate	0.2	0.15	0.69	0.75
Low Estimate	0.2	0.14	0.69	0.72
High Estimate	0.21	0.16	0.7	0.81
Year Ago EPS	0.17	0.13	0.54	0.69

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	4	4	4	4
Avg. Estimate	645.84M	585.74M	2.41B	2.57B
Low Estimate	640.1M	576.2M	2.39B	2.52B
High Estimate	659.66M	593.55M	2.43B	2.61B
Year Ago Sales	583.7M	536.29M	2.16B	2.41B
Sales Growth (year/est)	10.60%	9.20%	11.30%	6.80%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.16	0.13	0.11	0.18
EPS Actual	0.17	0.13	0.14	0.2
Difference	0.01	0	0.03	0.02
Surprise %	6.30%	0.00%	27.30%	11.10%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.2	0.15	0.69	0.75
7 Days Ago	0.2	0.15	0.69	0.75
30 Days Ago	0.2	0.15	0.69	0.74
60 Days Ago	0.19	0.15	0.68	0.72
90 Days Ago	0.19	0.15	0.65	0.69

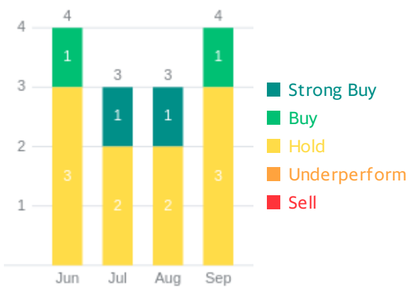
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	ROL	Industry	Sector(s)	S&P 500
Current Qtr.	17.60%	N/A	N/A	N/A
Next Qtr.	15.40%	N/A	N/A	N/A
Current Year	27.80%	N/A	N/A	N/A
Next Year	8.70%	N/A	N/A	N/A
Next 5 Years (per annum)	8.20%	N/A	N/A	N/A
Past 5 Years (per annum)	13.51%	N/A	N/A	N/A

People Also Watch

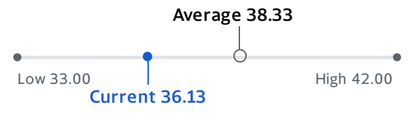
Symbol	Last Price	Change	% Change
RHI Robert Half International Inc.	102.59	+0.05	+0.05%
ROP Roper Technologies, Inc.	458.13	+2.59	+0.57%
ALLE Allegion plc	136.20	+0.98	+0.72%
IEX IDEX Corporation	212.51	-0.49	-0.23%
JKHY Jack Henry & Associates, Inc.	166.49	+0.33	+0.20%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (3)



Upgrades & Downgrades

Maintains	Stifel: to Hold	10/29/2020
Maintains	RBC Capital: to Sector Perform	7/30/2020
Maintains	Buckingham: to Neutral	2/4/2020
Initiated	Jefferies: to Hold	11/22/2019
Upgrade	Stifel Nicolaus: Sell to Hold	11/6/2019
Initiated	RBC Capital: to Sector Perform	10/8/2019

More Upgrades & Downgrades

U.S. Markets close in 6 hrs 13 mins

S&P 500	Dow 30	Nasdaq	Russell 2000
4,377.28	34,456.52	14,592.80	2,231.57
+17.82 (+0.41%)	+65.80 (+0.19%)	+80.36 (+0.55%)	+6.26 (+0.28%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Selective Insurance Group, Inc. (SIGI)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

77.73 +0.68 (+0.88%)

As of 9:46AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	6	5	6	7
Avg. Estimate	1.34	1.34	6.2	5.53
Low Estimate	1.2	1.29	5.95	5.25
High Estimate	1.48	1.38	6.35	6.13
Year Ago EPS	1.06	1.84	4.15	6.2

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	3	3	2	3
Avg. Estimate	784.23M	736.28M	3.15B	3.36B
Low Estimate	770.17M	729.84M	3.13B	3.36B
High Estimate	795.41M	742.7M	3.16B	3.36B
Year Ago Sales	701M	681.5M	2.77B	3.15B
Sales Growth (year/est)	11.90%	8.00%	13.50%	6.80%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	1.03	1.2	1.04	1.25
EPS Actual	1.06	1.84	1.7	1.85
Difference	0.03	0.64	0.66	0.6
Surprise %	2.90%	53.30%	63.50%	48.00%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	1.34	1.34	6.2	5.53
7 Days Ago	1.34	1.34	6.2	5.53
30 Days Ago	1.37	1.34	6.2	5.53
60 Days Ago	1.11	1.3	5.36	5.26
90 Days Ago	1.11	1.3	5.31	5.24

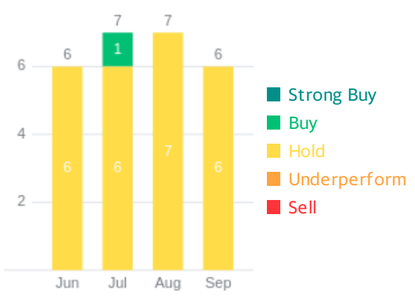
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	1	N/A	1
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	SIGI	Industry	Sector(s)	S&P 500
Current Qtr.	26.40%	N/A	N/A	N/A
Next Qtr.	-27.20%	N/A	N/A	N/A
Current Year	49.40%	N/A	N/A	N/A
Next Year	-10.80%	N/A	N/A	N/A
Next 5 Years (per annum)	10.00%	N/A	N/A	N/A
Past 5 Years (per annum)	9.79%	N/A	N/A	N/A

People Also Watch

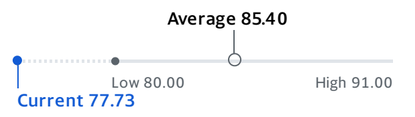
Symbol	Last Price	Change	% Change
STFC State Auto Financial Corporation	51.13	-0.07	-0.14%
RLI RLI Corp.	103.05	+0.69	+0.67%
UFCS United Fire Group, Inc.	23.73	+0.34	+1.46%
THG The Hanover Insurance Group, Inc.	132.27	+0.25	+0.19%
SAFT Safety Insurance Group, Inc.	79.32	-0.30	-0.38%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (5)



Upgrades & Downgrades

Initiated	Wolfe Research: to Outperform	8/17/2021
Maintains	RBC Capital: to Sector Perform	7/30/2021
Downgrade	JMP Securities: Outperform to Market Perform	7/14/2021
Maintains	JMP Securities: to Market Outperform	4/16/2021
Maintains	Credit Suisse: to Outperform	11/10/2020
Upgrade	Credit Suisse: Underperform to Outperform	5/14/2020

More Upgrades & Downgrades

U.S. markets close in 6 hours 13 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,375.00	34,446.39	14,583.46	2,231.38
+15.54 (+0.36%)	+55.67 (+0.16%)	+71.02 (+0.49%)	+6.07 (+0.27%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Sirius XM Holdings Inc. (SIRI)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

6.14 +0.04 (+0.66%)

As of 9:47AM EDT. Market open.

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	12	12	9	12
Avg. Estimate	0.07	0.06	0.29	0.33
Low Estimate	0.05	0.06	0.28	0.3
High Estimate	0.08	0.07	0.3	0.35
Year Ago EPS	0.06	0.07	0.25	0.29

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	11	10	14	13
Avg. Estimate	2.16B	2.22B	8.59B	8.93B
Low Estimate	2.13B	2.19B	8.51B	8.75B
High Estimate	2.19B	2.26B	8.68B	9.15B
Year Ago Sales	2.02B	2.19B	8.04B	8.59B
Sales Growth (year/est)	6.80%	1.40%	6.90%	3.90%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.05	0.01	0.06	0.07
EPS Actual	0.06	0.07	0.05	0.07
Difference	0.01	0.06	-0.01	0
Surprise %	20.00%	600.00%	-16.70%	0.00%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.07	0.06	0.29	0.33
7 Days Ago	0.07	0.06	0.29	0.33
30 Days Ago	0.07	0.06	0.29	0.33
60 Days Ago	0.07	0.06	0.28	0.32
90 Days Ago	0.07	0.06	0.26	0.31

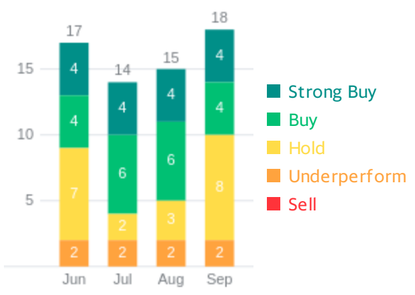
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	1	N/A
Up Last 30 Days	1	N/A	2	1
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	SIRI	Industry	Sector(s)	S&P 500
Current Qtr.	16.70%	N/A	N/A	N/A
Next Qtr.	-14.30%	N/A	N/A	N/A
Current Year	16.00%	N/A	N/A	N/A
Next Year	13.80%	N/A	N/A	N/A
Next 5 Years (per annum)	10.05%	N/A	N/A	N/A
Past 5 Years (per annum)	22.38%	N/A	N/A	N/A

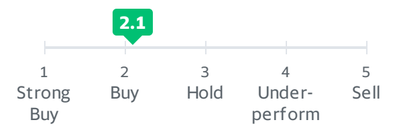
People Also Watch

Symbol	Last Price	Change	% Change
EBAY eBay Inc.	70.14	+0.17	+0.24%
F Ford Motor Company	14.27	-0.03	-0.22%
CSCO Cisco Systems, Inc.	55.64	+0.16	+0.29%
C Citigroup Inc.	71.39	-0.14	-0.20%
BAC Bank of America Corporation	43.21	+0.14	+0.33%

Recommendation Trends >



Recommendation Rating >



Analyst Price Targets (15) >

Upgrades & Downgrades >

Upgrade	Barclays: Underweight to Equal-Weight	9/28/2021
Maintains	Morgan Stanley: to Equal-Weight	7/28/2021
Downgrade	Credit Suisse: Outperform to Neutral	1/28/2021
Upgrade	RBC Capital: Sector Perform to Outperform	10/27/2020
Maintains	Benchmark: to Buy	10/23/2020
Upgrade	Credit Suisse: Neutral to Outperform	10/7/2020

More Upgrades & Downgrades

U.S. Markets close in 6 hrs 12 mins

S&P 500	Dow 30	Nasdaq	Russell 2000
4,377.94	34,463.92	14,595.54	2,231.66
+18.48 (+0.42%)	+73.20 (+0.21%)	+83.10 (+0.57%)	+6.35 (+0.29%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

Synopsys, Inc. (SNPS)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

305.97 +3.35 (+1.11%)

As of 9:47AM EDT. Market open.

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Oct 2021)	Next Qtr. (Jan 2022)	Current Year (2021)	Next Year (2022)
No. of Analysts	12	12	14	14
Avg. Estimate	1.78	1.76	6.82	7.63
Low Estimate	1.77	1.6	6.8	7.38
High Estimate	1.81	1.91	6.85	8.02
Year Ago EPS	1.58	1.52	5.55	6.82

Revenue Estimate	Current Qtr. (Oct 2021)	Next Qtr. (Jan 2022)	Current Year (2021)	Next Year (2022)
No. of Analysts	12	13	14	14
Avg. Estimate	1.14B	1.1B	4.2B	4.61B
Low Estimate	1.02B	1.05B	4.14B	4.5B
High Estimate	1.17B	1.14B	4.22B	4.71B
Year Ago Sales	1.03B	N/A	3.69B	4.2B
Sales Growth (year/est)	11.50%	N/A	14.00%	9.80%

Earnings History	10/30/2020	1/30/2021	4/29/2021	7/30/2021
EPS Est.	1.57	1.47	1.52	1.78
EPS Actual	1.58	1.52	1.7	1.81
Difference	0.01	0.05	0.18	0.03
Surprise %	0.60%	3.40%	11.80%	1.70%

EPS Trend	Current Qtr. (Oct 2021)	Next Qtr. (Jan 2022)	Current Year (2021)	Next Year (2022)
Current Estimate	1.78	1.76	6.82	7.63
7 Days Ago	1.79	1.77	6.82	7.63
30 Days Ago	1.49	1.7	6.48	7.37
60 Days Ago	1.49	1.71	6.48	7.37
90 Days Ago	1.49	1.71	6.48	7.4

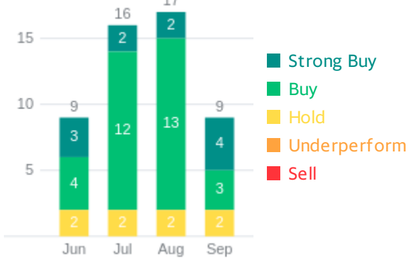
EPS Revisions	Current Qtr. (Oct 2021)	Next Qtr. (Jan 2022)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	1	1
Up Last 30 Days	12	10	14	13
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	SNPS	Industry	Sector(s)	S&P 500
Current Qtr.	12.70%	N/A	N/A	N/A
Next Qtr.	15.80%	N/A	N/A	N/A
Current Year	22.90%	N/A	N/A	N/A
Next Year	11.90%	N/A	N/A	N/A
Next 5 Years (per annum)	16.00%	N/A	N/A	N/A
Past 5 Years (per annum)	11.81%	N/A	N/A	N/A

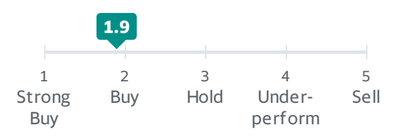
People Also Watch

Symbol	Last Price	Change	% Change
CDNS Cadence Design Systems, Inc.	154.19	+1.94	+1.27%
ANSS ANSYS, Inc.	343.97	+3.01	+0.88%
XLNX Xilinx, Inc.	153.11	+4.83	+3.26%
ADSK Autodesk, Inc.	291.73	+3.74	+1.30%
KLAC KLA Corporation	339.91	+4.61	+1.37%

Recommendation Trends



Recommendation Rating



Analyst Price Targets (17)

Upgrades & Downgrades

Initiated	Rosenblatt: to Buy	6/2/2021
Maintains	Needham: to Buy	2/18/2021
Maintains	KeyBanc: to Overweight	2/18/2021
Maintains	RBC Capital: to Outperform	2/16/2021
Maintains	KeyBanc: to Overweight	2/16/2021
Maintains	UBS: to Buy	2/16/2021

More Upgrades & Downgrades

U.S. Markets close in 6 hrs 11 mins

S&P 500	Dow 30	Nasdaq	Russell 2000
4,376.47	34,445.87	14,614.69	2,232.21
+17.01 (+0.39%)	+55.15 (+0.16%)	+102.25 (+0.70%)	+6.90 (+0.31%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

TriMas Corporation (TRS)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

32.12 +0.70 (+2.23%)

As of 9:47AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	3	3	3	3
Avg. Estimate	0.6	0.56	2.27	2.54
Low Estimate	0.58	0.52	2.22	2.35
High Estimate	0.62	0.62	2.35	2.75
Year Ago EPS	0.43	0.38	1.57	2.27

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	3	3	3	3
Avg. Estimate	223.32M	210.9M	859.96M	902.77M
Low Estimate	218.3M	206.1M	851.8M	880M
High Estimate	231.65M	216.72M	874.08M	937.4M
Year Ago Sales	199.46M	188.17M	769.97M	859.96M
Sales Growth (year/est)	12.00%	12.10%	11.70%	5.00%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.37	0.31	0.37	0.55
EPS Actual	0.43	0.38	0.49	0.62
Difference	0.06	0.07	0.12	0.07
Surprise %	16.20%	22.60%	32.40%	12.70%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.6	0.56	2.27	2.54
7 Days Ago	0.61	0.57	2.3	2.55
30 Days Ago	0.61	0.57	2.3	2.55
60 Days Ago	0.58	0.51	2.13	2.41
90 Days Ago	0.58	0.51	2.13	2.41

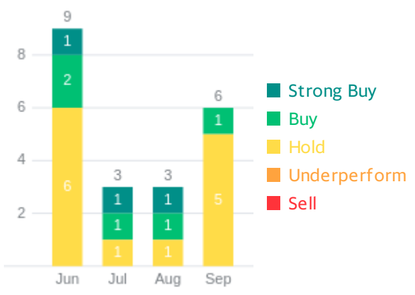
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	1	1	1	1
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	1	1	1	1

Growth Estimates	TRS	Industry	Sector(s)	S&P 500
Current Qtr.	39.50%	N/A	N/A	N/A
Next Qtr.	47.40%	N/A	N/A	N/A
Current Year	44.60%	N/A	N/A	N/A
Next Year	11.90%	N/A	N/A	N/A
Next 5 Years (per annum)	9.34%	N/A	N/A	N/A
Past 5 Years (per annum)	5.49%	N/A	N/A	N/A

People Also Watch

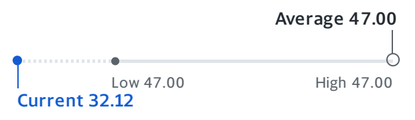
Symbol	Last Price	Change	% Change
AIMC Altra Industrial Motion Corp.	56.97	+0.29	+0.51%
SXI Standex International Corporation	101.53	+0.73	+0.72%
THR Thermon Group Holdings, Inc.	17.80	+0.14	+0.78%
UVSP Univest Financial Corporation	27.99	+0.12	+0.43%
TCBK TriCo Bancshares	43.97	+0.12	+0.27%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (1)



Upgrades & Downgrades

Maintains	Wells Fargo: Market Perform to Market Perform	3/1/2019
Maintains	BMO Capital: Outperform to Outperform	8/8/2018
Initiated	BMO Capital: to Outperform	4/3/2018
Maintains	JP Morgan: Overweight to Overweight	3/6/2018
Downgrade	Seaport Global: Buy to Neutral	9/15/2017
Upgrade	JP Morgan: Neutral to Overweight	8/9/2017

More Upgrades & Downgrades

U.S. markets close in 6 hours 13 minutes

S&P 500	Dow 30	Nasdaq	Russell 2000
4,375.80	34,453.12	14,584.39	2,231.34
+16.34 (+0.37%)	+62.40 (+0.18%)	+71.95 (+0.50%)	+6.03 (+0.27%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Tetra Tech, Inc. (TTEK)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

151.94 +2.34 (+1.56%)

As of 9:45AM EDT. Market open.

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	5	3	6	6
Avg. Estimate	1	1.03	3.73	4.1
Low Estimate	0.98	1	3.7	4
High Estimate	1.04	1.08	3.78	4.35
Year Ago EPS	0.91	0.96	3.26	3.73

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	5	3	5	6
Avg. Estimate	662.22M	680.85M	2.51B	2.69B
Low Estimate	631.23M	640.85M	2.5B	2.61B
High Estimate	679.1M	709.5M	2.52B	2.8B
Year Ago Sales	589.81M	N/A	2.35B	2.51B
Sales Growth (year/est)	12.30%	N/A	6.90%	7.20%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.8	0.81	0.75	0.88
EPS Actual	0.91	0.96	0.83	0.95
Difference	0.11	0.15	0.08	0.07
Surprise %	13.70%	18.50%	10.70%	8.00%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	1	1.03	3.73	4.1
7 Days Ago	1	1.03	3.73	4.1
30 Days Ago	1	1.03	3.73	4.1
60 Days Ago	1	0.99	3.7	4.07
90 Days Ago	0.99	0.95	3.7	4.05

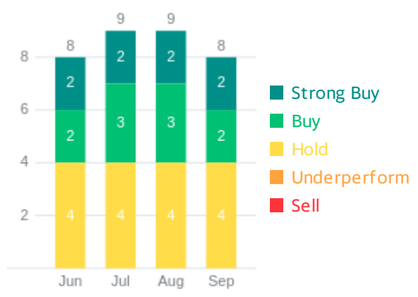
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	TTEK	Industry	Sector(s)	S&P 500
Current Qtr.	9.90%	N/A	N/A	N/A
Next Qtr.	7.30%	N/A	N/A	N/A
Current Year	14.40%	N/A	N/A	N/A
Next Year	9.90%	N/A	N/A	N/A
Next 5 Years (per annum)	15.00%	N/A	N/A	N/A
Past 5 Years (per annum)	17.71%	N/A	N/A	N/A

People Also Watch

Symbol	Last Price	Change	% Change
WTS Watts Water Technologies, Inc.	173.90	-0.22	-0.13%
ACM AECOM	64.08	+0.18	+0.29%
OSIS OSI Systems, Inc.	95.86	+0.77	+0.81%
AAWW Atlas Air Worldwide Holdings, Inc.	83.35	-1.85	-2.17%
ITRI Itron, Inc.	79.04	-0.11	-0.14%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (7)

Upgrades & Downgrades

Maintains	Maxim Group: to Buy	4/16/2021
Initiated	Vertical Research: to Hold	4/13/2021
Maintains	Roth Capital: to Buy	2/1/2021
Initiated	Berenberg: to Buy	6/11/2020
Maintains	Sidoti & Co.: to Buy	6/10/2020
Maintains	Stifel: to Hold	4/2/2020

More Upgrades & Downgrades

U.S. Markets close in 6 hrs 10 mins

S&P 500	Dow 30	Nasdaq	Russell 2000
4,381.80	34,483.60	14,611.06	2,232.92
+22.34 (+0.51%)	+92.88 (+0.27%)	+98.62 (+0.68%)	+7.61 (+0.34%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

Waters Corporation (WAT)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

369.33 +4.16 (+1.14%)

As of 9:50AM EDT. Market open.

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	14	14	13	16
Avg. Estimate	2.35	3.43	10.67	11.6
Low Estimate	2.27	3.29	10.52	11.14
High Estimate	2.54	3.57	10.99	12.14
Year Ago EPS	2.16	3.65	9.05	10.67

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	12	12	14	14
Avg. Estimate	653.74M	813.53M	2.76B	2.91B
Low Estimate	638M	781M	2.74B	2.85B
High Estimate	672M	832.5M	2.79B	3.01B
Year Ago Sales	N/A	786.66M	2.37B	2.76B
Sales Growth (year/est)	N/A	3.40%	16.80%	5.30%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	1.93	2.89	1.57	2.25
EPS Actual	2.16	3.65	2.29	2.6
Difference	0.23	0.76	0.72	0.35
Surprise %	11.90%	26.30%	45.90%	15.60%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	2.35	3.43	10.67	11.6
7 Days Ago	2.35	3.43	10.67	11.6
30 Days Ago	2.35	3.43	10.67	11.6
60 Days Ago	2.25	3.31	10.08	11.05
90 Days Ago	2.24	3.31	10.08	10.99

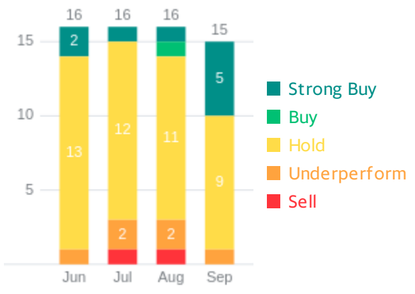
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	WAT	Industry	Sector(s)	S&P 500
Current Qtr.	8.80%	N/A	N/A	N/A
Next Qtr.	-6.00%	N/A	N/A	N/A
Current Year	17.90%	N/A	N/A	N/A
Next Year	8.70%	N/A	N/A	N/A
Next 5 Years (per annum)	9.30%	N/A	N/A	N/A
Past 5 Years (per annum)	9.11%	N/A	N/A	N/A

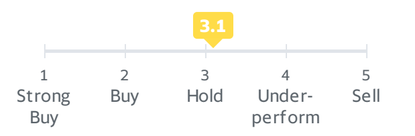
People Also Watch

Symbol	Last Price	Change	% Change
PKI PerkinElmer, Inc.	177.40	+2.35	+1.34%
MTD Mettler-Toledo International Inc.	1,420.91	+12.47	+0.89%
XRAY DENTSPLY SIRONA Inc.	59.30	+0.87	+1.49%
UHS Universal Health Services, Inc.	142.96	-0.31	-0.22%
COO The Cooper Companies, Inc.	423.57	+1.27	+0.30%

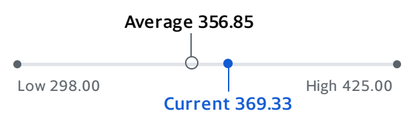
Recommendation Trends



Recommendation Rating



Analyst Price Targets (13)



Upgrades & Downgrades

Maintains	SVB Leerink: to Market Perform	8/4/2021
Maintains	Baird: to Neutral	8/4/2021
Upgrade	Evercore ISI Group: In-Line to Outperform	7/6/2021
Maintains	SVB Leerink: to Market Perform	5/6/2021
Maintains	Wells Fargo: to Underweight	5/6/2021
Downgrade	Wells Fargo: Equal-Weight to Underweight	1/7/2021

More Upgrades & Downgrades

U.S. markets open in 2 minutes

S&P Futures	Dow Futures	Nasdaq Futures	Russell 2000 Futures
4,360.75	34,343.00	14,789.50	2,230.20
+11.00 (+0.25%)	+78.00 (+0.23%)	+49.75 (+0.34%)	+8.30 (+0.37%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

Encore Wire Corporation (WIRE)

NasdaqGS - NasdaqGS Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

99.24 +0.59 (+0.60%)
At close: September 29 4:00PM EDT

99.49 +0.25 (0.25%)
Pre-Market: 08:14AM EDT

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	2	2	2	2
Avg. Estimate	2.91	1.81	15.52	7.85
Low Estimate	2.82	1.32	15.13	6.47
High Estimate	3.01	2.3	15.92	9.24
Year Ago EPS	1.02	1.17	3.68	15.52

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	2	2	2	2
Avg. Estimate	587.34M	539.67M	2.32B	2.33B
Low Estimate	585.38M	537.2M	2.31B	2.14B
High Estimate	589.3M	542.15M	2.32B	2.52B
Year Ago Sales	N/A	380.82M	1.28B	2.32B
Sales Growth (year/est)	N/A	41.70%	81.30%	0.70%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.75	0.68	0.87	1.38
EPS Actual	1.02	1.17	1.99	8.82
Difference	0.27	0.49	1.12	7.44
Surprise %	36.00%	72.10%	128.70%	539.10%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	2.91	1.81	15.52	7.85
7 Days Ago	2.91	1.81	15.52	7.85
30 Days Ago	2.91	1.81	15.52	7.85
60 Days Ago	1.23	1.19	5.78	5.82
90 Days Ago	1.23	1.19	5.78	5.12

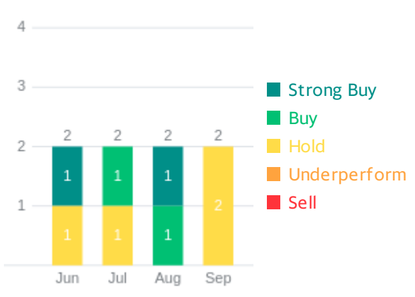
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	WIRE	Industry	Sector(s)	S&P 500
Current Qtr.	185.30%	N/A	N/A	N/A
Next Qtr.	54.70%	N/A	N/A	N/A
Current Year	321.70%	N/A	N/A	N/A
Next Year	-49.40%	N/A	N/A	N/A
Next 5 Years (per annum)	10.00%	N/A	N/A	N/A
Past 5 Years (per annum)	18.45%	N/A	N/A	N/A

People Also Watch

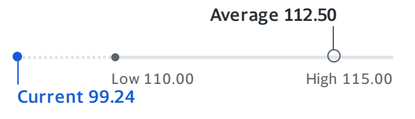
Symbol	Last Price	Change	% Change
DXPE DXP Enterprises, Inc.	30.25	+0.30	+1.00%
WCC WESCO International, Inc.	117.43	+0.96	+0.82%
FCFS FirstCash, Inc.	87.09	-0.66	-0.75%
EZPW EZCORP, Inc.	7.69	-0.20	-2.53%
WRLD World Acceptance Corporation	193.17	+0.04	+0.02%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (2)



Upgrades & Downgrades

Downgrade	Sidoti & Co.: Buy to Neutral	1/21/2021
Maintains	Sidoti & Co.: to Buy	10/28/2020
Downgrade	DA Davidson: Buy to Neutral	4/30/2020
Maintains	Sidoti & Co.: to Buy	2/19/2020
Upgrade	Sidoti & Co.: Neutral to Buy	6/3/2019
Downgrade	Sidoti & Co.: Buy to Neutral	2/13/2019

More Upgrades & Downgrades

U.S. Markets close in 6 hrs 9 mins

S&P 500	Dow 30	Nasdaq	Russell 2000
4,379.17	34,448.70	14,629.86	2,232.20
+19.71 (+0.45%)	+57.98 (+0.17%)	+117.42 (+0.81%)	+6.89 (+0.31%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

West Pharmaceutical Services, Inc. (WST)

NYSE - Nasdaq Real Time Price. Currency in USD

Add to watchlist

Quote Lookup

437.87 +5.46 (+1.26%)

As of 9:49AM EDT. Market open.

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	6	6	6	6
Avg. Estimate	1.8	1.9	8.21	8.8
Low Estimate	1.72	1.86	8.15	8.4
High Estimate	1.85	1.94	8.3	9.25
Year Ago EPS	1.15	1.34	4.76	8.21

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	6	6	7	7
Avg. Estimate	687.09M	703.48M	2.8B	3.02B
Low Estimate	679.55M	699M	2.78B	2.96B
High Estimate	695M	710.7M	2.88B	3.13B
Year Ago Sales	548M	580.2M	2.15B	2.8B
Sales Growth (year/est)	25.40%	21.20%	30.40%	8.00%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	1	1.12	1.43	1.74
EPS Actual	1.15	1.34	2.05	2.46
Difference	0.15	0.22	0.62	0.72
Surprise %	15.00%	19.60%	43.40%	41.40%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	1.8	1.9	8.21	8.8
7 Days Ago	1.8	1.9	8.21	8.8
30 Days Ago	1.8	1.9	8.21	8.8
60 Days Ago	1.66	1.69	7.14	7.79
90 Days Ago	1.66	1.69	7.14	7.79

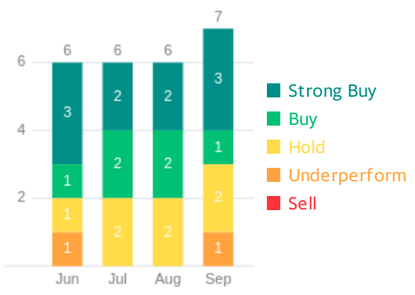
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	1
Up Last 30 Days	N/A	N/A	N/A	1
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	WST	Industry	Sector(s)	S&P 500
Current Qtr.	56.50%	N/A	N/A	N/A
Next Qtr.	41.80%	N/A	N/A	N/A
Current Year	72.50%	N/A	N/A	N/A
Next Year	7.20%	N/A	N/A	N/A
Next 5 Years (per annum)	25.80%	N/A	N/A	N/A
Past 5 Years (per annum)	14.38%	N/A	N/A	N/A

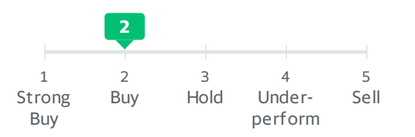
People Also Watch

Symbol	Last Price	Change	% Change
TFX Teleflex Incorporated	386.77	+1.57	+0.41%
STE STERIS plc	209.68	+0.57	+0.27%
MTD Mettler-Toledo International Inc.	1,420.91	+12.47	+0.89%
CTLT Catalent, Inc.	135.48	+1.24	+0.92%
BIO Bio-Rad Laboratories, Inc.	758.78	+9.51	+1.27%

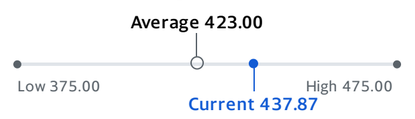
Recommendation Trends



Recommendation Rating



Analyst Price Targets (5)



Upgrades & Downgrades

Maintains	Keybanc: to Overweight	7/30/2021
Initiated	KeyBanc: to Overweight	11/10/2020
Initiated	Stephens & Co.: to Equal-Weight	10/14/2020
Upgrade	B of A Securities: Underperform to Neutral	4/24/2020
Downgrade	Bank of America: Neutral to Underperform	12/12/2019
Upgrade	Bank of America: Underperform to Neutral	7/26/2019

More Upgrades & Downgrades

U.S. markets open in 15 minutes

S&P Futures	Dow Futures	Nasdaq Futures	Russell 2000 Futures
4,358.50	34,335.00	14,781.50	2,231.60
+8.75 (+0.20%)	+70.00 (+0.20%)	+41.75 (+0.28%)	+9.70 (+0.44%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

Atmos Energy Corporation (ATO)

NYSE - NYSE Delayed Price. Currency in USD

Add to watchlist

Quote Lookup

88.91 +2.22 (+2.56%)
At close: September 29 4:02PM EDT

88.91 0.00 (0.00%)
Pre-Market: 09:14AM EDT

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	8	4	9	9
Avg. Estimate	0.34	1.83	5.11	5.43
Low Estimate	0.29	1.7	5.08	5.36
High Estimate	0.39	1.88	5.14	5.49
Year Ago EPS	0.53	1.71	4.72	5.11

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	5	3	9	9
Avg. Estimate	553.66M	1.04B	3.35B	3.65B
Low Estimate	467M	973.24M	3.05B	2.76B
High Estimate	646.38M	1.15B	3.49B	4.16B
Year Ago Sales	474.91M	N/A	2.82B	3.35B
Sales Growth (year/est)	16.60%	N/A	18.80%	8.90%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.51	1.58	2.05	0.72
EPS Actual	0.53	1.71	2.3	0.78
Difference	0.02	0.13	0.25	0.06
Surprise %	3.90%	8.20%	12.20%	8.30%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.34	1.83	5.11	5.43
7 Days Ago	0.34	1.83	5.11	5.43
30 Days Ago	0.34	1.83	5.11	5.43
60 Days Ago	0.4	1.82	5.1	5.42
90 Days Ago	0.42	1.78	5.08	5.42

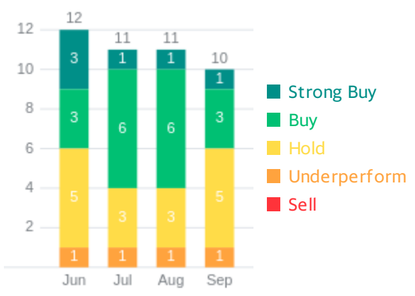
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	ATO	Industry	Sector(s)	S&P 500
Current Qtr.	-35.80%	N/A	N/A	N/A
Next Qtr.	7.00%	N/A	N/A	N/A
Current Year	8.30%	N/A	N/A	N/A
Next Year	6.30%	N/A	N/A	N/A
Next 5 Years (per annum)	7.80%	N/A	N/A	N/A
Past 5 Years (per annum)	8.41%	N/A	N/A	N/A

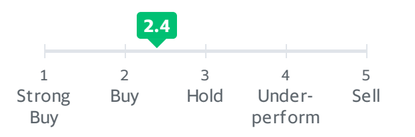
People Also Watch

Symbol	Last Price	Change	% Change
LNT Alliant Energy Corporation	56.75	+0.94	+1.68%
AOS A. O. Smith Corporation	63.55	+0.15	+0.24%
BKH Black Hills Corporation	63.54	+1.26	+2.02%
UGI UGI Corporation	43.02	+0.84	+1.99%
NJR New Jersey Resources Corporation	35.50	+0.67	+1.92%

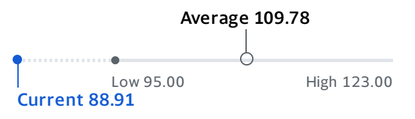
Recommendation Trends



Recommendation Rating



Analyst Price Targets (9)



Upgrades & Downgrades

Maintains	Morgan Stanley: to Overweight	9/17/2021
Maintains	Morgan Stanley: to Overweight	8/19/2021
Maintains	Mizuho: to Buy	8/17/2021
Maintains	Morgan Stanley: to Overweight	7/20/2021
Maintains	Wells Fargo: to Overweight	6/24/2021
Maintains	Morgan Stanley: to Overweight	6/21/2021

More Upgrades & Downgrades

U.S. markets open in 15 minutes

S&P Futures	Dow Futures	Nasdaq Futures	Russell 2000 Futures
4,359.25	34,339.00	14,783.75	2,231.60
+9.50 (+0.22%)	+74.00 (+0.22%)	+44.00 (+0.30%)	+9.70 (+0.44%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

New Jersey Resources Corporation (NJR)

NYSE - NYSE Delayed Price. Currency in USD

Add to watchlist

Quote Lookup

35.50 +0.67 (+1.92%)

At close: September 29 4:00PM EDT

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	7	4	8	9
Avg. Estimate	0.07	0.68	2.15	2.27
Low Estimate	0.03	0.49	2.08	2.23
High Estimate	0.1	0.77	2.18	2.3
Year Ago EPS	0.57	0.46	2.07	2.15

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	2	1	4	3
Avg. Estimate	376.5M	466M	2.23B	2.07B
Low Estimate	373M	466M	2B	2.01B
High Estimate	380M	466M	2.73B	2.17B
Year Ago Sales	400.04M	N/A	1.95B	2.23B
Sales Growth (year/est)	-5.90%	N/A	14.10%	-7.20%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.57	0.49	1.18	-0.12
EPS Actual	0.57	0.46	1.77	-0.15
Difference	0	-0.03	0.59	-0.03
Surprise %	0.00%	-6.10%	50.00%	-25.00%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.07	0.68	2.15	2.27
7 Days Ago	0.07	0.68	2.15	2.27
30 Days Ago	0.07	0.68	2.16	2.27
60 Days Ago	0.08	0.68	2.12	2.26
90 Days Ago	0.06	0.65	2.12	2.28

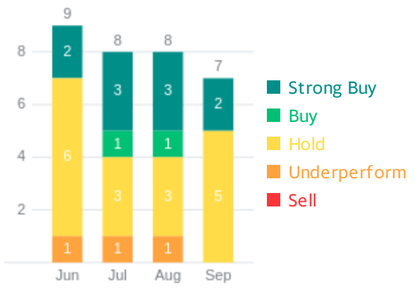
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	NJR	Industry	Sector(s)	S&P 500
Current Qtr.	-87.70%	N/A	N/A	N/A
Next Qtr.	47.80%	N/A	N/A	N/A
Current Year	3.90%	N/A	N/A	N/A
Next Year	5.60%	N/A	N/A	N/A
Next 5 Years (per annum)	6.00%	N/A	N/A	N/A
Past 5 Years (per annum)	50.73%	N/A	N/A	N/A

People Also Watch

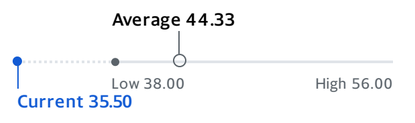
Symbol	Last Price	Change	% Change
SJI South Jersey Industries, Inc.	21.92	+0.40	+1.86%
NWN Northwest Natural Holding Company	46.63	+0.90	+1.97%
SWX Southwest Gas Holdings, Inc.	67.93	+1.23	+1.84%
NFG National Fuel Gas Company	53.42	-0.41	-0.75%
CPK Chesapeake Utilities Corporation	122.25	+2.46	+2.05%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (6)



Upgrades & Downgrades

Downgrade	B of A Securities: Neutral to Underperform	6/25/2021
Initiated	JP Morgan: to Neutral	5/3/2021
Maintains	B of A Securities: to Underperform	8/10/2020
Initiated	Mizuho: to Buy	7/24/2020
Maintains	B of A Securities: to Underperform	7/21/2020
Maintains	Wells Fargo: to Equal-Weight	5/11/2020

More Upgrades & Downgrades

U.S. markets open in 13 minutes

S&P Futures	Dow Futures	Nasdaq Futures	Russell 2000 Futures
4,358.75	34,337.00	14,781.75	2,231.20
+9.00 (+0.21%)	+72.00 (+0.21%)	+42.00 (+0.28%)	+9.30 (+0.42%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Northwest Natural Holding Company (NWN)

NYSE - NYSE Delayed Price. Currency in USD

Add to watchlist

Quote Lookup

46.63 +0.90 (+1.97%)
At close: September 29 4:00PM EDT

47.45 +0.82 (1.76%)
Pre-Market: 07:20AM EDT

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	6	6	8	8
Avg. Estimate	-0.75	1.37	2.54	2.63
Low Estimate	-0.89	1.25	2.5	2.55
High Estimate	-0.68	1.47	2.6	2.74
Year Ago EPS	-0.59	1.7	2.51	2.54

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	4	4	6	6
Avg. Estimate	100.97M	283.02M	839.46M	878.5M
Low Estimate	86.87M	266.1M	811.7M	852.3M
High Estimate	112.63M	307.82M	885.31M	947.36M
Year Ago Sales	93.28M	260.27M	773.68M	839.46M
Sales Growth (year/est)	8.20%	8.70%	8.50%	4.70%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	-0.69	1.49	1.82	-0.14
EPS Actual	-0.59	1.7	1.94	-0.02
Difference	0.1	0.21	0.12	0.12
Surprise %	14.50%	14.10%	6.60%	85.70%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	-0.75	1.37	2.54	2.63
7 Days Ago	-0.75	1.37	2.54	2.63
30 Days Ago	-0.75	1.37	2.54	2.63
60 Days Ago	-0.74	1.49	2.54	2.64
90 Days Ago	-0.63	1.28	2.53	2.63

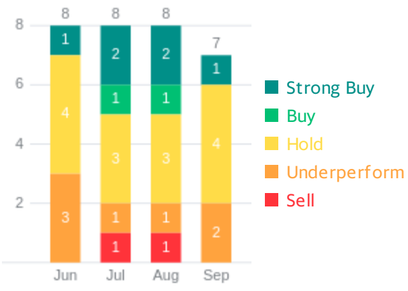
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	NWN	Industry	Sector(s)	S&P 500
Current Qtr.	-27.10%	N/A	N/A	N/A
Next Qtr.	-19.40%	N/A	N/A	N/A
Current Year	1.20%	N/A	N/A	N/A
Next Year	3.50%	N/A	N/A	N/A
Next 5 Years (per annum)	5.50%	N/A	N/A	N/A
Past 5 Years (per annum)	-5.39%	N/A	N/A	N/A

People Also Watch

Symbol	Last Price	Change	% Change
NJR New Jersey Resources Corporation	35.50	+0.67	+1.92%
AWR American States Water Company	86.90	+0.71	+0.82%
LANC Lancaster Colony Corporation	171.03	+1.79	+1.06%
NFG National Fuel Gas Company	53.42	-0.41	-0.75%
SJW SJW Group	67.08	+1.44	+2.19%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (8)

Upgrades & Downgrades

Initiated	Stifel: to Buy	12/17/2020
Upgrade	Wells Fargo: Underweight to Equal-Weight	11/25/2020
Maintains	B of A Securities: to Underperform	11/25/2020
Upgrade	UBS: Sell to Neutral	11/25/2020
Maintains	B of A Securities: to Underperform	11/25/2020
Maintains	Wells Fargo: to Underweight	11/25/2020

More Upgrades & Downgrades

U.S. markets open in 13 minutes

ES=F	YM=F	NQ=F	RTY=F
4,359.25	34,338.00	14,784.25	2,231.30
+9.50 (+0.22%)	+73.00 (+0.21%)	+44.50 (+0.30%)	+9.40 (+0.42%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

ONE Gas, Inc. (OGS)

NYSE - NYSE Delayed Price. Currency in USD

Add to watchlist

Quote Lookup

64.48 +1.18 (+1.86%)

At close: September 29 4:00PM EDT

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	8	8	7	7
Avg. Estimate	0.38	1.1	3.82	4.09
Low Estimate	0.34	1.08	3.77	4.03
High Estimate	0.41	1.17	3.87	4.14
Year Ago EPS	0.39	1.09	3.68	3.82

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	4	4	6	6
Avg. Estimate	247.32M	484.66M	1.65B	1.68B
Low Estimate	224.97M	396.5M	1.56B	1.33B
High Estimate	265.4M	548M	1.75B	1.9B
Year Ago Sales	242.4M	484.17M	1.53B	1.65B
Sales Growth (year/est)	2.00%	0.10%	8.10%	1.70%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.35	1.06	1.81	0.51
EPS Actual	0.39	1.09	1.79	0.56
Difference	0.04	0.03	-0.02	0.05
Surprise %	11.40%	2.80%	-1.10%	9.80%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.38	1.1	3.82	4.09
7 Days Ago	0.38	1.1	3.82	4.09
30 Days Ago	0.38	1.1	3.82	4.09
60 Days Ago	0.39	1.12	3.81	4.1
90 Days Ago	0.39	1.12	3.8	4.1

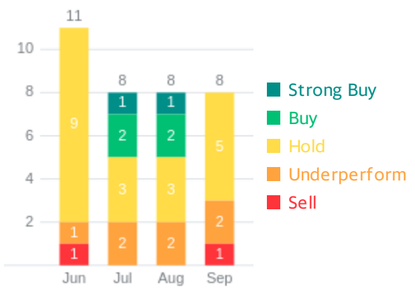
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	OGS	Industry	Sector(s)	S&P 500
Current Qtr.	-2.60%	N/A	N/A	N/A
Next Qtr.	0.90%	N/A	N/A	N/A
Current Year	3.80%	N/A	N/A	N/A
Next Year	7.10%	N/A	N/A	N/A
Next 5 Years (per annum)	5.00%	N/A	N/A	N/A
Past 5 Years (per annum)	15.32%	N/A	N/A	N/A

People Also Watch

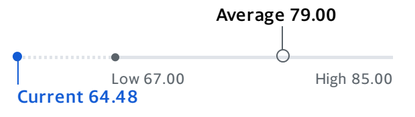
Symbol	Last Price	Change	% Change
NWE NorthWestern Corporation	58.76	+0.78	+1.35%
SWX Southwest Gas Holdings, Inc.	67.93	+1.23	+1.84%
NJR New Jersey Resources Corporation	35.50	+0.67	+1.92%
SR Spire Inc.	62.05	+1.20	+1.97%
OGE OGE Energy Corp.	33.53	+0.59	+1.79%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (8)



Upgrades & Downgrades

Maintains	Morgan Stanley: to Underweight	9/17/2021
Maintains	Morgan Stanley: to Underweight	8/19/2021
Maintains	Morgan Stanley: to Underweight	7/20/2021
Maintains	Morgan Stanley: to Underweight	6/21/2021
Maintains	Mizuho: to Buy	5/27/2021
Maintains	Morgan Stanley: to Underweight	5/18/2021

More Upgrades & Downgrades

U.S. markets open in 12 minutes

S&P Futures	Dow Futures	Nasdaq Futures	Russell 2000 Futures
4,359.00	34,338.00	14,781.00	2,231.30
+9.25 (+0.21%)	+73.00 (+0.21%)	+41.25 (+0.28%)	+9.40 (+0.42%)

JUST IN **Jobless claims: 362,000 Americans filed new claims last week**
Weekly claims rise from a week ago and missed expectations of 330,000

South Jersey Industries, Inc. (SJI)

NYSE - NYSE Delayed Price. Currency in USD

Add to watchlist

Quote Lookup

21.92 +0.40 (+1.86%)

At close: September 29 4:00PM EDT

Summary Chart Conversations Statistics Historical Data Profile Financials **Analysis** Options Holders Sustainability

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	10	9	9	10
Avg. Estimate	-0.17	0.56	1.62	1.68
Low Estimate	-0.29	0.45	1.58	1.62
High Estimate	-0.12	0.73	1.65	1.74
Year Ago EPS	-0.06	0.62	1.68	1.62

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	5	4	6	6
Avg. Estimate	286.62M	452.22M	1.65B	1.69B
Low Estimate	253.5M	306.8M	1.35B	1.27B
High Estimate	323.3M	520M	1.8B	2B
Year Ago Sales	261.28M	486M	1.54B	1.65B
Sales Growth (year/est)	9.70%	-7.00%	6.70%	2.60%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	-0.22	0.54	1.2	-0.01
EPS Actual	-0.06	0.62	1.26	0.02
Difference	0.16	0.08	0.06	0.03
Surprise %	72.70%	14.80%	5.00%	300.00%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	-0.17	0.56	1.62	1.68
7 Days Ago	-0.17	0.56	1.62	1.68
30 Days Ago	-0.16	0.55	1.62	1.68
60 Days Ago	-0.15	0.53	1.63	1.7
90 Days Ago	-0.16	0.54	1.62	1.7

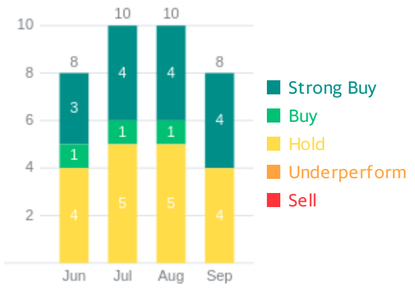
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	1	1	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	SJI	Industry	Sector(s)	S&P 500
Current Qtr.	-183.30%	N/A	N/A	N/A
Next Qtr.	-9.70%	N/A	N/A	N/A
Current Year	-3.60%	N/A	N/A	N/A
Next Year	3.70%	N/A	N/A	N/A
Next 5 Years (per annum)	4.80%	N/A	N/A	N/A
Past 5 Years (per annum)	13.27%	N/A	N/A	N/A

People Also Watch

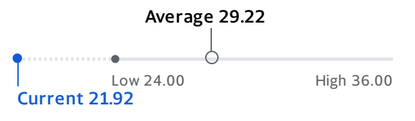
Symbol	Last Price	Change	% Change
NJR New Jersey Resources Corporation	35.50	+0.67	+1.92%
SWX Southwest Gas Holdings, Inc.	67.93	+1.23	+1.84%
NWN Northwest Natural Holding Company	46.63	+0.90	+1.97%
CPK Chesapeake Utilities Corporation	122.25	+2.46	+2.05%
UGI UGI Corporation	43.02	+0.84	+1.99%

Recommendation Trends



Recommendation Rating

Analyst Price Targets (9)



Upgrades & Downgrades

Maintains	Morgan Stanley: to Equal-Weight	9/17/2021
Maintains	Morgan Stanley: to Equal-Weight	7/20/2021
Upgrade	Morgan Stanley: Underweight to Equal-Weight	5/28/2021
Upgrade	JP Morgan: Underweight to Neutral	5/11/2021
Upgrade	B of A Securities: Neutral to Buy	4/28/2021

U.S. markets open in 13 minutes

S&P Futures	Dow Futures	Nasdaq Futures	Russell 2000 Futures
4,358.75	34,337.00	14,780.75	2,231.20
+9.00 (+0.21%)	+72.00 (+0.21%)	+41.00 (+0.28%)	+9.30 (+0.42%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Southwest Gas Holdings, Inc. (SWX)

NYSE - NYSE Delayed Price. Currency in USD

Add to watchlist

Quote Lookup

67.93 +1.23 (+1.84%)

At close: September 29 4:00PM EDT

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	6	5	7	7
Avg. Estimate	0.13	1.55	4.15	4.37
Low Estimate	0.04	1.35	3.95	4.29
High Estimate	0.21	1.76	4.25	4.47
Year Ago EPS	0.32	1.82	4.14	4.15

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	2	2	3	3
Avg. Estimate	771.95M	1.01B	3.54B	4.05B
Low Estimate	734.91M	933M	3.45B	3.55B
High Estimate	809M	1.09B	3.63B	4.31B
Year Ago Sales	413.92M	914.08M	3.3B	3.54B
Sales Growth (year/est)	86.50%	10.60%	7.20%	14.70%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	0.24	1.61	1.92	0.44
EPS Actual	0.32	1.82	2.03	0.43
Difference	0.08	0.21	0.11	-0.01
Surprise %	33.30%	13.00%	5.70%	-2.30%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	0.13	1.55	4.15	4.37
7 Days Ago	0.13	1.55	4.15	4.37
30 Days Ago	0.13	1.55	4.15	4.37
60 Days Ago	0.13	1.57	4.15	4.35
90 Days Ago	0.13	1.55	4.14	4.35

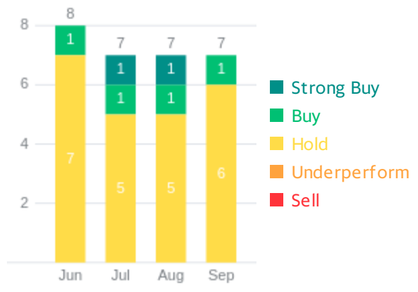
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	SWX	Industry	Sector(s)	S&P 500
Current Qtr.	-59.40%	N/A	N/A	N/A
Next Qtr.	-14.80%	N/A	N/A	N/A
Current Year	0.20%	N/A	N/A	N/A
Next Year	5.30%	N/A	N/A	N/A
Next 5 Years (per annum)	4.00%	N/A	N/A	N/A
Past 5 Years (per annum)	6.39%	N/A	N/A	N/A

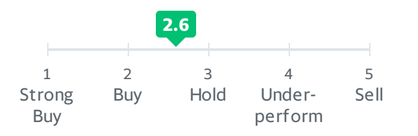
People Also Watch

Symbol	Last Price	Change	% Change
SJI South Jersey Industries, Inc.	21.92	+0.40	+1.86%
NJR New Jersey Resources Corporation	35.50	+0.67	+1.92%
NWN Northwest Natural Holding Company	46.63	+0.90	+1.97%
CPK Chesapeake Utilities Corporation	122.25	+2.46	+2.05%
NWE NorthWestern Corporation	58.76	+0.78	+1.35%

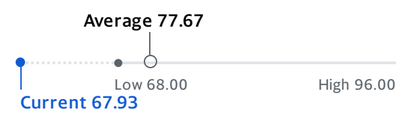
Recommendation Trends



Recommendation Rating



Analyst Price Targets (6)



Upgrades & Downgrades

Maintains	Wells Fargo: to Equal-Weight	6/30/2021
Downgrade	JP Morgan: Overweight to Neutral	1/29/2021
Maintains	B of A Securities: to Neutral	9/23/2020
Upgrade	Wells Fargo: Underweight to Equal-Weight	8/19/2020
Maintains	Jefferies: to Hold	7/24/2020
Maintains	Wells Fargo: to Underweight	5/11/2020

More Upgrades & Downgrades

U.S. markets open in 14 minutes

ES=F	YM=F	NQ=F	RTY=F
4,359.00	34,335.00	14,782.75	2,230.90
+9.25 (+0.21%)	+70.00 (+0.20%)	+43.00 (+0.29%)	+9.00 (+0.41%)

JUST IN

Jobless claims: 362,000 Americans filed new claims last week

Weekly claims rise from a week ago and missed expectations of 330,000

Spire Inc. (SR)

NYSE - NYSE Delayed Price. Currency in USD

Add to watchlist

Quote Lookup

62.05 +1.20 (+1.97%)

At close: September 29 4:00PM EDT

Currency in USD

Earnings Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	9	6	10	10
Avg. Estimate	-0.73	1.42	4.45	4.44
Low Estimate	-0.79	1.02	4.4	4.38
High Estimate	-0.69	1.54	4.5	4.56
Year Ago EPS	-0.37	1.42	3.76	4.45

Revenue Estimate	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
No. of Analysts	5	4	9	9
Avg. Estimate	252.89M	563.78M	2.12B	2.05B
Low Estimate	215M	524.43M	1.9B	1.76B
High Estimate	295.2M	616.3M	2.23B	2.3B
Year Ago Sales	251.9M	N/A	1.89B	2.12B
Sales Growth (year/est)	0.40%	N/A	12.60%	-3.60%

Earnings History	9/29/2020	12/30/2020	3/30/2021	6/29/2021
EPS Est.	-0.41	1.31	3.09	0.04
EPS Actual	-0.37	1.42	3.71	0.06
Difference	0.04	0.11	0.62	0.02
Surprise %	9.80%	8.40%	20.10%	50.00%

EPS Trend	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Current Estimate	-0.73	1.42	4.45	4.44
7 Days Ago	-0.73	1.42	4.45	4.44
30 Days Ago	-0.73	1.42	4.45	4.44
60 Days Ago	-0.71	1.49	4.44	4.43
90 Days Ago	-0.67	1.49	4.44	4.43

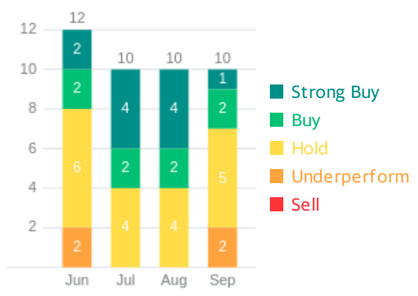
EPS Revisions	Current Qtr. (Sep 2021)	Next Qtr. (Dec 2021)	Current Year (2021)	Next Year (2022)
Up Last 7 Days	N/A	N/A	N/A	N/A
Up Last 30 Days	N/A	N/A	N/A	N/A
Down Last 7 Days	N/A	N/A	N/A	N/A
Down Last 30 Days	N/A	N/A	N/A	N/A

Growth Estimates	SR	Industry	Sector(s)	S&P 500
Current Qtr.	-97.30%	N/A	N/A	N/A
Next Qtr.	N/A	N/A	N/A	N/A
Current Year	18.40%	N/A	N/A	N/A
Next Year	-0.20%	N/A	N/A	N/A
Next 5 Years (per annum)	7.31%	N/A	N/A	N/A
Past 5 Years (per annum)	-3.96%	N/A	N/A	N/A

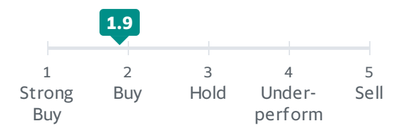
People Also Watch

Symbol	Last Price	Change	% Change
SWX Southwest Gas Holdings, Inc.	67.93	+1.23	+1.84%
NWE NorthWestern Corporation	58.76	+0.78	+1.35%
SJI South Jersey Industries, Inc.	21.92	+0.40	+1.86%
OGS ONE Gas, Inc.	64.48	+1.18	+1.86%
NJR New Jersey Resources Corporation	35.50	+0.67	+1.92%

Recommendation Trends



Recommendation Rating



Analyst Price Targets (10)

Upgrades & Downgrades

Upgrade	Mizuho: Neutral to Buy	9/24/2021
Maintains	Morgan Stanley: to Equal-Weight	9/17/2021
Maintains	Morgan Stanley: to Equal-Weight	8/19/2021
Maintains	Morgan Stanley: to Equal-Weight	7/20/2021
Maintains	Morgan Stanley: to Equal-Weight	6/21/2021
Upgrade	Sidoti & Co.: Neutral to Buy	6/10/2021

More Upgrades & Downgrades

Dependent Variable: RP
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 10/07/21 Time: 12:09
Sample (adjusted): 697 1149
Included observations: 453 after adjustments
Convergence achieved after 8 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
GARCH	2.170924	0.761253	2.851775	0.0043
Variance Equation				
C	0.000149	6.82E-05	2.178768	0.0293
RESID(-1)^2	0.102955	0.026283	3.917121	0.0001
GARCH(-1)	0.856561	0.035665	24.01668	0.0000

R-squared	-0.004263	Mean dependent var	0.007010
Adjusted R-squared	-0.004263	S.D. dependent var	0.057158
S.E. of regression	0.057280	Akaike info criterion	-2.958301
Sum squared resid	1.483016	Schwarz criterion	-2.921957
Log likelihood	674.0551	Hannan-Quinn criter.	-2.943980
Durbin-Watson stat	2.343819		

Dependent Variable: RP
Method: ML - ARCH (Marquardt) - Student's t distribution
Date: 10/07/21 Time: 12:02
Sample (adjusted): 25 1149
Included observations: 1125 after adjustments
Convergence achieved after 15 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
GARCH	2.797925	0.515377	5.428884	0.0000
Variance Equation				
C	0.000113	3.75E-05	3.006022	0.0026
RESID(-1)^2	0.129118	0.026529	4.867019	0.0000
GARCH(-1)	0.824686	0.032067	25.71763	0.0000
T-DIST. DOF	8.444701	1.905149	4.432567	0.0000

R-squared	-0.015076	Mean dependent var	0.004653
Adjusted R-squared	-0.015076	S.D. dependent var	0.054120
S.E. of regression	0.054526	Akaike info criterion	-3.355810
Sum squared resid	3.341780	Schwarz criterion	-3.333474
Log likelihood	1892.643	Hannan-Quinn criter.	-3.347369
Durbin-Watson stat	1.785982		

Dependent Variable: RP
Method: ML - ARCH (Marquardt) - Student's t distribution
Date: 10/07/21 Time: 12:00
Sample: 1 1149
Included observations: 1149
Convergence achieved after 11 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
GARCH	3.149670	0.515767	6.106769	0.0000
Variance Equation				
C	0.000121	3.89E-05	3.123950	0.0018
RESID(-1)^2	0.127405	0.026077	4.885811	0.0000
GARCH(-1)	0.821563	0.032698	25.12582	0.0000
T-DIST. DOF	8.744256	1.978188	4.420337	0.0000

R-squared	-0.019283	Mean dependent var	0.005604
Adjusted R-squared	-0.019283	S.D. dependent var	0.053805
S.E. of regression	0.054321	Akaike info criterion	-3.361675
Sum squared resid	3.387515	Schwarz criterion	-3.339714
Log likelihood	1936.282	Hannan-Quinn criter.	-3.353384
Durbin-Watson stat	1.777409		

Dependent Variable: RP
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 10/07/21 Time: 12:10
Sample (adjusted): 565 1149
Included observations: 585 after adjustments
Convergence achieved after 74 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
GARCH	1.984445	0.743167	2.670253	0.0076
Variance Equation				
C	0.001468	0.000426	3.450634	0.0006
RESID(-1)^2	0.202294	0.041669	4.854749	0.0000
GARCH(-1)	0.417042	0.144802	2.880082	0.0040

R-squared	-0.043199	Mean dependent var	0.006112
Adjusted R-squared	-0.043199	S.D. dependent var	0.059826
S.E. of regression	0.061105	Akaike info criterion	-2.813847
Sum squared resid	2.180526	Schwarz criterion	-2.783956
Log likelihood	827.0502	Hannan-Quinn criter.	-2.802198
Durbin-Watson stat	2.234537		

Dependent Variable: RP
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 10/07/21 Time: 12:11
Sample (adjusted): 565 1149
Included observations: 585 after adjustments
Convergence achieved after 12 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
GARCH	1.465530	0.706492	2.074376	0.0380
Variance Equation				
C	0.000310	0.000104	2.991017	0.0028
RESID(-1)^2	0.122279	0.033280	3.674259	0.0002
GARCH(-1)	0.782661	0.054615	14.33058	0.0000

R-squared	-0.005091	Mean dependent var	0.004296
Adjusted R-squared	-0.005091	S.D. dependent var	0.056873
S.E. of regression	0.057017	Akaike info criterion	-2.967595
Sum squared resid	1.898578	Schwarz criterion	-2.937703
Log likelihood	872.0215	Hannan-Quinn criter.	-2.955945
Durbin-Watson stat	2.296990		

Dependent Variable: RP
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 10/07/21 Time: 12:12
Sample (adjusted): 1058 1149
Included observations: 92 after adjustments
Convergence achieved after 22 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
GARCH	3.138177	2.035771	1.541518	0.1232
Variance Equation				
C	0.000445	0.000665	0.669282	0.5033
RESID(-1)^2	0.037158	0.077473	0.479631	0.6315
GARCH(-1)	0.825296	0.248336	3.323306	0.0009

R-squared	-0.004448	Mean dependent var	0.008416
Adjusted R-squared	-0.004448	S.D. dependent var	0.055433
S.E. of regression	0.055556	Akaike info criterion	-2.885801
Sum squared resid	0.280868	Schwarz criterion	-2.776158
Log likelihood	136.7468	Hannan-Quinn criter.	-2.841548
Durbin-Watson stat	2.224631		

Dependent Variable: RP
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 10/07/21 Time: 12:13
Sample (adjusted): 394 1149
Included observations: 756 after adjustments
Convergence achieved after 41 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
GARCH	1.568125	0.644790	2.431994	0.0150
Variance Equation				
C	0.000280	7.77E-05	3.608799	0.0003
RESID(-1)^2	0.116388	0.015419	7.548565	0.0000
GARCH(-1)	0.815336	0.027345	29.81665	0.0000

R-squared	-0.002494	Mean dependent var	0.004041
Adjusted R-squared	-0.002494	S.D. dependent var	0.060561
S.E. of regression	0.060636	Akaike info criterion	-2.844553
Sum squared resid	2.775958	Schwarz criterion	-2.820066
Log likelihood	1079.241	Hannan-Quinn criter.	-2.835121
Durbin-Watson stat	2.130364		

Dependent Variable: RP
Method: ML - ARCH (Marquardt) - Student's t distribution
Date: 10/07/21 Time: 12:01
Sample (adjusted): 25 1149
Included observations: 1125 after adjustments
Convergence achieved after 13 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
GARCH	1.530187	0.508439	3.009576	0.0026
Variance Equation				
C	5.45E-05	2.09E-05	2.612865	0.0090
RESID(-1)^2	0.107844	0.020963	5.144608	0.0000
GARCH(-1)	0.870472	0.022763	38.24014	0.0000
T-DIST. DOF	10.77747	3.280981	3.284832	0.0010

R-squared	-0.015364	Mean dependent var	0.003209
Adjusted R-squared	-0.015364	S.D. dependent var	0.054805
S.E. of regression	0.055225	Akaike info criterion	-3.366292
Sum squared resid	3.427914	Schwarz criterion	-3.343956
Log likelihood	1898.539	Hannan-Quinn criter.	-3.357851
Durbin-Watson stat	1.762356		

Dependent Variable: RP
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 10/07/21 Time: 12:15
Sample: 1 1149
Included observations: 1149
Convergence achieved after 26 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
GARCH	0.929763	0.354825	2.620342	0.0088
Variance Equation				
C	6.45E-05	1.36E-05	4.741543	0.0000
RESID(-1)^2	0.095108	0.008903	10.68280	0.0000
GARCH(-1)	0.897433	0.006858	130.8647	0.0000

R-squared	-0.013540	Mean dependent var	0.003985
Adjusted R-squared	-0.013540	S.D. dependent var	0.083178
S.E. of regression	0.083739	Akaike info criterion	-2.670917
Sum squared resid	8.050052	Schwarz criterion	-2.653348
Log likelihood	1538.442	Hannan-Quinn criter.	-2.664284
Durbin-Watson stat	2.150501		

Dependent Variable: RP
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 10/07/21 Time: 12:14
Sample (adjusted): 565 1149
Included observations: 585 after adjustments
Convergence achieved after 18 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
GARCH	1.369733	0.608523	2.250917	0.0244
Variance Equation				
C	0.000369	0.000122	3.028914	0.0025
RESID(-1)^2	0.089892	0.026403	3.404552	0.0007
GARCH(-1)	0.826648	0.047083	17.55737	0.0000

R-squared	0.000867	Mean dependent var	0.004282
Adjusted R-squared	0.000867	S.D. dependent var	0.065341
S.E. of regression	0.065312	Akaike info criterion	-2.651983
Sum squared resid	2.491160	Schwarz criterion	-2.622091
Log likelihood	779.7050	Hannan-Quinn criter.	-2.640334
Durbin-Watson stat	2.235739		

Atmos Energy Corporation | Credit Ratings

NYSE:ATO (MI KEY: 4057157; SPCIQ KEY: 252684)

A-

S&P Global Ratings

Issuer Credit Rating (Foreign Currency LT)
2/22/2021

CreditWatch/Outlook: Negative
3/11/2021

A1

Moody's

Long Term Rating (Senior Unsecured Domestic)
2/25/2021

Outlook:

Current Ratings

S&P GLOBAL RATINGS (S&P Entity Name:Atmos Energy Corp.)

RATING TYPE	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating							
Foreign Currency LT	A-	2/22/2021	8/20/2021	A-	CreditWatch/Outlook	Negative	3/11/2021
Local Currency LT	A-	2/22/2021	8/20/2021	A-	CreditWatch/Outlook	Negative	3/11/2021
Foreign Currency ST	A-2	2/22/2021	8/20/2021	A-1	Downgrade		
Local Currency ST	A-2	2/22/2021	8/20/2021	A-1	Downgrade		

MOODY'S

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Ratings Summary				
Long Term Rating (Senior Unsecured Domestic)	A1	2/25/2021	Rating Affirmation	
Short Term Rating (Commercial Paper Domestic)	P-1	2/25/2021	Rating Affirmation	
Outlook		2/25/2021		Negative
Ratings Detail				
Commercial Paper (Domestic)	P-1	2/25/2021	Rating Affirmation	
Senior Unsec. Shelf (Domestic)	(P)A1	2/25/2021	Rating Affirmation	
Senior Unsecured (Domestic)	A1	2/25/2021	Rating Affirmation	
Subordinate Shelf (Domestic)	WR	3/27/2016	Withdrawn	

Atmos Energy Corporation | Credit Ratings

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Senior Unsecured MTN (Domestic)	WR	8/18/1999	Withdrawn	
Senior Unsecured Bank Credit Facility (Domestic)	WR	7/17/1998	Withdrawn	

Ratings History

S&P GLOBAL RATINGS (S&P Entity Name:Atmos Energy Corp.)

RATING TYPE	RATING	RATING DATE	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Foreign Currency LT					
Issuer Credit Rating	A-	2/22/2021	CreditWatch/Outlook	Negative	3/11/2021
Issuer Credit Rating	A-	2/22/2021	Downgrade | CreditWatch/Outlook	Watch Neg	2/22/2021
Issuer Credit Rating	A	5/13/2016	Upgrade | CreditWatch/Outlook	Stable	5/13/2016
Issuer Credit Rating	A-	10/8/2013	CreditWatch/Outlook	Positive	10/29/2015
Issuer Credit Rating	A-	10/8/2013	Upgrade | CreditWatch/Outlook	Stable	10/8/2013
Issuer Credit Rating	BBB+	12/23/2008	Upgrade | CreditWatch/Outlook	Stable	12/23/2008
Issuer Credit Rating	BBB	9/30/2004	CreditWatch/Outlook	Positive	6/11/2007
Issuer Credit Rating	BBB	9/30/2004	Downgrade | CreditWatch/Outlook	Stable	9/30/2004
Issuer Credit Rating	A-	7/18/1997	CreditWatch/Outlook	Watch Neg	6/17/2004
Issuer Credit Rating	A-	7/18/1997	CreditWatch/Outlook	Negative	1/10/2003
Issuer Credit Rating	A-	7/18/1997	CreditWatch/Outlook	Stable	5/15/2001
Issuer Credit Rating	A-	7/18/1997	CreditWatch/Outlook	Watch Neg	4/17/2000
Issuer Credit Rating	A-	7/18/1997	New Rating | CreditWatch/Outlook	Stable	7/18/1997
Local Currency LT					
Issuer Credit Rating	A-	2/22/2021	CreditWatch/Outlook	Negative	3/11/2021
Issuer Credit Rating	A-	2/22/2021	Downgrade | CreditWatch/Outlook	Watch Neg	2/22/2021
Issuer Credit Rating	A	5/13/2016	Upgrade | CreditWatch/Outlook	Stable	5/13/2016
Issuer Credit Rating	A-	10/8/2013	CreditWatch/Outlook	Positive	10/29/2015
Issuer Credit Rating	A-	10/8/2013	Upgrade | CreditWatch/Outlook	Stable	10/8/2013
Issuer Credit Rating	BBB+	12/23/2008	Upgrade | CreditWatch/Outlook	Stable	12/23/2008
Issuer Credit Rating	BBB	9/30/2004	CreditWatch/Outlook	Positive	6/11/2007
Issuer Credit Rating	BBB	9/30/2004	Downgrade | CreditWatch/Outlook	Stable	9/30/2004
Issuer Credit Rating	A-	7/18/1997	CreditWatch/Outlook	Watch Neg	6/17/2004
Issuer Credit Rating	A-	7/18/1997	CreditWatch/Outlook	Negative	1/10/2003
Issuer Credit Rating	A-	7/18/1997	CreditWatch/Outlook	Stable	5/15/2001
Issuer Credit Rating	A-	7/18/1997	CreditWatch/Outlook	Watch Neg	4/17/2000
Issuer Credit Rating	A-	7/18/1997	New Rating | CreditWatch/Outlook	Stable	7/18/1997
Foreign Currency ST					
Issuer Credit Rating	A-2	2/22/2021	Downgrade		

Atmos Energy Corporation | Credit Ratings

RATING TYPE	RATING	RATING DATE	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating	A-1	5/13/2016	Upgrade		
Issuer Credit Rating	A-2	10/16/1998	CreditWatch/Outlook	NM	9/30/2004
Issuer Credit Rating	A-2	10/16/1998	CreditWatch/Outlook	Watch Neg	6/17/2004
Issuer Credit Rating	A-2	10/16/1998	New Rating		
Local Currency ST					
Issuer Credit Rating	A-2	2/22/2021	Downgrade		
Issuer Credit Rating	A-1	5/13/2016	Upgrade		
Issuer Credit Rating	A-2	10/16/1998	CreditWatch/Outlook	NM	9/30/2004
Issuer Credit Rating	A-2	10/16/1998	CreditWatch/Outlook	Watch Neg	6/17/2004
Issuer Credit Rating	A-2	10/16/1998	New Rating		

MOODY'S

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Outlook		**2/25/2021**		**Negative**
Outlook		12/16/2019		Stable
Outlook		12/14/2018		Positive
Outlook		1/30/2014		Stable
Outlook		11/8/2013		Ratings Under Review
Outlook		5/11/2011		Stable
Outlook		3/31/2011		Ratings Under Review
Outlook		3/19/2010		Positive
Outlook		5/18/2009		Stable
Outlook		3/23/2009		Ratings Under Review
Outlook		1/8/2009		Positive
Outlook		9/29/2004		Stable
Outlook		6/17/2004		Ratings Under Review
Outlook		11/15/2003		Stable

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
Txu Gas Capital Iv	Moody's	Long Term Rating (BACKED Pref. Shelf Domestic)	WR	10/4/2004				

Market Intelligence News

HEADLINE	DATE
Atmos Energy downgraded by S&P Global Ratings on winter storm gas costs The rating agency expects the company's financial measures to "materially weaken" after the eight-state gas utility operator spent up to	2/22/2021 5:37:00 PM ET

Atmos Energy Corporation | Credit Ratings

HEADLINE	DATE
$3.5 billion to procure natural gas at elevated prices.	
Gas utility stocks still boast elevated multiples and attractive dividends, analysts say, but their burgeoning reliance on debt after share prices collapsed prompted UBS to stop awarding the group a bonus for balance sheet strength. Market sell-off crushing 1 pillar of gas utilities' valuations, analysts say	4/8/2020 11:50:00 AM ET

S&P Credit Ratings and Research provided by S&P Global Ratings

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Latest S&P Ratings available unless you are a subscriber of S&P Ratings history.

New Jersey Resources Corporation | Credit Ratings

NYSE:NJR (MI KEY: 4057128; SPCIQ KEY: 291335)

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
New Jersey Natural Gas Co.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	NR	5/27/2019	5/27/2019	BBB+	NR	5/27/2019
	Moody's	Long Term Rating (Senior Secured Domestic)	A1	3/18/2020				

Market Intelligence News

HEADLINE	DATE
CreditSights analysts said nearly one-third of 58 utilities with at least 100,000 customers are at higher risk of regulatory and political pushback against natural gas use, evident in building gas bans and pipeline opposition. Report identifies 20 utilities most at risk from rising anti-gas sentiment	7/13/2020 1:12:00 PM ET

S&P Credit Ratings and Research provided by S&P Global Ratings

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Latest S&P Ratings available unless you are a subscriber of S&P Ratings history.

Northwest Natural Holding Company | Credit Ratings

NYSE:NWN (MI KEY: 4057132; SPCIQ KEY: 292047)

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
Northwest Energy Corp.	Moody's	Long Term Rating (Pref. Stock)	WR	11/23/1983				
Northwest Natural Gas Co.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	A+	1/25/2010	5/18/2021	AA-	Stable	1/25/2010
	Moody's	Long Term Rating (Senior Unsec. Shelf Domestic)	(P)Baa1	5/17/2019				

Market Intelligence News

HEADLINE	DATE
CreditSights analysts said nearly one-third of 58 utilities with at least 100,000 customers are at higher risk of regulatory and political pushback against natural gas use, evident in building gas bans and pipeline opposition. Report identifies 20 utilities most at risk from rising anti-gas sentiment	7/13/2020 1:12:00 PM ET
Gas utility stocks still boast elevated multiples and attractive dividends, analysts say, but their burgeoning reliance on debt after share prices collapsed prompted UBS to stop awarding the group a bonus for balance sheet strength. Market sell-off crushing 1 pillar of gas utilities' valuations, analysts say	4/8/2020 11:50:00 AM ET

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Latest S&P Ratings available unless you are a subscriber of S&P Ratings history.

ONE Gas, Inc. | Credit Ratings

NYSE:OGS (MI KEY: 4427129; SPCIQ KEY: 243685856)

BBB+

S&P Global Ratings

Issuer Credit Rating (Foreign Currency LT)
2/23/2021

Downgrade | CreditWatch/Outlook: Negative
2/23/2021

A3

Moody's

Long Term Rating (Senior Unsecured Domestic)
2/23/2021

Outlook:

Current Ratings

S&P GLOBAL RATINGS (S&P Entity Name:ONE Gas Inc.)

RATING TYPE	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating							
Foreign Currency LT	BBB+	2/23/2021	9/28/2021	A	Downgrade | CreditWatch/Outlook	Negative	2/23/2021
Local Currency LT	BBB+	2/23/2021	9/28/2021	A	Downgrade | CreditWatch/Outlook	Negative	2/23/2021
Foreign Currency ST	A-2	2/23/2021	9/28/2021	A-1	Downgrade		
Local Currency ST	A-2	2/23/2021	9/28/2021	A-1	Downgrade		

MOODY'S

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Ratings Summary				
Long Term Rating (Senior Unsecured Domestic)	A3	2/23/2021	Downgrade	
Short Term Rating (Commercial Paper Domestic)	P-2	2/23/2021	Downgrade	
Outlook		2/23/2021		Negative
Ratings Detail				

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Commercial Paper (Domestic)	P-2	2/23/2021	Downgrade	
Senior Unsecured (Domestic)	A3	2/23/2021	Downgrade	
Senior Unsec. Shelf (Domestic)	WR	5/31/2020	Withdrawn	

Ratings History

S&P GLOBAL RATINGS (S&P Entity Name:ONE Gas Inc.)

RATING TYPE	RATING	RATING DATE	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Foreign Currency LT					
Issuer Credit Rating	BBB+	2/23/2021	Downgrade | CreditWatch/Outlook	Negative	2/23/2021
Issuer Credit Rating	A	8/16/2017	Upgrade | CreditWatch/Outlook	Stable	8/16/2017
Issuer Credit Rating	A-	1/9/2014	CreditWatch/Outlook	Positive	6/23/2016
Issuer Credit Rating	A-	1/9/2014	New Rating | CreditWatch/Outlook	Stable	1/9/2014
Local Currency LT					
Issuer Credit Rating	BBB+	2/23/2021	Downgrade | CreditWatch/Outlook	Negative	2/23/2021
Issuer Credit Rating	A	8/16/2017	Upgrade | CreditWatch/Outlook	Stable	8/16/2017
Issuer Credit Rating	A-	1/9/2014	CreditWatch/Outlook	Positive	6/23/2016
Issuer Credit Rating	A-	1/9/2014	New Rating | CreditWatch/Outlook	Stable	1/9/2014
Foreign Currency ST					
Issuer Credit Rating	A-2	2/23/2021	Downgrade		
Issuer Credit Rating	A-1	8/16/2017	Upgrade		
Issuer Credit Rating	A-2	9/4/2014	New Rating		
Local Currency ST					
Issuer Credit Rating	A-2	2/23/2021	Downgrade		
Issuer Credit Rating	A-1	8/16/2017	Upgrade		
Issuer Credit Rating	A-2	9/4/2014	New Rating		

MOODY'S

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Outlook		**2/23/2021**		**Negative**
Outlook		1/28/2019		Stable
Outlook		1/19/2018		Negative
Outlook		1/13/2014		Stable

Market Intelligence News

HEADLINE	DATE
S&P downgrades One Gas due to weather impacts on financial measures S&P Global Ratings has lowered the issuer credit rating of One Gas to BBB+ from A, with a negative outlook.	2/24/2021 10:26:00 AM ET
Moody's downgrades One Gas' ratings; outlook negative Moody's said the $2.2 billion that One Gas spent to procure gas during the recent deep freeze is nearly 30 times the amount the company would spend on gas in a typical February.	2/23/2021 7:02:00 PM ET
Gas utility stocks still boast elevated multiples and attractive dividends, analysts say, but their burgeoning reliance on debt after share prices collapsed prompted UBS to stop awarding the group a bonus for balance sheet strength. Market sell-off crushing 1 pillar of gas utilities' valuations, analysts say	4/8/2020 11:50:00 AM ET

S&P Credit Ratings and Research provided by S&P Global Ratings

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Latest S&P Ratings available unless you are a subscriber of S&P Ratings history.

Atmos Energy Corporation | Credit Ratings

NYSE:ATO (MI KEY: 4057157; SPCIQ KEY: 252684)

A-

S&P Global Ratings

Issuer Credit Rating (Foreign Currency LT)
2/22/2021

CreditWatch/Outlook: Negative
3/11/2021

A1

Moody's

Long Term Rating (Senior Unsecured Domestic)
2/25/2021

Outlook:

Current Ratings

S&P GLOBAL RATINGS (S&P Entity Name:Atmos Energy Corp.)

RATING TYPE	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating							
Foreign Currency LT	A-	2/22/2021	8/20/2021	A-	CreditWatch/Outlook	Negative	3/11/2021
Local Currency LT	A-	2/22/2021	8/20/2021	A-	CreditWatch/Outlook	Negative	3/11/2021
Foreign Currency ST	A-2	2/22/2021	8/20/2021	A-1	Downgrade		
Local Currency ST	A-2	2/22/2021	8/20/2021	A-1	Downgrade		

MOODY'S

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Ratings Summary				
Long Term Rating (Senior Unsecured Domestic)	A1	2/25/2021	Rating Affirmation	
Short Term Rating (Commercial Paper Domestic)	P-1	2/25/2021	Rating Affirmation	
Outlook		2/25/2021		Negative
Ratings Detail				
Commercial Paper (Domestic)	P-1	2/25/2021	Rating Affirmation	
Senior Unsec. Shelf (Domestic)	(P)A1	2/25/2021	Rating Affirmation	
Senior Unsecured (Domestic)	A1	2/25/2021	Rating Affirmation	
Subordinate Shelf (Domestic)	WR	3/27/2016	Withdrawn	

Atmos Energy Corporation | Credit Ratings

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Senior Unsecured MTN (Domestic)	WR	8/18/1999	Withdrawn	
Senior Unsecured Bank Credit Facility (Domestic)	WR	7/17/1998	Withdrawn	

Ratings History

S&P GLOBAL RATINGS (S&P Entity Name:Atmos Energy Corp.)

RATING TYPE	RATING	RATING DATE	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Foreign Currency LT					
Issuer Credit Rating	A-	2/22/2021	CreditWatch/Outlook	Negative	3/11/2021
Issuer Credit Rating	A-	2/22/2021	Downgrade | CreditWatch/Outlook	Watch Neg	2/22/2021
Issuer Credit Rating	A	5/13/2016	Upgrade | CreditWatch/Outlook	Stable	5/13/2016
Issuer Credit Rating	A-	10/8/2013	CreditWatch/Outlook	Positive	10/29/2015
Issuer Credit Rating	A-	10/8/2013	Upgrade | CreditWatch/Outlook	Stable	10/8/2013
Issuer Credit Rating	BBB+	12/23/2008	Upgrade | CreditWatch/Outlook	Stable	12/23/2008
Issuer Credit Rating	BBB	9/30/2004	CreditWatch/Outlook	Positive	6/11/2007
Issuer Credit Rating	BBB	9/30/2004	Downgrade | CreditWatch/Outlook	Stable	9/30/2004
Issuer Credit Rating	A-	7/18/1997	CreditWatch/Outlook	Watch Neg	6/17/2004
Issuer Credit Rating	A-	7/18/1997	CreditWatch/Outlook	Negative	1/10/2003
Issuer Credit Rating	A-	7/18/1997	CreditWatch/Outlook	Stable	5/15/2001
Issuer Credit Rating	A-	7/18/1997	CreditWatch/Outlook	Watch Neg	4/17/2000
Issuer Credit Rating	A-	7/18/1997	New Rating | CreditWatch/Outlook	Stable	7/18/1997
Local Currency LT					
Issuer Credit Rating	A-	2/22/2021	CreditWatch/Outlook	Negative	3/11/2021
Issuer Credit Rating	A-	2/22/2021	Downgrade | CreditWatch/Outlook	Watch Neg	2/22/2021
Issuer Credit Rating	A	5/13/2016	Upgrade | CreditWatch/Outlook	Stable	5/13/2016
Issuer Credit Rating	A-	10/8/2013	CreditWatch/Outlook	Positive	10/29/2015
Issuer Credit Rating	A-	10/8/2013	Upgrade | CreditWatch/Outlook	Stable	10/8/2013
Issuer Credit Rating	BBB+	12/23/2008	Upgrade | CreditWatch/Outlook	Stable	12/23/2008
Issuer Credit Rating	BBB	9/30/2004	CreditWatch/Outlook	Positive	6/11/2007
Issuer Credit Rating	BBB	9/30/2004	Downgrade | CreditWatch/Outlook	Stable	9/30/2004
Issuer Credit Rating	A-	7/18/1997	CreditWatch/Outlook	Watch Neg	6/17/2004
Issuer Credit Rating	A-	7/18/1997	CreditWatch/Outlook	Negative	1/10/2003
Issuer Credit Rating	A-	7/18/1997	CreditWatch/Outlook	Stable	5/15/2001
Issuer Credit Rating	A-	7/18/1997	CreditWatch/Outlook	Watch Neg	4/17/2000
Issuer Credit Rating	A-	7/18/1997	New Rating | CreditWatch/Outlook	Stable	7/18/1997
Foreign Currency ST					
Issuer Credit Rating	A-2	2/22/2021	Downgrade		

Atmos Energy Corporation | Credit Ratings

RATING TYPE	RATING	RATING DATE	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating	A-1	5/13/2016	Upgrade		
Issuer Credit Rating	A-2	10/16/1998	CreditWatch/Outlook	NM	9/30/2004
Issuer Credit Rating	A-2	10/16/1998	CreditWatch/Outlook	Watch Neg	6/17/2004
Issuer Credit Rating	A-2	10/16/1998	New Rating		
Local Currency ST					
Issuer Credit Rating	A-2	2/22/2021	Downgrade		
Issuer Credit Rating	A-1	5/13/2016	Upgrade		
Issuer Credit Rating	A-2	10/16/1998	CreditWatch/Outlook	NM	9/30/2004
Issuer Credit Rating	A-2	10/16/1998	CreditWatch/Outlook	Watch Neg	6/17/2004
Issuer Credit Rating	A-2	10/16/1998	New Rating		

MOODY'S

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Outlook		**2/25/2021**		**Negative**
Outlook		12/16/2019		Stable
Outlook		12/14/2018		Positive
Outlook		1/30/2014		Stable
Outlook		11/8/2013		Ratings Under Review
Outlook		5/11/2011		Stable
Outlook		3/31/2011		Ratings Under Review
Outlook		3/19/2010		Positive
Outlook		5/18/2009		Stable
Outlook		3/23/2009		Ratings Under Review
Outlook		1/8/2009		Positive
Outlook		9/29/2004		Stable
Outlook		6/17/2004		Ratings Under Review
Outlook		11/15/2003		Stable

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
Txu Gas Capital Iv	Moody's	Long Term Rating (BACKED Pref. Shelf Domestic)	WR	10/4/2004				

Market Intelligence News

HEADLINE	DATE
Atmos Energy downgraded by S&P Global Ratings on winter storm gas costs The rating agency expects the company's financial measures to "materially weaken" after the eight-state gas utility operator spent up to	2/22/2021 5:37:00 PM ET

Atmos Energy Corporation | Credit Ratings

HEADLINE	DATE
$3.5 billion to procure natural gas at elevated prices.	
Gas utility stocks still boast elevated multiples and attractive dividends, analysts say, but their burgeoning reliance on debt after share prices collapsed prompted UBS to stop awarding the group a bonus for balance sheet strength. Market sell-off crushing 1 pillar of gas utilities' valuations, analysts say	4/8/2020 11:50:00 AM ET

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New Jersey Resources Corporation | Credit Ratings

NYSE:NJR (MI KEY: 4057128; SPCIQ KEY: 291335)

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
New Jersey Natural Gas Co.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	NR	5/27/2019	5/27/2019	BBB+	NR	5/27/2019
	Moody's	Long Term Rating (Senior Secured Domestic)	A1	3/18/2020				

Market Intelligence News

HEADLINE	DATE
CreditSights analysts said nearly one-third of 58 utilities with at least 100,000 customers are at higher risk of regulatory and political pushback against natural gas use, evident in building gas bans and pipeline opposition. Report identifies 20 utilities most at risk from rising anti-gas sentiment	7/13/2020 1:12:00 PM ET

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Northwest Natural Holding Company | Credit Ratings

NYSE:NWN (MI KEY: 4057132; SPCIQ KEY: 292047)

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
Northwest Energy Corp.	Moody's	Long Term Rating (Pref. Stock)	WR	11/23/1983				
Northwest Natural Gas Co.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	A+	1/25/2010	5/18/2021	AA-	Stable	1/25/2010
	Moody's	Long Term Rating (Senior Unsec. Shelf Domestic)	(P)Baa1	5/17/2019				

Market Intelligence News

HEADLINE	DATE
CreditSights analysts said nearly one-third of 58 utilities with at least 100,000 customers are at higher risk of regulatory and political pushback against natural gas use, evident in building gas bans and pipeline opposition. Report identifies 20 utilities most at risk from rising anti-gas sentiment	7/13/2020 1:12:00 PM ET
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ONE Gas, Inc. | Credit Ratings

NYSE:OGS (MI KEY: 4427129; SPCIQ KEY: 243685856)

BBB+

S&P Global Ratings

Issuer Credit Rating (Foreign Currency LT)
2/23/2021

Downgrade | CreditWatch/Outlook: Negative
2/23/2021

A3

Moody's

Long Term Rating (Senior Unsecured Domestic)
2/23/2021

Outlook:

Current Ratings

S&P GLOBAL RATINGS (S&P Entity Name:ONE Gas Inc.)

RATING TYPE	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating							
Foreign Currency LT	BBB+	2/23/2021	9/28/2021	A	Downgrade | CreditWatch/Outlook	Negative	2/23/2021
Local Currency LT	BBB+	2/23/2021	9/28/2021	A	Downgrade | CreditWatch/Outlook	Negative	2/23/2021
Foreign Currency ST	A-2	2/23/2021	9/28/2021	A-1	Downgrade		
Local Currency ST	A-2	2/23/2021	9/28/2021	A-1	Downgrade		

MOODY'S

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Ratings Summary				
Long Term Rating (Senior Unsecured Domestic)	A3	2/23/2021	Downgrade	
Short Term Rating (Commercial Paper Domestic)	P-2	2/23/2021	Downgrade	
Outlook		2/23/2021		Negative
Ratings Detail				

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Commercial Paper (Domestic)	P-2	2/23/2021	Downgrade	
Senior Unsecured (Domestic)	A3	2/23/2021	Downgrade	
Senior Unsec. Shelf (Domestic)	WR	5/31/2020	Withdrawn	

Ratings History

S&P GLOBAL RATINGS (S&P Entity Name:ONE Gas Inc.)

RATING TYPE	RATING	RATING DATE	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Foreign Currency LT					
Issuer Credit Rating	BBB+	2/23/2021	Downgrade | CreditWatch/Outlook	Negative	2/23/2021
Issuer Credit Rating	A	8/16/2017	Upgrade | CreditWatch/Outlook	Stable	8/16/2017
Issuer Credit Rating	A-	1/9/2014	CreditWatch/Outlook	Positive	6/23/2016
Issuer Credit Rating	A-	1/9/2014	New Rating | CreditWatch/Outlook	Stable	1/9/2014
Local Currency LT					
Issuer Credit Rating	BBB+	2/23/2021	Downgrade | CreditWatch/Outlook	Negative	2/23/2021
Issuer Credit Rating	A	8/16/2017	Upgrade | CreditWatch/Outlook	Stable	8/16/2017
Issuer Credit Rating	A-	1/9/2014	CreditWatch/Outlook	Positive	6/23/2016
Issuer Credit Rating	A-	1/9/2014	New Rating | CreditWatch/Outlook	Stable	1/9/2014
Foreign Currency ST					
Issuer Credit Rating	A-2	2/23/2021	Downgrade		
Issuer Credit Rating	A-1	8/16/2017	Upgrade		
Issuer Credit Rating	A-2	9/4/2014	New Rating		
Local Currency ST					
Issuer Credit Rating	A-2	2/23/2021	Downgrade		
Issuer Credit Rating	A-1	8/16/2017	Upgrade		
Issuer Credit Rating	A-2	9/4/2014	New Rating		

MOODY'S

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Outlook		**2/23/2021**		**Negative**
Outlook		1/28/2019		Stable
Outlook		1/19/2018		Negative
Outlook		1/13/2014		Stable

Market Intelligence News

HEADLINE	DATE
S&P downgrades One Gas due to weather impacts on financial measures S&P Global Ratings has lowered the issuer credit rating of One Gas to BBB+ from A, with a negative outlook.	2/24/2021 10:26:00 AM ET
Moody's downgrades One Gas' ratings; outlook negative Moody's said the $2.2 billion that One Gas spent to procure gas during the recent deep freeze is nearly 30 times the amount the company would spend on gas in a typical February.	2/23/2021 7:02:00 PM ET
Gas utility stocks still boast elevated multiples and attractive dividends, analysts say, but their burgeoning reliance on debt after share prices collapsed prompted UBS to stop awarding the group a bonus for balance sheet strength. Market sell-off crushing 1 pillar of gas utilities' valuations, analysts say	4/8/2020 11:50:00 AM ET

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South Jersey Industries, Inc. | Credit Ratings

NYSE:SJI (MI KEY: 4057145; SPCIQ KEY: 303963)

BBB

S&P Global Ratings

Issuer Credit Rating (Foreign Currency LT)
7/2/2018

CreditWatch/Outlook: Stable
3/19/2021

Current Ratings

S&P GLOBAL RATINGS (S&P Entity Name:South Jersey Industries Inc.)

RATING TYPE	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating							
Foreign Currency LT	BBB	7/2/2018	9/28/2021	BBB	CreditWatch/Outlook	Stable	3/19/2021
Local Currency LT	BBB	7/2/2018	9/28/2021	BBB	CreditWatch/Outlook	Stable	3/19/2021

Ratings History

S&P GLOBAL RATINGS (S&P Entity Name:South Jersey Industries Inc.)

RATING TYPE	RATING	RATING DATE	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Foreign Currency LT					
Issuer Credit Rating	BBB	7/2/2018	CreditWatch/Outlook	Stable	3/19/2021
Issuer Credit Rating	BBB	7/2/2018	CreditWatch/Outlook	Negative	3/10/2020
Issuer Credit Rating	BBB	7/2/2018	Downgrade | CreditWatch/Outlook	Stable	7/2/2018
Issuer Credit Rating	BBB+	6/17/2011	CreditWatch/Outlook	Negative	10/17/2017
Issuer Credit Rating	BBB+	6/17/2011	New Rating | CreditWatch/Outlook	Stable	6/17/2011
Local Currency LT					
Issuer Credit Rating	BBB	7/2/2018	CreditWatch/Outlook	Stable	3/19/2021
Issuer Credit Rating	BBB	7/2/2018	CreditWatch/Outlook	Negative	3/10/2020
Issuer Credit Rating	BBB	7/2/2018	Downgrade | CreditWatch/Outlook	Stable	7/2/2018
Issuer Credit Rating	BBB+	6/17/2011	CreditWatch/Outlook	Negative	10/17/2017
Issuer Credit Rating	BBB+	6/17/2011	New Rating | CreditWatch/Outlook	Stable	6/17/2011

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
Elizabethtown Gas Co.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	BBB	9/5/2018	9/28/2021	BBB	Stable	3/19/2021
	Moody's	Long Term Rating (Senior Unsecured Domestic)	WR	9/30/1992				
SJI Utilities Inc.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	BBB	9/5/2018	9/28/2021	BBB	Stable	3/19/2021
South Jersey Gas Co.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	BBB	7/2/2018	9/28/2021	BBB	Stable	3/19/2021
	Moody's	Long Term Rating (LT Issuer Rating Domestic)	A3	2/1/2021				

South Jersey Industries, Inc. | Credit Ratings

Market Intelligence News

HEADLINE	DATE
South Jersey Industries outlook upgraded to stable at S&P Global Ratings While a recent equity offering announcement hammered shares of South Jersey Industries, S&P Global Ratings said the offering would strengthen the gas distributor's financial risk profile.	3/22/2021 2:21:00 PM ET
CreditSights analysts said nearly one-third of 58 utilities with at least 100,000 customers are at higher risk of regulatory and political pushback against natural gas use, evident in building gas bans and pipeline opposition. Report identifies 20 utilities most at risk from rising anti-gas sentiment	7/13/2020 1:12:00 PM ET

S&P Credit Ratings and Research provided by S&P Global Ratings

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Latest S&P Ratings available unless you are a subscriber of S&P Ratings history.

Southwest Gas Holdings, Inc. | Credit Ratings

NYSE:SWX (MI KEY: 4884928; SPCIQ KEY: 304227)

BBB-

S&P Global Ratings

Issuer Credit Rating (Foreign Currency LT)
8/27/2021

CreditWatch/Outlook: Negative
10/5/2021

Baa2

Moody's

Long Term Rating (LT Issuer Rating Domestic)
1/29/2021

Outlook:

Current Ratings

S&P GLOBAL RATINGS (S&P Entity Name:Southwest Gas Holdings Inc.)

RATING TYPE	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating							
Foreign Currency LT	BBB-	8/27/2021	10/5/2021	BBB-	CreditWatch/Outlook	Negative	10/5/2021
Local Currency LT	BBB-	8/27/2021	10/5/2021	BBB-	CreditWatch/Outlook	Negative	10/5/2021

MOODY'S

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Ratings Summary				
Long Term Rating (LT Issuer Rating Domestic)	Baa2	1/29/2021	Downgrade	
Outlook		1/29/2021		Stable
Ratings Detail				
LT Issuer Rating (Domestic)	Baa2	1/29/2021	Downgrade	

Ratings History

S&P GLOBAL RATINGS (S&P Entity Name:Southwest Gas Holdings Inc.)

RATING TYPE	RATING	RATING DATE	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Foreign Currency LT					
Issuer Credit Rating	BBB-	8/27/2021	CreditWatch/Outlook	Negative	10/5/2021
Issuer Credit Rating	BBB-	8/27/2021	Downgrade | CreditWatch/Outlook	Stable	8/27/2021
Issuer Credit Rating	BBB+	12/28/2016	CreditWatch/Outlook	Watch Neg	6/29/2021
Issuer Credit Rating	BBB+	12/28/2016	CreditWatch/Outlook	Stable	9/28/2020
Issuer Credit Rating	BBB+	12/28/2016	CreditWatch/Outlook	Negative	11/28/2018
Issuer Credit Rating	BBB+	12/28/2016	New Rating | CreditWatch/Outlook	Stable	12/28/2016
Local Currency LT					

Southwest Gas Holdings, Inc. | Credit Ratings

RATING TYPE	RATING	RATING DATE	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating	BBB-	8/27/2021	CreditWatch/Outlook	Negative	10/5/2021
Issuer Credit Rating	BBB-	8/27/2021	Downgrade | CreditWatch/Outlook	Stable	8/27/2021
Issuer Credit Rating	BBB+	12/28/2016	CreditWatch/Outlook	Watch Neg	6/29/2021
Issuer Credit Rating	BBB+	12/28/2016	CreditWatch/Outlook	Stable	9/28/2020
Issuer Credit Rating	BBB+	12/28/2016	CreditWatch/Outlook	Negative	11/28/2018
Issuer Credit Rating	BBB+	12/28/2016	New Rating | CreditWatch/Outlook	Stable	12/28/2016

MOODY'S

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
LT Issuer Rating (Domestic)	**Baa2**	**1/29/2021**	**Downgrade**	
LT Issuer Rating (Domestic)	Baa1	1/28/2020	Rating Affirmation	
LT Issuer Rating (Domestic)	Baa1	12/29/2016	New	
Outlook		**1/29/2021**		**Stable**
Outlook		1/28/2020		Negative
Outlook		12/29/2016		Stable

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
Centuri Group, Inc.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	BB-	8/6/2021	8/6/2021	New	Stable	8/6/2021
	Moody's	Long Term Rating (LT Corporate Family Ratings)	Ba2	8/6/2021				
Southwest Gas Capital III	Moody's	Long Term Rating (BACKED Pref. Shelf Domestic)	WR	1/7/2009				
Southwest Gas Capital IV	Moody's	Long Term Rating (BACKED Pref. Shelf Domestic)	WR	1/7/2009				
Southwest Gas Capital I	Moody's	Long Term Rating (BACKED Pref. Stock Domestic)	WR	9/24/2003				
Southwest Gas Capital II	Moody's	Long Term Rating (BACKED Pref. Stock Domestic)	WR	5/26/2010				
Southwest Gas Corp.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	BBB	8/27/2021	10/5/2021	BBB	Negative	10/5/2021
	Moody's	Long Term Rating (Senior Unsecured Domestic)	Baa1	1/29/2021				

Market Intelligence News

HEADLINE	DATE
CreditSights analysts said nearly one-third of 58 utilities with at least 100,000 customers are at higher risk of regulatory and political pushback against natural gas use, evident in building gas bans and pipeline opposition. Report identifies 20 utilities most at risk from rising anti-gas sentiment	7/13/2020 1:12:00 PM ET
Gas utility stocks still boast elevated multiples and attractive dividends, analysts say, but their burgeoning reliance on debt after share prices collapsed prompted UBS to stop awarding the group a bonus for balance sheet strength. Market sell-off crushing 1 pillar of gas utilities' valuations, analysts say	4/8/2020 11:50:00 AM ET
Regulatory delays, new rules bite deeply into Southwest Gas' Q3'19 results Shares of Southwest Gas dipped after the company missed earnings expectations. Executives blamed changing natural gas infrastructure rules in the Northeast U.S. and the delay of two Arizona pipe replacement cases.	11/7/2019 3:24:00 PM ET

S&P Credit Ratings and Research provided by S&P Global Ratings

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Latest S&P Ratings available unless you are a subscriber of S&P Ratings history.

Spire Inc. | Credit Ratings

NYSE:SR (MI KEY: 4002506; SPCIQ KEY: 284847)

A-

S&P Global Ratings

Issuer Credit Rating (Foreign Currency LT)
7/19/2013

CreditWatch/Outlook: Stable
6/13/2014

Baa2

Moody's

Long Term Rating (Senior Unsecured Domestic)
8/12/2014

Outlook:

Current Ratings

S&P GLOBAL RATINGS (S&P Entity Name:Spire Inc.)

RATING TYPE	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating							
Foreign Currency LT	A-	7/19/2013	6/24/2021	A-	CreditWatch/Outlook	Stable	6/13/2014
Local Currency LT	A-	7/19/2013	6/24/2021	A-	CreditWatch/Outlook	Stable	6/13/2014
Foreign Currency ST	A-2	12/22/2016	6/24/2021	New	New Rating		
Local Currency ST	A-2	12/22/2016	6/24/2021	New	New Rating		

MOODY'S

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Ratings Summary				
Short Term Rating (Commercial Paper Domestic)	P-2	12/22/2016	New	
Long Term Rating (Senior Unsecured Domestic)	Baa2	8/12/2014	New	
Outlook		7/22/2014		Stable
Ratings Detail				
Pref. Stock (Domestic)	Ba1	5/14/2019	New	
Senior Unsec. Shelf (Domestic)	WR	6/2/2017	Withdrawn	
Subordinate Shelf (Domestic)	WR	6/2/2017	Withdrawn	
Pref. Shelf (Domestic)	WR	6/2/2017	Withdrawn	
Commercial Paper (Domestic)	P-2	12/22/2016	New	
Senior Unsecured (Domestic)	Baa2	8/12/2014	New	

Ratings History

S&P GLOBAL RATINGS (S&P Entity Name:Spire Inc.)

Spire Inc. | Credit Ratings

RATING TYPE	RATING	RATING DATE	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Foreign Currency LT					
Issuer Credit Rating	A-	7/19/2013	CreditWatch/Outlook	Stable	6/13/2014
Issuer Credit Rating	A-	7/19/2013	CreditWatch/Outlook	Watch Neg	4/7/2014
Issuer Credit Rating	A-	7/19/2013	Downgrade | CreditWatch/Outlook	Stable	7/19/2013
Issuer Credit Rating	A	5/5/2003	CreditWatch/Outlook	Watch Neg	4/4/2013
Issuer Credit Rating	A	5/5/2003	CreditWatch/Outlook	Negative	12/17/2012
Issuer Credit Rating	A	5/5/2003	Downgrade | CreditWatch/Outlook	Stable	5/5/2003
Issuer Credit Rating	A+	4/24/2002	New Rating | CreditWatch/Outlook	Stable	4/24/2002
Local Currency LT					
Issuer Credit Rating	A-	7/19/2013	CreditWatch/Outlook	Stable	6/13/2014
Issuer Credit Rating	A-	7/19/2013	CreditWatch/Outlook	Watch Neg	4/7/2014
Issuer Credit Rating	A-	7/19/2013	Downgrade | CreditWatch/Outlook	Stable	7/19/2013
Issuer Credit Rating	A	5/5/2003	CreditWatch/Outlook	Watch Neg	4/4/2013
Issuer Credit Rating	A	5/5/2003	CreditWatch/Outlook	Negative	12/17/2012
Issuer Credit Rating	A	5/5/2003	Downgrade | CreditWatch/Outlook	Stable	5/5/2003
Issuer Credit Rating	A+	4/24/2002	New Rating | CreditWatch/Outlook	Stable	4/24/2002
Foreign Currency ST					
Issuer Credit Rating	A-2	12/22/2016	New Rating		
Local Currency ST					
Issuer Credit Rating	A-2	12/22/2016	New Rating		

MOODY'S

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Outlook		**7/22/2014**		**Stable**
Outlook		4/7/2014		Negative
Outlook		1/31/2014		Stable
Outlook		11/8/2013		Ratings Under Review
Outlook		7/26/2013		Stable
Outlook		12/17/2012		Negative
Outlook		11/15/2003		Stable

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
Laclede Capital Trust I	Moody's	Long Term Rating (BACKED Pref. Stock Domestic)	WR	5/5/2008				
Spire Alabama Inc.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	A-	9/2/2014	6/24/2021	BBB-	Stable	9/2/2014
	Moody's	Long Term Rating (Senior Unsecured Domestic)	A2	7/30/2019				
Spire Missouri Inc.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	A-	7/19/2013	6/24/2021	A-	Stable	6/13/2014
	Moody's	Long Term Rating (First Mortgage Bonds Domestic)	A1	7/30/2019				

Market Intelligence News

HEADLINE	DATE
Spire pipeline setback slams stock price, but analysts see path forward While a court decision to vacate a Federal Energy Regulatory Commission	6/23/2021 4:41:00 PM ET

Spire Inc. | Credit Ratings

HEADLINE	DATE
certificate for the STL pipeline creates a new headache for Spire, some analysts expect Spire to prevail in showing the infrastructure provides valuable supply diversification.	

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South Jersey Industries, Inc. | Credit Ratings

NYSE:SJI (MI KEY: 4057145; SPCIQ KEY: 303963)

BBB

S&P Global Ratings

Issuer Credit Rating (Foreign Currency LT)
7/2/2018

CreditWatch/Outlook: Stable
3/19/2021

Current Ratings

S&P GLOBAL RATINGS (S&P Entity Name:South Jersey Industries Inc.)

RATING TYPE	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating							
Foreign Currency LT	BBB	7/2/2018	9/28/2021	BBB	CreditWatch/Outlook	Stable	3/19/2021
Local Currency LT	BBB	7/2/2018	9/28/2021	BBB	CreditWatch/Outlook	Stable	3/19/2021

Ratings History

S&P GLOBAL RATINGS (S&P Entity Name:South Jersey Industries Inc.)

RATING TYPE	RATING	RATING DATE	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Foreign Currency LT					
Issuer Credit Rating	BBB	7/2/2018	CreditWatch/Outlook	Stable	3/19/2021
Issuer Credit Rating	BBB	7/2/2018	CreditWatch/Outlook	Negative	3/10/2020
Issuer Credit Rating	BBB	7/2/2018	Downgrade | CreditWatch/Outlook	Stable	7/2/2018
Issuer Credit Rating	BBB+	6/17/2011	CreditWatch/Outlook	Negative	10/17/2017
Issuer Credit Rating	BBB+	6/17/2011	New Rating | CreditWatch/Outlook	Stable	6/17/2011
Local Currency LT					
Issuer Credit Rating	BBB	7/2/2018	CreditWatch/Outlook	Stable	3/19/2021
Issuer Credit Rating	BBB	7/2/2018	CreditWatch/Outlook	Negative	3/10/2020
Issuer Credit Rating	BBB	7/2/2018	Downgrade | CreditWatch/Outlook	Stable	7/2/2018
Issuer Credit Rating	BBB+	6/17/2011	CreditWatch/Outlook	Negative	10/17/2017
Issuer Credit Rating	BBB+	6/17/2011	New Rating | CreditWatch/Outlook	Stable	6/17/2011

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
Elizabethtown Gas Co.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	BBB	9/5/2018	9/28/2021	BBB	Stable	3/19/2021
	Moody's	Long Term Rating (Senior Unsecured Domestic)	WR	9/30/1992				
SJI Utilities Inc.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	BBB	9/5/2018	9/28/2021	BBB	Stable	3/19/2021
South Jersey Gas Co.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	BBB	7/2/2018	9/28/2021	BBB	Stable	3/19/2021
	Moody's	Long Term Rating (LT Issuer Rating Domestic)	A3	2/1/2021				

South Jersey Industries, Inc. | Credit Ratings

Market Intelligence News

HEADLINE	DATE
South Jersey Industries outlook upgraded to stable at S&P Global Ratings While a recent equity offering announcement hammered shares of South Jersey Industries, S&P Global Ratings said the offering would strengthen the gas distributor's financial risk profile.	3/22/2021 2:21:00 PM ET
CreditSights analysts said nearly one-third of 58 utilities with at least 100,000 customers are at higher risk of regulatory and political pushback against natural gas use, evident in building gas bans and pipeline opposition. Report identifies 20 utilities most at risk from rising anti-gas sentiment	7/13/2020 1:12:00 PM ET

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Spire Inc. | Credit Ratings

NYSE:SR (MI KEY: 4002506; SPCIQ KEY: 284847)

A-

S&P Global Ratings

Issuer Credit Rating (Foreign Currency LT)
7/19/2013

CreditWatch/Outlook: Stable
6/13/2014

Baa2

Moody's

Long Term Rating (Senior Unsecured Domestic)
8/12/2014

Outlook:

Current Ratings

S&P GLOBAL RATINGS (S&P Entity Name:Spire Inc.)

RATING TYPE	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating							
Foreign Currency LT	A-	7/19/2013	6/24/2021	A-	CreditWatch/Outlook	Stable	6/13/2014
Local Currency LT	A-	7/19/2013	6/24/2021	A-	CreditWatch/Outlook	Stable	6/13/2014
Foreign Currency ST	A-2	12/22/2016	6/24/2021	New	New Rating		
Local Currency ST	A-2	12/22/2016	6/24/2021	New	New Rating		

MOODY'S

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Ratings Summary				
Short Term Rating (Commercial Paper Domestic)	P-2	12/22/2016	New	
Long Term Rating (Senior Unsecured Domestic)	Baa2	8/12/2014	New	
Outlook		7/22/2014		Stable
Ratings Detail				
Pref. Stock (Domestic)	Ba1	5/14/2019	New	
Senior Unsec. Shelf (Domestic)	WR	6/2/2017	Withdrawn	
Subordinate Shelf (Domestic)	WR	6/2/2017	Withdrawn	
Pref. Shelf (Domestic)	WR	6/2/2017	Withdrawn	
Commercial Paper (Domestic)	P-2	12/22/2016	New	
Senior Unsecured (Domestic)	Baa2	8/12/2014	New	

Ratings History

S&P GLOBAL RATINGS (S&P Entity Name:Spire Inc.)

Spire Inc. | Credit Ratings

RATING TYPE	RATING	RATING DATE	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Foreign Currency LT					
Issuer Credit Rating	A-	7/19/2013	CreditWatch/Outlook	Stable	6/13/2014
Issuer Credit Rating	A-	7/19/2013	CreditWatch/Outlook	Watch Neg	4/7/2014
Issuer Credit Rating	A-	7/19/2013	Downgrade | CreditWatch/Outlook	Stable	7/19/2013
Issuer Credit Rating	A	5/5/2003	CreditWatch/Outlook	Watch Neg	4/4/2013
Issuer Credit Rating	A	5/5/2003	CreditWatch/Outlook	Negative	12/17/2012
Issuer Credit Rating	A	5/5/2003	Downgrade | CreditWatch/Outlook	Stable	5/5/2003
Issuer Credit Rating	A+	4/24/2002	New Rating | CreditWatch/Outlook	Stable	4/24/2002
Local Currency LT					
Issuer Credit Rating	A-	7/19/2013	CreditWatch/Outlook	Stable	6/13/2014
Issuer Credit Rating	A-	7/19/2013	CreditWatch/Outlook	Watch Neg	4/7/2014
Issuer Credit Rating	A-	7/19/2013	Downgrade | CreditWatch/Outlook	Stable	7/19/2013
Issuer Credit Rating	A	5/5/2003	CreditWatch/Outlook	Watch Neg	4/4/2013
Issuer Credit Rating	A	5/5/2003	CreditWatch/Outlook	Negative	12/17/2012
Issuer Credit Rating	A	5/5/2003	Downgrade | CreditWatch/Outlook	Stable	5/5/2003
Issuer Credit Rating	A+	4/24/2002	New Rating | CreditWatch/Outlook	Stable	4/24/2002
Foreign Currency ST					
Issuer Credit Rating	A-2	12/22/2016	New Rating		
Local Currency ST					
Issuer Credit Rating	A-2	12/22/2016	New Rating		

MOODY'S

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Outlook		**7/22/2014**		**Stable**
Outlook		4/7/2014		Negative
Outlook		1/31/2014		Stable
Outlook		11/8/2013		Ratings Under Review
Outlook		7/26/2013		Stable
Outlook		12/17/2012		Negative
Outlook		11/15/2003		Stable

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
Laclede Capital Trust I	Moody's	Long Term Rating (BACKED Pref. Stock Domestic)	WR	5/5/2008				
Spire Alabama Inc.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	A-	9/2/2014	6/24/2021	BBB-	Stable	9/2/2014
	Moody's	Long Term Rating (Senior Unsecured Domestic)	A2	7/30/2019				
Spire Missouri Inc.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	A-	7/19/2013	6/24/2021	A-	Stable	6/13/2014
	Moody's	Long Term Rating (First Mortgage Bonds Domestic)	A1	7/30/2019				

Market Intelligence News

HEADLINE	DATE
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Spire Inc. | Credit Ratings

HEADLINE	DATE
certificate for the STL pipeline creates a new headache for Spire, some analysts expect Spire to prevail in showing the infrastructure provides valuable supply diversification.	

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Latest S&P Ratings available unless you are a subscriber of S&P Ratings history.

Southwest Gas Holdings, Inc. | Credit Ratings

NYSE:SWX (MI KEY: 4884928; SPCIQ KEY: 304227)

BBB-

S&P Global Ratings

Issuer Credit Rating (Foreign Currency LT)
8/27/2021

CreditWatch/Outlook: Negative
10/5/2021

Baa2

Moody's

Long Term Rating (LT Issuer Rating Domestic)
1/29/2021

Outlook:

Current Ratings

S&P GLOBAL RATINGS (S&P Entity Name:Southwest Gas Holdings Inc.)

RATING TYPE	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating							
Foreign Currency LT	BBB-	8/27/2021	10/5/2021	BBB-	CreditWatch/Outlook	Negative	10/5/2021
Local Currency LT	BBB-	8/27/2021	10/5/2021	BBB-	CreditWatch/Outlook	Negative	10/5/2021

MOODY'S

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
Ratings Summary				
Long Term Rating (LT Issuer Rating Domestic)	Baa2	1/29/2021	Downgrade	
Outlook		1/29/2021		Stable
Ratings Detail				
LT Issuer Rating (Domestic)	Baa2	1/29/2021	Downgrade	

Ratings History

S&P GLOBAL RATINGS (S&P Entity Name:Southwest Gas Holdings Inc.)

RATING TYPE	RATING	RATING DATE	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Foreign Currency LT					
Issuer Credit Rating	BBB-	8/27/2021	CreditWatch/Outlook	Negative	10/5/2021
Issuer Credit Rating	BBB-	8/27/2021	Downgrade | CreditWatch/Outlook	Stable	8/27/2021
Issuer Credit Rating	BBB+	12/28/2016	CreditWatch/Outlook	Watch Neg	6/29/2021
Issuer Credit Rating	BBB+	12/28/2016	CreditWatch/Outlook	Stable	9/28/2020
Issuer Credit Rating	BBB+	12/28/2016	CreditWatch/Outlook	Negative	11/28/2018
Issuer Credit Rating	BBB+	12/28/2016	New Rating | CreditWatch/Outlook	Stable	12/28/2016
Local Currency LT					

Southwest Gas Holdings, Inc. | Credit Ratings

RATING TYPE	RATING	RATING DATE	ACTION	CREDITWATCH/ OUTLOOK	CREDITWATCH/ OUTLOOK DATE
Issuer Credit Rating	BBB-	8/27/2021	CreditWatch/Outlook	Negative	10/5/2021
Issuer Credit Rating	BBB-	8/27/2021	Downgrade | CreditWatch/Outlook	Stable	8/27/2021
Issuer Credit Rating	BBB+	12/28/2016	CreditWatch/Outlook	Watch Neg	6/29/2021
Issuer Credit Rating	BBB+	12/28/2016	CreditWatch/Outlook	Stable	9/28/2020
Issuer Credit Rating	BBB+	12/28/2016	CreditWatch/Outlook	Negative	11/28/2018
Issuer Credit Rating	BBB+	12/28/2016	New Rating | CreditWatch/Outlook	Stable	12/28/2016

MOODY'S

RATING TYPE	RATING	DATE	ACTION	OUTLOOK
LT Issuer Rating (Domestic)	**Baa2**	**1/29/2021**	**Downgrade**	
LT Issuer Rating (Domestic)	Baa1	1/28/2020	Rating Affirmation	
LT Issuer Rating (Domestic)	Baa1	12/29/2016	New	
Outlook		**1/29/2021**		**Stable**
Outlook		1/28/2020		Negative
Outlook		12/29/2016		Stable

Subsidiaries

SUBSIDIARY	AGENCY	DEBT TYPE (RATING TYPE)	RATING	RATING DATE	LAST REVIEW DATE	PREVIOUS RATING	CREDITWATCH / OUTLOOK	CREDITWATCH / OUTLOOK DATE
Centuri Group, Inc.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	BB-	8/6/2021	8/6/2021	New	Stable	8/6/2021
	Moody's	Long Term Rating (LT Corporate Family Ratings)	Ba2	8/6/2021				
Southwest Gas Capital III	Moody's	Long Term Rating (BACKED Pref. Shelf Domestic)	WR	1/7/2009				
Southwest Gas Capital IV	Moody's	Long Term Rating (BACKED Pref. Shelf Domestic)	WR	1/7/2009				
Southwest Gas Capital I	Moody's	Long Term Rating (BACKED Pref. Stock Domestic)	WR	9/24/2003				
Southwest Gas Capital II	Moody's	Long Term Rating (BACKED Pref. Stock Domestic)	WR	5/26/2010				
Southwest Gas Corp.	S&P Global Ratings	Issuer Credit Rating (Foreign Currency LT)	BBB	8/27/2021	10/5/2021	BBB	Negative	10/5/2021
	Moody's	Long Term Rating (Senior Unsecured Domestic)	Baa1	1/29/2021				

Market Intelligence News

HEADLINE	DATE
CreditSights analysts said nearly one-third of 58 utilities with at least 100,000 customers are at higher risk of regulatory and political pushback against natural gas use, evident in building gas bans and pipeline opposition. Report identifies 20 utilities most at risk from rising anti-gas sentiment	7/13/2020 1:12:00 PM ET
Gas utility stocks still boast elevated multiples and attractive dividends, analysts say, but their burgeoning reliance on debt after share prices collapsed prompted UBS to stop awarding the group a bonus for balance sheet strength. Market sell-off crushing 1 pillar of gas utilities' valuations, analysts say	4/8/2020 11:50:00 AM ET
Regulatory delays, new rules bite deeply into Southwest Gas' Q3'19 results Shares of Southwest Gas dipped after the company missed earnings expectations. Executives blamed changing natural gas infrastructure rules in the Northeast U.S. and the delay of two Arizona pipe replacement cases.	11/7/2019 3:24:00 PM ET

S&P Credit Ratings and Research provided by S&P Global Ratings

'Last Review Date' indicates the date on which an Issue/Issuer Credit Rating was last formally reviewed within a twelve-month period or when a Credit Rating Action was last published. For certain dependent instruments, the 'Last Review Date' will only be updated in the event of a Credit Rating change of the linked organization.

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Part 1
Summary & Index

File at the front of the *Ratings & Reports* binder. Last week's *Summary & Index* should be removed.

October 1, 2021

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SCREENS

The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

18.2

26 Weeks Ago	Market Low 3-23-20	Market High 9-2-21
22.0	11.0	19.0

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

1.9%

26 Weeks Ago	Market Low 3-23-20	Market High 9-2-21
1.8%	3.7%	1.8%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all 1700 stocks in the VL Universe

40%

26 Weeks Ago	Market Low 3-23-20	Market High 9-2-21
30%	145%	35%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all 1700 stocks in the VL Universe

17%

26 Weeks Ago	Market Low 3-23-20	Market High 9-2-21
5%	72%	12%

ANALYSES OF INDUSTRIES IN ALPHABETICAL ORDER WITH PAGE NUMBER

Numeral in parenthesis after the industry is rank for probable performance (next 12 months).

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September 24, 2021

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SCREENS

The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

18.5

26 Weeks Ago	Market Low 3-23-20	Market High 8-30-21
22.1	11.0	19.1

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

1.8%

26 Weeks Ago	Market Low 3-23-20	Market High 8-30-21
1.8%	3.7%	1.8%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all 1700 stocks in the VL Universe

35%

26 Weeks Ago	Market Low 3-23-20	Market High 8-30-21
25%	145%	35%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all 1700 stocks in the VL Universe

13%

26 Weeks Ago	Market Low 3-23-20	Market High 8-30-21
0%	72%	10%

ANALYSES OF INDUSTRIES IN ALPHABETICAL ORDER WITH PAGE NUMBER

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September 17, 2021

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Summary & Index Page Number

SCREENS

The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

19.0

26 Weeks Ago	Market Low 3-23-20	Market High 8-30-21
21.5	11.0	19.1

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

1.8%

26 Weeks Ago	Market Low 3-23-20	Market High 8-30-21
1.8%	3.7%	1.8%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all 1700 stocks in the VL Universe

35%

26 Weeks Ago	Market Low 3-23-20	Market High 8-30-21
30%	145%	35%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all 1700 stocks in the VL Universe

12%

26 Weeks Ago	Market Low 3-23-20	Market High 8-30-21
5%	72%	10%

ANALYSES OF INDUSTRIES IN ALPHABETICAL ORDER WITH PAGE NUMBER

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September 10, 2021

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Summary & Index Page Number

SCREENS

The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

19.1

26 Weeks Ago	Market Low	Market High
21.5	3-23-20 11.0	7-26-21 19.4

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

1.8%

26 Weeks Ago	Market Low	Market High
1.9%	3-23-20 3.7%	7-26-21 1.8%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all 1700 stocks in the VL Universe

35%

26 Weeks Ago	Market Low	Market High
30%	3-23-20 145%	7-26-21 35%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all 1700 stocks in the VL Universe

10%

26 Weeks Ago	Market Low	Market High
3%	3-23-20 72%	7-26-21 13%

ANALYSES OF INDUSTRIES IN ALPHABETICAL ORDER WITH PAGE NUMBER

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File at the front of the *Ratings & Reports* binder. Last week's *Summary & Index* should be removed.

September 3, 2021

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Summary & Index Page Number

SCREENS

The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

18.8

26 Weeks Ago	Market Low 3-23-20	Market High 7-26-21
21.4	11.0	19.4

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

1.8%

26 Weeks Ago	Market Low 3-23-20	Market High 7-26-21
1.9%	3.7%	1.8%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all 1700 stocks in the VL Universe

35%

26 Weeks Ago	Market Low 3-23-20	Market High 7-26-21
30%	145%	35%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all 1700 stocks in the VL Universe

12%

26 Weeks Ago	Market Low 3-23-20	Market High 7-26-21
4%	72%	13%

ANALYSES OF INDUSTRIES IN ALPHABETICAL ORDER WITH PAGE NUMBER

Numeral in parenthesis after the industry is rank for probable performance (next 12 months).

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August 27, 2021

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Summary & Index Page Number

SCREENS

The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

19.1

26 Weeks Ago	Market Low	Market High
21.3	3-23-20 11.0	7-26-21 19.4

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

1.8%

26 Weeks Ago	Market Low	Market High
1.9%	3-23-20 3.7%	7-26-21 1.8%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all 1700 stocks in the VL Universe

35%

26 Weeks Ago	Market Low	Market High
30%	3-23-20 145%	7-26-21 35%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all 1700 stocks in the VL Universe

10%

26 Weeks Ago	Market Low	Market High
3%	3-23-20 72%	7-26-21 13%

ANALYSES OF INDUSTRIES IN ALPHABETICAL ORDER WITH PAGE NUMBER

Numeral in parenthesis after the industry is rank for probable performance (next 12 months).

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August 20, 2021

TABLE OF SUMMARY & INDEX CONTENTS

SCREENS

The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

19.1

26 Weeks Ago	Market Low	Market High
21.4	3-23-20 11.0	7-26-21 19.4

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

1.8%

26 Weeks Ago	Market Low	Market High
1.9%	3-23-20 3.7%	7-26-21 1.8%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all 1700 stocks in the VL Universe

35%

26 Weeks Ago	Market Low	Market High
30%	3-23-20 145%	7-26-21 35%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all 1700 stocks in the VL Universe

11%

26 Weeks Ago	Market Low	Market High
3%	3-23-20 72%	7-26-21 13%

ANALYSES OF INDUSTRIES IN ALPHABETICAL ORDER WITH PAGE NUMBER

Numeral in parenthesis after the industry is rank for probable performance (next 12 months).

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August 13, 2021

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Summary & Index Page Number

SCREENS

The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

19.2

26 Weeks Ago	Market Low	Market High
20.5	3-23-20 11.0	7-26-21 19.4

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

1.8%

26 Weeks Ago	Market Low	Market High
2.0%	3-23-20 3.7%	7-26-21 1.8%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all 1700 stocks in the VL Universe

35%

26 Weeks Ago	Market Low	Market High
35%	3-23-20 145%	7-26-21 35%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all 1700 stocks in the VL Universe

12%

26 Weeks Ago	Market Low	Market High
9%	3-23-20 72%	7-26-21 13%

ANALYSES OF INDUSTRIES IN ALPHABETICAL ORDER WITH PAGE NUMBER

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Part 1
Summary & Index

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August 6, 2021

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SCREENS

The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

19.4

26 Weeks Ago	Market Low 3-23-20	Market High 7-12-21
21.7	11.0	19.8

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

1.8%

26 Weeks Ago	Market Low 3-23-20	Market High 7-12-21
1.9%	3.7%	1.8%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all 1700 stocks in the VL Universe

35%

26 Weeks Ago	Market Low 3-23-20	Market High 7-12-21
25%	145%	30%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all 1700 stocks in the VL Universe

13%

26 Weeks Ago	Market Low 3-23-20	Market High 7-12-21
6%	72%	12%

ANALYSES OF INDUSTRIES IN ALPHABETICAL ORDER WITH PAGE NUMBER

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Part 1
Summary & Index

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July 30, 2021

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Summary & Index Page Number

SCREENS

The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

19.0

26 Weeks Ago	Market Low 3-23-20	Market High 7-12-21
21.6	11.0	19.8

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

1.9%

26 Weeks Ago	Market Low 3-23-20	Market High 7-12-21
1.9%	3.7%	1.8%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all 1700 stocks in the VL Universe

40%

26 Weeks Ago	Market Low 3-23-20	Market High 7-12-21
25%	145%	30%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all 1700 stocks in the VL Universe

16%

26 Weeks Ago	Market Low 3-23-20	Market High 7-12-21
6%	72%	12%

ANALYSES OF INDUSTRIES IN ALPHABETICAL ORDER WITH PAGE NUMBER

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July 23, 2021

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SCREENS

The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

19.8

26 Weeks Ago	Market Low 3-23-20	Market High 6-14-21
21.7	11.0	21.1

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

1.8%

26 Weeks Ago	Market Low 3-23-20	Market High 6-14-21
1.9%	3.7%	1.7%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all 1700 stocks in the VL Universe

30%

26 Weeks Ago	Market Low 3-23-20	Market High 6-14-21
25%	145%	30%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all 1700 stocks in the VL Universe

12%

26 Weeks Ago	Market Low 3-23-20	Market High 6-14-21
6%	72%	7%

ANALYSES OF INDUSTRIES IN ALPHABETICAL ORDER WITH PAGE NUMBER

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July 16, 2021

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SCREENS

The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

20.3

26 Weeks Ago	Market Low 3-23-20	Market High 6-14-21
21.1	11.0	21.1

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

1.7%

26 Weeks Ago	Market Low 3-23-20	Market High 6-14-21
2.0%	3.7%	1.7%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all 1700 stocks in the VL Universe

30%

26 Weeks Ago	Market Low 3-23-20	Market High 6-14-21
30%	145%	30%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all 1700 stocks in the VL Universe

12%

26 Weeks Ago	Market Low 3-23-20	Market High 6-14-21
11%	72%	7%

ANALYSES OF INDUSTRIES IN ALPHABETICAL ORDER WITH PAGE NUMBER

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July 9, 2021

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SCREENS

The Median of Estimated **PRICE-EARNINGS RATIOS** of all stocks with earnings

20.5

26 Weeks Ago	Market Low 3-23-20	Market High 6-14-21
21.3	11.0	21.1

The Median of Estimated **DIVIDEND YIELDS** (next 12 months) of all dividend paying stocks

1.7%

26 Weeks Ago	Market Low 3-23-20	Market High 6-14-21
2.0%	3.7%	1.7%

The Median Estimated **THREE-TO-FIVE YEAR PRICE APPRECIATION POTENTIAL** of all 1700 stocks in the VL Universe

30%

26 Weeks Ago	Market Low 3-23-20	Market High 6-14-21
30%	145%	30%

The Median Estimated **18-MONTH APPRECIATION POTENTIAL TO TARGET PRICE RANGE** of all 1700 stocks in the VL Universe

11%

26 Weeks Ago	Market Low 3-23-20	Market High 6-14-21
7%	72%	7%

ANALYSES OF INDUSTRIES IN ALPHABETICAL ORDER WITH PAGE NUMBER

Numeral in parenthesis after the industry is rank for probable performance (next 12 months).

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Blue Chip Financial Forecasts®

Top Analysts' Forecasts Of U.S. And Foreign Interest Rates, Currency Values And The Factors That Influence Them

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Growth & Inflation Increase as Pandemic Impact Moderates

Some Economic Fallout after the Pandemic Eases. The availability of COVID vaccines and their widespread use is not only helping to shield the population from the disease, but also commensurately reviving business and other activities of society, such as school attendance. We can rejoice in this, but it does not cure all of society's ills. Indeed, perhaps the most prominent of these at the present time is inflation. For many months, we have experienced inflation that was actually too low – or at least well below the Federal Reserve's "target" of 2%. The Fed applies this target specifically to the personal consumption expenditure price index and to its ex-food-and-energy core.

Base Effects Raise Inflation Rates, but Current Months Strong Too. Across 2019, the PCE price index and the core both rose just 1.6% (December over December) and in 2020, the total index was up 1.2%, with that core only 1.4%. Clearly, the monetary policymakers were concerned about the apparent lack of price flexibility in the economy generally. This continued through February this year, but began to turn upward in March, continuing in April. The PCE core, at 1.9% year-over-year, remained below the target in March, but it rose 3.1% in April; the total rate rose 2.4% in March and accelerated to 3.6% y/y in April. Some of the March and April acceleration reflects base effects, as prices fell in March and April of last year when the pandemic struck hard at business activity. But prices were also strong in just those latest months, with the total PCE index up 0.56% m/m in March and 0.61% m/m in April; at annual rates, these are 6.9% and 7.5%, respectively. Consumers' own experiences have shown strong gasoline prices and used car prices as well as other energy costs. There is a general sense that more is coming and from more sources. Indeed, the Blue Chip Financial Forecasts panel looks for inflation in the CPI to surge at a 4.8% annual rate during the second quarter, accompanied by a 4.0% jump in the PCE price index.

All this said, the forecast tabulation shows that the panel estimates that inflation rates will moderate during the second half of this year, reaching the Fed's desired 2% pace by the fourth quarter. In Special Questions this month, respondents do indicate that the inflation burst should be "temporary," although that sentiment is not decisive: of 34 responses, just over half, 19, believe it is temporary, with 15 indicating that it may well "linger." And virtually all 34 believe the inflation risks lie to the upside. Causes of the inflation acceleration center on strength in the economy; some panelists also mention supply bottlenecks and the recent fiscal stimulus programs.

How Much GDP Growth This Quarter? GDP is projected to grow quite vigorously, with a 9.3% rate of expansion this quarter, following Q1's 6.4% pace. In Q3 growth would be 6.9%, with 5.0% following in Q4.

Steady Monetary Policy Foreseen. Strong as these growth and inflation numbers would be, no policy reaction is expected from the Federal Reserve, evidently because they are seen to be reactions to the economy opening up again as the force of the pandemic wanes. As we noted over a year ago, the associated recession was not generated from economic excesses, as recessions generally are. Indeed, the economy was in very decent condition when the pandemic arrived so it could stand the shock as well as possible. Clearly, the fiscal and monetary cushions put in place by policymakers have helped as well.

Going forward, the Blue Chip panel looks for the Federal Reserve to hold the federal funds rate steady throughout the current near-term forecast period, to the end of 2022. They do believe the Fed will moderate the pace of its purchases of Treasury notes and bonds and mortgage-backed securities. So from the latest (May 26) $7.9 trillion, the Fed's balance sheet total assets would rise to $8.6 trillion at the end of this year and $9.3 trillion at the end of 2022. They were $4.17 trillion at the end of 2019.

Yield Curve Steepening Expected to Be Orderly. As the Fed holds the fed funds rate steady, other short-term interest rates are seen to remain little changed as well, with 3-month Treasury bills just barely above zero until mid- to late-2022. The projected normality of economic conditions suggests the yield curve would have a gentle but increasing positive slope. So 10-year Treasuries, recently at 1.60%, are forecast to rise to 2.00% a year from now.

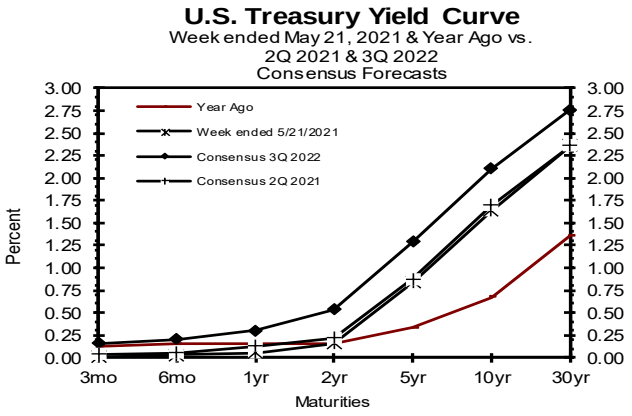
Long-Term Growth, Inflation and Interest Rates Also Seen to Be Orderly. This month, the Blue Chip Financial Forecast panel submitted its semiannual long-term projections. As currently near-term forecasts suggest, financial markets seem orderly and that moderate behavior is expected to continue. The key number is 2%: both GDP growth and long-term inflation through to 2030 would hover around 2.1% per year. Monetary policy would start to firm in 2023, lifting the fed funds rate from 0.06% currently to 0.40% in 2023, 2.1% in 2027 and an average of 2.2% from 2028 to 2032. The yield curve would reflect the addition of an inflation premium, albeit a modest one. So 30-year Treasury bonds, recently trading at 2.3% are seen to increase to an average of 3.9% during the 2028 to 2032 period.

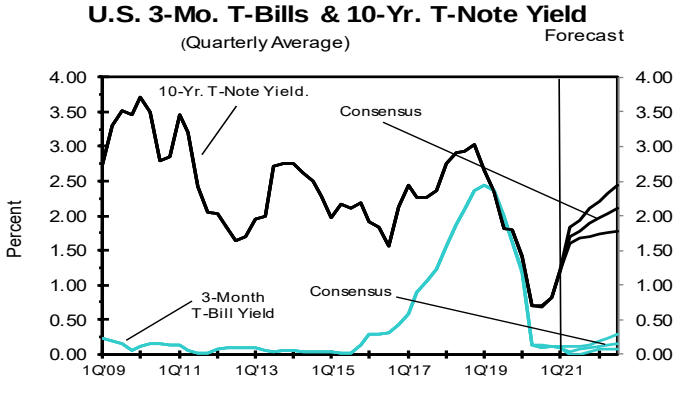
Carol Stone, CBE (Haver Analytics, New York, NY)

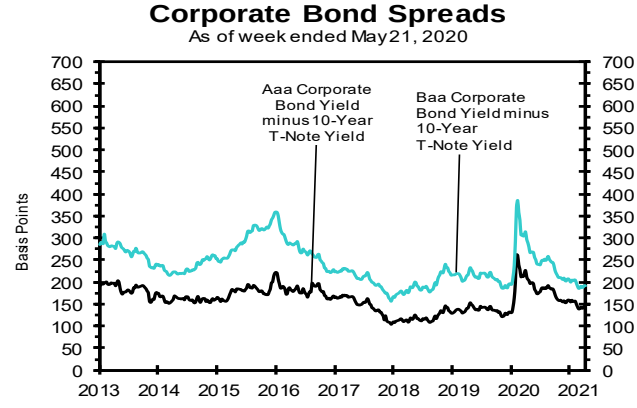
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

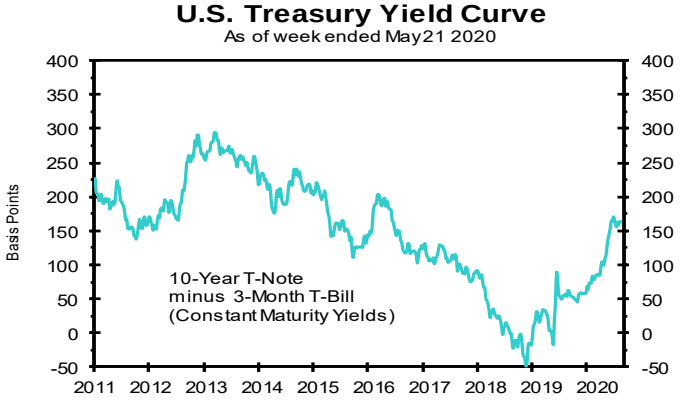
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Qtr*	2Q	3Q	4Q	1Q	2Q	3Q
Interest Rates	May 21	May 14	May 7	Apr 30	Apr	Mar	Feb	1Q 2021	2021	2021	2021	2022	2022	2022
Federal Funds Rate	0.06	0.06	0.06	0.07	0.07	0.07	0.08	0.08	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**
LIBOR, 3-mo.	0.15	0.16	0.17	0.18	0.18	0.19	0.19	0.20	**0.2**	**0.2**	**0.2**	**0.3**	**0.3**	**0.3**
Commercial Paper, 1-mo.	0.04	0.04	0.29	0.04	0.04	0.07	0.06	0.07	**0.1**	**0.1**	**0.1**	**0.1**	**0.2**	**0.2**
Treasury bill, 3-mo.	0.01	0.02	0.02	0.01	0.02	0.03	0.04	0.05	**0.0**	**0.1**	**0.1**	**0.1**	**0.1**	**0.2**
Treasury bill, 6-mo.	0.03	0.04	0.04	0.04	0.04	0.05	0.06	0.07	**0.1**	**0.1**	**0.1**	**0.1**	**0.2**	**0.2**
Treasury bill, 1 yr.	0.05	0.05	0.06	0.05	0.06	0.08	0.07	0.08	**0.1**	**0.1**	**0.2**	**0.2**	**0.3**	**0.3**
Treasury note, 2 yr.	0.16	0.16	0.16	0.17	0.16	0.15	0.12	0.13	**0.2**	**0.3**	**0.3**	**0.4**	**0.5**	**0.5**
Treasury note, 5 yr.	0.84	0.83	0.81	0.86	0.86	0.82	0.54	0.60	**0.9**	**1.0**	**1.1**	**1.2**	**1.2**	**1.3**
Treasury note, 10 yr.	1.64	1.65	1.60	1.63	1.64	1.61	1.26	1.32	**1.7**	**1.8**	**1.9**	**2.0**	**2.0**	**2.1**
Treasury note, 30 yr.	2.36	2.36	2.27	2.29	2.30	2.34	2.04	2.07	**2.4**	**2.5**	**2.6**	**2.6**	**2.7**	**2.8**
Corporate Aaa bond	3.09	3.11	3.01	3.04	3.04	3.15	2.84	2.88	**3.0**	**3.1**	**3.3**	**3.3**	**3.3**	**3.4**
Corporate Baa bond	3.56	3.57	3.48	3.51	3.51	3.62	3.30	3.35	**3.8**	**4.0**	**4.1**	**4.2**	**4.2**	**4.3**
State & Local bonds	2.64	2.65	2.65	2.63	2.66	2.74	2.63	2.68	**2.6**	**2.7**	**2.8**	**2.9**	**2.9**	**2.9**
Home mortgage rate	3.00	2.94	2.96	2.98	3.06	3.08	2.81	2.88	**3.1**	**3.3**	**3.4**	**3.5**	**3.5**	**3.6**
	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
Key Assumptions	2019	2019	2019	2020	2020	2020	2020	2021	2021	2021	2021	2022	2022	2022
Fed's AFE $ Index	110.4	110.6	110.5	111.4	112.4	107.3	105.2	103.4	**102.7**	**102.7**	**102.9**	**102.9**	**103.1**	**103.2**
Real GDP	1.5	2.6	2.4	-5.0	-31.4	33.4	4.3	6.4	**9.3**	**6.9**	**5.0**	**3.9**	**3.1**	**2.6**
GDP Price Index	2.5	1.5	1.4	1.4	-1.8	3.5	2.0	4.3	**3.3**	**2.5**	**2.1**	**2.2**	**2.2**	**2.3**
Consumer Price Index	3.5	1.3	2.6	1.0	-3.1	4.7	2.4	3.7	**4.8**	**2.6**	**2.1**	**2.2**	**2.3**	**2.2**
PCE Price Index	2.5	1.4	1.5	1.3	-1.6	3.7	1.5	3.7	**4.0**	**2.4**	**2.0**	**2.1**	**2.2**	**2.2**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index, PCE Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP, GDP Price Index and PCE Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index history is from the Department of Labor's Bureau of Labor Statistics (BLS).









----------Policy Rates[1]----------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	0.13	0.13	0.13	**0.13**	**0.13**	**0.13**
Japan	-0.10	-0.10	-0.10	**-0.09**	**-0.09**	**-0.09**
U.K.	0.10	0.10	0.10	**0.10**	**0.10**	**0.10**
Switzerland	-0.75	-0.75	-0.75	**-0.75**	**-0.75**	**-0.75**
Canada	0.25	0.25	0.25	**0.25**	**0.25**	**0.25**
Australia	0.10	0.10	0.25	**0.11**	**0.11**	**0.12**
Euro area	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**

----------10-Yr. Government Bond Yields[2]------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	1.63	1.58	0.66	**1.77**	**1.92**	**2.14**
Germany	-0.13	-0.25	-0.49	**-0.16**	**-0.05**	**0.10**
Japan	0.09	0.07	0.00	**0.09**	**0.08**	**0.08**
U.K.	0.92	0.82	0.21	**0.96**	**1.08**	**1.27**
France	0.18	-0.01	-0.04	**0.06**	**0.19**	**0.32**
Italy	1.03	0.78	1.62	**0.78**	**0.96**	**1.18**
Switzerland	-0.14	-0.26	-0.51	**-0.20**	**-0.15**	**-0.08**
Canada	1.54	1.52	0.51	**1.73**	**1.88**	**2.08**
Australia	1.63	1.63	0.87	**1.82**	**1.90**	**2.11**
Spain	0.58	0.37	0.68	**0.42**	**0.57**	**0.73**

----------Foreign Exchange Rates[3]----------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	101.73	103.28	113.58	**103.4**	**102.2**	**102.7**
Japan	108.94	107.94	107.50	**108.1**	**107.9**	**107.4**
U.K.	1.42	1.38	1.22	**1.41**	**1.42**	**1.44**
Switzerland	0.90	0.92	0.97	**0.92**	**0.92**	**0.91**
Canada	1.21	1.25	1.40	**1.24**	**1.24**	**1.25**
Australia	0.77	0.77	0.65	**0.78**	**0.78**	**0.78**
Euro	1.22	1.21	1.09	**1.20**	**1.21**	**1.23**

	Consensus Policy Rates vs. US Rate			Consensus 10-Year Gov't Yields vs. U.S. Yield	
	Now	In 12 Mo.		Now	In 12 Mo.
Japan	-0.23	**-0.22**	Germany	-1.76	**-2.04**
U.K.	-0.03	**-0.03**	Japan	-1.54	**-2.07**
Switzerland	-0.88	**-0.88**	U.K.	-0.71	**-0.88**
Canada	0.13	**0.12**	France	-1.45	**-1.82**
Australia	-0.03	**-0.01**	Italy	-0.60	**-0.97**
Euro area	-0.13	**-0.13**	Switzerland	-1.77	**-2.22**
			Canada	-0.09	**-0.06**
			Australia	0.00	**-0.03**
			Spain	-1.05	**-1.41**

Forecasts of panel members are on pages 10 and 11. Definitions of variables are as follows: [1]Monetary policy rates. [2]Government bonds are yields to maturity. [3]Foreign exchange rate forecasts for U.K., Australia and the Euro are U.S. dollars per currency unit. For the U.S dollar, forecasts are of the U.S. Federal Reserve Board's AFE Dollar Index.

International. Over the past few weeks, there have been signs that Europe is finally recovering from the latest wave of COVID infections with flash May PMIs rising all across Europe, led by services this time. Restrictions are being lifted, although the pace is varied, and vaccinations are picking up. Business and consumer confidence indicators have risen to above pre-pandemic levels. By contrast, Japan is dealing with the spread of one of the COVID variants and has re-imposed a State of Emergency in Tokyo and Osaka. Accordingly, its flash PMI slipped below the critical 50 level in May.

The Bank of England and Reserve Bank of Australia were the only major central banks to hold monetary policy committee meetings in May. Neither changed policy though the BoE did provide a tweak. The BoE slowed the pace of its asset purchases to £3.4 billion per week from £4.4 billion though it hastened to note that this move was not a change in its monetary "stance," but rather a technical adjustment. It still intends to reach its asset purchase target of £895 billion by year-end. On its policy interest rate, the BoE signaled that it plans to remain comfortably on hold for some time and is prepared to countenance strong growth and an inflation overshoot this year and into 2022. In that regard, the Bank raised its 2021 growth outlook with GDP expected to grow 7-1/4% in 2021, up from 5% previously and the fastest annual increase since at least 1948. Correspondingly, it lowered its 2022 GDP growth forecast to 5-3/4% from 7-1/4% previously. It significantly lowered its forecast of the peak unemployment rate to 5.4% in Q3 2021 from 7.8%. The Bank looks for CPI inflation to overshoot its 2% target this year, rising to a peak of 2.5% in Q4 and then falling back to close to 2% by the second half of next year.

The RBA left its policy cash rate unchanged at its May 4 meeting, as had been widely expected, and maintained rather high hurdles for a policy rate hike—CPI inflation (currently 1.1% y/y) "sustainably" in the 2%-3% target range and a labor market "tight enough to generate wage growth that is materially higher than it is currently." The Bank did offer new guidance on its two asset purchase programs. It said that it would decide whether to extend its yield curve control program and also its quantitative easing program at its July monetary policy committee meeting. Financial markets generally expect that both programs will be extended.

European Central Bank hawks were relatively subdued at the April Governing Council meeting, but their position has subsequently been made clear: If the economy continues to improve, the central bank should start to phase out the emergency pandemic asset purchases. The next meeting on June 10 will be key as the Governing Council will have much more information to work with—more vaccinations, timelier data reflecting the lifting of restrictions, and the staff's latest GDP growth and inflation forecasts.

Inflation appears to be on the rise globally, with headline CPI rates boosted by higher energy and food prices. However, producer and other input prices are also rising. And supply-chain bottlenecks are having an impact. While the rise in US inflation has been the largest, headline inflation figures are ticking up all around the world with JP Morgan's global CPI posting its largest one-month rise in April in more than two decades. Market-based inflation expectations are increasing with those in the US at levels not seen since 2008. However, so far central banks are considering the inflation increases to be temporary, mostly reflections of reopening economies. Time will tell whether this view is correct. Throughout 2021, financial markets have become more concerned about future inflation. Longer-term yields are currently higher than prior to the pandemic, but they have been relatively flat over the past month or so. Our forecast panel continues to look for further increases in yields on 10-year government debt over the coming twelve months and once again raised its 12-month ahead forecast in June from May.

Second Quarter 2021

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: 1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	A. Fed's Adv Fgn Econ $ Index	(Q-Q % Change) (SAAR): B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
ACIMA Private Wealth	0.1 L	3.3 H	0.2 L	0.1	0.0 L	0.0 L	0.1 L	0.1 L	0.7 L	1.6 L	2.2 L	2.9	3.8	1.7 L	3.0 L	101.0	8.0	1.1	3.0	0.8 L
Action Economics	0.1 L	3.3 H	0.2 L	0.1	0.0 L	0.1	0.1 L	0.2	0.9	1.7	2.4	3.0	3.7	3.0	3.2	103.4	8.5	3.3	6.2	4.8
AIG	0.1 L	3.3 H	0.2 L	na	0.0 L	0.0 L	0.1 L	0.2	0.9	1.8	2.4	na	3.7	na	3.3	na	10.0	2.0	2.7	2.0
Amherst Pierpont Securities	0.1 L	3.3 H	0.2 L	0.1	0.0 L	0.0 L	0.1 L	0.2	0.8	1.6 L	2.3	3.0	3.6	2.3	3.0 L	102.5	9.9	4.0	6.5	5.1
Bank of America	0.1 L	na	0.2 L	na	na	na	na	0.3	1.1 H	1.9	2.6 H	na	na	na	na	na	10.0	4.2	7.2	4.8
Barclays	0.1 L	3.3 H	na	na	na	na	na	0.2	0.8	1.6 L	2.4	na	na	na	na	na	11.0	4.6	6.0	4.8
BBVA	0.1 L	3.3 H	0.2 L	0.1	0.0 L	0.0 L	0.1 L	0.2	0.8	1.6 L	2.3	3.0	3.5 L	1.7 L	3.0 L	103.2	8.7	2.4	6.2	4.8
BMO Capital Markets	0.1 L	3.3 H	0.2 L	na	0.1	0.1	0.1 L	0.2	0.9	1.7	2.4	na	na	na	3.1	103.3	8.5	4.1	7.1	5.8
BNP Paribas Americas	0.1 L	na	na	na	na	na	na	0.3	na	2.0 H	na	na	na	na	na	na	12.7	na	7.2	6.6
Chan Economics	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.1 L	0.2	0.8	1.7	2.4	3.1	4.0	2.7	3.2	101.6	9.8	2.7	3.0	2.7
Chmura Economics & Analytics	0.1 L	3.3 H	0.2 L	0.1	0.0 L	0.0 L	0.1 L	0.2	0.8	1.6 L	2.3	2.9	na	na	3.0 L	na	5.6 L	5.7	6.0	na
Comerica Bank	0.1 L	3.2 L	0.2 L	na	0.0 L	0.0 L	0.1 L	0.2	0.8	1.6 L	2.3	na	na	na	3.1	na	5.7	3.2	3.0	3.0
Daiwa Capital Markets America	0.1 L	3.3 H	0.2 L	0.1	0.0 L	0.1	0.1 L	0.2	0.8	1.7	2.3	3.0	3.7	na	3.0 L	102.0	8.7	3.0	4.5	4.0
DePrince & Assoc.	0.1 L	3.2 L	0.2 L	0.1	0.0 L	0.0 L	0.1 L	0.2	0.9	1.7	2.3	3.0	3.7	2.3	3.0 L	101.6	7.9	2.3	2.5	2.3
Economist Intelligence Unit	0.1 L	3.3 H	na	0.1	0.0 L	0.0 L	0.1 L	0.2	0.8	1.7	2.3	na	na	na	3.0 L	na	7.6	na	2.0	4.1
Fannie Mae	0.1 L	3.3 H	na	na	0.0 L	0.0 L	0.1 L	0.2	0.8	1.6 L	2.3	na	na	na	3.0 L	na	9.2	3.6	2.9	3.1
Georgia State University	0.1 L	3.3 H	na	na	0.1	0.2 H	0.2	0.3	1.0	1.8	2.4	2.7	3.5 L	na	3.2	na	14.0 H	3.6	5.5	3.6
GLC Financial Economics	0.1 L	3.3 H	0.2 L	0.1	0.0 L	0.0 L	0.1 L	0.1 L	0.8	1.6 L	2.3	3.1	3.7	2.4	3.1	103.7	8.9	2.3	2.4	2.4
Goldman Sachs & Co.	0.1 L	na	0.2 L	na	0.1	na	na	0.2	0.9	1.8	2.5	na	na	na	na	na	10.5	3.6	6.9	4.6
Grant Thornton/Diane Swonk	0.1 L	3.3 H	0.2 L	0.0 L	0.0 L	0.0 L	0.1 L	0.2	0.9	1.7	2.4	3.2	3.7	na	3.1	na	9.5	8.2 H	7.1	7.2 H
IHS Markit	0.1 L	3.3 H	0.2 L	na	na	na	0.1 L	0.2	0.9	1.6 L	2.3	na	na	na	3.0 L	na	9.0	3.0	2.5	2.7
ING	0.1 L	na	0.3	na	na	na	na	0.2	1.0	1.8	2.4	na	na	na	na	na	10.3	na	na	na
J.P. Morgan Chase	0.1 L	na	0.2 L	na	na	na	na	0.2	0.9	1.8	2.5	na	na	na	na	na	10.0	3.5	6.2	5.5
Loomis, Sayles & Company	0.1 L	3.3 H	0.2 L	0.0 L	0.0 L	0.0 L	0.1 L	0.2	0.8	1.7	2.3	2.9	3.5 L	2.6	3.1	102.7	9.5	4.0	6.3	4.0
MacroFin Analytics & Rutgers Bus School	0.1 L	3.3 H	0.2 L	0.1	0.0 L	0.0 L	0.1 L	0.2	0.9	1.6 L	2.3	3.1	3.6	2.7	3.0 L	101.9	8.8	2.9	2.8	2.6
Mizuho Research Institute	0.1 L	na	na	na	na	na	na	na	na	1.8	na	na	na	na	na	na	na	na	na	na
Moody's Analytics	0.1 L	3.2 L	0.2 L	0.1	0.1	0.1	0.2	0.3	1.0	1.7	2.5	3.0	3.7	2.2	3.2	na	10.6	2.8	2.5	2.3
Naroff Economic Advisors	0.1 L	3.3 H	0.2 L	0.1	0.0 L	0.0 L	0.1 L	0.2	0.9	1.6 L	2.3	2.7	4.5	2.7	3.2	103.0	6.9	3.4	5.6	4.7
NatWest Markets	0.1 L	3.2 L	0.2 L	0.2	0.1	0.2 H	0.3 H	0.3	1.0	1.8	2.5	3.6 H	4.6	3.5 H	3.6 H	na	10.4	2.3	7.3 H	5.7
Nomura Securities, Inc.	0.1 L	3.3 H	na	na	na	na	na	0.2	0.9	1.7	na	na	na	na	na	na	8.0	3.1	7.1	5.9
Oxford Economics	0.1 L	3.3 H	0.2 L	na	0.0 L	0.1	0.1 L	0.2	1.0	1.8	2.4	2.2 L	na	na	3.2	104.4	13.3	5.8	7.1	5.6
PNC Financial Services Corp.	0.1 L	3.3 H	0.2 L	na	0.0 L	0.0 L	0.1 L	0.2	0.9	1.7	2.4	na	3.7	1.8	3.1	100.8 L	8.0	2.4	1.7 L	1.8
RDQ Economics	0.1 L	3.3 H	0.2 L	0.1	0.0 L	0.0 L	0.1 L	0.2	0.8	1.6 L	2.4	2.9	3.6	3.1	3.2	102.6	9.8	2.5	7.2	5.6
Regions Financial Corporation	0.1 L	3.3 H	0.2 L	0.1	0.0 L	0.0 L	0.1 L	0.2	0.9	1.7	2.3	3.1	4.0	2.8	3.1	102.7	7.5	3.7	3.9	4.0
S&P Global	0.1 L	3.3 H	0.2 L	na	0.1	0.1	0.2	0.3	0.9	1.7	2.5	na	na	na	3.0 L	na	11.3	3.1	3.2	2.9
Scotiabank Group	0.1 L	3.3 H	na	na	0.1	na	na	0.2	0.9	1.7	2.4	na	na	na	na	na	7.8	-0.7 L	2.4	1.9
Societe Generale	0.1 L	na	na	na	0.0 L	0.0 L	na	0.2	0.9	1.7	2.3	na	na	na	na	na	8.6	3.4	6.0	5.3
Swiss Re	0.1 L	3.3 H	0.4 H	0.3 H	0.2 H	0.2 H	0.3 H	0.5 H	0.9	1.6 L	2.2 L	3.6 H	4.8 H	na	3.3	na	11.2	5.7	5.6	3.9
The Northern Trust Company	0.1 L	3.3 H	0.2 L	0.0 L	0.0 L	0.0 L	0.1 L	0.2	0.8	1.7	2.4	3.0	3.5 L	3.0	3.2	101.7	10.9	2.8	3.1	2.9
Thru the Cycle	0.1 L	3.3 H	0.2 L	0.0 L	0.0 L	0.0 L	0.1 L	0.2	0.8	1.6 L	2.3	3.0	3.5 L	2.7	3.0 L	102.5	9.3	3.5	6.9	5.5
TS Lombard	0.1 L	3.2 L	0.4 H	0.2	0.2 H	0.2 H	0.2	0.2	0.9	1.6 L	2.3	3.1	3.9	2.2	3.6 H	105.0 H	9.5	2.8	2.8	2.8
Via Nova Investment Mgt.	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.1 L	0.2	0.9	1.7	2.2 L	3.2	3.7	2.9	3.3	104.0	7.0	2.1	2.5	2.2
Wells Fargo	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.1 L	0.2	0.9	1.8	2.5	3.1	4.0	3.0	3.3	na	9.8	4.1	5.1	4.1
June Consensus	**0.1**	**3.3**	**0.2**	**0.1**	**0.0**	**0.1**	**0.1**	**0.2**	**0.9**	**1.7**	**2.4**	**3.0**	**3.8**	**2.6**	**3.1**	**102.7**	**9.3**	**3.3**	**4.8**	**4.0**
Top 10 Avg.	0.1	3.3	0.3	0.1	0.1	0.1	0.2	0.3	1.0	1.8	2.5	3.2	4.1	2.9	3.3	103.5	11.6	5.0	7.1	5.9
Bottom 10 Avg.	0.1	3.3	0.2	0.1	0.0	0.0	0.1	0.2	0.8	1.6	2.3	2.8	3.6	2.2	3.0	101.8	7.2	1.9	2.4	2.1
May Consensus	0.1	3.3	0.2	0.1	0.0	0.1	0.1	0.2	0.9	1.7	2.4	3.0	3.9	2.7	3.2	103.9	9.0	2.4	2.8	2.5
Number of Forecasts Changed From A Month Ago:																				
Down	0	2	0	1	3	9	1	3	12	12	11	8	9	9	14	15	8	2	0	1
Same	41	31	32	20	31	22	29	35	25	25	24	13	12	8	16	2	16	8	6	6
Up	2	3	2	3	1	2	3	4	4	6	5	4	4	3	3	2	17	27	34	32
Diffusion Index	52%	51%	53%	54%	47%	39%	53%	51%	40%	43%	43%	42%	40%	35%	33%	16%	61%	84%	93%	90%

Third Quarter 2021

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: Short-Term: 1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	Intermediate-Term: 8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	Long-Term: 11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For Qtr.: A. Fed's Adv Fgn Econ $ Index	(Q-Q % Change) (SAAR): B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
ACIMA Private Wealth	0.1 L	3.3 H	0.2	0.1	0.0 L	0.0 L	0.1 L	0.1 L	0.7 L	1.5 L	2.1 L	2.9	3.8	1.6 L	2.9 L	101.0 L	5.0	1.0	2.5	1.2
Action Economics	0.1 L	3.3 H	0.2	0.1	0.1	0.1	0.1 L	0.4	1.1	1.8	2.5	3.1	3.8	3.0	3.4	103.5	6.5	2.6	2.1	1.9
AIG	0.1 L	3.3 H	0.2	na	0.0 L	0.1	0.1 L	0.2	1.0	1.9	2.6	na	4.0	na	3.5	na	8.0	1.9	2.7	1.6
Amherst Pierpont Securities	0.1 L	3.3 H	0.2	0.1	0.0 L	0.1	0.2	0.2	1.0	1.9	2.5	3.2	3.9	2.5	3.3	103.0	8.3	2.5	2.6	2.3
Bank of America	0.1 L	na	0.2	na	na	na	na	0.4	1.3 H	2.0	2.7	na	na	na	na	na	9.0	3.2	3.5	2.9
Barclays	0.1 L	3.3 H	na	na	na	na	na	0.2	0.9	1.7	2.4	na	na	na	na	na	8.0	2.3	2.2	2.0
BBVA	0.1 L	3.3 H	0.2	0.1	0.0 L	0.1	0.1 L	0.3	1.0	1.8	2.5	3.2	3.7	1.9	3.2	104.3 H	5.8	1.9	2.5	2.2
BMO Capital Markets	0.1 L	3.3 H	0.3	na	0.1	0.1	0.1 L	0.2	0.9	1.7	2.4	na	na	na	3.1	102.3	7.5	2.9	3.4	3.2
BNP Paribas Americas	0.1 L	na	na	na	na	na	na	0.4	na	2.1 H	na	na	na	na	na	na	7.9	na	3.6	3.6
Chan Economics	0.1 L	3.3 H	0.2	0.1	0.1	0.1	0.1 L	0.2	0.9	1.8	2.5	3.2	4.1	2.8	3.3	101.5	6.5	2.4	2.6	2.4
Chmura Economics & Analytics	0.1 L	3.3 H	0.2	0.1	0.0 L	0.1	0.1 L	0.2	0.8	1.7	2.4	3.0	na	na	3.2	na	5.9	4.3	4.7 H	na
Comerica Bank	0.1 L	3.2 L	0.2	na	0.1	0.1	0.1 L	0.2	0.9	1.7	2.4	na	na	na	3.2	na	3.3 L	2.8	2.9	2.9
Daiwa Capital Markets America	0.1 L	3.3 H	0.2	0.1	0.1	0.1	0.1 L	0.2	0.9	1.7	2.4	3.1	3.7	na	3.1	102.0	7.4	2.7	3.5	3.5
DePrince & Assoc.	0.1 L	3.2 L	0.2	0.1	0.1	0.1	0.1 L	0.2	1.0	1.7	2.4	3.3	4.2	2.7	3.2	101.8	6.3	2.2	2.3	2.1
Economist Intelligence Unit	0.1 L	3.3 H	na	0.1	0.0 L	0.1	0.1 L	0.2	0.9	1.7	2.4	na	na	na	3.0	na	4.8	na	1.8	0.6
Fannie Mae	0.1 L	3.3 H	na	na	0.1	0.1	0.1 L	0.2	0.9	1.6	2.3	na	na	na	3.0	na	6.3	2.6	2.2	2.1
Georgia State University	0.1 L	3.3 H	na	na	0.1	0.1	0.1 L	0.3	1.1	1.9	2.6	2.8	3.8	na	3.4	na	5.3	2.6	3.2	2.5
GLC Financial Economics	0.1 L	3.3 H	0.2	0.2	0.0 L	0.0 L	0.1 L	0.1 L	0.9	1.7	2.4	3.2	3.9	2.5	3.2	103.7	6.5	2.4	2.5	2.6
Goldman Sachs & Co.	0.1 L	na	0.2	na	0.1	na	na	0.3	0.9	1.9	2.6	na	na	na	na	na	8.0	1.5	4.0	2.1
Grant Thornton/Diane Swonk	0.1 L	3.3 H	0.2	0.0 L	0.0 L	0.0 L	0.1 L	0.3	0.9	1.7	2.4	3.3	3.7	na	3.1	na	7.5	0.5	0.3	0.3 L
IHS Markit	0.1 L	3.3 H	0.2	na	na	na	0.1 L	0.2	0.9	1.7	2.3	na	na	na	3.1	na	7.2	2.4	1.8	1.8
ING	0.1 L	na	0.3	na	na	na	na	0.2	1.2	2.0	2.6	na	na	na	na	na	6.8	na	na	na
J.P. Morgan Chase	0.1 L	na	0.2	na	na	na	na	0.2	1.0	1.9	2.6	na	na	na	na	na	8.3	3.5	2.9	2.5
Loomis, Sayles & Company	0.1 L	3.3 H	0.2	0.1	0.0 L	0.1	0.1 L	0.3	0.9	1.9	2.5	3.1	3.7	2.8	3.3	102.3	8.4	2.7	2.2	2.0
MacroFin Analytics & Rutgers Bus School	0.1 L	3.3 H	0.1 L	0.1	0.0 L	0.1	0.1 L	0.2	0.9	1.7	2.4	3.2	3.7	2.7	3.1	102.0	6.6	2.2	2.1	2.0
Mizuho Research Institute	0.1 L	na	na	na	na	na	na	na	na	1.8	na	na	na	na	na	na	na	na	na	na
Moody's Analytics	0.1 L	3.2 L	0.3	0.1	0.1	0.1	0.3 H	0.6 H	1.2	1.9	2.8 H	3.2	4.0	2.8	3.7 H	na	6.1	2.3	2.8	2.7
Naroff Economic Advisors	0.1 L	3.3 H	0.2	0.1	0.1	0.1	0.1 L	0.2	0.9	1.7	2.4	2.8	4.6	2.9	3.4	103.9	5.3	3.8	4.2	4.0 H
NatWest Markets	0.1 L	3.2 L	0.3	0.2	0.1	0.2 H	0.3 H	0.4	1.1	1.9	2.6	3.6	4.6	3.4 H	3.7 H	na	11.0	1.9	3.1	2.6
Nomura Securities, Inc.	0.1 L	3.3 H	na	na	na	na	na	0.2	0.9	1.8	na	na	na	na	na	na	6.0	3.3	3.6	3.0
Oxford Economics	0.1 L	3.3 H	0.2	na	0.1	0.1	0.1 L	0.2	1.1	1.8	2.6	2.4 L	na	na	3.3	104.1	11.3 H	2.8	3.5	3.2
PNC Financial Services Corp.	0.1 L	3.3 H	0.2	na	0.0 L	0.1	0.1 L	0.2	1.0	1.7	2.5	na	3.9	2.1	3.1	101.7	7.0	3.2	2.6	2.8
RDQ Economics	0.1 L	3.3 H	0.2	0.2	0.1	0.1	0.2	0.2	0.8	1.8	2.6	3.1	3.8	3.4 H	3.4	101.5	6.2	2.5	1.9	2.3
Regions Financial Corporation	0.1 L	3.3 H	0.2	0.1	0.0 L	0.1	0.1 L	0.2	0.9	1.7	2.4	3.2	4.1	2.9	3.2	102.3	5.5	2.5	1.8	2.2
S&P Global	0.1 L	3.3 H	0.3	na	0.1	0.2 H	0.2	0.3	1.0	1.8	2.6	na	na	na	3.1	na	5.0	3.0	2.7	2.8
Scotiabank Group	0.1 L	3.3 H	na	na	0.1	na	na	0.4	1.2	1.9	2.5	na	na	na	na	na	9.8	5.1 H	0.2 L	1.6
Societe Generale	0.1 L	na	na	na	0.1	0.1	na	0.2	0.9	1.7	2.3	na	na	na	na	na	5.6	2.1	2.4	2.0
Swiss Re	0.1 L	3.3 H	0.4 H	0.3 H	0.2 H	0.2 H	0.3 H	0.5	0.9	1.7	2.4	3.7 H	4.8 H	na	3.4	na	5.8	-0.7 L	0.4	2.7
The Northern Trust Company	0.1 L	3.3 H	0.3	0.0 L	0.1	0.2 H	0.2	0.3	0.9	1.8	2.7	3.2	3.9	3.1	3.4	101.5	7.9	2.2	2.2	2.4
Thru the Cycle	0.1 L	3.3 H	0.2	0.0 L	0.0 L	0.1	0.1 L	0.2	0.9	1.7	2.4	3.0	3.5 L	2.7	3.1	102.6	5.4	2.4	3.4	3.4
TS Lombard	0.1 L	3.2 L	0.4 H	0.2	0.2 H	0.2 H	0.3 H	0.4	1.1	1.7	2.4	3.2	4.0	2.3	3.7 H	104.0	5.5	1.6	1.6	1.6
Via Nova Investment Mgt.	0.1 L	3.3 H	0.2	0.1	0.1	0.1	0.1 L	0.2	0.9	1.7	2.2	3.2	3.7	2.9	3.3	104.0	6.5	2.1	2.5	2.0
Wells Fargo	0.1 L	3.3 H	0.2	0.1	0.1	0.1	0.1 L	0.2	1.0	1.9	2.6	3.2	4.1	3.1	3.4	na	8.4	2.5	3.5	2.9
June Consensus	**0.1**	**3.3**	**0.2**	**0.1**	**0.1**	**0.1**	**0.1**	**0.3**	**1.0**	**1.8**	**2.5**	**3.1**	**4.0**	**2.7**	**3.3**	**102.7**	**6.9**	**2.5**	**2.6**	**2.4**
Top 10 Avg.	0.1	3.3	0.3	0.2	0.1	0.2	0.2	0.4	1.1	1.9	2.6	3.3	4.3	3.0	3.5	103.5	9.1	3.5	3.8	3.3
Bottom 10 Avg.	0.1	3.3	0.2	0.1	0.0	0.1	0.1	0.2	0.9	1.7	2.3	2.9	3.7	2.4	3.1	101.8	5.1	1.4	1.4	1.5
May Consensus	0.1	3.3	0.2	0.1	0.1	0.1	0.2	0.3	1.0	1.8	2.5	3.2	4.0	2.8	3.3	103.9	7.1	2.2	2.4	2.2
Number of Forecasts Changed From A Month Ago:																				
Down	0	2	2	1	3	2	5	7	13	10	7	5	9	7	13	11	12	5	7	4
Same	41	31	30	21	30	28	26	32	20	28	27	16	13	10	17	5	16	10	14	11
Up	2	3	2	2	2	3	2	3	8	5	6	4	3	3	3	3	13	22	19	24
Diffusion Index	52%	51%	50%	52%	49%	52%	45%	45%	44%	44%	49%	48%	38%	40%	35%	29%	51%	73%	65%	76%

Fourth Quarter 2021

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter															Avg. For	(Q-Q % Change) (SAAR)			
	Short-Term							Intermediate-Term			Long-Term					Qtr.				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	A.	B.	C.	D.	E.
	Federal Funds Rate	Prime Bank Rate	LIBOR 3-Mo.	Com. Paper 1-Mo.	Treas. Bills 3-Mo.	Treas. Bills 6-Mo.	Treas. Bills 1-Yr.	Treas. Notes 2-Yr.	Treas. Notes 5-Yr.	Treas. Notes 10-Yr.	Treas. Bond 30-Yr.	Aaa Corp. Bond	Baa Corp. Bond	State & Local Bonds	Home Mtg. Rate	Fed's Adv Fgn Econ $ Index	Real GDP	GDP Price Index	Cons. Price Index	PCE Price Index
ACIMA Private Wealth	0.1 L	3.3 H	0.2 L	0.1	0.0 L	0.0 L	0.1	0.1 L	0.6 L	1.4 L	2.0 L	3.0	3.8	1.5 L	2.8 L	100.0 L	3.0	1.0	2.4	1.3
Action Economics	0.1 L	3.3 H	0.2 L	0.1	0.1	0.2 H	0.2	0.5	1.2	1.9	2.6	3.1	3.9	3.0	3.5	103.1	4.6	2.0	2.2	1.9
AIG	0.1 L	3.3 H	0.2 L	na	0.0 L	0.1	0.1	0.2	1.1	2.0	2.6	na	4.1	na	3.6	na	5.0	2.4	1.6	2.1
Amherst Pierpont Securities	0.1 L	3.3 H	0.3	0.1	0.2 H	0.2 H	0.3	0.4	1.3	2.1	2.9	3.6	4.4	2.8	3.6	104.0	4.4	2.5	2.3	2.1
Bank of America	0.1 L	na	0.3	na	na	na	na	0.4	1.5 H	2.2	2.8	na	na	na	na	na	5.0	2.3	1.8	1.5
Barclays	0.1 L	3.3 H	na	na	na	na	na	0.2	1.0	1.7	2.5	na	na	na	na	na	6.5	2.4	2.6	2.2
BBVA	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.1	0.3	1.1	2.0	2.7	3.2	3.8	2.1	3.3	104.9 H	4.0	2.0	2.5	2.2
BMO Capital Markets	0.1 L	3.3 H	0.3	na	0.1	0.1	0.2	0.2	0.9	1.8	2.4	na	na	na	3.1	101.4	4.5	2.3	2.7	2.4
BNP Paribas Americas	0.1 L	na	na	na	na	na	na	0.5	na	2.2	na	na	na	na	na	na	3.1	na	1.3	0.9
Chan Economics	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.1	0.2	1.0	1.8	2.6	3.3	4.2	2.8	3.3	101.2	4.9	2.3	2.5	2.3
Chmura Economics & Analytics	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.1	0.2	0.8	1.7	2.4	3.1	na	na	3.2	na	4.1	3.2	3.3 H	na
Comerica Bank	0.1 L	3.2 L	0.3	na	0.1	0.2 H	0.2	0.4	1.0	1.8	2.5	na	na	na	3.4	na	6.6	2.7	3.0	3.0
Daiwa Capital Markets America	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.1	0.2	1.0	1.9	2.5	3.2	3.9	na	3.4	103.0	6.2	2.5	3.0	2.8
DePrince & Assoc.	0.1 L	3.2 L	0.2 L	0.2	0.1	0.1	0.1	0.3	1.1	1.8	2.4	3.5	4.6	3.0	3.3	102.4	4.6	2.1	2.2	2.0
Economist Intelligence Unit	0.1 L	3.3 H	na	0.1	0.1	0.1	0.1	0.2	0.9	1.8	2.4	na	na	na	3.1	na	5.7	na	1.7	0.9
Fannie Mae	0.1 L	3.3 H	na	na	0.0 L	0.0 L	0.1	0.3	1.0	1.7	2.3	na	na	na	3.1	na	5.9	2.1	1.9	2.0
Georgia State University	0.1 L	3.3 H	na	na	0.0 L	0.1	0.0 L	0.3	1.1	1.9	2.6	2.8	4.1	na	3.6	na	2.5	2.3	2.3	2.1
GLC Financial Economics	0.1 L	3.3 H	0.2 L	0.2	0.1	0.1	0.1	0.2	0.9	1.8	2.5	3.3	4.0	2.7	3.3	103.9	6.9	2.5	2.6	2.7
Goldman Sachs & Co.	0.1 L	na	0.3	na	0.1	na	na	0.3	0.9	1.9	2.6	na	na	na	na	na	7.0	0.9	1.1	1.1
Grant Thornton/Diane Swonk	0.1 L	3.3 H	0.2 L	0.1	0.0 L	0.1	0.1	0.3	1.1	2.0	2.7	3.5	4.1	na	3.5	na	5.6	0.4 L	0.3 L	0.4 L
IHS Markit	0.1 L	3.3 H	0.2 L	na	na	na	0.1	0.2	1.0	1.8	2.4	na	na	na	3.3	na	7.7	1.8	1.6	1.7
ING	0.1 L	na	0.3	na	na	na	na	0.4	1.5 H	2.3 H	2.7	na	na	na	na	na	5.8	na	na	na
J.P. Morgan Chase	0.1 L	na	0.2 L	na	na	na	na	0.3	1.1	2.0	2.7	na	na	na	na	na	3.0	1.8	1.9	1.6
Loomis, Sayles & Company	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.2	0.3	1.1	2.0	2.6	3.2	3.8	2.9	3.4	102.3	5.5	1.9	1.8	1.7
MacroFin Analytics & Rutgers Bus School	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.1	0.2	0.9	1.7	2.4	3.2	3.7 L	2.8	3.1	102.2	4.7	2.1	2.1	1.9
Mizuho Research Institute	0.1 L	na	na	na	na	na	na	na	na	1.9	na	na	na	na	na	na	na	na	na	na
Moody's Analytics	0.1 L	3.2 L	0.3	0.1	0.1	0.2 H	0.4 H	0.8 H	1.5 H	2.1	3.0 H	3.6	4.4	3.1	3.9	na	6.5	2.7	2.6	2.7
Naroff Economic Advisors	0.1 L	3.3 H	0.3	0.2	0.1	0.1	0.2	0.3	1.0	1.8	2.5	3.0	4.7	2.9	3.5	104.1	4.5	3.1	3.3 H	3.3 H
NatWest Markets	0.1 L	3.2 L	0.3	0.2	0.1	0.2 H	0.3	0.5	1.3	2.0	2.7	3.6	4.5	3.3	3.8	na	9.5 H	0.5	2.0	1.9
Nomura Securities, Inc.	0.1 L	3.3 H	na	na	na	na	na	0.2	0.9	1.8	na	na	na	na	na	na	5.8	3.4 H	2.0	1.6
Oxford Economics	0.1 L	3.3 H	0.2 L	na	0.1	0.2 H	0.1	0.2	1.2	2.0	2.7	2.6 L	na	na	3.4	104.7	3.4	2.0	1.2	1.4
PNC Financial Services Corp.	0.1 L	3.3 H	0.2 L	na	0.1	0.1	0.1	0.3	1.0	1.8	2.6	na	4.0	2.1	3.3	102.5	5.0	2.9	2.5	2.5
RDQ Economics	0.1 L	3.3 H	0.2 L	0.2	0.1	0.1	0.2	0.2	0.9	2.0	2.9	3.3	4.0	3.8 H	3.6	101.2	4.5	2.6	2.3	2.3
Regions Financial Corporation	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.1	0.3	1.0	1.9	2.5	3.3	4.2	3.0	3.3	102.4	5.3	2.0	1.6	1.8
S&P Global	0.1 L	3.3 H	0.3	na	0.2 H	0.2 H	0.2	0.3	1.1	2.0	2.7	na	na	na	3.3	na	2.8	2.0	2.0	1.8
Scotiabank Group	0.1 L	3.3 H	na	na	0.1	na	na	0.6	1.3	2.1	2.5	na	na	na	na	na	6.4	2.8	2.6	2.0
Societe Generale	0.1 L	na	na	na	0.1	0.1	na	0.3	1.0	1.8	2.4	na	na	na	na	na	4.2	2.2	2.4	2.1
Swiss Re	0.1 L	3.3 H	0.4 H	0.3 H	0.2 H	0.2 H	0.3	0.5	1.0	1.8	2.5	3.7 H	4.8 H	na	3.5	na	1.4 L	1.0	1.4	2.5
The Northern Trust Company	0.1 L	3.3 H	0.3	0.0 L	0.1	0.2 H	0.3	0.4	1.2	1.9	2.9	3.4	4.1	3.3	3.6	102.5	5.4	2.3	2.1	2.1
Thru the Cycle	0.1 L	3.3 H	0.2 L	0.0 L	0.0 L	0.1	0.1	0.2	1.0	1.7	2.5	3.1	3.7 L	2.8	3.2	103.8	2.8	2.1	2.5	2.7
TS Lombard	0.1 L	3.2 L	0.4 H	0.2	0.2 H	0.2 H	0.4 H	0.6	1.3	2.0	2.7	3.5	4.3	2.6	4.0 H	104.0	4.5	1.6	1.6	1.6
Via Nova Investment Mgt.	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.1	0.2	0.9	1.7	2.2	3.2	3.7 L	2.9	3.3	104.0	4.5	2.0	2.2	1.9
Wells Fargo	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.1	0.2	1.2	2.0	2.7	3.3	4.2	3.2	3.5	na	7.6	2.5	2.5	2.4
June Consensus	**0.1**	**3.3**	**0.2**	**0.1**	**0.1**	**0.1**	**0.2**	**0.3**	**1.1**	**1.9**	**2.6**	**3.3**	**4.1**	**2.8**	**3.4**	**102.9**	**5.0**	**2.1**	**2.1**	**2.0**
Top 10 Avg.	0.1	3.3	0.3	0.2	0.1	0.2	0.3	0.5	1.3	2.1	2.8	3.5	4.4	3.2	3.7	104.0	7.1	2.8	2.8	2.7
Bottom 10 Avg.	0.1	3.3	0.2	0.1	0.0	0.1	0.1	0.2	0.9	1.7	2.3	3.0	3.8	2.5	3.2	101.8	3.0	1.3	1.3	1.2
May Consensus	0.1	3.3	0.3	0.1	0.1	0.1	0.2	0.3	1.1	1.9	2.6	3.3	4.2	2.9	3.4	104.1	4.9	2.1	2.2	2.1
Number of Forecasts Changed From A Month Ago:																				
Down	0	2	2	1	3	1	5	7	12	6	8	4	6	5	12	11	6	9	14	12
Same	41	31	30	21	30	30	25	30	22	31	27	15	15	11	16	4	19	13	13	14
Up	2	3	2	2	2	2	3	5	7	6	5	6	4	4	5	4	16	15	13	13
Diffusion Index	52%	51%	50%	52%	49%	52%	47%	48%	44%	50%	46%	54%	46%	48%	39%	32%	62%	58%	49%	51%

First Quarter 2022

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: Short-Term: 1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	Intermediate-Term: 8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	Long-Term: 11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For Qtr.: A. Fed's Adv Fgn Econ $ Index	(Q-Q % Change) (SAAR): B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
Amherst Pierpont Securities	0.2 H	3.3 H	0.5 H	0.2	0.4 H	0.4 H	0.5 H	0.7	1.5	2.3 H	3.1	3.9 H	4.7	2.9	3.8	105.5 H	3.5	2.7	2.9	2.6
ACIMA Private Wealth	0.1 L	3.3 H	0.2 L	0.1	0.0 L	0.0 L	0.1	0.1 L	0.6 L	1.4 L	1.8 L	3.0	3.9	1.4 L	2.6 L	100.0 L	3.0	1.2 L	2.0	1.2
Action Economics	0.1 L	3.3 H	0.2 L	0.1	0.1	0.2	0.2	0.5	1.3	2.0	2.7	3.1	4.0	3.0	3.5	102.9	4.1	2.1	2.6	2.4
AIG	0.1 L	3.3 H	0.3	na	0.1	0.1	0.1	0.3	1.1	2.0	2.7	na	4.2	na	3.7	na	4.0	2.1	2.6	1.7
Bank of America	0.1 L	na	0.3	na	na	na	na	0.6	1.6	2.3 H	2.8	na	na	na	na	na	5.0	2.4	1.5	1.6
Barclays	0.1 L	3.3 H	na	na	na	na	na	0.3	1.1	1.8	2.5	na	na	na	na	na	2.0	1.6	1.2 L	1.2
BBVA	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.2	0.4	1.2	2.0	2.8	3.3	3.9	2.2	3.4	104.5	5.1	2.2	2.2	2.0
BMO Capital Markets	0.1 L	3.3 H	0.3	na	0.1	0.1	0.2	0.3	1.0	1.8	2.5	na	na	na	3.2	100.9	3.8	2.4	3.0	2.8
BNP Paribas Americas	0.1 L	na	na	na	na	na	na	0.7	na	2.3 H	na	na	na	na	na	na	4.0	na	1.8	1.5
Chan Economics	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.1	0.2	1.1	1.9	2.6	3.3	4.2	2.9	3.4	101.3	3.0	2.1	2.3	2.2
Chmura Economics & Analytics	0.1 L	3.3 H	0.3	0.1	0.1	0.1	0.1	0.2	0.9	1.7	2.5	3.1	na	na	3.3	na	4.8	2.8	3.1	na
Comerica Bank	0.1 L	3.2 L	0.3	na	0.1	0.2	0.3	0.4	1.1	1.9	2.6	na	na	na	3.5	na	4.9	2.5	2.6	2.8
Daiwa Capital Markets America	0.1 L	3.3 H	0.3	0.1	0.1	0.1	0.1	0.2	1.1	2.0	2.7	3.4	4.2	na	3.6	103.0	4.6	2.4	2.7	2.5
DePrince & Assoc.	0.1 L	3.2 L	0.2 L	0.2	0.1	0.1	0.1	0.3	1.1	1.8	2.5	3.6	4.5	3.1	3.4	102.6	3.5	2.2	2.2	2.1
Economist Intelligence Unit	0.1 L	3.3 H	na	0.1	0.1	0.1	0.1	0.2	1.0	1.8	2.5	na	na	na	3.3	na	3.7	na	2.3	2.9
Fannie Mae	0.1 L	3.3 H	na	na	0.0 L	0.1	0.2	0.3	1.1	1.8	2.3	na	na	na	3.2	na	3.8	2.4	2.2	2.2
Georgia State University	0.1 L	3.3 H	na	na	0.0 L	0.0 L	-0.1 L	0.3	1.1	2.0	2.7	2.8	4.3	na	3.7	na	2.9	2.0	2.2	1.7
GLC Financial Economics	0.1 L	3.3 H	0.2 L	0.2	0.1	0.1	0.1	0.2	1.0	1.8	2.6	2.9	4.0	3.1	3.4	104.0	5.4	2.6	2.7	3.0 H
Goldman Sachs & Co.	0.1 L	na	0.2 L	na	0.1	na	na	na	na	2.0	na	na	na	na	na	na	5.0	1.7	1.9	1.6
Grant Thornton/Diane Swonk	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.1	0.4	1.1	2.0	2.7	3.5	4.0	na	3.5	na	3.7	1.3	1.2 L	1.1 L
IHS Markit	0.1 L	3.3 H	0.2 L	na	na	na	0.0	0.3	1.0	1.8	2.5	na	na	na	3.4	na	4.2	1.9	1.8	1.7
ING	0.1 L	na	0.3	na	na	na	na	0.4	1.5	2.3 H	2.7	na	na	na	na	na	3.9	na	na	na
J.P. Morgan Chase	0.1 L	na	0.2 L	na	na	na	na	0.4	1.3	2.1	2.7	na	na	na	na	na	3.5	1.9	2.2	1.9
Loomis, Sayles & Company	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.2	0.4	1.3	2.1	2.6	3.3	3.9	3.0	3.5	102.3	3.3	1.9	2.0	1.8
MacroFin Analytics & Rutgers Bus School	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.1	0.3	1.0	1.8	2.5	3.3	3.8	2.8	3.2	102.5	3.5	2.1	2.0	1.9
Mizuho Research Institute	0.1 L	na	na	na	na	na	na	na	na	1.9	na	na	na	na	na	na	na	na	na	na
Moody's Analytics	0.1 L	3.2 L	0.3	0.1	0.2	0.3	0.5 H	0.9 H	1.7 H	2.2	3.2 H	3.7	4.6	3.2	4.0	na	5.1	2.4	2.3	2.4
Naroff Economic Advisors	0.1 L	3.3 H	0.3	0.2	0.2	0.2	0.2	0.4	1.1	1.9	2.7	3.1	4.8	3.0	3.6	104.6	3.3	2.6	2.7	2.7
NatWest Markets	0.1 L	3.2 L	0.3	0.2	0.1	0.2	0.3	0.7	1.5	2.1	2.7	2.7 L	3.7 L	2.3	2.7	na	6.5 H	1.7	2.3	2.6
Nomura Securities, Inc.	0.1 L	3.3 H	na	na	na	na	na	0.3	1.0	1.8	na	na	na	na	na	na	4.9	3.7 H	1.4	1.1 L
Oxford Economics	0.1 L	3.3 H	0.2 L	na	0.2	0.2	0.2	0.3	1.2	2.1	2.9	2.9	na	na	3.6	104.9	1.7 L	1.4	1.5	1.4
PNC Financial Services Corp.	0.1 L	3.3 H	0.2 L	na	0.1	0.1	0.2	0.3	1.0	1.8	2.6	na	4.0	2.2	3.4	103.3	3.5	2.7	2.4	2.5
RDQ Economics	0.1 L	3.3 H	0.2 L	0.2	0.1	0.1	0.2	0.2	1.0	2.1	3.0	3.4	4.1	3.6 H	3.7	100.3	4.6	2.6	2.5	2.4
Regions Financial Corporation	0.1 L	3.3 H	0.3	0.2	0.1	0.1	0.2	0.4	1.1	2.0	2.6	3.3	4.2	3.1	3.4	102.7	3.8	2.2	2.0	2.3
S&P Global	0.1 L	3.3 H	0.3	na	0.2	0.2	0.3	0.4	1.2	2.1	2.8	na	na	na	3.4	na	1.9	1.5	1.7	1.6
Scotiabank Group	0.1 L	3.3 H	na	na	0.1	na	na	0.7	1.4	2.2	2.5	na	na	na	na	na	3.4	3.0	4.1 H	2.3
Societe Generale	0.1 L	na	na	na	0.1	0.1	na	0.4	1.2	2.0	2.5	na	na	na	na	na	3.3	2.3	2.1	1.8
Swiss Re	0.1 L	3.3 H	0.4	0.3 H	0.2	0.2	0.4	0.5	1.0	1.8	2.5	3.8	4.9 H	na	3.6	na	3.9	2.8	2.5	2.2
The Northern Trust Company	0.1 L	3.3 H	0.3	0.0 L	0.1	0.2	0.4	0.5	1.2	2.0	3.0	3.5	4.4	3.5	3.8	103.5	3.9	2.3	2.1	2.0
Thru the Cycle	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.2	0.3	1.1	1.9	2.6	3.2	3.8	2.9	3.3	104.8	3.6	2.4	2.8	2.4
TS Lombard	0.1 L	3.2 L	0.4	0.2	0.2	0.2	0.5 H	0.8	1.5	2.2	2.9	3.7	4.5	2.8	4.2 H	100.0 L	3.5	1.8	1.8	1.8
Via Nova Investment Mgt.	0.1 L	3.3 H	0.2 L	0.1	0.1	0.1	0.1	0.2	0.9	1.7	2.2	3.2	3.7 L	2.9	3.3	105.0	3.5	2.0	2.0	1.9
Wells Fargo	0.1 L	3.3 H	0.3	0.1	0.1	0.1	0.2	0.3	1.3	2.1	2.7	3.4	4.3	3.3	3.6	na	6.0	2.3	2.3	2.2
June Consensus	**0.1**	**3.3**	**0.3**	**0.1**	**0.1**	**0.1**	**0.2**	**0.4**	**1.2**	**2.0**	**2.6**	**3.3**	**4.2**	**2.9**	**3.5**	**102.9**	**3.9**	**2.2**	**2.2**	**2.1**
Top 10 Avg.	0.1	3.3	0.3	0.2	0.2	0.2	0.4	0.7	1.5	2.2	2.9	3.6	4.5	3.2	3.8	104.3	5.3	2.8	2.9	2.7
Bottom 10 Avg.	0.1	3.3	0.2	0.1	0.1	0.1	0.1	0.2	0.9	1.7	2.4	3.0	3.9	2.5	3.2	101.6	2.8	1.6	1.6	1.4
May Consensus	0.1	3.3	0.3	0.1	0.1	0.1	0.2	0.4	1.2	2.0	2.7	3.3	4.2	3.0	3.5	104.0	3.8	2.2	2.2	2.1
Number of Forecasts Changed From A Month Ago:																				
Down	0	2	3	0	2	3	7	6	7	10	5	7	6	4	11	12	4	10	14	12
Same	41	31	28	22	32	29	23	30	24	27	27	13	14	12	16	3	21	17	13	16
Up	2	3	3	2	1	1	3	5	9	6	7	5	5	4	6	4	16	10	13	11
Diffusion Index	52%	51%	50%	54%	49%	47%	44%	49%	53%	45%	53%	46%	48%	50%	42%	29%	65%	50%	49%	49%

Second Quarter 2022

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: Short-Term: 1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	Intermediate-Term: 8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	Long-Term: 11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	Avg. For Qtr. A. Fed's Adv Fgn Econ $ Index	(Q-Q % Change) (SAAR) B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
Amherst Pierpont Securities	0.4 H	3.6 H	0.8 H	0.5 H	0.6 H	0.7 H	0.9 H	0.9	1.8 H	2.5 H	3.4 H	4.1 H	4.9 H	3.1	4.0	107.0 H	3.5	2.5	2.8	2.5
ACIMA Private Wealth	0.1 L	3.3	0.2 L	0.1	0.0 L	0.0 L	0.1	0.1 L	0.5 L	1.3 L	1.8 L	2.9	3.8	1.4	2.6	99.0 L	2.0	1.1	2.0	1.0 L
Action Economics	0.1 L	3.3	0.2 L	0.1	0.1	0.2	0.2	0.6	1.3	2.0	2.7	3.1	4.0	3.0	3.5	102.7	3.7	1.7	2.7	2.5
AIG	0.1 L	3.3	0.3	na	0.1	0.1	0.2	0.3	1.1	2.1	2.7	na	4.3	na	3.8	na	4.0	2.2	1.9	1.8
Bank of America	0.1 L	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	4.5	2.7	2.4	2.2
Barclays	0.1 L	3.3	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.5 L	1.8	1.4	1.4
BBVA	0.1 L	3.3	0.3	0.2	0.1	0.2	0.3	0.5	1.3	2.1	2.9	3.4	3.9	2.2	3.5	104.2	5.2 H	2.1	2.0	1.8
BMO Capital Markets	0.1 L	3.3	0.3	na	0.1	0.1	0.2	0.4	1.1	1.9	2.5	na	na	na	3.2	100.6	3.1	2.4	2.9	2.6
BNP Paribas Americas	0.1 L	na	na	na	na	na	na	0.9	na	2.4	na	na	na	na	na	na	4.3	na	2.1	2.0
Chan Economics	0.1 L	3.3	0.2 L	0.1	0.1	0.1	0.2	0.3	1.2	2.0	2.7	3.4	4.3	3.0	3.5	101.8	2.5	2.0	2.2	2.1
Chmura Economics & Analytics	0.1 L	3.3	0.3	0.1	0.1	0.1	0.2	0.2	0.9	1.8	2.5	3.2	na	na	3.3	na	4.0	2.6	2.8	na
Comerica Bank	0.1 L	3.2 L	0.3	na	0.1	0.2	0.3	0.5	1.1	1.9	2.7	na	na	na	3.7	na	4.3	2.3	2.5	2.6
Daiwa Capital Markets America	0.1 L	3.3	0.3	0.1	0.1	0.1	0.2	0.3	1.2	2.2	2.8	3.7	4.4	na	3.8	104.0	3.8	2.4	2.6	2.4
DePrince & Assoc.	0.1 L	3.2 L	0.2 L	0.2	0.1	0.1	0.2	0.4	1.2	1.9	2.5	3.8	4.6	3.2	3.5	102.8	2.9	2.3	2.3	2.2
Economist Intelligence Unit	0.1 L	3.3	na	0.1	0.1	0.1	0.2	0.3	1.1	1.9	2.5	na	na	na	3.3	na	1.9	na	2.3	2.8
Fannie Mae	0.1 L	3.3	na	na	0.1	0.2	0.3	0.4	1.2	1.8	2.4	na	na	na	3.3	na	2.9	2.5	2.2	2.2
Georgia State University	0.1 L	3.3	na	na	0.0 L	0.0 L	-0.1 L	0.3	1.2	2.1	2.8	2.9	4.4	na	3.9	na	2.6	1.8	2.3	1.7
GLC Financial Economics	0.1 L	3.3	0.2 L	0.2	0.1	0.1	0.2	0.3	0.9	1.8	2.6	3.0	4.3	3.2	3.4	103.8	5.0	2.6	2.9	3.4 H
Goldman Sachs & Co.	0.1 L	na	0.2 L	na	0.1	na	na	na	na	2.0	na	na	na	na	na	na	3.0	2.2	2.4	2.1
Grant Thornton/Diane Swonk	0.1 L	3.3	0.2 L	0.1	0.1	0.1	0.2	0.4	1.2	2.0	2.7	3.5	4.2	na	3.6	na	1.6	3.5	3.0	3.1
IHS Markit	0.1 L	3.3	0.3	na	na	na	0.0	0.3	1.0	1.9	2.5	na	na	na	3.5	na	2.7	2.0	1.6	1.7
ING	0.1 L	na	0.3	na	na	na	na	0.8	1.8 H	2.5 H	2.9	na	na	na	na	na	3.6	na	na	na
J.P. Morgan Chase	0.1 L	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	3.0	1.9	2.2	1.9
Loomis, Sayles & Company	0.1 L	3.3	0.2 L	0.1	0.1	0.1	0.3	0.5	1.4	2.1	2.6	3.3	4.0	3.1	3.5	102.3	2.4	2.0	2.0	1.8
MacroFin Analytics & Rutgers Bus School	0.1 L	3.3	0.2 L	0.1	0.1	0.2	0.2	0.3	1.0	1.8	2.5	3.3	3.8	2.8	3.2	102.8	2.5	2.0	1.8	2.0
Mizuho Research Institute	0.1 L	na	na	na	na	na	na	na	na	2.0	na	na	na	na	na	na	na	na	na	na
Moody's Analytics	0.1 L	3.2 L	0.4	0.1	0.2	0.3	0.6	1.0 H	1.7	2.3	3.3	3.8	4.8	3.3	4.1	na	2.7	2.3	2.3	2.5
Naroff Economic Advisors	0.1 L	3.3	0.3	0.2	0.2	0.2	0.3	0.4	1.2	1.9	2.8	3.2	4.9 H	3.1	3.8	105.3	2.5	2.5	2.5	2.6
NatWest Markets	0.1 L	3.2 L	0.3	0.2	0.1	0.2	0.3	0.8	1.6	2.2	2.7	1.6 L	2.6 L	0.7 L	1.7 L	na	2.1	1.7	2.8	2.8
Nomura Securities, Inc.	0.1 L	3.3	na	na	na	na	na	0.3	1.0	1.8	na	na	na	na	na	na	3.9	3.6	0.9 L	1.3
Oxford Economics	0.1 L	3.3	0.3	na	0.2	0.2	0.3	0.3	1.3	2.3	3.0	3.2	na	na	3.8	104.7	4.5	2.2	2.5	2.3
PNC Financial Services Corp.	0.1 L	3.3	0.2 L	na	0.1	0.1	0.2	0.3	1.0	1.8	2.7	na	4.1	2.2	3.4	104.1	2.8	2.8	2.6	2.4
RDQ Economics	0.1 L	3.3	0.2 L	0.2	0.1	0.1	0.2	0.2	1.0	2.2	3.1	3.5	4.2	3.7 H	3.8	99.5	3.6	2.7	2.7	2.5
Regions Financial Corporation	0.1 L	3.3	0.3	0.2	0.1	0.2	0.2	0.4	1.2	2.0	2.8	3.4	4.3	3.2	3.5	103.3	3.3	1.8	1.9	2.1
S&P Global	0.1 L	3.3	0.3	na	0.2	0.2	0.3	0.4	1.2	2.2	2.8	na	na	na	3.4	na	2.4	1.8	2.1	2.0
Scotiabank Group	0.1 L	3.3	na	na	0.1	na	na	0.9	1.5	2.2	2.6	na	na	na	na	na	1.7	-0.1 L	2.8	2.4
Societe Generale	0.1 L	na	na	na	0.1	0.1	na	0.4	1.4	2.3	2.8	na	na	na	na	na	2.6	2.3	2.0	2.0
Swiss Re	0.1 L	3.3	0.4	0.3	0.2	0.2	0.4	0.5	1.0	1.9	2.5	3.8	4.9 H	na	3.6	na	2.7	4.8 H	4.7 H	2.0
The Northern Trust Company	0.1 L	3.3	0.3	0.0 L	0.1	0.2	0.4	0.5	1.2	2.0	3.0	3.5	4.4	3.6	3.8	104.0	3.1	2.2	2.0	1.9
Thru the Cycle	0.1 L	3.3	0.2 L	0.1	0.1	0.1	0.2	0.4	1.2	1.9	2.6	3.3	3.8	2.9	3.4	105.1	3.3	2.0	2.6	2.1
TS Lombard	0.1 L	3.2 L	0.4	0.2	0.3	0.3	0.6	1.0 H	1.7	2.4	3.1	3.9	4.7	3.0	4.4 H	100.0	3.3	2.1	2.1	2.1
Via Nova Investment Mgt.	0.1 L	3.3	0.2 L	0.1	0.1	0.1	0.1	0.2	0.9	1.7	2.2	3.2	3.7	2.9	3.3	105.0	3.0	2.1	2.0	1.9
Wells Fargo	0.1 L	3.3	0.3	0.1	0.1	0.1	0.2	0.4	1.4	2.2	2.8	3.5	4.4	3.4	3.7	na	3.3	2.0	2.1	1.9
June Consensus	**0.1**	**3.3**	**0.3**	**0.2**	**0.1**	**0.2**	**0.3**	**0.5**	**1.2**	**2.0**	**2.7**	**3.3**	**4.2**	**2.9**	**3.5**	**103.1**	**3.1**	**2.2**	**2.3**	**2.2**
Top 10 Avg.	0.1	3.3	0.4	0.2	0.2	0.3	0.4	0.8	1.6	2.3	3.0	3.7	4.6	3.3	3.9	104.7	4.4	3.0	3.0	2.7
Bottom 10 Avg.	0.1	3.3	0.2	0.1	0.1	0.1	0.1	0.3	0.9	1.8	2.4	3.0	3.8	2.4	3.1	101.5	2.1	1.6	1.8	1.6
May Consensus	0.1	3.3	0.3	0.2	0.1	0.2	0.3	0.5	1.2	2.1	2.7	3.4	4.3	2.9	3.6	104.2	3.1	2.2	2.2	2.1
Number of Forecasts Changed From A Month Ago:																				
Down	0	2	4	1	2	3	4	5	8	7	3	4	4	4	11	12	5	7	9	8
Same	41	31	26	21	32	29	26	25	21	29	25	15	16	11	16	3	24	17	16	19
Up	2	3	2	2	1	1	3	8	8	4	8	6	5	5	6	4	12	13	15	12
Diffusion Index	52%	51%	47%	52%	49%	47%	48%	54%	50%	46%	57%	54%	52%	53%	42%	29%	59%	58%	58%	55%

Third Quarter 2022

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	A. Fed's Adv Fgn Econ $ Index	B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
	Percent Per Annum -- Average For Quarter															Avg. For ---Qtr.---	(Q-Q % Change) (SAAR)			
	Short-Term							Intermediate-Term			Long-Term									
Amherst Pierpont Securities	0.7 H	3.8 H	1.0 H	0.8 H	0.9 H	1.0 H	1.1 H	1.2 H	2.0 H	2.7 H	3.5 H	4.3 H	5.0 H	3.3	4.2	108.0 H	3.2	2.5	2.8	2.5
BBVA	0.2	3.3	0.3	0.2	0.2	0.2	0.4	0.6	1.4	2.2	2.9	3.5	4.0	2.3	3.6	103.8	4.4	1.9	2.2	2.0
Regions Financial Corporation	0.2	3.3	0.3	0.2	0.2	0.2	0.3	0.5	1.3	2.1	2.9	3.5	4.4	3.2	3.6	104.0	2.6	1.9	2.0	2.0
ACIMA Private Wealth	0.1 L	3.3	0.2 L	0.1	0.0 L	0.0 L	0.1	0.1 L	0.4 L	1.2 L	1.7 L	2.8	3.7	1.4	2.5	98.0 L	2.5	1.3	1.8	1.2 L
Action Economics	0.1 L	3.3	0.2 L	0.1	0.1	0.2	0.3	0.6	1.3	2.0	2.7	3.1	4.0	3.0	3.5	102.5	3.2	2.8	na	na
AIG	0.1 L	3.3	0.3	na	0.1	0.1	0.2	0.3	1.2	2.1	2.8	na	4.3	na	3.8	na	3.0	2.2	2.7	1.9
Barclays	0.1 L	3.3	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.0 L	2.1	2.2	1.8
BMO Capital Markets	0.1 L	3.3	0.3	na	0.1	0.1	0.3	0.5	1.2	1.9	2.6	na	na	na	3.3	100.2	2.6	2.1	2.5	2.2
BNP Paribas Americas	0.1 L	na	na	na	na	na	na	1.2 H	na	2.4	na	na	na	na	na	na	3.7	na	2.2	2.3
Chan Economics	0.1 L	3.3	0.3	0.2	0.2	0.2	0.3	0.3	1.2	2.1	2.8	3.5	4.4	3.1	3.6	102.5	2.5	2.0	2.2	2.0
Chmura Economics & Analytics	0.1 L	3.3	0.4	0.2	0.1	0.1	0.2	0.3	0.9	1.8	2.5	3.2	na	na	3.4	na	3.4	2.3	2.4	na
Comerica Bank	0.1 L	3.2 L	0.3	na	0.1	0.2	0.3	0.5	1.1	2.0	2.8	na	na	na	3.9	na	3.5	2.2	2.4	2.5
Daiwa Capital Markets America	0.1 L	3.3	0.3	0.2	0.1	0.2	0.2	0.3	1.3	2.4	2.9	3.9	4.6	na	4.0	104.0	3.3	2.3	2.6	2.4
DePrince & Assoc.	0.1 L	3.2 L	0.2 L	0.3	0.2	0.2	0.2	0.5	1.3	2.0	2.6	3.6	4.7	3.1	3.6	103.1	2.6	2.3	2.3	2.2
Economist Intelligence Unit	0.1 L	3.3	na	0.2	0.1	0.2	0.2	0.3	1.2	2.0	2.5	na	na	na	3.4	na	1.6	na	1.8	1.9
Fannie Mae	0.1 L	3.3	na	na	0.2	0.3	0.4	0.5	1.4	1.9	2.4	na	na	na	3.4	na	2.3	2.6	2.2	2.3
Georgia State University	0.1 L	3.3	na	na	0.0 L	0.1	0.0 L	0.4	1.2	2.2	2.8	2.9	4.6	na	4.0	na	2.0	1.8	2.3	1.8
GLC Financial Economics	0.1 L	3.3	0.3	0.2	0.1	0.1	0.2	0.3	0.9	2.2	2.8	3.3	4.6	3.5	3.8	103.9	5.1 H	2.8	2.9 H	3.3 H
Goldman Sachs & Co.	0.1 L	na	0.2 L	na	0.1	na	na	na	na	2.1	na	na	na	na	na	na	2.0	2.2	2.1	2.0
Grant Thornton/Diane Swonk	0.1 L	3.3	0.2 L	0.1	0.1	0.1	0.3	0.6	1.2	2.0	2.8	3.6	4.2	na	3.6	na	1.8	2.8	2.4	2.5
IHS Markit	0.1 L	3.3	0.3	na	na	na	0.1	0.3	1.1	1.9	2.6	na	na	na	3.6	na	1.6	2.0	1.6	1.7
ING	0.1 L	na	0.3	na	na	na	na	0.8	1.8	2.5	2.9	na	na	na	na	na	3.1	na	na	na
J.P. Morgan Chase	0.1 L	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	2.5	2.0	2.2	1.9
Loomis, Sayles & Company	0.1 L	3.3	0.3	0.2	0.1	0.2	0.3	0.6	1.5	2.2	2.6	3.4	4.0	3.1	3.6	102.3	1.8	2.1	2.1	1.9
MacroFin Analytics & Rutgers Bus School	0.1 L	3.3	0.2 L	0.1	0.2	0.2	0.2	0.3	1.0	1.8	2.5	3.4	3.9	2.9	3.2	103.1	2.3	2.0	1.9	2.0
Mizuho Research Institute	0.1 L	na	na	na	na	na	na	na	na	2.0	na	na	na	na	na	na	na	na	na	na
Moody's Analytics	0.1 L	3.2 L	0.4	0.1	0.2	0.4	0.7	1.1	1.8	2.3	3.3	3.9	4.9	3.3	4.1	na	2.3	2.2	2.3	2.4
Naroff Economic Advisors	0.1 L	3.3	0.4	0.3	0.3	0.3	0.3	0.5	1.3	2.1	2.9	3.3	5.0 H	3.3	3.9	106.0	2.1	2.5	2.5	2.5
NatWest Markets	0.1 L	3.2 L	0.3	0.2	0.1	0.2	0.3	0.9	1.7	2.3	2.7	1.7 L	2.7 L	0.8 L	1.8 L	na	2.3	1.7	2.0	2.2
Nomura Securities, Inc.	0.1 L	3.3	na	na	na	na	na	0.4	1.1	1.8	na	na	na	na	na	na	2.3	3.7	1.9	1.8
Oxford Economics	0.1 L	3.3	0.3	na	0.2	0.2	0.3	0.4	1.4	2.4	3.0	3.6	na	na	4.0	104.2	2.8	2.3	2.6	2.7
PNC Financial Services Corp.	0.1 L	3.3	0.2 L	na	0.1	0.2	0.2	0.3	1.0	1.9	2.7	na	4.1	2.2	3.5	104.6	2.3	2.9	2.6	2.4
RDQ Economics	0.1 L	3.3	0.2 L	0.2	0.1	0.1	0.2	0.3	1.1	2.2	3.2	3.4	4.2	3.8 H	3.8	99.5	3.7	2.9	2.7	2.5
S&P Global	0.1 L	3.3	0.3	na	0.2	0.2	0.3	0.4	1.3	2.2	2.9	na	na	na	3.5	na	1.7	2.2	2.2	2.1
Scotiabank Group	0.1 L	3.3	na	na	0.1	na	na	1.1	1.6	2.3	2.6	na	na	na	na	na	1.8	5.3 H	0.5	2.5
Societe Generale	0.1 L	na	na	na	0.1	0.1	na	0.5	1.7	2.6	3.0	na	na	na	na	na	2.3	2.3	2.0	2.0
Swiss Re	0.1 L	3.3	0.4	0.3	0.2	0.2	0.4	0.5	1.1	1.9	2.6	3.9	4.9	na	3.7	na	2.2	-0.7 L	0.4 L	2.0
The Northern Trust Company	0.1 L	3.3	0.3	0.0 L	0.1	0.2	0.4	0.5	1.2	2.0	3.0	3.5	4.4	3.7	3.8	103.5	2.7	2.1	2.0	1.9
Thru the Cycle	0.1 L	3.3	0.2 L	0.1	0.1	0.1	0.3	0.5	1.3	2.0	2.6	3.3	3.8	2.9	3.5	105.4	2.1	1.9	2.6	2.2
TS Lombard	0.1 L	3.2 L	0.4	0.2	0.3	0.3	0.7	1.2 H	1.9	2.6	3.3	4.1	4.9	3.2	4.6 H	100.0	2.8	2.3	2.3	2.3
Via Nova Investment Mgt.	0.1 L	3.3	0.2 L	0.1	0.1	0.1	0.1	0.2	0.9	1.7	2.2	3.2	3.7	2.9	3.3	105.0	3.0	2.1	2.0	2.0
Wells Fargo	0.1 L	3.3	0.3	0.1	0.1	0.1	0.2	0.5	1.5	2.2	2.9	3.5	4.4	3.4	3.8	na	2.6	2.0	2.3	1.9
June Consensus	**0.1**	**3.3**	**0.3**	**0.2**	**0.2**	**0.2**	**0.3**	**0.5**	**1.3**	**2.1**	**2.8**	**3.4**	**4.3**	**2.9**	**3.6**	**103.2**	**2.6**	**2.3**	**2.2**	**2.2**
Top 10 Avg.	0.2	3.4	0.4	0.3	0.3	0.3	0.5	0.9	1.7	2.5	3.1	3.8	4.8	3.4	4.0	104.9	3.7	3.1	2.7	2.6
Bottom 10 Avg.	0.1	3.3	0.2	0.1	0.1	0.1	0.2	0.3	1.0	1.8	2.4	3.0	3.8	2.5	3.1	101.5	1.7	1.6	1.6	1.8
May Consensus	0.1	3.3	0.3	0.2	0.2	0.2	0.3	0.5	1.3	2.1	2.8	3.4	4.3	3.0	3.7	104.2	2.6	2.2	2.2	2.1
Number of Forecasts Changed From A Month Ago:																				
Down	0	3	4	0	1	2	4	6	10	7	7	3	6	6	10	10	10	8	11	8
Same	40	30	26	22	32	30	26	24	19	26	21	15	13	10	18	4	21	16	16	18
Up	2	3	2	2	2	1	3	8	8	7	8	7	6	4	5	5	9	12	11	11
Diffusion Index	52%	50%	47%	54%	51%	48%	48%	53%	47%	50%	51%	58%	50%	45%	42%	37%	49%	56%	50%	54%

International Interest Rate And Foreign Exchange Rate Forecasts

United States

Blue Chip Forecasters	Fed Fund Target Rate			10 Yr. Gov't Bond Yield %			Fed's AFE $ Index		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	0.13	0.13	--	1.65	1.70	--	--	--	--
BMO Capital Markets	0.13	0.13	0.13	1.65	1.75	1.85	102.5	101.7	100.6
IHSMarkit	--	--	--	1.68	1.76	1.87	--	--	--
ING Financial Markets	0.13	0.13	0.13	2.00	2.25	2.50	100.2	98.2	100.5
Mizuho Research Institute	--	--	--	1.75	1.85	1.95	--	--	--
Moody's Analytics	0.13	0.13	0.13	1.69	1.88	2.19	--	--	--
Northern Trust	0.13	0.13	0.13	1.75	1.85	2.00	101.5	100.0	104.0
Oxford Economics	0.13	0.13	0.13	1.92	2.02	2.32	104.1	104.7	104.7
S&P Global	0.12	0.12	0.12	1.70	1.82	2.10	--	--	--
Scotiabank	0.13	0.13	0.13	1.85	2.10	2.20	--	--	--
TS Lombard	0.13	0.13	0.13	1.70	2.00	2.40	108.0	105.0	104.0
Wells Fargo	0.13	0.13	0.13	1.95	2.05	2.20	103.8	103.8	102.3
June Consensus	**0.13**	**0.13**	**0.13**	**1.77**	**1.92**	**2.14**	**103.4**	**102.2**	**102.7**
High	0.13	0.13	0.13	2.00	2.25	2.50	108.0	105.0	104.7
Low	0.12	0.12	0.12	1.65	1.70	1.85	100.2	98.2	100.5
Last Months Avg.	0.13	0.13	0.13	1.73	1.84	2.07	104.6	103.4	102.5

Japan

Blue Chip Forecasters	Policy-Rate Balance Rate			10 Yr. Gov't Bond Yield %			Yen per US$		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	-0.10	-0.10	--	0.10	0.15	--	110.0	111.0	--
BMO Capital Markets	-0.10	-0.10	-0.10	0.10	0.10	0.10	108.0	108.0	106.0
IHSMarkit	--	--	--	--	--	--	109.1	108.9	106.7
ING Financial Markets	-0.10	-0.10	-0.10	0.10	0.00	0.00	108.0	108.0	109.0
Mizuho Research Institute	-0.10	-0.10	-0.10	0.10	0.10	0.15	108.0	109.0	110.0
Moody's Analytics	-0.10	-0.10	-0.10	0.08	0.08	0.13	107.4	105.6	104.0
Nomura Securities	--	--	--	--	--	--	109.0	110.0	111.0
Northern Trust	-0.10	-0.10	-0.10	0.10	0.10	0.10	108.0	108.0	107.0
Oxford Economics	-0.04	-0.05	-0.05	0.05	0.02	0.00	110.0	110.0	110.0
S&P Global	-0.10	-0.10	-0.10	0.04	-0.02	-0.05	104.5	104.7	104.7
Scotiabank	-0.10	-0.10	-0.10	--	--	--	107.0	106.0	108.0
TS Lombard	-0.06	-0.06	-0.06	0.10	0.10	0.10	106.0	103.0	100.0
Wells Fargo	-0.10	-0.10	-0.10	0.10	0.15	0.15	110.0	111.0	113.0
June Consensus	**-0.09**	**-0.09**	**-0.09**	**0.09**	**0.08**	**0.08**	**108.1**	**107.9**	**107.4**
High	-0.04	-0.05	-0.05	0.10	0.15	0.15	110.0	111.0	113.0
Low	-0.10	-0.10	-0.10	0.04	-0.02	-0.05	104.5	103.0	100.0
Last Months Avg.	-0.09	-0.09	-0.09	0.09	0.08	0.07	107.8	107.5	106.2

United Kingdom

Blue Chip Forecasters	Official Bank Rate			10 Yr. Gilt Yields %			US$ per Pound Sterling		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	0.10	0.10	--	1.10	1.20	--	1.40	1.40	--
BMO Capital Markets	0.10	0.10	0.10	0.85	0.90	1.20	1.40	1.41	1.42
IHSMarkit	--	--	--	--	--	--	1.40	1.40	1.41
ING Financial Markets	0.10	0.10	0.10	1.00	1.10	1.20	1.47	1.51	1.51
Moody's Analytics	0.10	0.10	0.10	0.91	1.05	1.32	1.40	1.46	1.53
Nomura Securities	--	--	--	--	--	--	1.49	1.51	1.54
Northern Trust	0.10	0.10	0.10	0.85	0.95	1.05	1.40	1.39	1.37
Oxford Economics	0.10	0.10	0.10	0.95	1.00	1.09	1.39	1.39	1.40
S&P Global	0.10	0.10	0.10	--	--	--	1.31	1.30	1.34
Scotiabank	0.10	0.10	0.10	--	--	--	1.47	1.48	1.49
TS Lombard	0.10	0.10	0.10	1.00	1.30	1.70	1.36	1.42	1.45
Wells Fargo	0.10	0.10	0.10	1.05	1.15	1.30	1.39	1.40	1.42
June Consensus	**0.10**	**0.10**	**0.10**	**0.96**	**1.08**	**1.27**	**1.41**	**1.42**	**1.44**
High	0.10	0.10	0.10	1.10	1.30	1.70	1.49	1.51	1.54
Low	0.10	0.10	0.10	0.85	0.90	1.05	1.31	1.30	1.34
Last Months Avg.	0.10	0.10	0.10	0.87	0.97	1.08	1.39	1.42	1.45

Switzerland

Blue Chip Forecasters	SNB Policy Rate			10 Yr. Gov't Bond Yield %			CHF per US$		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	-0.75	-0.75	--	--	--	--	0.97	0.97	--
IHSMarkit	--	--	--	--	--	--	0.91	0.91	0.91
ING Financial Markets	-0.75	-0.75	-0.75	-0.15	-0.10	0.00	0.90	0.90	0.92
Moody's Analytics	-0.75	-0.75	-0.75	-0.23	-0.15	-0.05	0.89	0.88	0.84
Nomura Securities	--	--	--	--	--	--	0.92	0.92	0.91
Northern Trust	-0.75	-0.75	-0.75	-0.20	-0.15	-0.10	0.89	0.90	0.92
Oxford Economics	-0.75	-0.75	-0.75	-0.12	-0.09	-0.04	0.93	0.93	0.92
S&P Global	-0.75	-0.75	-0.75	-0.30	-0.26	-0.19	0.93	0.95	0.94
Scotiabank	--	--	--	--	--	--	0.90	0.90	0.90
TS Lombard	-0.75	-0.75	-0.75	--	--	--	0.97	0.97	0.97
June Consensus	**-0.75**	**-0.75**	**-0.75**	**-0.20**	**-0.15**	**-0.08**	**0.92**	**0.92**	**0.91**
High	-0.75	-0.75	-0.75	-0.12	-0.09	0.00	0.97	0.97	0.97
Low	-0.75	-0.75	-0.75	-0.30	-0.26	-0.19	0.89	0.88	0.84
Last Months Avg.	-0.75	-0.75	-0.75	-0.20	-0.10	0.03	0.93	0.93	0.92

Canada

Blue Chip Forecasters	O/N MMkt Financing Rate			10 Yr. Gov't Bond Yield %			C$ per US$		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	0.25	0.25	--	--	--	--	1.23	1.22	--
BMO Capital Markets	0.25	0.25	0.25	1.60	1.65	1.75	1.22	1.21	1.20
IHSMarkit	--	--	--	--	--	--	1.22	1.24	1.24
ING Financial Markets	0.25	0.25	0.25	2.00	2.25	2.50	1.19	1.16	1.20
Moody's Analytics	0.25	0.25	0.25	1.54	1.67	1.96	1.30	1.31	1.30
Nomura Securities	--	--	--	--	--	--	1.24	1.23	1.22
Northern Trust	0.25	0.25	0.25	1.60	1.70	1.80	1.21	1.22	1.25
Oxford Economics	0.25	0.25	0.25	1.96	2.08	2.35	1.27	1.29	1.29
S&P Global	0.25	0.25	0.25	1.73	1.86	1.95	1.26	1.27	1.28
Scotiabank	0.25	0.25	0.25	1.70	1.80	1.90	1.20	1.19	1.18
TS Lombard	0.25	0.25	0.25	1.65	1.95	2.35	1.38	1.38	1.38
Wells Fargo	0.25	0.25	0.25	1.80	1.95	2.20	1.21	1.20	1.16
June Consensus	**0.25**	**0.25**	**0.25**	**1.73**	**1.88**	**2.08**	**1.24**	**1.24**	**1.25**
High	0.25	0.25	0.25	2.00	2.25	2.50	1.38	1.38	1.38
Low	0.25	0.25	0.25	1.54	1.65	1.75	1.19	1.16	1.16
Last Months Avg.	0.25	0.25	0.25	1.60	1.75	1.94	1.26	1.26	1.26

International Interest Rate And Foreign Exchange Rate Forecasts

Australia

Blue Chip Forecasters	Official Cash Rate			10 Yr. Gov't Bond Yield %			US$ per A$		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	0.10	0.10	--	--	--	--	0.76	0.76	--
IHSMarkit	--	--	--	--	--	--	0.77	0.76	0.74
ING Financial Markets	0.10	0.10	0.10	2.10	2.20	2.40	0.81	0.83	0.82
Moody's Analytics	0.10	0.10	0.10	1.54	1.43	1.57	0.78	0.78	0.74
Nomura Securities	--	--	--	--	--	--	0.79	0.80	0.82
Northern Trust	0.10	0.10	0.10	1.65	1.75	1.85	0.78	0.78	0.76
Oxford Economics	0.04	0.05	0.10	1.86	2.06	2.31	0.75	0.75	0.74
S&P Global	0.10	0.10	0.10	1.84	1.69	1.90	0.78	0.78	0.78
Scotiabank	0.10	0.10	0.10	--	--	--	0.80	0.80	0.79
TS Lombard	0.25	0.25	0.25	1.95	2.25	2.65	--	--	--
Wells Fargo	--	--	--	--	--	--	0.79	0.80	0.82
June Consensus	**0.11**	**0.11**	**0.12**	**1.82**	**1.90**	**2.11**	**0.78**	**0.78**	**0.78**
High	0.25	0.25	0.25	2.10	2.25	2.65	0.81	0.83	0.82
Low	0.04	0.05	0.10	1.54	1.43	1.57	0.75	0.75	0.74
Last Months Avg.	0.11	0.11	0.12	1.77	1.87	2.08	0.76	0.77	0.77

Euro area

Blue Chip Forecasters	Main Refinancing Rate			US$ per Euro		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	0.00	0.00	--	1.15	1.14	--
BMO Capital Markets	0.00	0.00	0.00	1.21	1.22	1.23
IHSMarkit	--	--	--	1.20	1.20	1.20
ING Financial Markets	0.00	0.00	0.00	1.25	1.28	1.25
Moody's Analytics	0.00	0.00	0.00	1.20	1.21	1.24
Nomura Securities	--	--	--	1.24	1.25	1.27
Northern Trust	0.00	0.00	0.00	1.21	1.23	1.19
Oxford Economics	0.00	0.00	0.00	1.19	1.20	1.21
S&P Global	0.00	0.00	0.00	1.18	1.17	1.20
Scotiabank	0.00	0.00	0.00	1.22	1.23	1.25
TS Lombard	0.00	0.00	0.00	1.20	1.25	1.28
Wells Fargo	0.00	0.00	0.00	1.18	1.17	1.19
June Consensus	**0.00**	**0.00**	**0.00**	**1.20**	**1.21**	**1.23**
High	0.00	0.00	0.00	1.25	1.28	1.28
Low	0.00	0.00	0.00	1.15	1.14	1.19
Last Months Avg.	-0.05	-0.05	-0.06	1.20	1.21	1.23

Blue Chip Forecasters	10 Yr. Gov't Bond Yields %											
	Germany			France			Italy			Spain		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	-0.20	-0.10	--	--	--	--	--	--	--	--	--	--
BMO Capital Markets	-0.20	-0.15	0.00	--	--	--	--	--	--	--	--	--
ING Financial Markets	0.00	0.20	0.25	0.20	0.45	0.50	0.75	1.05	1.15	0.55	0.80	0.90
Moody's Analytics	-0.25	-0.19	-0.06	0.00	0.07	0.20	0.82	0.89	1.00	0.37	0.45	0.51
Northern Trust	-0.20	-0.10	0.00	0.15	0.20	0.25	0.95	1.05	1.15	0.50	0.60	0.70
Oxford Economics	-0.05	0.00	0.07	0.31	0.35	0.41	0.95	1.12	1.44	0.67	0.78	0.96
S&P Global	-0.39	-0.32	-0.22	-0.08	0.01	0.13	0.66	0.77	1.05	0.33	0.42	0.56
TS Lombard	0.00	0.30	0.70	-0.25	0.05	0.45	0.57	0.87	1.27	0.07	0.37	0.77
Wells Fargo	-0.15	-0.10	0.05	--	--	--	--	--	--	--	--	--
June Consensus	**-0.16**	**-0.05**	**0.10**	**0.06**	**0.19**	**0.32**	**0.78**	**0.96**	**1.18**	**0.42**	**0.57**	**0.73**
High	0.00	0.30	0.70	0.31	0.45	0.50	0.95	1.12	1.44	0.67	0.80	0.96
Low	-0.39	-0.32	-0.22	-0.25	0.01	0.13	0.57	0.77	1.00	0.07	0.37	0.51
Last Months Avg.	-0.22	-0.11	0.04	-0.04	0.08	0.25	0.69	0.81	1.07	0.30	0.44	0.64

	Consensus Forecasts 10-year Bond Yields vs U.S. Yield			
	Current	In 3 Mo.	In 6 Mo.	In 12 Mo.
Japan	-1.54	-1.69	-1.84	-2.07
United Kingdom	-0.71	-0.81	-0.84	-0.88
Switzerland	-1.77	-1.97	-2.07	-2.22
Canada	-0.09	-0.04	-0.04	-0.06
Australia	0.00	0.05	-0.02	-0.03
Germany	-1.76	-1.93	-1.97	-2.04
France	-1.45	-1.72	-1.73	-1.82
Italy	-0.60	-0.99	-0.96	-0.97
Spain	-1.05	-1.36	-1.35	-1.41

	Consensus Forecasts Policy Rates vs U.S. Target Rate			
	Current	In 3 Mo.	In 6 Mo.	In 12 Mo.
Japan	-0.23	-0.22	-0.04	-0.22
United Kingdom	-0.03	-0.03	-0.03	-0.03
Switzerland	-0.88	-0.88	-0.88	-0.88
Canada	0.13	0.12	0.12	0.12
Australia	-0.03	-0.02	-0.02	-0.01
Euro area	-0.13	-0.13	-0.13	-0.13

Special Questions:

1. When do you think the Fed will raise the Federal Funds rate?

2021	2022	2023	2024	2025	2026	Later
0%	11%	66%	17%	3%	0%	3%

2. a. How large do you estimate the Fed's balance sheet at year-end (tril.$)?

2021	2022	2023
8.6	9.3	9.5

b. Do your estimates for each year reflect an acceleration, deceleration or no change relative to the current pace of asset purchases?

	Acceleration	Deceleration	No change
2021	0%	22%	78%
2022	0%	94%	6%
2023	0%	87%	13%

3. a. Does the balance of risks to your inflation forecasts in 2021 and 2022 lie to the upside?

Yes	100%
No	0%

b. If yes, what is the main source of those upside risks?

A stronger than expected recovery	39%
Commodity price pressures	9%
Looser monetary policy	9%
Looser fiscal policy	21%
A weaker U.S. dollar	3%
Other factors	18%

4. Are the inflation risks you perceive for 2021 and 2022 temporary or are they likely to linger?

Temporary	56%
Likely to linger	44%

Viewpoints:

A Sampling of Views on the Economy, Financial Markets and Government Policy Excerpted from Recent Reports Issued by our Blue Chip Panel Members and Others

The Case for Tapering QE

The Federal Open Market Committee has provided only the vaguest of forward guidance on its asset purchasing program, noting that the effort would be continued until "substantial further progress" is made toward the Fed's employment and inflation goals. Officials have consistently indicated over the past several months that the labor market is far from where they would like it to be and that inflation remains below target. Thus, the possibility of tapering the quantitative easing program has not been on the FOMC's agenda. The minutes from the April FOMC meeting again noted that "it would likely be some time until the economy had made substantial further progress" toward the Committee's goals. However, the minutes also mentioned for the first time the possibility of tapering: a "number" of Fed officials indicated that if the economy continued to improve rapidly "it might be appropriate at some point in upcoming meetings to begin discussing a plan for adjusting the pace of asset purchases." The statement was guarded (it might be appropriate…to begin discussing…), and it was not strong enough to suggest a near-term change, but nevertheless, it represented a shift.

The improvement in the economy is the obvious reason to consider a change in the QE program, but two other factors are probably in play as well: the purchases are contributing to unusually low levels of interest rates in the money market, and they might be leading many investors in the long-end of the market to take excessive risks.

The Money Market. The purchase of securities by the Federal Reserve will inject reserves into the banking system, and the new reserves, all else equal, will put downward pressure on short-term interest rates. The cumulative impact of the Fed purchases on short-term rates started to become apparent in February, when rates on repurchase agreements started a descent from a range of 7 to 12 basis points (close to the midpoint of the Fed's target range for the federal funds rate) to recent average readings of one basis point, with some transactions occurring at negative rates. Rates on Treasury bills also have retreated, with the three-month security now trading at 1 or 2 basis points, down from 10 to 15 basis points last summer and fall. Three recent auctions of four-week T-bills carried stop-out rates of 0.0 percent; that is, there were no winning bids in positive territory.

The downward pressure has intensified recently, as another factor adding reserves to the banking system has come into play. The Treasury Department ran an unusually high cash balance during the worst of the pandemic, which drained reserves from the banking system when the Treasury raised new cash in the market. The Treasury is now reducing its cash balance, which is adding reserves and leading to more downward pressure.

Despite the abundance of liquidity, money market rates have generally not moved into negative territory. Rates have remained (barely) positive because the Fed offers many institutional investors the opportunity to park funds at a Federal Reserve Bank through a reverse repurchase agreement (RRP) at a zero interest rate. Investors have flocked to this instrument recently, with utilization moving from levels in the neighborhood of $200 billion a short time ago to $522 billion on May 19. The availability of RRPs has absorbed much of the downward pressure on interest rates associated with the abundance of reserves in the banking system, and the Fed could possibly push short-term interest rates higher by increasing the interest rates on this instrument. Indeed, minutes from recent FOMC meetings indicate that such a step is under consideration. Such action most likely would be effective in maintaining positive interest rates, but it is treating symptoms rather than the underlying cause. The down ward pressure on short-term interest rates is a reflection of excessive reserves in the banking system. A better strategy might be to reduce the volume of reserves in the banking system, or at least stop adding them through the quantitative easing program.

Long-Term Financial Markets. The QE program is having an influence on the short end of the fixed-income market, and it has most likely put downward pressure on long-term Treasury and mortgage rates as well. These low rates, in turn, have led investors to search for opportunities in other markets, spreading the effect of QE throughout the long end of the maturity spectrum.

The reach for higher yields has had a pronounced effect on corporate bonds, as rates on these instruments have declined more than those on Treasury securities, pushing credit spreads to the low end of their historical range. The latest semi-annual report on financial stability from the Federal Reserve Board noted the tight spreads and viewed them as a sign of an elevated appetite for risk. The Fed report highlighted the low level of the so-called excess bond premium, which is a measure of the gap between the corporate-Treasury rate spread and expected credit losses.

The Fed report on financial stability also noted elevated asset valuations in other investment outlets, such as leveraged loans and real estate (both commercial and residential). Of course, equity prices are elevated as well. A price-earnings ratio constructed by the Fed staff (based on expected earnings) has moved within the range last seen during the tech bubble in the late 1990s and early 2000s.

The experience during the tech bubble did not end well, and thus a comparable price-earnings ratio today might stir concern about a pronounced equity correction in the months ahead. The current situation is perhaps less troubling because interest rates today are much lower than they were in the earlier cycle (the 10-year Treasury rate averaged 6.0 percent in 2000), and lower rates would justify elevated equity values. In this regard, the Fed report on financial stability included a chart showing the spread between the earnings-price ratio and the real 10-year Treasury rate. The earnings-price ratio is the inverse of the price-earnings ratio mentioned above. It represents an expected rate of return. This spread is approximately equal to the median value over the past few decades and comfortably above readings during the tech bubble, suggesting that current equity values are perhaps sustainable.

One wonders, though, about the sustainability of today's interest rates. The Fed will eventually have to end its QE program; continuing it indefinitely would amount to the adoption of banana-republic monetary policy. Without the support of QE, Treasury rates will most likely increase, which would probably lead to the repricing of other financial assets. Thus, today's QE effort, originally adopted to steady financial markets, might be the source of instability in the future.

Interestingly, Chair Powell has a different view. In his latest press conference, he noted that the equity market had an element of froth and that low interest rates might be having an influence. However, he felt that most of the exuberance in the stock market was the result of good progress in fighting Covid and the expectation of a brisk recovery.

Michael Moran (Daiwa Capital Markets)

Long-Range Survey:

The table below contains the results of our twice-annual long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are consensus estimates for the years 2022 through 2027 and averages for the five-year periods 2023-2027 and 2028-2032. Apply these projections cautiously. Few if any economic, demographic and political forces can be evaluated accurately over such long time spans.

		Average For The Year						Five-Year Averages	
		2022	2023	2024	2025	2026	2027	2023-2027	2028-2032
1. Federal Funds Rate	CONSENSUS	**0.1**	**0.4**	**1.0**	**1.6**	**1.9**	**2.1**	**1.4**	**2.2**
	Top 10 Average	0.2	0.7	1.6	2.4	2.6	2.7	2.0	2.7
	Bottom 10 Average	0.1	0.1	0.5	0.9	1.3	1.5	0.9	1.6
2. Prime Rate	CONSENSUS	**3.3**	**3.5**	**4.2**	**4.7**	**5.0**	**5.2**	**4.5**	**5.2**
	Top 10 Average	3.4	3.8	4.7	5.4	5.7	5.8	5.1	5.8
	Bottom 10 Average	3.2	3.3	3.7	4.0	4.4	4.6	4.0	4.7
3. LIBOR, 3-Mo.	CONSENSUS	**0.4**	**0.6**	**1.3**	**1.8**	**2.1**	**2.3**	**1.6**	**2.4**
	Top 10 Average	0.5	1.0	1.8	2.4	2.7	2.9	2.2	3.0
	Bottom 10 Average	0.2	0.4	0.8	1.2	1.6	1.7	1.1	1.8
4. Commercial Paper, 1-Mo	CONSENSUS	**0.2**	**0.6**	**1.3**	**1.8**	**2.1**	**2.3**	**1.6**	**2.4**
	Top 10 Average	0.4	0.9	1.6	2.3	2.6	2.8	2.0	2.8
	Bottom 10 Average	0.1	0.3	0.9	1.3	1.8	1.9	1.2	2.0
5. Treasury Bill Yield, 3-Mo	CONSENSUS	**0.2**	**0.5**	**1.0**	**1.6**	**1.9**	**2.1**	**1.4**	**2.2**
	Top 10 Average	0.3	0.8	1.6	2.2	2.5	2.7	1.9	2.7
	Bottom 10 Average	0.1	0.2	0.6	0.9	1.3	1.5	0.9	1.6
6. Treasury Bill Yield, 6-Mo	CONSENSUS	**0.2**	**0.5**	**1.1**	**1.6**	**2.0**	**2.2**	**1.5**	**2.3**
	Top 10 Average	0.3	0.8	1.7	2.3	2.6	2.7	2.0	2.8
	Bottom 10 Average	0.1	0.3	0.6	1.0	1.4	1.6	1.0	1.7
7. Treasury Bill Yield, 1-Yr	CONSENSUS	**0.3**	**0.7**	**1.2**	**1.8**	**2.1**	**2.3**	**1.6**	**2.4**
	Top 10 Average	0.5	1.0	1.8	2.4	2.8	2.9	2.2	3.0
	Bottom 10 Average	0.2	0.3	0.7	1.1	1.5	1.7	1.1	1.8
8. Treasury Note Yield, 2-Yr	CONSENSUS	**0.5**	**0.9**	**1.5**	**2.0**	**2.3**	**2.5**	**1.8**	**2.6**
	Top 10 Average	0.7	1.3	2.1	2.7	3.0	3.1	2.5	3.3
	Bottom 10 Average	0.3	0.5	0.9	1.3	1.6	1.8	1.2	1.9
9. Treasury Note Yield, 5-Yr	CONSENSUS	**1.2**	**1.6**	**2.1**	**2.5**	**2.8**	**2.8**	**2.4**	**3.0**
	Top 10 Average	1.5	2.0	2.8	3.3	3.5	3.5	3.0	3.6
	Bottom 10 Average	0.9	1.2	1.5	1.8	2.0	2.2	1.7	2.3
10. Treasury Note Yield, 10-Yr	CONSENSUS	**2.0**	**2.4**	**2.7**	**3.0**	**3.2**	**3.3**	**2.9**	**3.3**
	Top 10 Average	2.3	2.8	3.4	3.8	4.0	3.9	3.6	4.0
	Bottom 10 Average	1.7	1.9	2.1	2.3	2.5	2.6	2.3	2.7
11. Treasury Bond Yield, 30-Yr	CONSENSUS	**2.6**	**2.9**	**3.3**	**3.6**	**3.8**	**3.8**	**3.5**	**3.9**
	Top 10 Average	3.0	3.5	4.0	4.5	4.6	4.5	4.2	4.6
	Bottom 10 Average	2.3	2.4	2.5	2.7	2.9	3.1	2.7	3.2
12. Corporate Aaa Bond Yield	CONSENSUS	**3.3**	**3.7**	**4.1**	**4.5**	**4.7**	**4.7**	**4.3**	**4.8**
	Top 10 Average	3.6	4.2	4.7	5.2	5.4	5.4	5.0	5.4
	Bottom 10 Average	3.1	3.2	3.4	3.7	3.9	4.1	3.7	4.2
13. Corporate Baa Bond Yield	CONSENSUS	**4.3**	**4.7**	**5.1**	**5.4**	**5.6**	**5.7**	**5.3**	**5.8**
	Top 10 Average	4.6	5.1	5.6	6.1	6.3	6.2	5.9	6.4
	Bottom 10 Average	4.0	4.3	4.5	4.7	4.9	5.2	4.7	5.2
14. State & Local Bonds Yield	CONSENSUS	**2.9**	**3.2**	**3.6**	**3.9**	**4.1**	**4.2**	**3.8**	**4.2**
	Top 10 Average	3.2	3.5	4.1	4.5	4.7	4.7	4.3	4.8
	Bottom 10 Average	2.6	2.9	3.1	3.4	3.7	3.7	3.3	3.8
15. Home Mortgage Rate	CONSENSUS	**3.6**	**4.0**	**4.4**	**4.7**	**4.9**	**5.0**	**4.6**	**5.0**
	Top 10 Average	4.0	4.5	5.0	5.5	5.6	5.6	5.2	5.7
	Bottom 10 Average	3.2	3.6	3.8	4.0	4.2	4.3	4.0	4.4
A. Fed's AFE Nominal $ Index	CONSENSUS	**103.7**	**103.7**	**104.0**	**103.7**	**103.6**	**103.3**	**103.7**	**103.1**
	Top 10 Average	105.3	106.0	106.8	107.0	107.3	107.5	106.9	107.9
	Bottom 10 Average	102.0	101.5	101.4	100.8	100.4	100.0	100.8	99.4
		Year-Over-Year, % Change						Five-Year Averages	
		2022	2023	2024	2025	2026	2027	2023-2027	2028-2032
B. Real GDP	CONSENSUS	**4.2**	**2.6**	**2.3**	**2.2**	**2.1**	**2.1**	**2.2**	**2.1**
	Top 10 Average	5.3	3.3	2.7	2.5	2.4	2.4	2.7	2.5
	Bottom 10 Average	2.9	2.0	1.9	1.8	1.8	1.7	1.8	1.7
C. GDP Chained Price Index	CONSENSUS	**2.3**	**2.3**	**2.2**	**2.1**	**2.2**	**2.1**	**2.2**	**2.1**
	Top 10 Average	2.6	2.6	2.4	2.4	2.4	2.4	2.4	2.3
	Bottom 10 Average	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9
D. Consumer Price Index	CONSENSUS	**2.4**	**2.4**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**
	Top 10 Average	2.8	2.7	2.5	2.5	2.5	2.4	2.5	2.4
	Bottom 10 Average	2.1	2.1	1.9	1.9	2.0	1.9	2.0	1.9
E. PCE Price Index	CONSENSUS	**2.3**	**2.2**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
	Top 10 Average	2.7	2.5	2.4	2.4	2.4	2.4	2.4	2.3
	Bottom 10 Average	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9

Databank:

2021 Historical Data

Monthly Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Retail and Food Service Sales (a)	7.6	-2.9	10.7	0.0	....	....	....	....	....	....	....	....
Auto & Light Truck Sales (b)	16.77	15.90	17.96	18.50	....	....	....	....	....	....	....	....
Personal Income (a, current $)	10.2	-6.9	20.9	-13.1	....	....	....	....	....	....	....	....
Personal Consumption (a, current $)	3.4	-1.0	4.7	0.5	....	....	....	....	....	....	....	....
Consumer Credit (e)	0.5	7.5	7.4	....	....	....	....	....	....	....	....	....
Consumer Sentiment (U. of Mich.)	79.0	76.8	84.9	88.3	82.9	....	....	....	....	....	....	....
Household Employment (c)	201	208	609	328	....	....	....	....	....	....	....	....
Nonfarm Payroll Employment (c)	233	536	770	266	....	....	....	....	....	....	....	....
Unemployment Rate (%)	6.3	6.2	6.0	6.1	....	....	....	....	....	....	....	....
Average Hourly Earnings (All, cur. $)	29.92	30.00	29.96	30.17	....	....	....	....	....	....	....	....
Average Workweek (All, hrs.)	35.0	34.6	34.9	35.0	....	....	....	....	....	....	....	....
Industrial Production (d)	-1.8	-4.9	1.1	17.6	....	....	....	....	....	....	....	....
Capacity Utilization (%)	74.9	72.7	74.2	74.6	....	....	....	....	....	....	....	....
ISM Manufacturing Index (g)	58.7	60.8	64.7	60.7	....	....	....	....	....	....	....	....
ISM Nonmanufacturing Index (g)	58.7	55.3	63.7	62.7	....	....	....	....	....	....	....	....
Housing Starts (b)	1.625	1.447	1.733	1.569	....	....	....	....	....	....	....	....
Housing Permits (b)	1.883	1.726	1.755	1.733	....	....	....	....	....	....	....	....
New Home Sales (1-family, c)	993	854	917	863	....	....	....	....	....	....	....	....
Construction Expenditures (a)	0.6	-0.6	0.2	....	....	....	....	....	....	....	....	....
Consumer Price Index (nsa, d)	1.4	1.7	2.6	4.2	....	....	....	....	....	....	....	....
CPI ex. Food and Energy (nsa, d)	1.4	1.3	1.6	3.0	....	....	....	....	....	....	....	....
PCE Chain Price Index (d)	1.4	1.6	2.4	3.6	....	....	....	....	....	....	....	....
Core PCE Chain Price Index (d)	1.4	1.4	1.9	3.1	....	....	....	....	....	....	....	....
Producer Price Index (nsa, d)	1.7	2.8	4.2	6.2	....	....	....	....	....	....	....	....
Durable Goods Orders (a)	2.4	1.3	1.3	-1.3	....	....	....	....	....	....	....	....
Leading Economic Indicators (a)	0.5	-0.1	1.3	1.6	....	....	....	....	....	....	....	....
Balance of Trade & Services (f)	-67.8	-70.5	-74.4	....	....	....	....	....	....	....	....	....
Federal Funds Rate (%)	0.09	0.08	0.07	0.07	....	....	....	....	....	....	....	....
3-Mo. Treasury Bill Rate (%)	0.08	0.04	0.03	0.02	....	....	....	....	....	....	....	....
10-Year Treasury Note Yield (%)	1.08	1.26	1.61	1.64	....	....	....	....	....	....	....	....

2020 Historical Data

Monthly Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Retail and Food Service Sales (a)	0.6	-0.2	-8.6	-14.7	18.1	8.8	1.4	0.8	2.0	0.1	-1.4	-1.2
Auto & Light Truck Sales (b)	16.87	16.78	11.36	8.72	12.11	13.02	14.63	15.11	16.30	16.37	15.71	16.23
Personal Income (a, current $)	0.9	0.8	-1.8	12.4	-4.0	-1.1	0.7	-2.7	0.7	-0.2	-0.9	0.7
Personal Consumption (a, current $)	0.6	0.0	-6.7	-12.7	8.7	6.5	1.5	1.2	1.3	0.3	-0.6	-0.6
Consumer Credit (e)	2.5	4.6	-5.2	-18.2	-4.3	5.8	3.7	-3.1	5.0	0.1	3.3	3.3
Consumer Sentiment (U. of Mich.)	99.8	101.0	89.1	71.8	72.3	78.1	72.5	74.1	80.4	81.8	76.9	80.7
Household Employment (c)	-76	73	-3196	-22166	3854	4876	1677	3499	267	2126	140	21
Nonfarm Payroll Employment (c)	315	289	-1683	-20679	2833	4846	1726	1583	716	680	264	-306
Unemployment Rate (%)	3.5	3.5	4.4	14.8	13.3	11.1	10.2	8.4	7.8	6.9	6.7	6.7
Average Hourly Earnings (All, cur. $)	28.43	28.51	28.74	30.07	29.74	29.35	29.37	29.47	29.50	29.52	29.61	29.91
Average Workweek (All, hrs.)	34.3	34.4	34.1	34.2	34.7	34.6	34.6	34.7	34.8	34.8	34.8	34.7
Industrial Production (d)	-2.1	-1.4	-5.3	-17.7	-16.2	-11.0	-7.0	-6.6	-6.6	-4.7	-4.7	-3.2
Capacity Utilization (%)	76.1	76.3	73.4	63.4	64.7	68.7	71.5	72.3	72.1	72.9	73.3	74.2
ISM Manufacturing Index (g)	51.1	50.3	49.7	41.7	43.1	52.2	53.7	55.6	55.7	58.8	57.7	60.5
ISM Nonmanufacturing Index (g)	55.9	56.7	53.6	41.6	45.4	56.5	56.6	57.2	57.2	56.2	56.8	57.7
Housing Starts (b)	1.589	1.589	1.277	0.938	1.046	1.273	1.497	1.376	1.448	1.514	1.551	1.661
Housing Permits (b)	1.550	1.478	1.382	1.094	1.246	1.296	1.542	1.522	1.589	1.595	1.696	1.758
New Home Sales (1-family, c)	756	730	623	582	704	839	972	977	971	969	865	943
Construction Expenditures (a)	1.9	0.2	-0.3	-3.4	-1.3	1.0	1.1	2.0	-0.2	2.5	1.4	2.1
Consumer Price Index (nsa, d)	2.5	2.3	1.5	0.3	0.1	0.6	1.0	1.3	1.4	1.2	1.2	1.4
CPI ex. Food and Energy (nsa, d)	2.3	2.4	2.1	1.4	1.2	1.2	1.6	1.7	1.7	1.6	1.6	1.6
PCE Chain Price Index (d)	1.9	1.8	1.3	0.5	0.5	0.9	1.0	1.2	1.4	1.2	1.1	1.2
Core PCE Chain Price Index (d)	1.8	1.9	1.7	0.9	1.0	1.1	1.3	1.4	1.5	1.4	1.3	1.4
Producer Price Index (nsa, d)	2.0	1.1	0.3	-1.5	-1.1	-0.7	-0.3	-0.3	0.3	0.6	0.8	0.8
Durable Goods Orders (a)	-4.8	0.9	-20.7	-11.6	10.6	11.3	9.8	2.0	1.6	1.0	2.2	1.5
Leading Economic Indicators (a)	0.5	-0.1	-7.6	-6.4	3.1	3.0	2.0	1.5	0.9	0.7	0.9	0.4
Balance of Trade & Services (f)	-44.4	-38.0	-47.2	-52.6	-56.3	-51.8	-62.1	-66.1	-63.2	-64.0	-69.0	-67.0
Federal Funds Rate (%)	1.55	1.58	0.65	0.05	0.05	0.08	0.09	0.10	0.09	0.09	0.09	0.09
3-Mo. Treasury Bill Rate (%)	1.55	1.54	0.30	0.14	0.13	0.16	0.13	0.10	0.11	0.10	0.09	0.09
10-Year Treasury Note Yield (%)	1.76	1.50	0.87	0.66	0.67	0.73	0.62	0.65	0.68	0.79	0.87	0.93

(a) month-over-month % change; (b) millions, saar; (c) month-over-month change, thousands; (d) year-over-year % change; (e) annualized % change; (f) $ billions; (g) level. Most series are subject to frequent government revisions. Use with care.

Calendar of Upcoming Economic Data Releases

Monday	Tuesday	Wednesday	Thursday	Friday
	June 1 Construction (Apr) ISM Manufacturing (May) IHS Markit Mfg PMI (May) Texas Manufacturing Outlook Survey (May)	**2** Texas Service Sector Outlook Survey (May)	**3** ADP Employment Report (May) Productivity & Costs (Q1) ISM Services PMI (May) IHS Markit Service PMI (May) Challenger Employment (May) BEA Auto & Truck Sales (May) Weekly Jobless Claims EIA Crude Oil Stocks Mortgage Applications	**4** Employment Situation (May) Manufacturers' Shipments, Inventories & Orders (Apr) Public Debt (May)
7 Consumer Credit (Apr)	**8** International Trade (Apr) QFR (Q1) JOLTS (Apr) Treasury Auction Allotments (May) Manpower Survey (Q3) NFIB (May)	**9** Wholesale Trade (Apr) Transportation Services Index (Apr) Kansas City Fed Labor Market Conditions Indicators (May) Kansas City Financial Stress Index (May) EIA Crude Oil Stocks Mortgage Applications	**10** CPI (May) Real Earnings (May) QSS (Q1) Cleveland Fed Median CPI (May) Financial Accounts (Q1) Monthly Treasury (May) Weekly Jobless Claims	**11** Consumer Sentiment (Jun, Preliminary)
14	**15** Producer Prices (May) Advance Retail Sales (May) IP & Capacity Utilization (May) MTIS (Apr) Empire State Mfg Survey (Jun) Home Builders (Jun) TIC Data (Apr) FOMC Meeting	16 New Residential Construction (May) Import & Export Prices (May) Business Leaders Survey (Jun) EIA Crude Oil Stocks Mortgage Applications FOMC Meeting	**17** ECEC (Q1) Philadelphia Fed Mfg Business Outlook Survey (Jun) Composite Indexes (May) Weekly Jobless Claims	**18** Livingston Survey (Jun)
21 Chicago Fed National Activity Index (May)	**22** Existing Home Sales (May) H.6 Money Stock (May) Treasury Auction (Jun) Philadelphia Fed Nonmfg Business Outlook Survey (Jun) Richmond Fed Mfg & Service Sector Surveys (Jun)	**23** Intl Transactions (Q1) New Residential Sales (May) Final Building Permits (May) IHS Markit Flash PMI for Mfg & Services (Jun) Steel Imports (May, Prelim) EIA Crude Oil Stocks Mortgage Applications	**24** GDP & Corp Profits(Q1,3rd Est) Adv Durable Goods (May) Adv Trade & Inventories (May) GDP by Industry (Q1) Kansas City Fed Manufacturing Survey (Jun) Weekly Jobless Claims	**25** Personal Income (May) Consumer Sentiment (Jun, Final) Strike Report (Jun) Dallas Fed Trimmed-Mean PCE (May)
28 Texas Manufacturing Outlook Survey (Jun)	**29** Case-Shiller HPI (Apr) FHFA HPI (Apr) Consumer Confidence (Jun) Texas Service Sector Outlook Survey (Jun)	**30** ADP Employment Report (Jun) Intl Investment Position (Q1) Agricultural Prices (May) Chicago PMI (Jun) Pending Home Sales (May) EIA Crude Oil Stocks Mortgage Applications	**July 1** Construction (May) ISM Manufacturing (Jun) IHS Markit Mfg PMI (Jun) Challenger Employment Report (Jun) Weekly Jobless Claims	**2** Employment Situation (Jun) MSIO (May) International Trade (May) BEA Auto Sales (Jun) BEA Truck Sales (Jun)
5 **Independence Day Observed All Markets Closed**	**6** ISM Services PMI (Jun) IHS Markit Service PMI (Jun)	**7** JOLTS (May) Public Debt (Jun) Mortgage Applications	**8** Consumer Credit (May) Kansas City Fed Labor Market Conditions Indicators (Jun) Weekly Jobless Claims EIA Crude Oil Stocks	**9** Wholesale Trade (May) Kansas City Financial Stress Index (Jun)

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TABLE OF CONTENTS

Inflation Still a Concern but Interest Rates Expected to Rise Modestly

Big questions continue to weigh on financial markets, investors and the economy as a whole. Perhaps the biggest issue involves inflation. It is currently above the Federal Reserve's 2% target. But will this inflation simply decelerate on its own, will it remained uncomfortably elevated for a while, or is this the beginning of an upward spiral? Furthermore, the federal government budget deficit is enormous. But, somewhat surprisingly, interest rates are not surging ahead even as the federal government borrows unprecedented amounts of money.

Numerous questions pervade, but it does seem that outcomes are less challenging than raw numbers might imply. Inflation, measured by the personal consumption expenditures price index, was 6.5% in Q2 2021, seasonally adjusted annual rate from Q1 2021, and 3.9% from Q2 2020; July saw 4.2% from July 2020. The question that arises is whether these uncomfortably sizable rates will continue, increase or slow. Right now, in the wake of the COVID-19 pandemic, there is no easy answer. The Blue Chip Financial Forecasts panel projects a moderation of inflation to 2.2% during 2022. Nonetheless, a majority of the panel believes, according to one of this month's "Special Questions" on page 14, that the inflationary pressures are "likely to linger." And, as we have pointed out in recent discussion, the causes of inflation continue to be more complex than simple demand-greater-than-supply relationships. Demand is growing as the economy continues to reopen. But the response of supply has been uneven due to bottlenecks. This may mean that usual fixes, such as monetary policy tightening, are not so direct in helping to rein in the price increases. Also, monetary policy tightening that slows demand might be less desirable if it curtails the process of reopening.

The role of COVID itself is also complex. Its widespread and highly contagious nature means it impacts millions of people in thousands of places around the world. Just when it appeared to be coming under control, the Delta variant developed and cases of that version mushroomed around the world. Fortunately, the deployments have been enormously helpful, with 63.6% of the U.S. population having at least one dose by September 28 and 55.1% fully vaccinated. [These numbers are from Oxford University's "Our World in Data."] The importance of the disease and the vaccinations for the economic outlook is suggested by another Special Question; 59% of survey participants cite uneven vaccination rates and the emergence of more variants of the COVID infection as the biggest threat to global economic stability. The second widest cause of instability would be the supply-chain issues, but this was cited by just 18% of respondents. More inflation and other more conventional issues regarding fiscal and monetary policy were chosen by notably smaller portions of the survey participants.

10-year Treasury yield forecast to rise to just 2% late next year. It is notable that the current elevated inflation rates and continuing uncertain economic and financial environment have not been accompanied by significantly higher interest rates. And the consensus forecast of the panelists indicates that interest rates are not expected to move dramatically going forward. The forecast for the 10-year Treasury yield, trading just above 1.50% now, is expected to average that for the fourth quarter and then to move up slowly across 2022, reaching 2.0% by the fourth quarter then. This is the same as the last two months' forecasts, which are actually somewhat lower than the few months before.

Unchanged fed funds rate expected until late 2022. Short-term rates are also expected to be basically steady going forward, as the Fed has already said it will likely not change the federal funds rate for quite some time. The Blue Chip panel looks for the first hike in the rate in Q4 2022 and that is just up to 0.2% from the current 0.1%; a further modest increase is projected for Q1 2023.

SOFR Forecast Preview

As we described last month, the key benchmark interest rate for short-term private sector borrowing will change in January. It is widely believed that LIBOR has at times been subjected to some manipulation; market participants have made it known that they desire a benchmark rate that reflects actual transactions in money markets. So, in January, LIBOR will be replaced by SOFR, the "secured overnight financing rate," a rate that measures the actual cost of short-term repo operations backed by Treasuries. See our article in the Viewpoints section of last month's "Blue Chip Financial Forecasts." For now and the next two months, as survey participants become more accustomed to SOFR and to forecasting it, we will just show the consensus forecast, and then in January we will start to show individual forecasts in our regular forecast tables. Note that the LIBOR we report is for 3 months while SOFR is overnight. So these two rates will differ meaningfully.

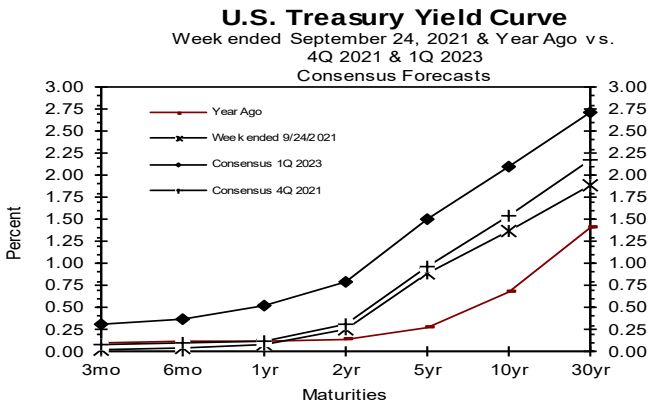
	LIBOR 3-Month	Secured Overnight Financing Rate (SOFR)
Q1 2021	0.19	0.04
Q2 2021	0.13	0.02
Q3 2021	0.13	0.05
Q4 2021	0.2	0.06
Q1 2022	0.22	0.07
Q2 2022	0.26	0.08
Q3 2022	0.29	0.1
Q4 2022	0.35	0.14
Q1 2023	0.45	0.21

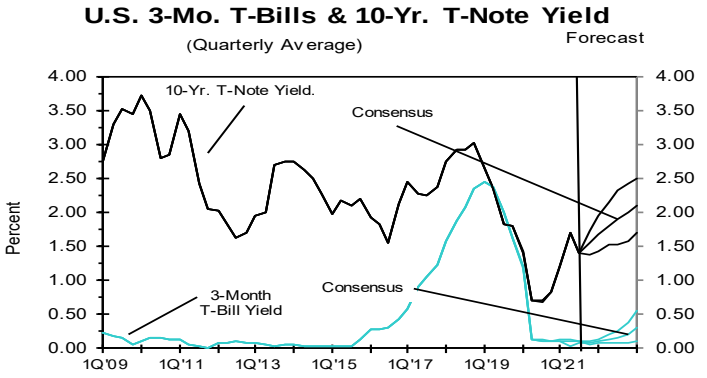
Carol Stone, CBE (Haver Analytics, New York, NY)

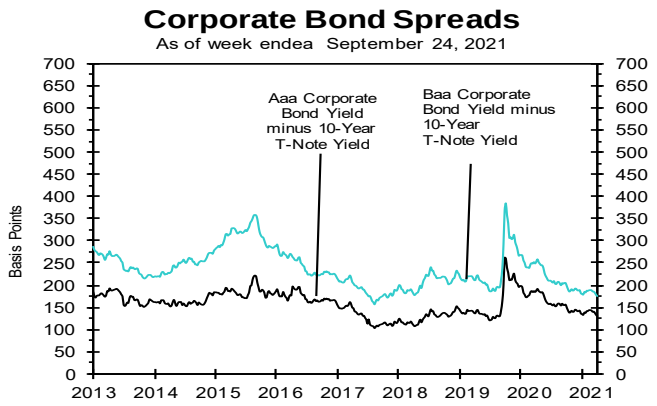
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

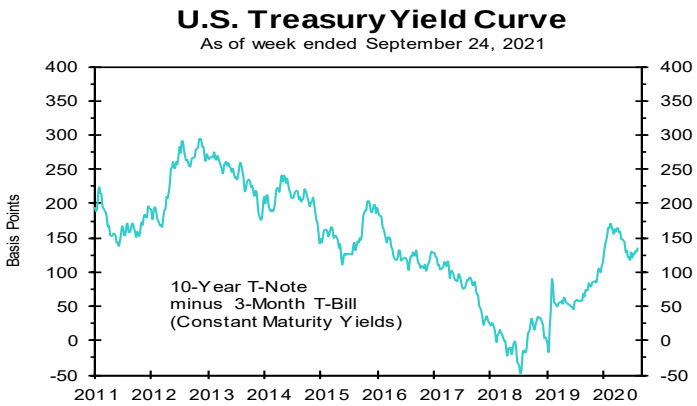
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Qtr*	4Q	1Q	3Q	3Q	4Q	1Q
Interest Rates	Sep 24	Sep 17	Sep 10	Sep 3	Aug	Jul	Jun	3Q 2021*	2021	2022	2022	2022	2022	2023
Federal Funds Rate	0.08	0.08	0.08	0.08	0.09	0.10	0.08	0.09	**0.1**	**0.1**	**0.1**	**0.1**	**0.2**	**0.3**
Prime Rate	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**	**3.4**
LIBOR, 3-mo.	0.13	0.12	0.12	0.12	0.12	0.13	0.13	0.13	**0.2**	**0.2**	**0.3**	**0.3**	**0.4**	**0.4**
Commercial Paper, 1-mo.	0.06	0.05	0.05	0.05	0.05	0.05	0.04	0.05	**0.1**	**0.1**	**0.1**	**0.2**	**0.2**	**0.3**
Treasury bill, 3-mo.	0.03	0.04	0.05	0.05	0.05	0.05	0.04	0.05	**0.1**	**0.1**	**0.1**	**0.2**	**0.2**	**0.3**
Treasury bill, 6-mo.	0.05	0.05	0.06	0.06	0.06	0.05	0.05	0.05	**0.1**	**0.1**	**0.2**	**0.2**	**0.3**	**0.4**
Treasury bill, 1 yr.	0.08	0.07	0.08	0.07	0.07	0.08	0.07	0.07	**0.1**	**0.2**	**0.2**	**0.3**	**0.4**	**0.5**
Treasury note, 2 yr.	0.25	0.22	0.23	0.20	0.22	0.22	0.20	0.22	**0.3**	**0.4**	**0.5**	**0.5**	**0.7**	**0.8**
Treasury note, 5 yr.	0.89	0.83	0.81	0.78	0.77	0.76	0.84	0.79	**1.0**	**1.1**	**1.2**	**1.3**	**1.4**	**1.5**
Treasury note, 10 yr.	1.37	1.33	1.35	1.30	1.28	1.32	1.52	1.31	**1.5**	**1.7**	**1.8**	**1.9**	**2.0**	**2.1**
Treasury note, 30 yr.	1.89	1.88	1.95	1.92	1.92	1.94	2.16	1.92	**2.2**	**2.3**	**2.4**	**2.5**	**2.6**	**2.7**
Corporate Aaa bond	2.68	2.67	2.73	2.72	2.72	2.72	2.91	2.71	**2.9**	**3.0**	**3.1**	**3.2**	**3.3**	**3.4**
Corporate Baa bond	3.12	3.11	3.17	3.15	3.16	3.17	3.35	3.16	**3.6**	**3.8**	**4.0**	**4.1**	**4.2**	**4.3**
State & Local bonds	2.67	2.66	2.66	2.65	2.64	2.60	2.64	2.64	**2.5**	**2.6**	**2.6**	**2.7**	**2.8**	**2.9**
Home mortgage rate	2.88	2.86	2.88	2.87	2.84	2.87	2.98	2.86	**3.0**	**3.2**	**3.4**	**3.5**	**3.6**	**3.7**
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	3Q	3Q	4Q	1Q
Key Assumptions	2019	2020	2020	2020	2020	2021	2021	2021**	2021	2022	2022	2022	2022	2023
Fed's AFE $ Index	110.5	111.4	112.4	107.3	105.2	103.4	102.9	105.0	**105.5**	**105.5**	**105.2**	**104.9**	**104.7**	**104.6**
Real GDP	1.9	-5.1	-31.2	33.8	4.5	6.3	6.7	6.4	**5.4**	**4.2**	**3.8**	**3.1**	**2.5**	**2.4**
GDP Price Index	1.5	1.6	-1.5	3.6	2.2	4.3	6.1	4.2	**2.9**	**2.5**	**2.5**	**2.5**	**2.5**	**2.4**
Consumer Price Index	2.6	1.0	-3.1	4.7	2.4	3.7	8.4	5.5	**2.8**	**2.4**	**2.5**	**2.4**	**2.4**	**2.3**
PCE Price Index	1.7	1.3	-1.6	3.7	1.5	3.8	6.5	4.3	**2.5**	**2.2**	**2.2**	**2.2**	**2.1**	**2.2**

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index, PCE Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. *Interest rate data for 3Q 2021 are based on historical data through the week ended September 24. **Data for 3Q 2021 for the Fed's AFE $ Index are based on data through the week ended September 24. Figures for 3Q 2021 Real GDP, GDP Chained Price Index, Consumer Price Index, and PCE Price Index are consensus forecasts from the September 2021 survey.









----------Policy Rates[1]----------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	0.13	0.13	0.13	**0.14**	**0.14**	**0.19**
Japan	-0.10	-0.10	-0.10	**-0.08**	**-0.08**	**-0.10**
U.K.	0.10	0.10	0.10	**0.10**	**0.10**	**0.18**
Switzerland	-0.75	-0.75	-0.75	**-0.75**	**-0.75**	**-0.75**
Canada	0.25	0.25	0.25	**0.25**	**0.25**	**0.36**
Australia	0.10	0.10	0.25	**0.09**	**0.10**	**0.12**
Euro area	0.00	0.00	0.00	**-0.05**	**-0.05**	**-0.05**

----------10-Yr. Government Bond Yields[2]------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	1.47	1.31	0.66	**1.57**	**1.78**	**2.07**
Germany	-0.22	-0.42	-0.52	**-0.26**	**-0.16**	**0.04**
Japan	0.06	0.03	0.02	**0.06**	**0.10**	**0.16**
U.K.	0.92	0.67	0.23	**0.83**	**1.02**	**1.32**
France	0.12	-0.06	-0.25	**0.06**	**0.21**	**0.41**
Italy	0.78	0.64	0.90	**0.84**	**1.03**	**1.24**
Switzerland	-0.17	-0.33	-0.48	**-0.19**	**-0.07**	**0.13**
Canada	1.38	1.21	0.54	**1.48**	**1.74**	**2.06**
Australia	1.36	1.15	0.85	**1.47**	**1.74**	**2.07**
Spain	0.36	0.29	0.22	**0.42**	**0.58**	**0.77**

----------Foreign Exchange Rates[3]----------

	History			Consensus Forecasts Months From Now:		
	Latest:	Month Ago:	Year Ago:	3	6	12
U.S.	105.68	104.98	108.05	**104.0**	**103.8**	**102.7**
Japan	110.72	109.84	105.59	**110.3**	**110.3**	**110.4**
U.K.	1.37	1.38	1.27	**1.40**	**1.41**	**1.43**
Switzerland	0.92	0.91	0.93	**0.92**	**0.92**	**0.92**
Canada	1.27	1.26	1.34	**1.25**	**1.24**	**1.24**
Australia	0.73	0.73	0.70	**0.74**	**0.75**	**0.76**
Euro	1.17	1.18	1.16	**1.18**	**1.19**	**1.20**

	Consensus Policy Rates vs. US Rate			Consensus 10-Year Gov't Yields vs. U.S. Yield	
	Now	In 12 Mo.		Now	In 12 Mo.
Japan	-0.23	**-0.29**	Germany	-1.69	**-2.03**
U.K.	-0.03	**-0.01**	Japan	-1.41	**-1.91**
Switzerland	-0.88	**-0.94**	U.K.	-0.55	**-0.75**
Canada	0.13	**0.17**	France	-1.35	**-1.67**
Australia	-0.03	**-0.07**	Italy	-0.69	**-0.83**
Euro area	-0.13	**-0.24**	Switzerland	-1.64	**-1.94**
			Canada	-0.09	**-0.01**
			Australia	-0.11	**0.00**
			Spain	-1.11	**-1.30**

Forecasts of panel members are on pages 10 and 11. Definitions of variables are as follows: [1]Monetary policy rates. [2]Government bonds are yields to maturity. [3]Foreign exchange rate forecasts for U.K., Australia and the Euro are U.S. dollars per currency unit. For the U.S dollar, forecasts are of the U.S. Federal Reserve Board's AFE Dollar Index.

International. The global economy continues to slow under the weight of new Delta-variant COVID infections, lingering supply-chain bottlenecks, weaker consumer spending and higher-than-expected inflation. The slowdown has been clearly visible in the performance of monthly PMIs, which have fallen throughout the summer. The composite PMI for developed market (DM) economies fell from a pandemic high of 61.1 in May to 54.1 in August, with most DM countries that report flash readings showing a further decline in September. To be sure, notwithstanding the recent decline, the level of the DM PMIs it still consistent with economic growth. Nonetheless, the speed of the PMI downturn is worrisome. The decline in composite PMIs has been led by manufacturing and mostly reflects the deleterious impact of lingering supply-chain bottlenecks. More recently, the services sector has slowed as well with the continued spread of Delta-variant cases and faster-than-expected inflation denting consumer confidence and accordingly, spending.

Additionally, the ongoing economic slowdown in China and growing concerns over potential broad-based economic fallout from a beleaguered large property development company has generated renewed volatility in global financial markets. This, along with the US Fed signaling that tapering of its asset purchases would likely begin in November, has placed upward pressure on longer-term yields. Our forecasters expect 10-year yields to rise from current levels over the next 12 months in all the countries in our survey.

There were numerous central bank meetings during September. The Norges Bank became the first developed market central bank to raise its policy rate with a 25-bp increase on September 23, which it had essentially promised at its August meeting. In raising the rate, the Bank noted that "a normalizing economy now suggests that it is appropriate to begin a gradual normalization of the policy rate." Accordingly, the Bank noted that "the policy rate will most likely be raised further in December." Emerging market (EM) central banks almost uniformly raised policy rates over the past month, led by a 100-bp increase in Brazil. This was the fifth rate hike in Brazil this year, totaling 425 bps. In all, there were 11 rate hikes by EM central banks in September. By contrast, the central bank of Turkey completely surprised markets with a 100-bp cut despite elevated inflation, which sent the lira to near record lows in the FX market.

Policy meetings by the major central banks did not lead to any policy changes though the comments following the meetings were generally more hawkish than previously. The Bank of England left policy unchanged but a second committee member joined the previous lone dissenter in voting to end the Bank's asset purchases now. The meeting summary noted that recent developments appear to have strengthened the case for tightening and interestingly, that tightening would be accomplished by raising the policy interest rate even if that tightening became appropriate before the end of the existing government bond purchase program. That program is scheduled to end at the end of this year. Financial markets are not looking for a rate hike this year but some participants are now expecting one in Q1 2022.

The European Central Bank also did not alter its policy at its September 9 meeting though it did agree to slow the pace of its asset purchases. In the second and third quarters of this year, the ECB had stepped up its asset purchases under its Pandemic Emergency Purchase Program (PEPP) in an attempt to provide additional support for the economy amid the Delta wave of new COVID infections. The decision at this meeting was simply to continue purchasing assets going forward but at a slower pace than in Q2 or Q3. The PEPP is still scheduled to extend until the end of March 2022 with a monthly target of asset purchases of €60-70 billion per month. The ECB is also conducting a parallel Asset Purchase Plan (APP) in which it purchases €20 billion of assets per month. After the September meeting, President Lagarde noted that the future of both programs will be discussed at the December meeting, not at the next meeting scheduled for late October.

Fourth Quarter 2021

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	1 Federal Funds Rate		2 Prime Bank Rate		3 LIBOR 3-Mo.	4 Com. Paper 1-Mo.		5 Treas. Bills 3-Mo.		6 Treas. Bills 6-Mo.		7 Treas. Bills 1-Yr.		8 Treas. Notes 2-Yr.		9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.		11 Treas. Bond 30-Yr.		12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate		A. Fed's Adv Fgn Econ $ Index		B. Real GDP	C. GDP Price Index		D. Cons. Price Index	E. PCE Price Index	
ACIMA Private Wealth	0.1	L	3.3	H	0.2	0.1	L	0.0	L	0.0	L	0.1	L	0.2	L	0.7	1.3	L	1.9	L	3.0	3.8	1.5	2.8	L	103.0	L	3.0	1.0	L	2.4	1.3	
AIG	0.1	L	3.3	H	0.2	na		0.1	H	0.1		0.1	L	0.3		1.0	1.6		2.2		na	3.5	na	3.2		na		6.0	1.8		1.6	1.7	
Amherst Pierpont Securities	0.1	L	3.3	H	0.2	0.1	L	0.1	H	0.1		0.2		0.4		1.2	1.7		2.4		2.9	3.6	2.5	3.3		106.8		8.7	H	3.0	2.8	2.5	
Bank of America	0.1	L	na		0.2	na		na		na		na		0.5		1.1	1.6		2.1		na	na	na	na		na		6.0	2.9		2.5	1.9	
Barclays	0.1	L	3.3	H	na	na		na		na		na		0.3		1.0	1.5		2.1		na	na	na	na		na		5.0	2.3		2.5	2.0	
BBVA USA	0.1	L	3.3	H	0.2	0.1	L	0.1	H	0.1		0.1	L	0.3		1.0	1.6		2.2		2.9	3.4	1.7	3.0		104.5		4.4	2.4		2.5	2.3	
BMO Capital Markets	0.1	L	3.3	H	0.1	L	na	0.1	H	0.1		0.1	L	0.2	L	0.9	1.4		2.0		na	na	na	3.0		103.8		4.0	3.1		3.8	3.5	
BNP Paribas Americas	0.1	L	na		na	na		na		na		na		0.4		na	1.7		2.3		na	na	na	na		na		6.3	na		2.5	na	
Chan Economics	0.1	L	3.3	H	0.2	0.1	L	0.1	H	0.1		0.1	L	0.3		1.0	1.5		2.1		2.8	3.5	2.4	3.0		105.5		4.5	2.4		2.4	2.3	
Chmura Economics & Analytics	0.1	L	3.3	H	0.1	L	0.1	L	0.1	H	0.1		0.1	L	0.2	L	0.8	1.4		1.9	L	2.5	na	na	2.9		na		4.8	3.2		3.8	na	
Comerica Bank	0.1	L	3.2	L	0.2	na		0.1	H	0.1		0.1	L	0.3		0.8	1.3	L	2.0		na	na	na	2.9		na		6.4	3.7		3.9	3.6	
Daiwa Capital Markets America	0.1	L	3.3	H	0.2	0.1	L	0.1	H	0.1		0.1	L	0.3		1.0	1.5		2.0		2.7	3.5	na	3.0		106.0		3.9	3.5		3.8	3.5	
DePrince & Assoc.	0.1	L	3.2	L	0.2	0.1	L	0.1	H	0.1		0.1	L	0.3		0.8	1.4		2.0		2.9	3.8	2.5	3.0		105.0		4.7	3.1		3.3	3.0	
Economist Intelligence Unit	0.1	L	3.3	H	na	0.1	L	0.0	L	0.1		0.1	L	0.3		1.1	1.5		2.2		na	na	na	3.1		na		6.5	na		na	na	
Fannie Mae	0.1	L	3.3	H	na	na		0.1	H	0.1		0.1	L	0.4		1.0	1.5		2.0		na	na	na	3.0		na		5.3	4.2	H	3.0	3.0	
Georgia State University	0.1	L	3.3	H	na	na		0.1	H	0.1		0.1	L	0.4		1.1	1.6		2.1		2.5	3.8	na	3.1		na		2.9	2.6		2.8	2.4	
GLC Financial Economics	0.1	L	3.3	H	0.2	0.1	L	0.1	H	0.1		0.1	L	0.3		0.9	1.4		2.0		3.0	3.4	2.7	2.9		104.7		5.6	3.1		5.0	H	2.0	
Goldman Sachs & Co.	0.1	L	na		0.2	na		0.1	H	na		na		0.3		1.0	1.6		2.6		na	na	na	na		na		5.0	2.1		1.9	2.2	
Grant Thornton/Diane Swonk	0.1	L	3.2	L	0.2	0.1	L	0.1	H	0.1		0.2		0.3		0.6	L	1.3	L	2.0		2.7	3.4	na	2.9		na		5.0	3.7		1.2	2.5	
IHS Markit	0.1	L	3.3	H	0.2	na		0.1	H	0.1		0.1	L	0.3		0.9	1.4		2.1		na	na	na	3.0		na		6.2	3.0		1.2	1.6	
ING	0.1	L	na		0.2	na		na		na		na		0.3		1.1	1.8	H	2.5		na	na	na	na		na		6.5	na		na	na	
J.P. Morgan Chase	0.1	L	na		0.2	na		na		na		na		0.3		0.9	1.5		2.2		na	na	na	na		na		3.5	2.5		3.1	3.1	
Loomis, Sayles & Company	0.1	L	3.3	H	0.2	0.1	L	0.1	H	0.1		0.1	L	0.2	L	0.8	1.5		2.0		2.7	3.4	2.7	3.0		105.3		6.2	3.6		2.7	2.5	
MacroFin Analytics & Rutgers Bus School	0.1	L	3.3	H	0.1	L	0.1	L	0.0	L	0.1		0.1	L	0.3		1.0	1.5		2.0		2.9	3.3	2.8	3.0		106.1		5.7	2.9		1.8	2.1	
Mizuho Research Institute	0.1	L	na		na	na		na		na		na		na		na	1.7		na		na	na	na	na		na		na	na		na	na	
Moody's Analytics	0.1	L	3.3	H	0.2	0.1	L	0.1	H	0.2	H	0.3	H	0.6	H	1.2	1.7		2.7	H	3.1	3.8	2.6	3.1		na		7.5	2.9		3.3	3.0	
Naroff Economic Advisors	0.1	L	3.3	H	0.2	0.1	L	0.1	H	0.1		0.1	L	0.3		1.0	1.5		2.1		2.7	4.5	H	2.7	2.9		105.2		5.1	3.8		4.2	4.0	H
NatWest Markets	0.1	L	3.2	L	0.3	0.2	H	0.1	H	0.2	H	0.3	H	0.5		1.3	H	1.7	2.2		3.6	H	4.5	H	3.3	H	na		na	4.3	2.5		2.5	2.4	
Nomura Securities, Inc.	0.1	L	3.3	H	na	na		na		na		na		0.2	L	0.8	1.5		na		na	na	na	na		na		5.1	4.2	H	3.8	3.1	
Oxford Economics	0.1	L	3.3	H	0.2	na		0.1	H	0.1		0.1	L	0.2	L	0.9	1.7		2.4		2.1	L	na	na	3.0		104.4		4.5	1.9		1.2	1.5	
PNC Financial Services Corp.	0.1	L	3.3	H	0.2	na		0.1	H	0.1		0.1	L	0.3		1.0	1.5		2.2		na	3.5	2.3	3.1		105.1		6.3	3.5		2.3	2.3	
RDQ Economics	0.1	L	3.3	H	0.2	0.2	H	0.1	H	0.1		0.2		0.3		0.9	1.7		2.4		3.0	3.7	2.9	3.2		105.1		8.5	3.5		3.5	3.0	
Regions Financial Corporation	0.1	L	3.3	H	0.2	0.1	L	0.1	H	0.1		0.1	L	0.3		1.0	1.5		2.0		2.9	3.7	2.4	3.1		105.9		5.5	3.8		4.4	4.0	H
S&P Global	0.1	L	3.3	H	0.2	na		0.1	H	0.1		0.1	L	0.2	L	0.9	1.7		2.4		na	na	na	2.9		na		5.5	1.4		0.8	1.2	
Scotiabank Group	0.1	L	3.3	H	na	na		0.1	H	na		na		0.5		1.1	1.8	H	2.2		na	na	na	na		na		7.1	2.9		0.3	L	0.5	L
Societe Generale	0.1	L	3.3	H	0.1	L	0.1	L	0.1	H	0.1		0.1	L	0.3		1.0	1.6		2.3		na	na	1.3	L	3.1		na	4.9	2.3		3.0	2.8	
Swiss Re	0.1	L	3.3	H	0.4	H	0.2	H	0.0	L	0.1		0.2		0.3		0.9	1.5		2.1		2.8	3.5	na	3.2		109.1	H	2.8	L	na	2.9	2.2	
The Northern Trust Company	0.1	L	3.3	H	0.2	0.1	L	0.1	H	0.1		0.1	L	0.3		0.9	1.5		2.2		2.8	3.5	2.9	2.9		105.0		5.7	3.2		3.4	3.3	
Thru the Cycle	0.1	L	3.3	H	0.1	L	0.1	L	0.1	H	0.1		0.1	L	0.4		1.1	1.6		2.1		3.0	3.4	2.9	3.2		106.5		5.2	3.3		2.9	3.6	
TS Lombard	0.1	L	3.2	L	0.4	H	0.2	H	0.1	H	0.1		0.2		0.3		0.9	1.8	H	2.4		3.2	4.0	2.3	3.6	H	108.0		4.5	3.0		3.0	3.0	
Via Nova Investment Mgt.	0.1	L	3.3	H	0.2		0.1	L	0.0	L	0.1		0.1	L	0.2	L	0.8	1.3	L	2.0		2.8	3.2	L	2.5	2.8	L	105.3		na	na		na	na	
Wells Fargo	0.1	L	3.3	H	0.2	0.1	L	0.1	H	0.1		0.1	L	0.3		0.9	1.6		2.2		2.9	3.7	2.7	3.0		na		5.7	2.9		3.0	2.4	
October Consensus	**0.1**		**3.3**		**0.2**	**0.1**		**0.1**		**0.1**		**0.1**		**0.3**		**1.0**	**1.5**		**2.2**		**2.9**	**3.6**	**2.5**	**3.0**		**105.5**		**5.4**	**2.9**		**2.8**	**2.5**	
Top 10 Avg.	0.1		3.3		0.3	0.1		0.1		0.1		0.2		0.4		1.1	1.7		2.4		3.1	3.9	2.8	3.2		106.5		7.0	3.8		4.0	3.5	
Bottom 10 Avg.	0.1		3.3		0.2	0.1		0.1		0.1		0.1		0.2		0.8	1.4		2.0		2.6	3.4	2.1	2.9		104.6		3.8	2.0		1.5	1.6	
September Consensus	0.1		3.3		0.2	0.1		0.1		0.1		0.1		0.3		0.9	1.6		2.2		2.9	3.7	2.5	3.1		105.2		5.4	2.8		2.4	2.3	
Number of Forecasts Changed From A Month Ago:																																	
Down	0		0		6	1		2		1		1		6		10	13		15		8	7	3	10		3		17	4		7	7	
Same	42		36		26	22		33		31		31		30		18	19		21		13	11	12	15		7		7	10		11	10	
Up	0		0		2	1		0		1		1		5		12	10		4		3	6	5	7		10		15	21		20	19	
Diffusion Index	50%		50%		44%	50%		47%		50%		50%		49%		53%	46%		36%		40%	48%	55%	45%		68%		47%	74%		67%	67%	

First Quarter 2022

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	A. Fed's Adv Fgn Econ $ Index	B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
	Percent Per Annum -- Average For Quarter															Avg. For ---Qtr.---	(Q-Q % Change) (SAAR)			
	Short-Term							Intermediate-Term			Long-Term									
ACIMA Private Wealth	0.1 L	3.3 H	0.2	0.1 L	0.0 L	0.0 L	0.1 L	0.2 L	0.6 L	1.3 L	1.8 L	3.0	3.9	1.4	2.6 L	101.0 L	3.0	1.2	2.0	1.2
AIG	0.1 L	3.3 H	0.3	na	0.1	0.1	0.1 L	0.4	1.1	1.7	2.3	na	3.6	na	3.3	na	4.0	1.9	2.2	1.9
Amherst Pierpont Securities	0.1 L	3.3 H	0.3	0.1 L	0.1	0.2	0.3	0.6	1.4	2.1	2.8	3.4	4.1	2.9	3.7 H	107.5	4.8	3.2	2.9	2.6
Bank of America	0.1 L	na	0.2	na	na	na	na	0.6	1.3	1.7	2.1	na	na	na	na	na	6.0 H	2.8	1.6	1.5
Barclays	0.1 L	3.3 H	na	na	na	na	na	0.4	1.1	1.6	2.1	na	na	na	na	na	3.5	2.1	1.9	1.8
BBVA USA	0.1 L	3.3 H	0.2	0.2 H	0.1	0.2	0.2	0.4	1.2	1.9	2.5	3.2	3.8	2.0	3.3	104.2	2.4 L	2.2	2.3	2.2
BMO Capital Markets	0.1 L	3.3 H	0.1 L	na	0.1	0.1	0.1 L	0.3	1.0	1.6	2.1	na	na	na	3.2	103.0	3.0	2.9	3.4	3.2
BNP Paribas Americas	0.1 L	na	na	na	na	na	na	0.6	na	1.8	2.4	na	na	na	na	na	5.0	na	1.7	na
Chan Economics	0.1 L	3.3 H	0.2	0.1 L	0.1	0.1	0.1 L	0.3	1.0	1.5	2.1	2.8	3.5	2.4	3.0	105.0	3.7	2.3	2.3	2.2
Chmura Economics & Analytics	0.1 L	3.3 H	0.2	0.1 L	0.1	0.1	0.1 L	0.2 L	0.9	1.4	2.0	2.6	na	na	3.0	na	3.1	3.0	3.3	na
Comerica Bank	0.1 L	3.2 L	0.2	na	0.1	0.1	0.2	0.3	0.9	1.4	2.0	na	na	na	2.9	na	5.9	2.8	3.0	2.3
Daiwa Capital Markets America	0.1 L	3.3 H	0.2	0.1 L	0.1	0.1	0.1 L	0.3	1.1	1.5	2.0	2.8	3.6	na	3.1	106.0	4.4	3.3	3.2	3.0
DePrince & Assoc.	0.1 L	3.2 L	0.2	0.2 H	0.1	0.1	0.1 L	0.3	0.9	1.5	2.1	3.2	4.0	2.7	3.2	104.7	3.6	2.7	2.9	2.6
Economist Intelligence Unit	0.1 L	3.3 H	na	0.1 L	0.1	0.1	0.1 L	0.4	1.2	1.6	2.2	na	na	na	3.1	na	2.8	na	na	na
Fannie Mae	0.1 L	3.3 H	na	na	0.1	0.1	0.2	0.5	1.1	1.6	2.0	na	na	na	3.1	na	4.5	2.7	2.7	2.6
Georgia State University	0.1 L	3.3 H	na	na	0.1	0.1	0.2	0.5	1.3	1.9	2.3	2.6	4.1	na	3.4	na	2.7	1.8	2.3	2.0
GLC Financial Economics	0.1 L	3.3 H	0.2	0.2 H	0.1	0.2	0.2	0.3	1.0	1.4	2.1	3.4	3.9	2.7	3.1	104.9	5.2	3.9	5.0 H	2.4
Goldman Sachs & Co.	0.1 L	na	0.2	na	0.1	na	na	na	na	1.6	na	na	na	na	na	na	5.0	1.8	2.3	1.8
Grant Thornton/Diane Swonk	0.1 L	3.2 L	0.1 L	0.1 L	0.1	0.1	0.2	0.4	0.6 L	1.4	2.1	2.8	3.5	na	3.0	na	4.8	1.7	1.7	1.4
IHS Markit	0.1 L	3.3 H	0.2	na	0.1	0.1	0.2	0.4	1.0	1.6	2.2	na	na	na	3.2	na	4.8	1.8	1.7	1.6
ING	0.1 L	na	0.2	na	na	na	na	0.4	1.3	2.0	2.7	na	na	na	na	na	4.4	na	na	na
J.P. Morgan Chase	0.1 L	na	0.2	na	na	na	na	0.4	1.1	1.8	2.5	na	na	na	na	na	3.5	2.0	2.5	2.0
Loomis, Sayles & Company	0.1 L	3.3 H	0.2	0.1 L	0.1	0.1	0.1 L	0.3	1.0	1.7	2.3	2.9	3.6	2.8	3.2	105.3	4.7	2.0	2.1	1.7
MacroFin Analytics & Rutgers Bus School	0.1 L	3.3 H	0.2	0.1 L	0.1	0.1	0.1 L	0.3	1.0	1.5	2.1	2.8	3.2 L	2.9	3.0	106.3	3.2	2.1	2.0	1.8
Mizuho Research Institute	0.1 L	na	na	na	na	na	na	na	na	1.7	na	na	na	na	na	na	na	na	na	na
Moody's Analytics	0.1 L	3.3 H	0.3	0.1 L	0.2 H	0.3 H	0.5 H	0.8 H	1.5 H	2.0	3.0 H	3.5 H	4.4	2.8	3.3	na	4.6	2.8	2.6	2.4
Naroff Economic Advisors	0.1 L	3.3 H	0.2	0.1 L	0.1	0.1	0.1 L	0.4	1.1	1.6	2.3	2.8	4.6 H	3.0	3.2	105.7	4.5	3.1	3.3	3.3 H
NatWest Markets	0.1 L	3.2 L	0.3	0.2 H	0.1	0.2	0.3	0.7	1.4	1.8	2.3	2.7	3.7	2.3	na	na	3.4	2.5	2.0	2.5
Nomura Securities, Inc.	0.1 L	3.3 H	na	na	na	na	na	0.2 L	0.9	1.7	na	na	na	na	na	na	5.8	4.5 H	2.4	1.8
Oxford Economics	0.1 L	3.3 H	0.2	na	0.1	0.1	0.1 L	0.2 L	1.0	1.9	2.6	2.2 L	na	na	3.1	104.0	4.6	1.2	1.3 L	1.2
PNC Financial Services Corp.	0.1 L	3.3 H	0.2	na	0.1	0.1	0.2	0.3	1.1	1.7	2.4	na	3.8	2.4	3.3	105.6	4.0	2.7	1.7	1.9
RDQ Economics	0.1 L	3.3 H	0.2	0.2 H	0.1	0.1	0.3	0.4	1.0	1.9	2.6	3.2	3.9	3.1	3.4	105.3	6.0 H	3.2	2.8	2.9
Regions Financial Corporation	0.1 L	3.3 H	0.3	0.2 H	0.1	0.1	0.2	0.4	1.1	1.7	2.1	3.1	3.9	2.5	3.3	106.4	5.3	2.5	2.7	2.6
S&P Global	0.1 L	3.3 H	0.2	na	0.1	0.2	0.1 L	0.2 L	1.0	1.9	2.6	na	na	na	3.0	na	4.1	0.7 L	1.3 L	1.1 L
Scotiabank Group	0.1 L	3.3 H	na	na	0.2 H	na	na	0.7	1.4	2.2 H	2.5	na	na	na	na	na	4.6	4.5 H	2.1	3.3 H
Societe Generale	0.1 L	3.3 H	0.1 L	0.1 L	0.1	0.1	0.1 L	0.4	1.1	1.7	2.3	na	na	1.3 L	3.2	na	3.1	2.1	2.6	2.3
Swiss Re	0.1 L	3.3 H	0.5 H	0.2 H	0.0 L	0.1	0.2	0.4	1.0	1.6	2.2	3.0	3.8	na	3.5	108.7 H	4.7	na	2.0	1.7
The Northern Trust Company	0.1 L	3.3 H	0.3	0.1 L	0.1	0.2	0.2	0.4	1.1	1.7	2.5	3.1	3.9	3.2 H	3.2	106.0	3.8	2.7	2.9	2.9
Thru the Cycle	0.1 L	3.3 H	0.2	0.1 L	0.1	0.1	0.1 L	0.4	1.2	1.7	2.2	3.0	3.5	2.9	3.3	107.8	4.4	2.7	2.8	2.7
TS Lombard	0.1 L	3.2 L	0.4	0.2 H	0.2 H	0.2	0.3	0.4	1.1	1.8	2.4	3.2	4.0	2.3	3.6	106.0	3.5	2.0	2.0	2.0
Via Nova Investment Mgt.	0.1 L	3.3 H	0.2	0.1 L	0.1	0.1	0.1 L	0.2 L	0.8	1.4	2.1	2.9	3.4	2.6	2.9	105.6	na	na	na	na
Wells Fargo	0.1 L	3.3 H	0.2	0.1 L	0.1	0.1	0.1 L	0.4	1.1	1.8	2.4	3.0	3.8	2.8	3.2	na	4.1	2.4	2.4	2.2
October Consensus	**0.1**	**3.3**	**0.2**	**0.1**	**0.1**	**0.1**	**0.2**	**0.4**	**1.1**	**1.7**	**2.3**	**3.0**	**3.8**	**2.6**	**3.2**	**105.5**	**4.2**	**2.5**	**2.4**	**2.2**
Top 10 Avg.	0.1	3.3	0.3	0.2	0.1	0.2	0.3	0.6	1.3	2.0	2.6	3.2	4.1	2.9	3.4	106.6	5.4	3.4	3.3	2.9
Bottom 10 Avg.	0.1	3.3	0.2	0.1	0.1	0.1	0.1	0.2	0.9	1.4	2.0	2.7	3.5	2.2	3.0	104.3	3.0	1.6	1.7	1.5
September Consensus	0.1	3.3	0.2	0.1	0.1	0.1	0.2	0.4	1.1	1.7	2.3	3.0	3.9	2.5	3.2	105.0	4.1	2.4	2.2	2.1
Number of Forecasts Changed From A Month Ago:																				
Down	0	0	6	1	1	0	4	4	7	10	15	8	8	4	12	3	7	5	4	6
Same	42	36	27	23	33	33	28	25	22	26	20	12	10	8	14	8	12	19	14	15
Up	0	0	1	0	1	0	1	11	10	6	4	4	6	8	6	9	20	11	20	15
Diffusion Index	50%	50%	43%	48%	50%	50%	45%	59%	54%	45%	36%	42%	46%	60%	41%	65%	67%	59%	71%	63%

Second Quarter 2022

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	A. Fed's Adv Fgn Econ $ Index	B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
	Percent Per Annum -- Average For Quarter															Avg. For ---Qtr.---	(Q-Q % Change) (SAAR)			
	Short-Term							Intermediate-Term			Long-Term									
Amherst Pierpont Securities	0.2 H	3.3 H	0.5	0.2	0.3 H	0.5 H	0.6 H	0.8	1.7 H	2.4 H	3.2 H	3.8	4.5	3.1	4.0 H	108.0	4.3	3.0	2.8	2.5
Regions Financial Corporation	0.2 H	3.3 H	0.3	0.2	0.1	0.2	0.2	0.5	1.2	1.8	2.2	3.2	4.0	2.6	3.4	106.9	4.1	2.3	2.4	2.5
ACIMA Private Wealth	0.1 L	3.3 H	0.2	0.1 L	0.0 L	0.0 L	0.1 L	0.1 L	0.5 L	1.3 L	1.8 L	2.9	3.8	1.4	2.6 L	99.0 L	2.0	1.1 L	2.0	1.0 L
AIG	0.1 L	3.3 H	0.3	na	0.1	0.1	0.2	0.4	1.1	1.8	2.5	na	3.7	na	3.5	na	3.5	2.0	2.7	1.9
Bank of America	0.1 L	na	0.3	na	na	na	na	0.7	1.4	1.8	2.2	na	na	na	na	na	5.0	3.5	2.3	2.4
Barclays	0.1 L	3.3 H	na	na	na	na	na	0.5	1.2	1.6	2.2	na	na	na	na	na	3.0	1.8	1.4	1.4
BBVA USA	0.1 L	3.3 H	0.3	0.2	0.2	0.2	0.3	0.5	1.3	2.1	2.8	3.4	3.9	2.2	3.5	103.8	3.6	2.0	2.1	2.0
BMO Capital Markets	0.1 L	3.3 H	0.1 L	na	0.1	0.1	0.2	0.4	1.1	1.7	2.2	na	na	na	3.4	102.5	2.8	2.3	2.7	2.5
BNP Paribas Americas	0.1 L	na	na	na	na	na	na	0.7	na	1.9	2.4	na	na	na	na	na	5.0	na	1.4	na
Chan Economics	0.1 L	3.3 H	0.2	0.1 L	0.1	0.1	0.2	0.4	1.1	1.6	2.2	2.9	3.6	2.5	3.1	104.8	3.1	2.2	2.3	2.2
Chmura Economics & Analytics	0.1 L	3.3 H	0.2	0.1 L	0.1	0.1	0.1 L	0.2	0.9	1.5	2.1	2.6	na	na	3.1	na	4.5	2.6	2.9	na
Comerica Bank	0.1 L	3.2 L	0.2	na	0.1	0.2	0.2	0.4	0.9	1.5	2.1	na	na	na	3.0	na	5.6	2.4	2.6	2.2
Daiwa Capital Markets America	0.1 L	3.3 H	0.3	0.1 L	0.1	0.1	0.2	0.4	1.1	1.6	2.2	2.9	3.7	na	3.2	107.0	3.9	3.0	3.2	3.0
DePrince & Assoc.	0.1 L	3.2 L	0.2	0.2	0.1	0.1	0.2	0.4	1.1	1.7	2.3	3.4	4.3	2.9	3.4	104.4	3.1	2.5	2.7	2.4
Economist Intelligence Unit	0.1 L	3.3 H	na	0.1 L	0.1	0.1	0.2	0.4	1.2	1.6	2.3	na	na	na	3.2	na	2.1	na	na	na
Fannie Mae	0.1 L	3.3 H	na	na	0.1	0.2	0.3	0.6	1.2	1.6	2.0	na	na	na	3.2	na	4.4	2.3	1.7	2.1
Georgia State University	0.1 L	3.3 H	na	na	0.1	0.2	0.2	0.6	1.4	2.1	2.7	3.0	4.5	na	3.8	na	4.9	1.6	2.6	2.2
GLC Financial Economics	0.1 L	3.3 H	0.2	0.2	0.1	0.2	0.2	0.4	1.1	1.7	2.5	4.3 H	4.9 H	2.7	3.7	104.4	4.2	4.4	4.7	2.4
Goldman Sachs & Co.	0.1 L	na	0.2	na	0.1	na	na	na	na	1.6	na	na	na	na	na	na	4.5	2.1	2.6	2.0
Grant Thornton/Diane Swonk	0.1 L	3.2 L	0.2	0.1 L	0.1	0.1	0.2	0.4	0.8	1.6	2.3	3.0	3.8	na	3.3	na	4.0	1.7	3.1	1.4
IHS Markit	0.1 L	3.3 H	0.3	na	0.1	0.1	0.2	0.5	1.1	1.7	2.3	na	na	na	3.4	na	4.0	1.7	1.2 L	1.5
ING	0.1 L	na	0.2	na	na	na	na	0.7	1.6	2.3	2.9	na	na	na	na	na	3.9	na	na	na
J.P. Morgan Chase	0.1 L	na	0.2	na	na	na	na	0.4	1.2	1.9	2.6	na	na	na	na	na	3.0	2.0	2.3	2.0
Loomis, Sayles & Company	0.1 L	3.3 H	0.2	0.1 L	0.1	0.1	0.2	0.3	1.3	1.9	2.5	3.1	3.8	2.9	3.4	105.3	4.0	1.8	2.0	1.4
MacroFin Analytics & Rutgers Bus School	0.1 L	3.3 H	0.2	0.1 L	0.1	0.1	0.1 L	0.3	1.0	1.5	2.1	2.7	3.1	2.9	3.1	106.5	3.0	1.8	1.8	2.0
Mizuho Research Institute	0.1 L	na	na	na	na	na	na	na	na	1.7	na	na	na	na	na	na	na	na	na	na
Moody's Analytics	0.1 L	3.3 H	0.4	0.1 L	0.2	0.3	0.6 H	0.9 H	1.7 H	2.2	3.2 H	3.8	4.7	3.0	3.5	na	2.8	2.5	2.4	2.5
Naroff Economic Advisors	0.1 L	3.3 H	0.3	0.2	0.2	0.2	0.2	0.4	1.2	1.8	2.5	2.9	4.7	3.0	3.3	106.3	3.3	2.6	2.7	2.7
NatWest Markets	0.1 L	3.2 L	0.3	0.2	0.1	0.2	0.3	0.9 H	1.6	1.9	2.4	1.6 L	2.6 L	0.7 L	na	na	2.8	2.7	2.5	2.7
Nomura Securities, Inc.	0.1 L	3.3 H	na	na	na	na	na	0.3	1.0	1.7	na	na	na	na	na	na	4.8	5.2 H	1.5	1.7
Oxford Economics	0.1 L	3.3 H	0.3	na	0.2	0.2	0.2	0.3	1.1	2.0	2.7	2.4	na	na	3.2	103.6	5.8 H	1.8	2.0	1.9
PNC Financial Services Corp.	0.1 L	3.3 H	0.3	na	0.1	0.2	0.2	0.3	1.1	1.7	2.4	na	3.9	2.4	3.3	106.0	3.5	2.7	2.2	2.2
RDQ Economics	0.1 L	3.3 H	0.2	0.2	0.1	0.2	0.4	0.5	1.2	2.3	3.0	3.6	4.3	3.3	3.8	105.3	4.0	3.1	3.1	3.0
S&P Global	0.1 L	3.3 H	0.3	na	0.2	0.2	0.2	0.3	1.1	2.0	2.7	na	na	na	3.1	na	4.1	2.3	2.0	1.9
Scotiabank Group	0.1 L	3.3 H	na	na	0.2	na	na	0.9 H	1.5	2.2	2.6	na	na	na	na	na	3.2	4.9	6.1 H	4.5 H
Societe Generale	0.1 L	3.3 H	0.1 L	0.1 L	0.1	0.1	0.1 L	0.5	1.2	1.7	2.4	na	na	1.4	3.2	na	1.9 L	2.1	2.4	2.1
Swiss Re	0.1 L	3.3 H	0.6 H	0.3 H	0.0 L	0.1	0.2	0.5	1.1	1.7	2.3	3.2	4.0	na	3.6	108.1	4.9	na	1.8	1.6
The Northern Trust Company	0.1 L	3.3 H	0.3	0.1 L	0.1	0.2	0.3	0.5	1.4	1.9	2.8	3.4	4.3	3.5 H	3.5	104.0	3.8	2.4	2.5	2.5
Thru the Cycle	0.1 L	3.3 H	0.2	0.1 L	0.1	0.1	0.2	0.4	1.3	1.7	2.2	3.0	3.6	3.0	3.3	108.2 H	3.0	2.4	2.8	2.0
TS Lombard	0.1 L	3.2 L	0.4	0.2	0.3 H	0.3	0.4	0.5	1.3	2.0	2.7	3.5	4.3	2.6	3.8	104.0	3.3	2.4	2.4	2.4
Via Nova Investment Mgt.	0.1 L	3.3 H	0.2	0.1 L	0.1	0.1	0.1 L	0.2	0.8	1.4	2.1	2.9	3.4	2.6	2.9	105.8	na	na	na	na
Wells Fargo	0.1 L	3.3 H	0.2	0.1 L	0.1	0.1	0.2	0.5	1.2	2.0	2.5	3.3	4.2	3.0	3.4	na	4.1	2.2	2.2	2.1
October Consensus	**0.1**	**3.3**	**0.3**	**0.1**	**0.1**	**0.2**	**0.2**	**0.5**	**1.2**	**1.8**	**2.4**	**3.1**	**4.0**	**2.6**	**3.4**	**105.2**	**3.8**	**2.5**	**2.5**	**2.2**
Top 10 Avg.	0.1	3.3	0.4	0.2	0.2	0.3	0.4	0.7	1.5	2.2	2.9	3.6	4.5	3.1	3.7	106.8	4.9	3.5	3.4	2.8
Bottom 10 Avg.	0.1	3.3	0.2	0.1	0.1	0.1	0.2	0.3	0.9	1.5	2.1	2.7	3.5	2.1	3.1	103.6	2.6	1.7	1.7	1.6
September Consensus	0.1	3.3	0.3	0.1	0.1	0.2	0.2	0.5	1.2	1.8	2.5	3.1	4.0	2.6	3.3	104.7	3.4	2.3	2.3	2.1
Number of Forecasts Changed From A Month Ago:																				
Down	0	0	2	0	0	0	4	3	10	9	14	7	5	1	11	2	4	6	6	6
Same	41	36	30	23	34	32	25	30	21	28	22	12	14	14	16	8	13	17	17	14
Up	1	0	2	1	1	1	4	7	8	5	3	5	5	5	5	10	22	12	15	16
Diffusion Index	51%	50%	50%	52%	51%	52%	50%	55%	47%	45%	36%	46%	50%	60%	41%	70%	73%	59%	62%	64%

Third Quarter 2022

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: 1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	A. Avg. For Qtr. Fed's Adv Fgn Econ $ Index	(Q-Q % Change) (SAAR) B. Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
Amherst Pierpont Securities	0.4 H	3.6 H	0.8 H	0.5 H	0.6 H	0.7 H	0.9 H	1.0	1.9 H	2.6 H	3.4 H	4.0	4.8	3.3	4.3 H	108.5 H	3.6	3.0	2.8	2.5
ING	0.3	na	0.5	na	na	na	na	0.8	1.6	2.3	2.8	na	na	na	na	na	3.5	na	na	na
BBVA USA	0.2	3.3	0.3	0.2	0.2	0.3	0.3	0.6	1.4	2.2	2.9	3.5	4.0	2.3	3.6	103.5	3.9	2.2	2.2	2.1
Economist Intelligence Unit	0.2	3.3	na	0.2	0.2	0.3	0.3	0.6	1.3	1.7	2.4	na	na	na	3.3	na	1.9	na	na	na
GLC Financial Economics	0.2	3.3	0.3	0.3	0.2	0.3	0.5	0.5	1.2	1.8	2.8	4.6 H	5.4 H	2.8	4.0	104.3	4.4	4.9	3.8 H	2.3
MacroFin Analytics & Rutgers Bus School	0.2	3.3	0.2	0.1 L	0.1	0.1	0.2	0.4	1.1	1.6	2.1	2.6	3.0	2.9	3.1	106.7	2.5	2.0	1.9	2.1
RDQ Economics	0.2	3.3	0.3	0.3	0.2	0.3	0.5	0.7	1.5	2.6 H	3.4 H	3.8	4.6	3.7 H	4.1	105.9	3.7	3.0	3.1	3.0
Regions Financial Corporation	0.2	3.3	0.4	0.2	0.2	0.2	0.3	0.6	1.3	1.9	2.4	3.3	4.1	2.7	3.5	107.2	3.2	2.1	2.2	2.4
ACIMA Private Wealth	0.1 L	3.3	0.2	0.1 L	0.0 L	0.0 L	0.1 L	0.1 L	0.4 L	1.2 L	1.7 L	2.8	3.7	1.4	2.5 L	98.0 L	2.5	1.3 L	1.8	1.2 L
AIG	0.1 L	3.3	0.3	na	0.1	0.1	0.2	0.5	1.2	1.9	2.5	na	3.9	na	3.6	na	3.0	2.1	2.3	1.9
Bank of America	0.1 L	na	0.4	na	na	na	na	0.8	1.5	1.9	2.2	na	na	na	na	na	4.0	3.2	2.3	2.0
Barclays	0.1 L	3.3	na	na	na	na	na	0.7	1.3	1.7	2.2	na	na	na	na	na	2.0	2.2	2.1	1.9
BMO Capital Markets	0.1 L	3.3	0.1 L	na	0.1	0.1	0.2	0.5	1.2	1.8	2.4	na	na	na	3.5	102.0	2.6	2.1	2.5	2.3
BNP Paribas Americas	0.1 L	na	na	na	na	na	na	0.9	na	1.9	2.5	na	na	na	na	na	5.0 H	na	2.2	na
Chan Economics	0.1 L	3.3	0.3	0.2	0.2	0.2	0.3	0.5	1.2	1.7	2.3	3.0	3.7	2.6	3.2	104.5	2.8	2.2	2.3	2.2
Chmura Economics & Analytics	0.1 L	3.3	0.2	0.1 L	0.1	0.1	0.1 L	0.3	0.9	1.5	2.1	2.7	na	na	3.2	na	3.3	2.5	3.0	na
Comerica Bank	0.1 L	3.2 L	0.2	na	0.1	0.2	0.2	0.4	1.0	1.5	2.2	na	na	na	3.1	na	4.7	2.2	2.3	2.1
Daiwa Capital Markets America	0.1 L	3.3	0.3	0.2	0.1	0.2	0.2	0.4	1.2	1.8	2.3	3.1	3.9	na	3.4	107.0	3.7	2.9	3.1	2.9
DePrince & Assoc.	0.1 L	3.3	0.2	0.2	0.2	0.2	0.2	0.5	1.2	1.8	2.4	3.4	4.6	3.0	3.5	104.2	2.6	2.4	2.5	2.3
Fannie Mae	0.1 L	3.3	na	na	0.2	0.3	0.5	0.8	1.4	1.7	2.1	na	na	na	3.3	na	3.6	2.4	2.1	2.1
Georgia State University	0.1 L	3.3	na	na	0.1	0.2	0.3	0.6	1.5	2.2	2.8	2.9	4.6	na	4.0	na	4.2	1.8	2.5	2.0
Goldman Sachs & Co.	0.1 L	na	0.2	na	0.2	na	na	na	na	1.6	na	na	na	na	na	na	3.5	2.1	2.2	1.9
Grant Thornton/Diane Swonk	0.1 L	3.2 L	0.1 L	0.1 L	0.1	0.1	0.2	0.4	0.4 L	1.5	2.3	2.9	3.6	na	3.2	na	2.9	1.7	1.4 L	1.4
IHS Markit	0.1 L	3.3	0.3	na	0.1	0.1	0.3	0.6	1.2	1.8	2.4	na	na	na	3.5	na	3.1	1.7	1.4 L	1.4
J.P. Morgan Chase	0.1 L	na	0.2	na	na	na	na	0.5	1.4	2.0	2.7	na	na	na	na	na	2.5	2.1	2.3	2.0
Loomis, Sayles & Company	0.1 L	3.3	0.2	0.1 L	0.1	0.1	0.2	0.4	1.5	2.1	2.6	3.3	3.9	3.0	3.6	105.3	3.1	1.9	2.2	1.6
Mizuho Research Institute	0.1 L	na	na	na	na	na	na	na	na	1.6	na	na	na	na	na	na	na	na	na	na
Moody's Analytics	0.1 L	3.3	0.4	0.1 L	0.2	0.4	0.7	1.0	1.8	2.3	3.3	3.9	4.9	3.2	3.6	na	1.3	2.5	2.4	2.4
Naroff Economic Advisors	0.1 L	3.3	0.3	0.2	0.2	0.3	0.3	0.5	1.2	2.0	2.6	3.0	4.9	3.2	3.4	105.6	2.5	2.5	2.5	2.6
NatWest Markets	0.1 L	3.3	0.3	0.2	0.1	0.2	0.3	0.1 L	1.7	2.1	2.4	1.7 L	2.7 L	0.8 L	na	na	2.0	2.5	2.2	2.4
Nomura Securities, Inc.	0.1 L	3.3	na	na	na	na	na	0.3	1.1	1.7	na	na	na	na	na	na	2.9	5.4 H	1.8	1.9
Oxford Economics	0.1 L	3.3	0.3	na	0.2	0.2	0.3	0.3	1.2	2.2	2.8	2.5	na	na	3.3	103.3	3.7	1.9	2.3	2.2
PNC Financial Services Corp.	0.1 L	3.3	0.3	na	0.1	0.2	0.2	0.3	1.1	1.7	2.5	na	3.9	2.4	3.4	106.2	3.0	2.8	2.6	2.5
S&P Global	0.1 L	3.3	0.3	na	0.2	0.2	0.3	0.3	1.2	2.2	2.8	na	na	na	3.3	na	3.0	2.2	2.3	2.2
Scotiabank Group	0.1 L	3.3	na	na	0.2	na	na	1.2 H	1.6	2.3	2.6	na	na	na	na	na	1.9	3.7	3.8 H	3.4 H
Societe Generale	0.1 L	3.3	0.1 L	0.1 L	0.1	0.1	0.2	0.7	1.3	1.8	2.4	na	na	1.4	3.3	na	1.2 L	2.1	2.4	2.1
Swiss Re	0.1 L	3.3	0.7	0.3	0.0 L	0.1	0.3	0.5	1.1	1.6	2.4	3.3	4.2	na	3.6	107.5	2.8	na	2.0	1.7
The Northern Trust Company	0.1 L	3.3	0.3	0.1 L	0.1	0.3	0.4	0.6	1.4	2.0	2.8	3.5	4.4	3.7 H	3.7	102.0	3.0	2.3	2.2	2.0
Thru the Cycle	0.1 L	3.3	0.2	0.1 L	0.1	0.1	0.3	0.4	1.3	1.8	2.2	3.1	3.7	3.0	3.4	108.3	3.3	2.4	2.8	2.5
TS Lombard	0.1 L	3.2 L	0.4	0.2	0.3	0.3	0.4	0.6	1.4	2.3	3.0	3.8	4.6	2.9	4.1	102.0	2.8	2.8	2.8	2.8
Via Nova Investment Mgt.	0.1 L	3.3	0.2	0.1 L	0.1	0.1	0.1 L	0.2	0.8	1.5	2.1	3.0	3.5	2.7	3.0	106.0	na	na	na	na
Wells Fargo	0.1 L	3.3	0.2	0.1 L	0.1	0.1	0.2	0.6	1.4	2.1	2.6	3.4	4.3	3.1	3.6	na	3.4	2.1	2.0	2.1
October Consensus	**0.1**	**3.3**	**0.3**	**0.2**	**0.2**	**0.2**	**0.3**	**0.5**	**1.3**	**1.9**	**2.5**	**3.2**	**4.1**	**2.7**	**3.5**	**104.9**	**3.1**	**2.5**	**2.4**	**2.2**
Top 10 Avg.	0.2	3.3	0.5	0.3	0.3	0.4	0.5	0.9	1.6	2.3	3.0	3.7	4.7	3.2	3.9	106.9	4.1	3.4	3.0	2.7
Bottom 10 Avg.	0.1	3.3	0.2	0.1	0.1	0.1	0.2	0.3	0.9	1.5	2.1	2.7	3.6	2.2	3.1	102.9	2.0	1.9	1.9	1.7
September Consensus	0.1	3.3	0.3	0.2	0.2	0.2	0.3	0.5	1.3	1.9	2.5	3.2	4.1	2.7	3.5	104.5	2.9	2.4	2.4	2.2
Number of Forecasts Changed From A Month Ago:																				
Down	0	0	3	0	1	1	3	5	7	5	10	7	4	1	11	2	5	6	8	8
Same	39	36	25	20	32	29	24	25	23	29	21	12	15	12	16	9	14	23	22	17
Up	3	0	4	4	2	3	6	7	6	5	5	5	5	7	5	9	20	6	8	11
Diffusion Index	54%	50%	52%	58%	51%	53%	55%	53%	49%	50%	43%	46%	52%	65%	41%	68%	69%	50%	50%	54%

Fourth Quarter 2022

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter															Avg. For	(Q-Q % Change) (SAAR)			
	Short-Term							Intermediate-Term			Long-Term					Qtr.				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	A.	B.	C.	D.	E.
	Federal Funds Rate	Prime Bank Rate	LIBOR 3-Mo.	Com. Paper 1-Mo.	Treas. Bills 3-Mo.	Treas. Bills 6-Mo.	Treas. Bills 1-Yr.	Treas. Notes 2-Yr.	Treas. Notes 5-Yr.	Treas. Notes 10-Yr.	Treas. Bond 30-Yr.	Aaa Corp. Bond	Baa Corp. Bond	State & Local Bonds	Home Mtg. Rate	Fed's Adv Fgn Econ $ Index	Real GDP	GDP Price Index	Cons. Price Index	PCE Price Index
Amherst Pierpont Securities	0.7 H	3.8 H	1.0 H	0.8 H	0.9 H	1.0 H	1.2 H	1.3 H	2.2 H	2.8 H	3.6 H	4.2	5.0	3.5	4.5 H	109.0	3.4	3.1	2.8	2.5
ING	0.6	na	0.8	na	na	na	na	1.0	1.7	2.3	2.8	na	na	na	na	na	3.1	na	na	na
Economist Intelligence Unit	0.5	3.6	na	0.5	0.4	0.5	0.6	0.8	1.6	2.0	2.7	na	na	na	3.6	na	1.7	na	na	na
BNP Paribas Americas	0.4	na	na	na	na	na	na	1.0	na	2.0	2.5	na	na	na	na	na	3.8	na	2.8	na
RDQ Economics	0.4	3.3 L	0.5	0.5	0.2	0.3	0.6	0.8	1.6	2.8 H	3.6 H	4.0	4.8	4.0 H	4.3	105.9	3.7	3.0	3.0	3.0 H
Regions Financial Corporation	0.4	3.3 L	0.5	0.3	0.3	0.3	0.4	0.7	1.4	2.0	2.5	3.4	4.2	2.8	3.6	107.6	2.6	2.2	2.2	2.3
TS Lombard	0.4	3.5	0.6	0.4	0.5	0.5	0.6	0.8	1.6	2.5	3.2	4.0	4.8	3.1	4.3	100.0	2.8	2.8	2.8	2.8
GLC Financial Economics	0.3	3.4	0.3	0.3	0.2	0.4	0.5	0.6	1.3	1.8	2.8	4.3 H	5.1 H	2.8	4.0	104.0	3.3	3.8	3.4 H	2.0
BBVA USA	0.2	3.3 L	0.4	0.3	0.3	0.3	0.4	0.6	1.5	2.3	3.0	3.5	4.1	2.3	3.6	103.3	4.1 H	2.1	2.2	2.1
Chmura Economics & Analytics	0.2	3.3 L	0.3	0.2	0.2	0.2	0.2	0.4	1.0	1.6	2.2	2.9	na	na	3.3	na	3.2	2.1	2.7	na
Comerica Bank	0.2	3.3 L	0.3	na	0.1	0.2	0.3	0.5	1.0	1.5	2.2	na	na	na	3.1	na	4.1 H	2.2	2.1	2.1
Daiwa Capital Markets America	0.2	3.4	0.4	0.3	0.2	0.3	0.3	0.5	1.4	2.0	2.5	3.3	4.1	na	3.7	108.0	3.5	2.7	3.0	2.8
DePrince & Assoc.	0.2	3.4	0.4	0.4	0.3	0.3	0.3	0.6	1.3	2.0	2.5	3.6	4.8	3.2	3.7	104.2	2.4	2.4	2.5	2.3
MacroFin Analytics & Rutgers Bus School	0.2	3.3 L	0.2	0.1 L	0.1	0.2	0.2	0.4	1.1	1.6	2.1	2.6	3.0	2.9	3.1	106.7	2.1	2.0	2.0	2.0
S&P Global	0.2	3.3 L	0.3	na	0.2	0.2	0.3	0.4	1.4	2.3	2.9	na	na	na	3.4	na	2.2	2.5	2.8	2.5
Thru the Cycle	0.2	3.3 L	0.3	0.1 L	0.2	0.2	0.4	0.4	1.5	1.9	2.3	3.2	3.9	3.1	3.5	109.2 H	2.4	2.3	2.6	2.6
ACIMA Private Wealth	0.1 L	3.3 L	0.2	0.1 L	0.0 L	0.0 L	0.1 L	0.1 L	0.4 L	1.2 L	1.7 L	2.8	3.7	1.4	2.5 L	97.0 L	1.5	0.9 L	1.9	1.1
AIG	0.1 L	3.3 L	0.3	na	0.1	0.1	0.2	0.6	1.3	2.0	2.6	na	4.0	na	3.6	na	2.5	2.0	1.6	1.8
Bank of America	0.1 L	na	0.4	na	na	na	na	0.9	1.6	1.9	2.2	na	na	na	na	na	2.0	3.3	2.5	2.0
Barclays	0.1 L	3.3 L	na	na	na	na	na	na	na	na	na	na	na	na	na	na	2.0	2.4	2.4	2.1
BMO Capital Markets	0.1 L	3.3 L	0.1 L	na	0.1	0.1	0.3	0.7	1.3	2.0	2.5	na	na	na	3.7	101.5	2.3	2.1	2.5	2.2
Chan Economics	0.1 L	3.3 L	0.3	0.2	0.2	0.2	0.3	0.5	1.2	1.7	2.3	3.0	3.7	2.6	3.2	104.0	2.5	2.2	2.3	2.1
Fannie Mae	0.1 L	3.3 L	na	na	0.4	0.5	0.6	0.9	1.4	1.7	2.1	na	na	na	3.3	na	2.5	2.6	2.2	2.4
Georgia State University	0.1 L	3.3 L	na	na	0.1	0.2	0.3	0.7	1.5	2.3	2.9	2.9	4.6	na	4.0	na	3.4	1.9	2.6	2.1
Goldman Sachs & Co.	0.1 L	na	0.3	na	0.2	na	na	na	na	1.8	na	na	na	na	na	na	1.5	2.1	1.9	1.9
Grant Thornton/Diane Swonk	0.1 L	3.3 L	0.2	0.1 L	0.1	0.1	0.3	0.4	1.3	2.0	2.7	3.3	4.0	na	3.6	na	2.5	2.7	2.5	2.4
IHS Markit	0.1 L	3.3 L	0.3	na	0.1	0.1	0.4	0.7	1.3	1.9	2.5	na	na	na	3.6	na	2.4	1.9	1.8	1.6
J.P. Morgan Chase	0.1 L	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	2.3	2.1	2.3	2.0
Loomis, Sayles & Company	0.1 L	3.3 L	0.2	0.1 L	0.1	0.1	0.3	0.6	1.7	2.1	2.6	3.3	4.0	3.1	3.6	105.3	2.4	2.0	2.2	1.7
Mizuho Research Institute	0.1 L	na	na	na	na	na	na	na	na	1.7	na	na	na	na	na	na	na	na	na	na
Moody's Analytics	0.1 L	3.3 L	0.4	0.1 L	0.3	0.4	0.8	1.1	1.9	2.4	3.4	3.9	5.0	3.2	3.6	na	1.4 L	2.2	2.3	2.3
Naroff Economic Advisors	0.1 L	3.3 L	0.3	0.2	0.3	0.4	0.5	0.7	1.4	2.2	2.8	3.2	5.0	3.3	3.6	105.0	2.1	2.5	2.5	2.5
NatWest Markets	0.1 L	3.3 L	0.3	0.2	0.1	0.2	0.3	1.3 H	1.9	2.2	2.5	1.7 L	2.7 L	0.8 L	na	na	2.0	2.5	2.2	2.3
Nomura Securities, Inc.	0.1 L	3.3 L	na	na	na	na	na	0.4	1.2	1.7	na	na	na	na	na	na	1.7	5.2 H	2.3	2.1
Oxford Economics	0.1 L	3.3 L	0.3	na	0.2	0.2	0.3	0.4	1.4	2.3	2.9	2.8	na	na	3.5	103.0	2.1	2.4	3.0	2.7
PNC Financial Services Corp.	0.1 L	3.3 L	0.3	na	0.2	0.2	0.3	0.4	1.1	1.8	2.5	na	4.0	2.5	3.5	106.5	2.5	2.9	2.9	2.7
Scotiabank Group	0.1 L	3.3 L	na	na	0.2	na	na	1.3 H	1.8	2.3	2.6	na	na	na	na	na	1.6	2.9	0.0 L	-0.6 L
Societe Generale	0.1 L	3.3 L	0.1 L	0.1 L	0.1	0.2	0.4	0.9	1.4	1.8	2.5	na	na	1.5	3.3	na	2.1	2.2	2.5	2.2
Swiss Re	0.1 L	3.3 L	0.6	0.3	0.0 L	0.1	0.3	0.5	1.1	1.6	2.3	3.2	4.1	na	3.5	107.0	2.2	na	2.0	1.8
The Northern Trust Company	0.1 L	3.3 L	0.3	0.1 L	0.1	0.3	0.5	0.6	1.5	2.1	2.8	3.6	4.5	3.8	3.9	101.0	2.7	2.4	2.2	1.9
Via Nova Investment Mgt.	0.1 L	3.3 L	0.2	0.1 L	0.1	0.1	0.1 L	0.3	0.9	1.6	2.2	3.1	3.6	2.8	3.1	106.0	na	na	na	na
Wells Fargo	0.1 L	3.3 L	0.2	0.1 L	0.1	0.1	0.3	0.8	1.6	2.1	2.6	3.4	4.3	3.1	3.7	na	2.8	2.1	2.3	2.1
October Consensus	**0.2**	**3.3**	**0.4**	**0.2**	**0.2**	**0.3**	**0.4**	**0.7**	**1.4**	**2.0**	**2.6**	**3.3**	**4.2**	**2.8**	**3.6**	**104.7**	**2.5**	**2.5**	**2.4**	**2.1**
Top 10 Avg.	0.4	3.4	0.6	0.4	0.4	0.5	0.6	1.1	1.8	2.4	3.1	3.8	4.8	3.3	4.0	107.1	3.6	3.2	2.9	2.7
Bottom 10 Avg.	0.1	3.3	0.2	0.1	0.1	0.1	0.2	0.4	1.0	1.6	2.2	2.8	3.7	2.2	3.2	102.3	1.8	1.9	1.8	1.5
September Consensus	0.1	3.3	0.3	0.2	0.2	0.3	0.4	0.6	1.4	2.0	2.6	3.3	4.2	2.7	3.5	104.3	2.4	2.3	2.2	2.2
Number of Forecasts Changed From A Month Ago:																				
Down	2	2	5	2	3	2	3	5	4	4	7	6	6	2	6	2	6	9	7	9
Same	33	32	21	19	29	27	22	24	23	30	23	12	12	12	19	8	15	15	18	17
Up	7	2	6	3	3	4	8	8	9	5	6	6	6	6	7	10	18	11	13	10
Diffusion Index	56%	50%	52%	52%	50%	53%	58%	54%	57%	51%	49%	50%	50%	60%	52%	70%	65%	53%	58%	51%

First Quarter 2023

Interest Rate Forecasts

Key Assumptions

Blue Chip Financial Forecasts Panel Members	Percent Per Annum -- Average For Quarter: 1 Federal Funds Rate	2 Prime Bank Rate	3 LIBOR 3-Mo.	4 Com. Paper 1-Mo.	5 Treas. Bills 3-Mo.	6 Treas. Bills 6-Mo.	7 Treas. Bills 1-Yr.	8 Treas. Notes 2-Yr.	9 Treas. Notes 5-Yr.	10 Treas. Notes 10-Yr.	11 Treas. Bond 30-Yr.	12 Aaa Corp. Bond	13 Baa Corp. Bond	14 State & Local Bonds	15 Home Mtg. Rate	A. Avg. For Qtr. Fed's Adv Fgn Econ $ Index	B. (Q-Q % Change, SAAR) Real GDP	C. GDP Price Index	D. Cons. Price Index	E. PCE Price Index
Amherst Pierpont Securities	0.9 H	4.0 H	1.3 H	1.0 H	1.1 H	1.2 H	1.4 H	1.5 H	2.4 H	3.0 H	3.8 H	4.4 H	5.2 H	3.7	4.7 H	109.0	3.2	3.3	2.9	2.7
ING	0.9 H	na	1.0	na	na	na	na	1.2	1.8	2.3	2.8	na	na	na	na	na	3.0	na	na	na
Economist Intelligence Unit	0.7	3.8	na	0.7	0.7	0.8	0.8	1.1	1.9	2.3	2.9	na	na	na	3.8	na	1.7	na	na	na
Chmura Economics & Analytics	0.5	3.7	0.7	0.6	0.5	0.6	0.6	0.7	1.3	2.0	2.6	3.0	na	na	3.5	na	3.1	2.4	2.9	na
Daiwa Capital Markets America	0.5	3.6	0.7	0.5	0.5	0.5	0.5	0.8	1.6	2.1	2.7	3.5	4.3	na	3.9	108.0	3.3	2.7	3.0	2.8
Regions Financial Corporation	0.5	3.6	0.6	0.3	0.3	0.4	0.5	0.8	1.5	2.1	2.6	3.5	4.4	2.9	3.7	108.1	2.3	2.1	2.1	2.2
Scotiabank Group	0.5	3.5	na	na	0.4	na	na	1.5 H	1.9	2.4	2.7	na	na	na	na	na	1.9	2.5	1.7 L	2.6
BNP Paribas Americas	0.4	na	na	na	na	na	na	1.1	na	2.0	2.5	na	na	na	na	na	2.8	na	2.4	na
Comerica Bank	0.4	3.5	0.6	na	0.4	0.4	0.5	0.8	1.3	1.8	2.5	na	na	na	3.4	na	3.3	2.1	2.0	2.0
MacroFin Analytics & Rutgers Bus School	0.4	3.5	0.4	0.3	0.4	0.4	0.4	0.6	1.3	1.8	2.4	2.7 L	3.1 L	3.2	3.3	106.9	2.0	2.0	2.0	2.0
S&P Global	0.4	3.5	0.5	na	0.4	0.5	0.5	0.6	1.6	2.5	3.0	na	na	na	3.5	na	2.6	2.2	2.3	2.6
Thru the Cycle	0.4	3.5	0.4	0.3	0.3	0.4	0.6	0.5	1.5	1.9	2.4	3.3	4.0	3.1	3.7	109.5 H	2.1	2.2	1.9	2.3
TS Lombard	0.4	3.5	0.6	0.4	0.6	0.6	0.8	1.0	1.8	2.7	3.4	4.2	5.0	3.3	4.5	100.0	2.8	2.8	2.8	2.8
BMO Capital Markets	0.3	3.4	0.3	na	0.2	0.3	0.5	0.8	1.4	2.0	2.5	na	na	na	3.7	101.5	2.3	2.1	2.5	2.2
GLC Financial Economics	0.3	3.5	0.4	0.4	0.3	0.4	0.5	0.6	1.5	1.9	3.0	4.0	5.0	2.8	4.4	103.9	2.6	3.8	2.8	2.0
Naroff Economic Advisors	0.3	3.3 L	0.4	0.3	0.5	0.6	0.7	0.9	1.4	2.2	2.9	3.5	5.2 H	3.5	3.7	104.4	1.8	2.4	2.3	2.3
Via Nova Investment Mgt.	0.3	3.3 L	0.4	0.3	0.3	0.4	0.5	0.6	1.3	2.0	2.5	3.5	4.0	3.2	3.6	106.0	na	na	na	na
BBVA USA	0.2	3.3 L	0.5	0.3	0.3	0.4	0.5	0.7	1.5	2.4	3.1	3.6	4.1	2.4	3.7	103.1	3.6 H	2.1	2.2	2.1
Moody's Analytics	0.2	3.3 L	0.5	0.2	0.3	0.5	1.0	1.2	1.9	2.5	3.4	4.0	5.1	3.4	3.7	na	2.5	2.0	2.4	2.4
Oxford Economics	0.2	3.3 L	0.3	na	0.2	0.2	0.3	0.5	1.5	2.5	3.0	2.9	na	na	3.5	102.5	2.5	2.5	2.4	2.7
ACIMA Private Wealth	0.1 L	3.3 L	0.2 L	0.1 L	0.0 L	0.0 L	0.1 L	0.1 L	0.4 L	1.2 L	1.6 L	2.7 L	3.7	1.3 L	2.4 L	97.0 L	2.0	1.0 L	2.0	1.1 L
AIG	0.1 L	3.3 L	0.3	na	0.1	0.1	0.3	0.6	1.3	2.1	2.7	na	4.1	na	3.7	na	1.9	2.1	1.8	1.8
Barclays	0.1 L	3.3 L	na	na	na	na	na	na	na	na	na	na	na	na	na	na	2.0	2.7	2.0	2.6
Chan Economics	0.1 L	3.3 L	0.3	0.2	0.2	0.2	0.3	0.5	1.2	1.7	2.3	3.0	3.7	2.6	3.2	104.0	2.3	2.1	2.2	2.1
Georgia State University	0.1 L	3.3 L	na	na	0.1	0.2	0.3	0.7	1.6	2.4	3.0	2.9	4.6	na	4.0	na	2.3	2.1	2.5	2.2
Goldman Sachs & Co.	0.1 L	na	0.3	na	0.2	na	na	na	na	2.0	na	na	na	na	na	na	1.5 L	2.2	1.9	1.9
Grant Thornton/Diane Swonk	0.1 L	3.3 L	0.2 L	0.1 L	0.1	0.2	0.8	1.3	1.8	2.3	2.9	3.6	4.4	na	3.9	na	1.9	1.7	1.8	1.6
IHS Markit	0.1 L	3.3 L	0.3	na	0.1	0.1	0.4	0.7	1.4	2.0	2.6	na	na	na	3.7	na	2.3	2.0	2.0	1.8
Loomis, Sayles & Company	0.1 L	3.3 L	0.2 L	0.1 L	0.1	0.1	0.3	0.7	1.7	2.1	2.6	3.3	4.0	3.1	3.6	105.3	2.2	2.1	2.3	1.9
Mizuho Research Institute	0.1 L	na	na	na	na	na	na	na	na	1.7	na	na	na	na	na	na	na	na	na	na
Nomura Securities, Inc.	0.1 L	3.3 L	na	na	na	na	na	0.5	1.3	1.7	na	na	na	na	na	na	1.9	5.5 H	2.2	2.0
PNC Financial Services Corp.	0.1 L	3.3 L	0.3	na	0.2	0.3	0.3	0.4	1.1	1.8	2.6	na	4.0	2.5	3.5	106.6	2.4	3.0	3.2 H	2.9 H
Societe Generale	0.1 L	3.3 L	0.2 L	0.1 L	0.3	0.4	0.6	1.0	1.5	1.9	2.5	na	na	1.5	3.4	na	2.3	2.2	2.4	2.1
Swiss Re	0.1 L	3.3 L	0.6	0.2	0.0 L	0.1	0.2	0.5	1.0	1.5	2.2	3.1	4.0	na	3.4	106.6	2.1	na	2.1	1.8
The Northern Trust Company	0.1 L	3.3 L	0.3	0.1 L	0.2	0.4	0.6	0.7	1.6	2.3	2.8	3.8	4.7	4.0 H	4.1	100.0	2.3	2.2	2.0	2.2
Wells Fargo	0.1 L	3.3 L	0.2 L	0.1 L	0.1	0.2	0.5	1.0	1.8	2.2	2.6	3.5	4.4	3.2	3.8	na	2.8	2.0	2.3	2.0
Bank of America	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.7	3.4	2.3	2.1
October Consensus	**0.3**	**3.4**	**0.4**	**0.3**	**0.3**	**0.4**	**0.5**	**0.8**	**1.5**	**2.1**	**2.7**	**3.4**	**4.3**	**2.9**	**3.7**	**104.6**	**2.4**	**2.4**	**2.3**	**2.2**
Top 10 Avg.	0.6	3.6	0.7	0.5	0.6	0.6	0.8	1.2	1.9	2.5	3.2	3.8	4.8	3.4	4.1	107.0	3.1	3.1	2.7	2.6
Bottom 10 Avg.	0.1	3.3	0.3	0.2	0.1	0.1	0.3	0.5	1.2	1.7	2.3	3.0	3.9	2.5	3.3	102.2	1.9	1.9	1.9	1.8
September Consensus	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Number of Forecasts Changed From A Month Ago:																				
Down	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Same	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Up	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Diffusion Index	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

International Interest Rate And Foreign Exchange Rate Forecasts

United States

Blue Chip Forecasters	Fed Fund Target Rate			10 Yr. Gov't Bond Yield %			Fed's AFE $ Index		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	0.13	0.13	--	1.50	1.55	--	--	--	--
BMO Capital Markets	0.13	0.13	0.13	1.45	1.60	1.90	103.3	102.8	101.8
IHSMarkit	--	--	--	1.46	1.60	1.84	--	--	--
ING Financial Markets	0.13	0.13	0.38	1.75	2.00	2.25	103.5	104.4	106.5
Mizuho Research Institute	0.13	0.13	0.13	1.70	1.70	1.60	--	--	--
Moody's Analytics	0.13	0.13	0.13	1.35	1.70	2.22	--	--	--
Northern Trust	0.13	0.13	0.13	1.50	1.70	2.00	105.0	106.0	102.0
Oxford Economics	0.13	0.13	0.13	1.70	1.88	2.25	104.4	104.0	103.3
S&P Global	0.12	0.13	0.13	1.68	1.85	2.16	--	--	--
Scotiabank	0.25	0.25	0.25	1.80	2.15	2.25	--	--	--
TS Lombard	0.13	0.13	0.38	1.40	1.80	2.30	104.0	102.0	100.0
Wells Fargo	0.13	0.13	0.13	1.50	1.80	2.00	--	--	--
October Consensus	**0.14**	**0.14**	**0.19**	**1.57**	**1.78**	**2.07**	**104.0**	**103.8**	**102.7**
High	0.25	0.25	0.38	1.80	2.15	2.30	105.0	106.0	106.5
Low	0.12	0.13	0.13	1.35	1.55	1.60	103.3	102.0	100.0
Last Months Avg.	0.13	0.13	0.15	1.61	1.79	2.08	104.2	102.8	102.3

Japan

Blue Chip Forecasters	Policy-Rate Balance Rate			10 Yr. Gov't Bond Yield %			Yen per US$		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	0.10	0.10	--	0.05	0.05	--	111.0	112.0	--
BMO Capital Markets	-0.10	-0.10	-0.10	0.10	0.10	0.10	110.0	110.0	109.0
IHSMarkit	--	--	--	--	--	--	110.6	110.5	108.4
ING Financial Markets	-0.10	-0.10	-0.10	0.00	0.00	0.00	112.0	113.0	118.0
Mizuho Research Institute	-0.10	-0.10	-0.10	0.10	0.10	0.10	111.0	111.0	110.0
Moody's Analytics	-0.10	-0.10	-0.10	0.04	0.03	0.02	108.9	108.0	106.9
Nomura Securities	--	--	--	--	--	--	112.0	113.0	115.0
Northern Trust	-0.10	-0.10	-0.10	0.05	0.10	0.10	110.0	109.0	108.0
Oxford Economics	-0.05	-0.05	-0.05	0.02	0.00	0.00	109.9	109.7	109.4
S&P Global	-0.10	-0.10	-0.10	0.02	0.00	0.01	110.0	110.0	110.1
Scotiabank	-0.10	-0.10	-0.10	--	--	--	107.0	108.0	110.0
TS Lombard	-0.10	-0.10	-0.10	0.10	0.50	1.00	110.0	108.0	106.0
Wells Fargo	-0.10	-0.10	-0.10	0.10	0.10	0.15	111.0	112.0	114.0
October Consensus	**-0.08**	**-0.08**	**-0.10**	**0.06**	**0.10**	**0.16**	**110.3**	**110.3**	**110.4**
High	0.10	0.10	-0.05	0.10	0.50	1.00	112.0	113.0	118.0
Low	-0.10	-0.10	-0.10	0.00	0.00	0.00	107.0	108.0	106.0
Last Months Avg.	-0.09	-0.09	-0.09	0.06	0.07	0.07	109.9	110.1	109.6

United Kingdom

Blue Chip Forecasters	Official Bank Rate			10 Yr. Gilt Yields %			US$ per Pound Sterling		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	0.10	0.10	--	0.75	0.85	--	1.40	1.39	--
BMO Capital Markets	0.10	0.10	0.25	0.65	0.85	1.20	1.40	1.41	1.42
IHSMarkit	--	--	--	--	--	--	1.38	1.39	1.39
ING Financial Markets	0.10	0.10	0.10	0.85	1.00	1.20	1.41	1.39	1.40
Moody's Analytics	0.10	0.10	0.15	0.73	1.17	1.62	1.47	1.48	1.54
Nomura Securities	--	--	--	--	--	--	1.47	1.49	1.53
Northern Trust	0.10	0.10	0.25	0.95	1.05	1.20	1.36	1.39	1.41
Oxford Economics	0.10	0.10	0.10	0.85	0.93	1.15	1.40	1.41	1.43
S&P Global	0.10	0.10	0.10	0.78	0.89	1.08	1.38	1.39	1.40
Scotiabank	0.10	0.10	0.20	--	--	--	1.38	1.40	1.42
TS Lombard	0.10	0.10	0.25	1.00	1.40	1.90	1.35	1.38	1.40
Wells Fargo	0.10	0.10	0.25	0.90	1.05	1.20	1.36	1.37	1.41
October Consensus	**0.10**	**0.10**	**0.18**	**0.83**	**1.02**	**1.32**	**1.40**	**1.41**	**1.43**
High	0.10	0.10	0.25	1.00	1.40	1.90	1.47	1.49	1.54
Low	0.10	0.10	0.10	0.65	0.85	1.08	1.35	1.37	1.39
Last Months Avg.	0.10	0.10	0.11	0.83	0.97	1.24	1.40	1.42	1.43

Switzerland

Blue Chip Forecasters	SNB Policy Rate			10 Yr. Gov't Bond Yield %			CHF per US$		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	-0.75	-0.75	--	--	--	--	0.92	0.91	--
IHSMarkit	--	--	--	--	--	--	0.91	0.91	0.91
ING Financial Markets	-0.75	-0.75	-0.75	-0.15	-0.10	0.00	0.91	0.94	0.97
Moody's Analytics	-0.75	-0.75	-0.75	-0.36	-0.36	-0.24	0.92	0.91	0.87
Nomura Securities	--	--	--	--	--	--	0.89	0.89	0.90
Northern Trust	-0.75	-0.75	-0.75	-0.15	-0.05	0.10	0.93	0.92	0.91
Oxford Economics	-0.75	-0.75	-0.75	-0.19	-0.11	0.04	0.92	0.92	0.92
S&P Global	-0.75	-0.75	-0.75	-0.12	-0.03	0.15	0.92	0.93	0.93
Scotiabank	--	--	--	--	--	--	0.96	0.96	0.94
TS Lombard	-0.75	-0.75	-0.75	-0.15	0.25	0.75	0.92	0.92	0.92
October Consensus	**-0.75**	**-0.75**	**-0.75**	**-0.19**	**-0.07**	**0.13**	**0.92**	**0.92**	**0.92**
High	-0.75	-0.75	-0.75	-0.12	0.25	0.75	0.96	0.96	0.97
Low	-0.75	-0.75	-0.75	-0.36	-0.36	-0.24	0.89	0.89	0.87
Last Months Avg.	-0.75	-0.75	-0.75	-0.21	-0.09	0.09	0.92	0.91	0.92

Canada

Blue Chip Forecasters	O/N MMkt Financing Rate			10 Yr. Gov't Bond Yield %			C$ per US$		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	0.25	0.25	--	--	--	--	1.24	1.23	--
BMO Capital Markets	0.25	0.25	0.25	1.35	1.50	1.75	1.24	1.23	1.21
IHSMarkit	--	--	--	--	--	--	1.26	1.25	1.23
ING Financial Markets	0.25	0.25	0.50	1.70	2.00	2.25	1.23	1.22	1.23
Moody's Analytics	0.25	0.25	0.25	1.20	1.52	1.97	1.23	1.23	1.22
Nomura Securities	--	--	--	--	--	--	1.24	1.23	1.21
Northern Trust	0.25	0.25	0.50	1.50	1.70	1.90	1.28	1.26	1.24
Oxford Economics	0.25	0.25	0.25	1.60	1.80	2.21	1.27	1.27	1.27
S&P Global	0.25	0.25	0.25	1.56	1.72	2.14	1.23	1.25	1.26
Scotiabank	0.25	0.25	0.50	1.50	1.85	1.95	1.22	1.24	1.25
TS Lombard	0.25	0.25	0.25	1.35	1.75	2.25	1.26	1.26	1.26
Wells Fargo	0.25	0.25	0.50	1.60	1.85	2.10	1.28	1.26	1.22
October Consensus	**0.25**	**0.25**	**0.36**	**1.48**	**1.74**	**2.06**	**1.25**	**1.24**	**1.24**
High	0.25	0.25	0.50	1.70	2.00	2.25	1.28	1.27	1.27
Low	0.25	0.25	0.25	1.20	1.50	1.75	1.22	1.22	1.21
Last Months Avg.	0.25	0.25	0.31	1.47	1.71	2.00	1.24	1.23	1.23

International Interest Rate And Foreign Exchange Rate Forecasts

Australia

Blue Chip Forecasters	Official Cash Rate			10 Yr. Gov't Bond Yield %			US$ per A$		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	0.10	0.10	--	--	--	--	0.74	0.75	--
IHSMarkit	--	--	--	--	--	--	0.73	0.72	0.72
ING Financial Markets	0.10	0.10	0.10	1.50	1.60	1.90	0.73	0.75	0.75
Moody's Analytics	0.07	0.10	0.10	1.17	1.31	1.42	0.74	0.73	0.75
Nomura Securities	--	--	--	--	--	--	0.75	0.76	0.78
Northern Trust	0.10	0.10	0.10	1.50	1.65	1.80	0.71	0.72	0.74
Oxford Economics	0.05	0.08	0.10	1.62	1.95	2.39	0.74	0.74	0.74
S&P Global	0.10	0.10	0.10	1.38	1.85	2.36	0.73	0.73	0.74
Scotiabank	0.10	0.10	0.10	--	--	--	0.78	0.76	0.75
TS Lombard	0.10	0.10	0.25	1.65	2.05	2.55	0.75	0.80	0.85
October Consensus	**0.09**	**0.10**	**0.12**	**1.47**	**1.74**	**2.07**	**0.74**	**0.75**	**0.76**
High	0.10	0.10	0.25	1.65	2.05	2.55	0.78	0.80	0.85
Low	0.05	0.08	0.10	1.17	1.31	1.42	0.71	0.72	0.72
Last Months Avg.	0.11	0.12	0.12	1.46	1.71	1.94	0.75	0.75	0.76

Euro area

Blue Chip Forecasters	Main Refinancing Rate			US$ per Euro		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	0.00	0.00	--	1.18	1.18	--
BMO Capital Markets	0.00	0.00	0.00	1.20	1.21	1.22
IHSMarkit	--	--	--	1.20	1.20	1.21
ING Financial Markets	0.00	0.00	0.00	1.20	1.18	1.15
Mizuho Research Institute	0.00	0.00	0.00	1.17	1.16	1.18
Moody's Analytics	0.00	0.00	0.00	1.18	1.19	1.24
Nomura Securities	--	--	--	1.22	1.23	1.25
Northern Trust	0.00	0.00	0.00	1.16	1.18	1.19
Oxford Economics	0.00	0.00	0.00	1.20	1.21	1.22
S&P Global	0.00	0.00	0.00	1.19	1.20	1.21
Scotiabank	0.00	0.00	0.00	1.18	1.17	1.15
TS Lombard	0.00	0.00	0.00	1.16	1.18	1.22
Wells Fargo	-0.50	-0.50	-0.50	1.15	1.16	1.18
October Consensus	**-0.05**	**-0.05**	**-0.05**	**1.18**	**1.19**	**1.20**
High	0.00	0.00	0.00	1.22	1.23	1.25
Low	-0.50	-0.50	-0.50	1.15	1.16	1.15
Last Months Avg.	-0.05	-0.05	-0.05	1.19	1.20	1.21

Blue Chip Forecasters	10 Yr. Gov't Bond Yields %											
	Germany			France			Italy			Spain		
	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.	In 3 Mo.	In 6 Mo.	In 12 Mo.
Barclays	-0.30	-0.25	--	--	--	--	--	--	--	--	--	--
BMO Capital Markets	-0.45	-0.35	-0.20	--	--	--	--	--	--	--	--	--
ING Financial Markets	-0.15	-0.10	0.10	0.25	0.40	0.35	1.05	1.10	1.00	0.65	0.75	0.70
Mizuho Research Institute	-0.20	-0.20	-0.20	--	--	--	--	--	--	--	--	--
Moody's Analytics	-0.44	-0.36	-0.18	-0.08	-0.10	0.07	0.68	0.77	0.93	0.26	0.24	0.39
Northern Trust	-0.15	-0.05	0.10	0.20	0.35	0.50	0.90	1.05	1.20	0.50	0.65	0.70
Oxford Economics	-0.20	-0.10	0.08	0.15	0.24	0.42	0.93	1.11	1.43	0.57	0.72	1.01
S&P Global	-0.22	-0.12	0.10	0.09	0.22	0.44	0.92	1.15	1.42	0.49	0.63	0.86
TS Lombard	-0.20	0.20	0.70	-0.25	0.15	0.65	0.57	0.97	1.47	0.07	0.47	0.97
Wells Fargo	-0.30	-0.25	-0.10	--	--	--	--	--	--	--	--	--
October Consensus	**-0.26**	**-0.16**	**0.04**	**0.06**	**0.21**	**0.41**	**0.84**	**1.03**	**1.24**	**0.42**	**0.58**	**0.77**
High	-0.15	0.20	0.70	0.25	0.40	0.65	1.05	1.15	1.47	0.65	0.75	1.01
Low	-0.45	-0.36	-0.20	-0.25	-0.10	0.07	0.57	0.77	0.93	0.07	0.24	0.39
Last Months Avg.	-0.26	-0.18	-0.04	0.04	0.14	0.29	0.80	0.92	1.15	0.40	0.51	0.69

Consensus Forecasts
10-year Bond Yields vs U.S. Yield

	Current	In 3 Mo.	In 6 Mo.	In 12 Mo.
Japan	-1.41	-1.51	-1.68	-1.91
United Kingdom	-0.55	-0.74	-0.76	-0.75
Switzerland	-1.64	-1.75	-1.84	-1.94
Canada	-0.09	-0.08	-0.03	-0.01
Australia	-0.11	-0.10	-0.04	0.00
Germany	-1.69	-1.83	-1.94	-2.03
France	-1.35	-1.51	-1.57	-1.67
Italy	-0.69	-0.72	-0.75	-0.83
Spain	-1.11	-1.14	-1.20	-1.30

Consensus Forecasts
Policy Rates vs U.S. Target Rate

	Current	In 3 Mo.	In 6 Mo.	In 12 Mo.
Japan	-0.23	-0.22	-0.06	-0.29
United Kingdom	-0.03	-0.04	-0.04	-0.01
Switzerland	-0.88	-0.89	-0.89	-0.94
Canada	0.13	0.11	0.11	0.17
Australia	-0.03	-0.05	-0.04	-0.07
Euro area	-0.13	-0.19	-0.19	-0.24

Viewpoints:

A Sampling of Views on the Economy, Financial Markets and Government Policy Excerpted from Recent Reports Issued by our Blue Chip Panel Members and Others

A recovery half full

In the aftermath of an over-10% plunge in global GDP last year, the world economy has staged a remarkably rapid recovery. Although the initial rebound in 2H20 was widely anticipated, growth exceeded expectations and GDP reversed two-thirds of the pandemic drop within the first two quarters of the expansion. The global economy has gone on to exhibit impressive resiliency through the second wave of COVID-19, with GDP gains at a 4.5%ar shaving an additional percentage point off of the gap during 1H21.

In the face of continuing COVID-related headwinds, we look for the recovery to continue on its robust path and return global GDP to its pre-crisis trajectory next year. If we are right, this episode will mark a break from the experience of the past two expansions when the initial recovery was incomplete, leading to a long journey back to normalcy. The speedy recovery to date highlights the effectiveness of policy supports, which have mitigated private sector balance sheet scarring that had generated powerful growth drags in earlier phases of the past two upturns. These policies are also promoting the quick removal of slack, which in the past has contributed to sustained disinflationary impulses. With balance sheets healthy, slack limited, and policy stances remaining growth-oriented, the prospects are good for this expansion to continue delivering above-trend growth and push underlying inflation higher.

As impressive as the first steps have been, the recovery remains incomplete. Global GDP stood more than 2%-pts below its pre-pandemic path at midyear—a gap smaller than at a similar point in the post-GFC recovery, but relatively large based on historical experience. To complete the recovery and close the output gap global GDP needs to rise more than 4% over the coming year. While supports are in place to deliver a robust outcome, the recent downshift in momentum poses a challenge. Risks to our current-quarter global forecast of a 5.6%ar gain are skewed to the downside. The greater concern is that recent disappointments point to weaker growth ahead.

There are reasons to remain confident that strong growth lies ahead. Although the Delta drag has not passed, recent evidence confirms the effectiveness of vaccines in limiting deaths and hospitalizations. With the pace of vaccination now picking up smartly in the areas most impacted by this wave—Asia and Australia—the case for fading drag to generate a growth lift later this year looks good. The continued buoyancy of global financial markets is also encouraging. Asset prices remain elevated in the face of the downshift in growth momentum with positive news notable in EM where recoveries have lagged. In addition, neither the movement toward central bank tapering nor the continued upward pressure on global inflation has generated a tantrum in global bond markets.

Persistent supply constraints linked to the limited availability of key inputs and transportation impediments are the greatest immediate threat to growth. The latest readings show delivery times and transportation costs still near record highs. Last week's US employment report also points to labor supply constraints. These drags should fade along with the Delta wave and be accompanied by a growth boost from inventory rebuilding. However, the longer constraints linger, the greater the risk that higher consumer prices and the lack of available products as we move toward the holiday shopping season destroy (rather than defer) final demand. This concern should be reinforced next week as we expect both US and China retail sales to have contracted in August.

Look to Asia for signs of fading headwinds

Signs that supply constraints are easing should be evident first in Asia's upstream goods-producing economies. China's August trade sent an encouraging signal, with strong shipments to developed markets. Product details highlight firming exports of lower-end consumer goods and steady gains in tech shipments. Bottleneck constraints remain, and some of the increase in nominal exports surely owes to steep price increases. But we believe volume shipments are also on the rise as COVID-related backups at Chinese ports start to fade.

Elsewhere in the region, August signals are more mixed. Echoing the recent Korean trade data, Taiwan's export volumes ticked lower—consistent with July softening in export orders—while export prices jumped. In Japan, real exports posted a robust 1.7% gain in July and we look for another strong 1% gain in next week's August report. Improving external conditions look to be offset, however, by a reported slump in small-firm sentiment in Japan. According to the Economy Watchers' Survey for August, auto-related firms pointed to production cutbacks from persistent semiconductor shortages and noted difficulties in getting parts from Southeast Asia. Notably, the survey suggests no immediate easing of the supply bottleneck.

On a brighter note: Global capex healthy

Alongside a persistent supply crunch, we have been concerned about the latest slide in manufacturing expectations. However, growth in businesses' equipment spending remains resilient, even if it has downshifted from its recent torrid pace. Data this week from Japan and Taiwan show a solid expansion in domestic capital investment—a welcome sign that businesses are looking through the near-term difficulties. In Asia, Taiwan's August capital goods imports posted strong gains and indicators point to a large gain in next week's Japan July machinery orders. Globally, our CapexNow shows equipment investment decelerating but still expanding at a solid 6.6%ar this quarter—a 0.5%-pt upgrade this week. That businesses continue to invest supports the view that near-term headwinds should fade.

Expecting a soft turn for the better in China

Of greater importance for the outlook for China is the anticipated rebound in domestic demand that we expect to accompany a shift toward policy stimulus. An acceleration in government bond issuance boosted overall total social financing in this week's August report, suggesting this turn is underway. Together with the rise in China's imports of key industrial metals in August, a pickup in infrastructure projects should soon boost FAI growth. However, with COVID fears still present at midyear, we expect retail sales contracted 1%m/m last month after a 0.5% drop in July. On balance, we project IP to have just edged up 0.3% last month.

DM CBs to gradually scale back QE…

As recoveries have advanced and inflation has surprised to the upside, DM central banks are proceeding with plans to scale back their balance sheet policies. They are not ignoring the incomplete progress toward recovery, however, or the recent rise in downside risks. Balancing these considerations, they are signaling that asset purchases will be tapered but continue into next year, and that balance sheet tapering is separate from guidance on interest rate policy.

This week the RBA surprised local markets by following through with plans to scale back its QE purchase pace, despite ongoing lockdowns. However, the RBA also announced it would continue that purchase pace beyond its prior November guidance to at least next February. The ECB also announced a "moderately lower" purchase pace going forward—we expect €60bn/mo—and flagged December as the date for decisions around PEPP, which is set to end in March, and its TLTROs. We expect net purchases to continue at around €50bn per month from 2Q22. The continued strong rebound in the Canadian labor market has set up the BoC to taper further in October, while the disappointing August jobs report in the US looks to have cooled calls for an earlier taper by hawks at the Fed; we continue to look for a December taper announcement.

…while EM central banks to tighten more

A surge in inflation that has pushed high-yielder central banks to accelerate rate hikes is now generating a broader move toward EM tightening. In the CEE, inflation continues to surprise sharply higher, and we have pulled forward rate hike expectations. The latest strong CPI print in Czechia implies core inflation will remain near 5% into 2022, and we now expect the CNB to hike 125bp this year (starting with 50bp this month). Hungary is set to hike again this month as well, while Poland and Romania should see liftoffs early next year. Russia surprised this week with a 25bp hike instead of the 50bp we expected, but the CBR also signaled likely rate hikes ahead. We look for another 50bp of hikes this year to 7.25%.

Slower progress on vaccinations has kept EM Asian central banks more patient, but they are also responding to price pressures. The Bank of Korea hiked last month and we expect another rate increase in November as the BoK sees less macroeconomic risk from elevated cases given rising vaccination rates. Singapore has had less success with managing hospitalization rates, and the pace of reopening has slowed. Nonetheless, domestic labor costs and global goods prices are pressuring inflation higher. We now expect the MAS to move pre-emptively in October, shifting the slope of its basket-band crawl system and possibly re-centering the midpoint as well.

The reaction of monetary policy to inflationary upswings remains in the spotlight in Latam as well. Rising inflation prompted Peru to step up its pace with a 50bp hike this past week, which followed Chile's 75bp move at the end of August. With inflation breaching the upper end of the target range in Colombia, this week we revised our call to earlier and more rate hikes by BanRep. Only in Mexico, where real rates never dipped into negative territory during the pandemic, are there risks for monetary policy to under-deliver against our forecast. We continue to expect Banxico to hike once more in September, amid a clear 3Q stall in activity.

Political tensions rise in Brazil

Institutional frictions in Brazil rose sharply this week as the Supreme Court's chief justice strongly defended the courts against defiant statements made by President Bolsonaro. The president's subsequent decision to stand down—at least for now—helped to calm market concerns, but the risk of a renewed rise in tensions remains ahead of the 2022 election cycle. The charged political environment adds headwinds to already slowing growth, but at the same time inflation continues to surprise to the upside. On the back of this week's strong August print, we have revised up our 2021 CPI inflation forecast to 7.9%—well above the 3.75% target. Rising inflation is increasing the pressure on Brazil's central bank to speed up an already vigorous pace of rate hikes.

Draghi shows Italy what it takes

We continue to expect above-consensus growth in Italy this year and next, due in large part to Prime Minister Draghi's far-reaching structural reforms. These have unleashed a surge in optimism for a solid and lasting rebound in activity after nearly a decade-long stagnation. Success in Italy will echo well beyond its borders, as Italy has perennially raised questions about the viability of the Euro project. European governance made a dramatic shift with the Recovery Fund Initiative, exchanging fiscal support for reform, and we have argued that demonstrable success in modernizing southern Europe is necessary to convince the North to deepen this approach. We expect Draghi to remain PM until the end of his term in 2023, and with his achievements set to be lasting in our view, Italy's populist forces should be marginalized.

September 10, 2021

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Special Questions:

1. a. When will the US Fed begin to taper its Treasury security purchases?

November 2021	December 2021	Q1 2022	Later
45%	45%	8%	3%

b. When will the US Fed begin to taper its MBS purchases?

November 2021	December 2021	Q1 2022	Later
42%	45%	11%	3%

c. How long will the tapering last? 8 months

2. When do you think the Fed will raise the Federal Funds rate?

by the end 2021	by the end Jun 2022	by the end 2022	by the end Jun 2023	by the end 2023	Later
0%	8%	37%	45%	5%	5%

3. a. What is your estimate of the US federal government deficit for:

FY 2021	FY 2022
$3.0 tril.	$1.6 tril.

b. Do you see the size of your deficit forecast supporting economic growth? Yes 81% No 19%

c. Do you see the size of your deficit forecast raising interest rates so that econ growth is actually squeezed? Yes 12.5% No 87.5%

d. Do you see the size of your deficit forecast putting meaningful upward pressure on inflation? Yes 44% No 56%

4. Are the inflation risks in the U.S. temporary or are they likely to linger?

Temporary	Likely to linger
44%	56%

5. What factor would most ease your concerns about upside inflation risk?

A quicker-than-expected easing of global supply chain bottlenecks	71%
A rebound in domestic private sector capex and/or productivity	3%
A withdrawal of fiscal policy stimulus	3%
A bigger (or swifter) than expected tightening of monetary policy	20%
Another factor	3%

6. Do you think financial markets are too complacent concerning the inflation outlook? Yes 59% No 41%

7. As their economies recover, will central banks be too slow in removing their monetary accommodation to avoid inflation accelerating to well above target?

	Yes	No
US Federal Reserve Bank	63%	38%
European Central Bank	38%	62%
Bank of Japan	14%	86%
Bank of England	36%	64%
Bank of Canada	13%	87%

8. What, in your view, is the biggest threat to global economic stability over the next 12 months?

Geopolitical tensions emanating from, for example, Afghanistan, China, Russia, Iran	6%
An uneven global vaccination rollout and various mutations including the Delta variant	59%
Further positive inflation surprises and tighter-than-expected monetary policy	9%
Increased global financial instability stemming from heightened stress in China's property sector	6%
Enduring international supply chain disruption	18%
A premature loosening of lockdown stringency that triggers another wave of COVID-19	3%

Databank:

2021 Historical Data

Monthly Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Retail and Food Service Sales (a)	7.6	-2.9	11.3	0.9	-1.4	0.9	-1.8	0.7	....	....	....	....
Auto & Light Truck Sales (b)	16.78	15.93	17.64	18.30	16.89	15.47	14.62	13.06	....	....	....	....
Personal Income (a, current $)	9.9	-7.2	21.0	-13.6	-2.1	0.2	1.1	....	....	....	....	....
Personal Consumption (a, current $)	3.3	-1.1	5.2	1.0	0.1	1.1	0.3	....	....	....	....	....
Consumer Credit (e)	-0.5	5.8	5.5	5.2	9.9	10.6	4.7	....	....	....	....	....
Consumer Sentiment (U. of Mich.)	79.0	76.8	84.9	88.3	82.9	85.5	81.2	70.3	71.0	....	....	....
Household Employment (c)	201	208	609	328	444	-18	1043	509	....	....	....	....
Nonfarm Payroll Employment (c)	233	536	785	269	614	962	1053	235	....	....	....	....
Unemployment Rate (%)	6.3	6.2	6.0	6.1	5.8	5.9	5.4	5.2	....	....	....	....
Average Hourly Earnings (All, cur. $)	29.92	30.00	29.97	30.17	30.31	30.44	30.56	30.73	....	....	....	....
Average Workweek (All, hrs.)	35.0	34.6	34.9	34.9	34.8	34.7	34.7	34.7	....	....	....	....
Industrial Production (d)	-1.7	-4.9	1.8	17.8	16.3	10.1	6.6	5.9	....	....	....	....
Capacity Utilization (%)	75.0	72.7	74.8	74.8	75.2	75.6	76.2	76.4	....	....	....	....
ISM Manufacturing Index (g)	58.7	60.8	64.7	60.7	61.2	60.6	59.5	59.9	....	....	....	....
ISM Nonmanufacturing Index (g)	58.7	55.3	63.7	62.7	64.0	60.1	64.1	61.7	....	....	....	....
Housing Starts (b)	1.625	1.447	1.725	1.514	1.594	1.657	1.554	1.615	....	....	....	....
Housing Permits (b)	1.883	1.726	1.755	1.733	1.683	1.594	1.630	1.721	....	....	....	....
New Home Sales (1-family, c)	993	823	873	796	733	685	729	740	....	....	....	....
Construction Expenditures (a)	3.0	-1.1	1.0	0.3	0.7	0.0	0.3	....	....	....	....	....
Consumer Price Index (nsa, d)	1.4	1.7	2.6	4.2	5.0	5.4	5.4	5.3	....	....	....	....
CPI ex. Food and Energy (nsa, d)	1.4	1.3	1.6	3.0	3.8	4.5	4.3	4.0	....	....	....	....
PCE Chain Price Index (d)	1.4	1.6	2.5	3.6	4.0	4.0	4.2	....	....	....	....	....
Core PCE Chain Price Index (d)	1.5	1.5	2.0	3.1	3.5	3.6	3.6	....	....	....	....	....
Producer Price Index (nsa, d)	1.6	3.0	4.1	6.5	6.6	7.3	7.8	8.3	....	....	....	....
Durable Goods Orders (a)	2.4	1.3	1.3	-0.7	3.2	0.8	0.5	1.8	....	....	....	....
Leading Economic Indicators (a)	0.5	0.0	1.3	1.3	1.2	0.6	0.8	0.9	....	....	....	....
Balance of Trade & Services (f)	-65.7	-68.2	-72.2	-66.7	-68.5	-73.2	-70.1	....	....	....	....	....
Federal Funds Rate (%)	0.09	0.08	0.07	0.07	0.06	0.08	0.10	0.09	....	....	....	....
3-Mo. Treasury Bill Rate (%)	0.08	0.04	0.03	0.02	0.02	0.04	0.05	0.05	....	....	....	....
10-Year Treasury Note Yield (%)	1.08	1.26	1.61	1.64	1.62	1.52	1.32	1.28	....	....	....	....

2020 Historical Data

Monthly Indicator	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Retail and Food Service Sales (a)	0.6	-0.2	-8.6	-14.7	18.2	8.7	1.4	0.8	2.2	0.1	-1.4	-1.2
Auto & Light Truck Sales (b)	16.87	16.88	11.25	8.61	12.13	13.10	14.71	15.25	16.28	16.40	15.87	16.31
Personal Income (a, current $)	1.1	0.7	-1.9	12.5	-4.0	-0.9	0.9	-2.9	0.7	-0.2	-1.0	0.7
Personal Consumption (a, current $)	0.6	0.1	-6.9	-12.6	8.6	6.4	1.7	1.0	1.5	0.4	-0.5	-0.5
Consumer Credit (e)	2.5	4.6	-5.2	-18.2	-4.3	5.8	3.8	-3.2	4.9	0.0	3.1	3.2
Consumer Sentiment (U. of Mich.)	99.8	101.0	89.1	71.8	72.3	78.1	72.5	74.1	80.4	81.8	76.9	80.7
Household Employment (c)	-76	73	-3196	-22166	3854	4876	1677	3499	267	2126	140	21
Nonfarm Payroll Employment (c)	315	289	-1683	-20679	2833	4846	1726	1583	716	680	264	-306
Unemployment Rate (%)	3.5	3.5	4.4	14.8	13.3	11.1	10.2	8.4	7.8	6.9	6.7	6.7
Average Hourly Earnings (All, cur. $)	28.43	28.51	28.74	30.07	29.74	29.35	29.37	29.47	29.50	29.52	29.61	29.91
Average Workweek (All, hrs.)	34.3	34.4	34.1	34.2	34.7	34.6	34.6	34.7	34.8	34.8	34.8	34.7
Industrial Production (d)	-2.1	-1.4	-5.3	-17.7	-16.2	-11.0	-7.0	-6.6	-6.6	-4.7	-4.7	-3.3
Capacity Utilization (%)	76.1	76.3	73.4	63.4	64.7	68.7	71.5	72.3	72.1	72.9	73.3	74.1
ISM Manufacturing Index (g)	51.1	50.3	49.7	41.7	43.1	52.2	53.7	55.6	55.7	58.8	57.7	60.5
ISM Nonmanufacturing Index (g)	55.9	56.7	53.6	41.6	45.4	56.5	56.6	57.2	57.2	56.2	56.8	57.7
Housing Starts (b)	1.589	1.589	1.277	0.938	1.046	1.273	1.497	1.376	1.448	1.514	1.551	1.661
Housing Permits (b)	1.550	1.478	1.382	1.094	1.246	1.296	1.542	1.522	1.589	1.595	1.696	1.758
New Home Sales (1-family, c)	756	730	623	582	704	839	972	977	971	969	865	943
Construction Expenditures (a)	1.9	1.0	0.4	-3.6	-1.0	-0.2	0.3	1.1	0.3	0.9	1.0	1.1
Consumer Price Index (nsa, d)	2.5	2.3	1.5	0.3	0.1	0.6	1.0	1.3	1.4	1.2	1.2	1.4
CPI ex. Food and Energy (nsa, d)	2.3	2.4	2.1	1.4	1.2	1.2	1.6	1.7	1.7	1.6	1.6	1.6
PCE Chain Price Index (d)	1.9	1.9	1.3	0.4	0.5	0.9	1.0	1.3	1.4	1.2	1.1	1.3
Core PCE Chain Price Index (d)	1.8	1.9	1.7	0.9	1.0	1.1	1.3	1.5	1.6	1.4	1.4	1.5
Producer Price Index (nsa, d)	2.0	1.1	0.3	-1.5	-1.1	-0.7	-0.3	-0.3	0.3	0.6	0.8	0.8
Durable Goods Orders (a)	-4.8	0.9	-20.7	-11.6	10.6	11.3	9.8	2.0	1.6	1.0	2.2	1.5
Leading Economic Indicators (a)	0.5	-0.1	-7.6	-6.4	3.1	3.0	2.0	1.5	0.9	0.7	0.9	0.4
Balance of Trade & Services (f)	-45.5	-41.6	-47.2	-53.0	-54.9	-50.7	-60.7	-63.7	-62.6	-63.7	-67.3	-65.8
Federal Funds Rate (%)	1.55	1.58	0.65	0.05	0.05	0.08	0.09	0.10	0.09	0.09	0.09	0.09
3-Mo. Treasury Bill Rate (%)	1.55	1.54	0.30	0.14	0.13	0.16	0.13	0.10	0.11	0.10	0.09	0.09
10-Year Treasury Note Yield (%)	1.76	1.50	0.87	0.66	0.67	0.73	0.62	0.65	0.68	0.79	0.87	0.93

(a) month-over-month % change; (b) millions, saar; (c) month-over-month change, thousands; (d) year-over-year % change; (e) annualized % change; (f) $ billions; (g) level. Most series are subject to frequent government revisions. Use with care.

Calendar of Upcoming Economic Data Releases

Monday	Tuesday	Wednesday	Thursday	Friday
October 4 Manufacturers' Shipments, Inventories & Orders (Aug) NABE Outlook (Q3) BEA Auto Sales (Sep) BEA Truck Sales (Sep)	**5** International Trade (Aug) ISM Services PMI (Sep) IHS Markit Services PMI (Sep)	**6** ADP Employment Report (Sep) Public Debt (Sep) Interest on Public Debt (Sep) EIA Crude Oil Stocks Mortgage Applications	**7** Consumer Credit (Aug) Challenger Employment Report (Sep) Treasury Auction Allotments (Sep) Weekly Jobless Claims	**8** Employment Situation (Sep) Wholesale Trade (Aug) Kansas City Financial Stress Index (Sep)
11 **COLUMBUS DAY** **BOND MARKETS CLOSED**	**12** JOLTS (Aug) NFIB (Sep)	**13** CPI (Sep) Real Earnings (Sep) Cleveland Fed Median CPI (Sep) Monthly Treasury (Sep) Kansas City Fed Labor Market Conditions Indicators (Sep) Mortgage Applications	**14** Producer Prices (Sep) Transportation Services Index (Aug) EIA Crude Oil Stocks Weekly Jobless Claims	**15** Import & Export Prices (Sep) Advance Retail Sales (Sep) MTIS (Aug) Consumer Sentiment (Oct, Preliminary) Empire State Mfg Survey (Oct) Housing Affordability (Aug)
18 IP & Capacity Utilization (Sep) Business Leaders Survey (Oct) Home Builders (Oct) TIC Data (Aug)	**19** New Residential Construction (Sep)	**20** EIA Crude Oil Stocks Mortgage Applications	**21** Existing Home Sales (Sep) Philadelphia Fed Mfg Business Outlook Survey (Oct) Composite Indexes (Sep) Weekly Jobless Claims	**22** IHS Markit Mfg and Services PMI (Oct Flash) Treasury Auction Allotments (Oct) Monthly Treasury Statement (Sep) *Expected this Week*
25 NABE Business Conditions Survey (Q3) Chicago Fed National Activity Index (Sep) Texas Manufacturing Outlook Survey (Oct)	**26** Case-Shiller & FHFA HPI (Aug) Housing Vacancies (Q3) New Residential Sales (Sep) H.6 Money Stock (Sep) Consumer Confidence (Oct) Philly Fed Nonmfg Bus (Oct) Richmond Fed Mfg & Service Sector Surveys (Oct) Texas Service Sector (Oct) Steel Imports (Sep)	**27** Advance Trade & Inventories (Sep) Advance Durable Goods (Sep) BED (Q1) FRB Philadelphia Coincident Economic Activity Index (Sep) EIA Crude Oil Stocks Mortgage Applications	**28** GDP (Q3, Adv) Kansas City Fed Manufacturing Survey (Oct) Pending Home Sales (Sep) Weekly Jobless Claims	**29** Employment Cost Index (Q3) Personal Income (Sep) Agricultural Prices (Sep) Dallas Fed Trimmed-Mean PCE (Sep) Chicago PMI (Oct) Alt Measures of Labor Underutilization (Q3) Consumer Sentiment(Oct, Final)
November 1 Construction (Sep) ISM Manufacturing (Oct) IHS Markit Mfg PMI (Oct)	**2** FOMC Meeting	**3** Manufacturers' Shipments, Inventories & Orders (Sep) ADP Employment Report (Oct) ISM Services PMI (Oct) IHS Markit Services PMI (Oct) BEA Auto Sales (Oct) BEA Truck Sales (Oct) FOMC Meeting EIA Crude Oil Stocks Mortgage Applications	4 Productivity & Costs (Q3) International Trade (Sep) Public Debt (Oct) Challenger Employment Report (Oct) NAHB-Wells Fargo Housing Opportunity Index (Q3) Weekly Jobless Claims	**5** Employment Situation (Oct) Consumer Credit (Sep)
8 Treasury Auction Allotments (Oct) Senior Loan Officer Survey (Q4)	**9** Producer Prices (Oct) NFIB (Oct) Kansas City Financial Stress Index (Oct)	**10** CPI & Real Earnings (Oct) Transportation Services (Sep) Wholesale Trade (Sep) Cleveland Fed Median CPI (Oct) Monthly Treasury (Oct) First Time Housing Affordability (Q3) EIA Crude Oil Stocks Mortgage Applications Weekly Jobless Claims	**11** **VETERANS DAY** **BOND MARKETS CLOSED**	**12** JOLTS (Sep) Consumer Sentiment (Nov, Preliminary)

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APPLE INC. NDQ-AAPL

RECENT PRICE **149.55** | P/E RATIO **25.3** (Trailing: 29.2 / Median: 13.0) | RELATIVE P/E RATIO **1.37** | DIV'D YLD **0.6%** | **VALUE LINE**

TIMELINESS 1 Raised 4/9/21
SAFETY 1 Raised 4/17/20
TECHNICAL 4 Lowered 9/10/21
BETA .90 (1.00 = Market)

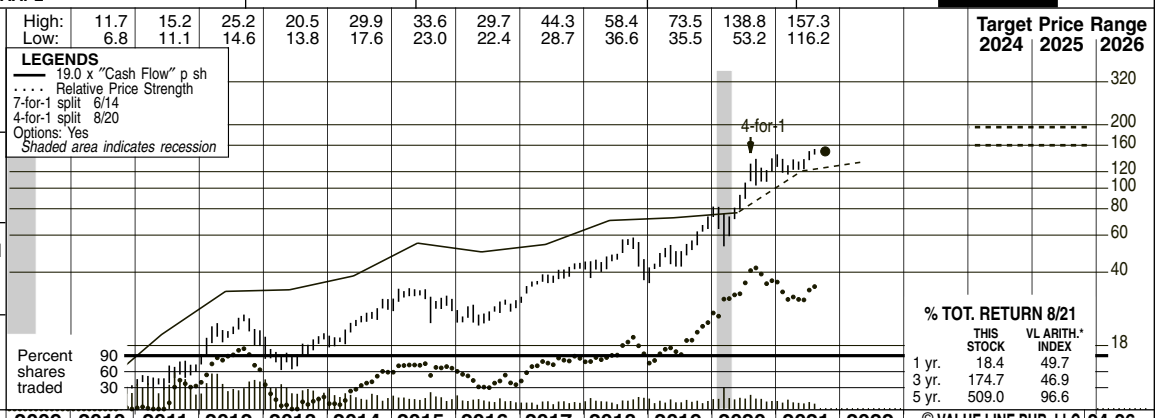
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$121-$257 $189 (25%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	195	(+30%)	*8%*
Low	160	(+5%)	*3%*

Institutional Decisions

	4Q2020	1Q2021	2Q2021
to Buy	1716	1605	1749
to Sell	1798	1986	1821
Hld's(000)	962965494401929387483		



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
.60	.81	.98	1.31	1.45	2.54	4.16	5.95	6.79	7.79	10.47	10.10	11.18	13.96	14.64	16.17	***22.60***	***24.50***	Sales per sh [A]	***31.85***
.06	.09	.16	.21	.25	.59	1.07	1.71	1.74	2.02	2.90	2.63	2.85	3.70	3.82	4.03	***6.35***	***7.05***	"Cash Flow" per sh	***9.35***
.05	.08	.14	.19	.22	.54	.99	1.58	1.42	1.61	2.31	2.08	2.30	2.98	2.97	3.28	***5.60***	***6.15***	Earnings per sh [B]	***8.00***
- -	- -	- -	- -	- -	- -	- -	.09	.41	.45	.50	.55	.60	.68	.75	.80	***.85***	***.92***	Div'ds Decl'd per sh [E]	***1.80***
.01	.03	.03	.04	.05	.08	.16	.32	.32	.41	.50	.60	.61	.70	.59	.43	***.60***	***.75***	Cap'l Spending per sh	***1.25***
.32	.42	.60	.85	1.10	1.86	2.94	4.50	4.91	4.75	5.35	6.01	6.54	5.63	5.09	3.85	***3.95***	***4.85***	Book Value per sh	***8.90***
23381	23947	24425	24873	25195	25647	26020	26298	25178	23465	22315	21345	20505	19020	17773	16977	***16250***	***15500***	Common Shs Outst'g [C]	***13500***
26.2	29.1	26.3	30.4	19.2	15.2	12.4	12.0	12.3	13.0	12.8	12.6	14.9	15.3	16.1	24.7	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***22.0***
1.40	1.57	1.40	1.83	1.28	.97	.78	.76	.69	.68	.64	.66	.75	.83	.86	1.26			Relative P/E Ratio	***1.20***
- -	- -	- -	- -	- -	- -	- -	.5%	2.3%	2.2%	1.7%	2.1%	1.8%	1.5%	1.6%	1.0%			Avg Ann'l Div'd Yield	***1.0%***
108249	156508	170910	182795	233715	215639	229234	265595	260174	274515	***367000***	***380000***	Sales ($mill) [A]	***430000***
32.9%	37.4%	32.6%	33.1%	35.3%	32.7%	31.2%	30.8%	29.4%	28.2%	***32.0%***	***32.5%***	Operating Margin	***32.5%***
1814.0	3277.0	6757.0	7946.0	11257	10505	10157	10903	12547	11056	***12500***	***14000***	Depreciation ($mill) [D]	***18500***
25922	41733	37037	39510	53394	45687	48351	59531	55256	57411	***91000***	***95300***	Net Profit ($mill)	***108000***
24.2%	25.2%	26.2%	26.1%	26.4%	25.6%	24.6%	18.3%	15.9%	14.4%	***16.0%***	***16.0%***	Income Tax Rate	***16.0%***
23.9%	26.7%	21.7%	21.6%	22.8%	21.2%	21.1%	22.4%	21.2%	20.9%	***24.8%***	***25.1%***	Net Profit Margin	***25.1%***
17018	19111	29628	5083.0	8768.0	27863	27831	14473	57101	38321	***10000***	***15000***	Working Cap'l ($mill)	***30000***
- -	- -	16960	28987	53463	75427	97207	93735	91807	98667	***105000***	***105000***	Long-Term Debt ($mill)	***105000***
76615	118210	123549	111547	119355	128249	134047	107147	90488	65339	***64000***	***75000***	Shr. Equity ($mill)	***120000***
33.8%	35.3%	26.5%	28.4%	31.3%	23.2%	21.8%	30.8%	31.5%	36.5%	***55.5%***	***54.5%***	Return on Total Cap'l	***49.0%***
33.8%	35.3%	30.0%	35.4%	44.7%	35.6%	36.1%	55.6%	61.1%	87.9%	***NMF***	***NMF***	Return on Shr. Equity	***90.0%***
33.8%	33.2%	21.4%	25.4%	35.0%	26.2%	26.5%	42.8%	45.5%	66.3%	***NMF***	***NMF***	Retained to Com Eq	***70.0%***
- -	6%	29%	28%	22%	27%	26%	23%	26%	25%	***15%***	***15%***	All Div'ds to Net Prof	***23%***

CAPITAL STRUCTURE as of 6/26/21
Total Debt $121791 mill. **Due in 5 Yrs** $60000 mill.
LT Debt $105752 mill. **LT Interest** $5000 mill. (62% of Cap'l)
Leases, Uncapitalized Annual rentals $1493 mill.

No Defined Benefit Pension Plan
Pfd Stock None
Common Stock 16,530 mill. shs.
as of 7/16/21

MARKET CAP: $2.47 trillion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/26/21
Cash Assets	100557	90943	61696
Receivables	22926	16120	17475
Inventory (FIFO)	4106	4061	5178
Other	35230	32589	30074
Current Assets	162819	143713	114423
Accts Payable	46236	42296	40409
Debt Due	16240	13769	16039
Other	43242	49327	51306
Current Liab.	105718	105392	107754

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	24.0%	12.5%	*13.5%*
"Cash Flow"	27.0%	11.5%	*16.0%*
Earnings	25.5%	11.5%	*17.0%*
Dividends	- -	10.5%	*16.0%*
Book Value	14.5%	-.5%	*10.5%*

Fiscal Year Ends	QUARTERLY SALES ($ mill.) [A] Dec.Per	Mar.Per	Jun.Per	Sep.Per	Full Fiscal Year
2018	88293	61137	53265	62900	265595
2019	84310	58015	53809	64040	260174
2020	91819	58313	59685	64698	274515
2021	111439	89584	81434	***84543***	***367000***
2022	***115400***	***92800***	***84300***	***87500***	***380000***

Fiscal Year Ends	EARNINGS PER SHARE [A B] Dec.Per	Mar.Per	Jun.Per	Sep.Per	Full Fiscal Year
2018	.97	.68	.59	.74	2.98
2019	1.05	.62	.55	.75	2.97
2020	1.25	.64	.65	.73	3.28
2021	1.68	1.40	1.30	***1.22***	***5.60***
2022	***1.85***	***1.55***	***1.40***	***1.35***	***6.15***

Calendar	QUARTERLY DIVIDENDS PAID [E] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.143	.158	.158	.158	.62
2018	.158	.183	.183	.183	.71
2019	.183	.193	.193	.193	.76
2020	.193	.205	.205	.205	.81
2021	.205	.22	.22		

BUSINESS: Apple Inc., established in 1977, is one of the world's largest makers of PCs and peripheral and consumer products, such as the *iPod* digital music player, the *iPad* tablet, the *iPhone* smartphone, and the *Apple Watch*, for sale primarily to the business, creative, education, government, and consumer markets. It also sells operating systems, services like *iCloud* storage and *Apple Pay*, and a host of digital content from the popular *iTunes* store and other portals. Research and development: 6.8% of '20 sales. Has approximately 147,000 employees. Off./dir. own less than 1.0% of common stock; Vanguard, 7.8%; BlackRock, 6.6% (1/21 Proxy). CEO: Tim Cook. Inc.: CA. Addr.: One Apple Park Way, Cupertino, CA 95014. Tel.: 408-996-1010. Internet: www.apple.com.

Apple shares have been solid relative performers over the past few months. The Dow component has been outshined much of this year by its mega-cap tech counterparts, including Microsoft, Facebook, and Alphabet, which have enjoyed greater investor support. But Apple stock has been regaining its momentum lately, rallying about 15% in value since our last full-page write-up in June. And recent results have been more than impressive, as the company, masterfully led by CEO Tim Cook for the last decade, continues to generate robust free cash flow and successfully navigate a challenging, supply-constrained business environment. In fact, for the third quarter of fiscal 2021 (ended June 26th), share net clocked in at $1.30, trouncing our $0.99 estimate, as revenue jumped a better-than-anticipated 36%, to $81.4 billion. (We were looking for sales of $72.9 billion.)

Growth has been broad based across the company. A near-50% surge in *iPhone* sales led the charge during the third period, with many customers upgrading to new 5G-enabled smartphones, and with Apple winning over consumers that were previously part of the *Android* ecosystem. All of the company's major product lines expanded at a double-digit clip in the quarter, however. *Mac* and *iPad* revenues were up 16% and 12%, respectively, thanks to ongoing work-from-home tailwinds. The high-margined services business grew 33%, as customers spent more time online and took advantage of the tech giant's ever-widening roster of offerings, from music streaming to *iCloud* storage. And other products, highlighted by the *Apple Watch* collection, continued to gain traction.

Prospects remain bright. Chip shortages and further pandemic-related disruptions may hurt revenues a bit in the near term. But, over time, the company should continue to grow nicely by leveraging its massive installed base of devices. And a rumored move into autonomous vehicles could produce another huge home run for Apple as we head toward mid-decade.

This issue is timely (1), though buy-and-hold investors may now wish to wait for a more attractive entry point before committing new funds here.

Justin Hellman *September 24, 2021*

(A) Fiscal year ends last Saturday in September. **(B)** Diluted earnings. Quarters may not add to total due to rounding/changes in the share count. Next earnings report due in late October. **(C)** In millions, adjusted for splits. **(D)** Depreciation on accelerated basis. **(E)** New dividend policy adopted 3/12. Payments typically made in February, May, August, and November.

Company's Financial Strength	A++
Stock's Price Stability	80
Price Growth Persistence	90
Earnings Predictability	85

ASSURANT, INC. NYSE-AIZ

RECENT PRICE **155.78** | P/E RATIO **15.3** (Trailing: 22.7 Median: 12.0) | RELATIVE P/E RATIO **0.79** | DIV'D YLD **1.7%** | **VALUE LINE**

TIMELINESS 3 Lowered 2/19/21
SAFETY 2 Raised 5/16/14
TECHNICAL 3 Raised 6/4/21
BETA .90 (1.00 = Market)

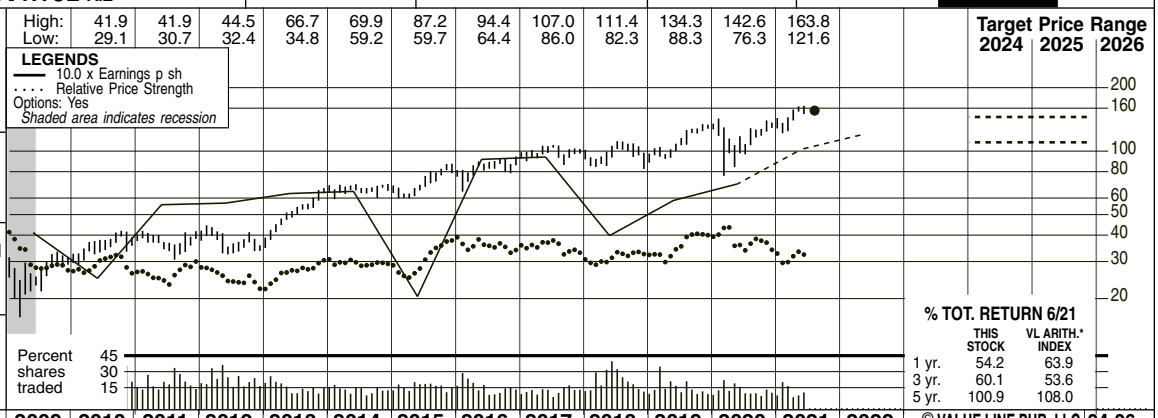
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$118-$246 $182 (15%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	145	(-5%)	*Nil*
Low	110	(-30%)	*-6%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	156	190	172
to Sell	204	191	217
Hld's(000)	55783	55329	56932



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
49.93	55.81	62.77	67.53	64.73	72.58	80.49	92.00	108.03	124.56	126.82	89.51	84.02	99.45	133.79	143.92	*172.00*	*190.10*	Premium Inc per sh	*250.00*
5.26	6.01	6.77	6.60	5.99	6.89	7.79	9.07	9.05	9.47	9.51	9.22	9.42	9.67	11.26	9.92	*12.00*	*14.60*	Investment Inc per sh	*18.60*
3.50	5.56	5.38	3.77	4.09	2.50	5.58	5.67	6.30	6.44	2.05	9.13	9.39	3.98	5.84	6.99	*10.20*	*12.10*	Earnings per sh [A]	*12.85*
.31	.38	.46	.54	.59	.63	.70	.81	.96	1.06	1.37	2.03	2.15	2.28	2.43	2.55	*2.67*	*2.85*	Div'ds Decl'd per sh [B]	*2.95*
28.33	31.26	34.65	31.61	41.61	46.87	56.79	65.92	67.29	74.77	68.70	73.26	81.47	82.53	94.25	102.62	*127.30*	*141.90*	Book Value per sh [C]	*174.25*
130.59	122.62	118.01	117.37	116.65	102.00	88.52	78.66	71.83	69.30	65.85	55.94	52.42	61.91	59.95	57.97	*50.00*	*48.00*	Common Shs Outst'g [D]	*47.00*
129%	159%	165%	172%	64%	76%	66%	57%	76%	88%	104%	114%	121%	118%	118%	115%	*Bold figures are*		Price to Book Value	*84%*
10.4	9.0	10.6	14.4	6.5	14.3	6.7	6.6	8.2	10.3	34.8	9.2	10.5	24.4	19.0	16.9	*Value Line*		Avg Ann'l P/E Ratio	*10.0*
.55	.49	.56	.87	.43	.91	.42	.42	.46	.54	1.75	.48	.53	1.32	1.01	.87	*estimates*		Relative P/E Ratio	*.55*
.9%	.8%	.8%	1.0%	2.2%	1.8%	1.9%	2.2%	1.9%	1.6%	1.9%	2.4%	2.2%	2.3%	2.2%	2.2%			Avg Ann'l Div'd Yield	*2.4%*
7125.4	7237.0	7759.8	8632.1	8351.0	5007.4	4404.1	6156.9	8020.0	8342.7	*8600*	*9125*	Premium Inc ($mill)	*11750*
689.5	713.1	650.3	656.4	626.2	515.7	493.8	598.4	675.0	574.9	*600*	*700*	Investment Inc ($mill)	*875*
425.3	493.8	603.0	1032.3	1318.6	1846.2	31.0	--	31.0	31.0	*20.0*	*30.0*	Other Income ($mill)	*300*
8240.2	8443.9	9013.1	10321	10296	7369.3	4928.9	6755.3	8695.0	8917.6	*9220*	*9855*	Total Income ($mill)	*12925*
2389.7	3655.4	3675.5	4405.3	4742.5	1808.5	1870.6	2342.6	2654.7	2549.3	*2700*	*2900*	Benefits & Reserves ($m)	*3000*
23.7%	36.2%	38.1%	36.7%	29.6%	33.4%	NMF	24.3%	30.2%	14.1%	*23.0%*	*23.0%*	Income Tax Rate	*23.0%*
545.8	483.7	488.9	470.9	141.6	565.4	519.6	251.0	382.6	441.8	*560*	*580*	Net Profit ($mill)	*605*
84.7	77.7	72.3	69.7	--	4.3	3.6	5.3	5.3	5.3	*70.0*	*70.0*	Insur in Force ($bill)	*65.0*
27115	28947	29715	31562	30043	29709	31843	41089	44291	44650	*44000*	*45000*	Total Assets ($mill)	*48000*
5026.9	5185.4	4833.5	5181.3	4524.0	4098.1	4270.6	5112.0	5652.8	5951.4	*6365*	*6810*	Shr. Equity ($mill) [C]	*8190*
10.9%	9.3%	10.1%	9.1%	3.1%	13.8%	12.2%	4.9%	6.8%	7.4%	*8.0%*	*8.5%*	Return on Shr. Equity	*7.5%*
9.5%	8.0%	8.6%	7.6%	1.0%	10.7%	9.4%	2.0%	3.8%	4.5%	*6.5%*	*6.5%*	Retained to Com Eq	*5.5%*
12%	14%	15%	16%	67%	22%	23%	59%	44%	39%	*26%*	*24%*	All Div'ds to Net Prof	*23%*

CAPITAL STRUCTURE as of 3/31/21
Total Debt $2204 mill. **Due in 5 Yrs** None.
LT Debt $2204 mill. **LT Interest** $42.7 mill.
(LT Interest Earned: 7.1x)
(27% of Cap'l)
Leases, Uncapitalized: Annual rentals: $23.0 mill.

Pension Assets-12/20 $803.3 mill.shs.
Oblig. $875.5 mill
Pfd Stock None
Common Stock 60,566,633 shs
as of 4/30/21

MARKET CAP: $9.4 billion (Large Cap)

FINANCIAL POSITION ($MILL.)	2019	2020	3/31/21
Investments	14552	15679	7870
Cash& equiv.	1867	2229	1651
Premiums Due	1693	1556	1924
Other	26179	25186	32966
Total Assets	44291	44650	44411
Notes Payable	--	--	--
Debt	2007	2253	2204
Other	36602	36442	36442
Total Liab.	38609	38695	38585

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Premium Inc	--	8.0%	*4.0%*
Earnings	--	1.0%	*11.5%*
Dividends	--	16.5%	*4.0%*
Book Value	--	11.0%	*6.5%*

Calendar	QUARTERLY PREMIUM INC. ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1124	1338	1853	1840	6156.9
2019	1904	2033	2015	2068	8020.0
2020	2084	2036	2103	2120	8342.7
2021	2106	*2100*	*2200*	*2194*	*8600*
2022	*2155*	*2170*	*2350*	*2450*	*9125*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1.96	1.09	.76	.32	3.98
2019	2.52	2.21	d.96	1.91	5.84
2020	2.43	2.81	d.58	2.23	6.99
2021	2.41	*2.69*	*2.30*	*2.80*	*10.20*
2022	*3.20*	*3.20*	*2.50*	*3.20*	*12.10*

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.53	.53	.53	.56	2.15
2018	.56	.56	.56	.60	2.28
2019	.60	.60	.60	.63	2.43
2020	.63	.63	.63	.66	2.55
2021	.66	.66			

BUSINESS: Assurant, Inc. provides specialized insurance products and related services primarily in North America, South America, and Europe. The company operates in four segments: Global Housing (homeowners insurance); Global Lifestlye (offers domestic and international extended service contracts); Global Preneed (pre-paid funeral insurance); Corp. & Other. Exited the health insurance market (2016) and sold its Employee Benefits segment (3/16). Acq'd The Warranty Group (5/18). 14,100 emplys. 12/31/20. Pres.: Keith Demmings. CEO: Alan B. Colberg. Offs./dirs. own less than 1% of com. stk.; Vanguard Group, 11.5%; T. Rowe Price, 9.6%; BlackRock, 8.8% (3/21 proxy). Inc.: DE. Addrs.: 28 Liberty St., 41st Fl., New York, NY 10005. Tel.: 212-859-7000. Web:www.assurant.com.

Assurant got off to a slow start in 2021. The company posted a modest 2% uptick in premium income, year to year, to $2.11 billion. The premium growth was fueled by recent acquisitions within the Global Lifestyle business, as new programs launched at the end of 2020 helped bolster the mobile subscriber base. In addition, higher income from the automotive sector, related to significant increases in auto production versus pre-pandemic first-quarter levels, also chipped in. Meantime, earnings of $2.41 a share came in relatively flat as higher reportable catastrophes from the Texas winter storms and the absence of a $79 million tax benefit recorded in the comparable-year period limited much of the aforementioned growth.

Some company changes are forthcoming. Assurant continues to shift its portfolio away from risk-based insurance toward more-profitable professional services. As of the first quarter, the Preneed segment is reported as discontinued operations. The sale to CUNA Mutual Group is for a total cash price of $1.25 billion and is slated to close by the fourth quarter. Management intends to return 75% of the net proceeds via stock buybacks, and 25% will be for investments in connected world and specialty P&C offerings. What's more, Alan Coldberg announced his decision to retire as CEO at the end of this year. Effective immediately, Keith Demmings was named president in advance of his appointment as chief executive officer.

We look for double-digit earnings advances this year and next. Management raised its 2021 operating income guidance to the tune of 10%-14% (previously 9%). While we anticipate lower Housing segment earnings due to tougher comps, strength will likely be driven by lower corporate losses and a mid-single-digit gain in mobile subscribers on the Global Lifestyle unit as new programs are released in North America and Asia/Pacific regions. The lender-placed business ought to improve, thanks to a more favorable economic backdrop.

We suggest investors stay on the sidelines, for now. The stock is just an average choice for the year ahead. What's more, it is already trading above our 3- to 5-year Target Price Range.

Oriatal J. Haiby *August 6, 2021*

(A) Diluted earnings. Next earnings report due early November. Earnings may not sum due to changes in shares outstanding.
(B) Dividends historically paid in mid-March, June, September, and December.
(C) Includes intangibles. In 2020, $3285.5 million, $52.00 per share.
(D) In millions.

Company's Financial Strength	A
Stock's Price Stability	90
Price Growth Persistence	90
Earnings Predictability	40

ANSYS, INC. NDQ-ANSS

RECENT PRICE **363.25** | P/E RATIO **51.9** (Trailing: 52.0 / Median: 26.0) | RELATIVE P/E RATIO **2.68** | DIV'D YLD **Nil** | **VALUE LINE**

TIMELINESS 3 Lowered 6/11/21
SAFETY 2 Raised 5/15/15
TECHNICAL 4 Lowered 7/2/21
BETA .85 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$272-$567 $420 (15%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	355	(Nil)	*Nil*
Low	260	(-30%)	*-8%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	304	382	324
to Sell	294	275	359
Hld's(000)	77420	78604	79167

% TOT. RETURN 6/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	19.0	63.9
3 yr.	99.3	53.6
5 yr.	282.4	108.0

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
2.47	3.42	4.93	5.35	5.76	6.33	7.57	8.72	9.38	10.37	10.72	11.54	13.04	15.59	17.83	19.58	*21.15*	*23.00*	Revenues per sh	*30.00*
.81	.90	1.51	1.81	1.99	2.33	2.73	3.18	3.59	3.77	3.78	3.99	4.35	6.36	6.87	7.08	*7.35*	*8.00*	"Cash Flow" per sh	*10.75*
.65	.56	.98	1.29	1.25	1.64	2.53	2.91	3.27	3.41	3.42	3.63	4.01	5.98	6.58	6.70	*7.00*	*7.65*	Earnings per sh	*10.25*
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	Div'ds Decl'd per sh	*Nil*
.07	.09	.14	.19	.09	.16	.24	.26	.31	.29	.18	.15	.23	.26	.52	.41	*.50*	*.50*	Cap'l Spending per sh	*.50*
3.51	6.93	8.20	13.23	14.63	16.69	18.94	20.94	23.14	24.43	24.90	25.77	26.68	31.68	40.28	47.33	*51.45*	*56.50*	Book Value per sh [B]	*76.75*
64.10	77.18	78.20	89.38	89.72	91.65	92.65	92.67	92.32	90.77	88.14	85.69	84.19	83.63	85.73	86.57	*87.50*	*88.50*	Common Shs Outst'g [C]	*90.00*
27.9	42.5	31.0	29.4	25.7	27.0	21.3	22.4	24.5	23.0	26.1	24.8	30.2	27.5	30.8	43.9	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*30.0*
1.49	2.29	1.65	1.77	1.71	1.72	1.34	1.43	1.38	1.21	1.31	1.30	1.52	1.49	1.64	2.25			Relative P/E Ratio	*1.65*
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -			Avg Ann'l Div'd Yield	*Nil*
701.1	807.7	865.9	941.4	944.5	988.6	1098.1	1303.5	1528.4	1695.5	*1850*	*2035*	Revenues ($mill)	*2700*
52.3%	52.3%	51.2%	50.2%	49.5%	48.9%	48.0%	48.8%	46.8%	44.6%	*42.5%*	*43.0%*	Operating Margin	*44.0%*
14.2	18.1	20.0	20.9	19.5	18.7	17.9	18.4	23.6	28.0	*30.0*	*35.0*	Depreciation ($mill)	*50.0*
239.0	276.8	311.5	320.9	313.3	322.9	347.9	513.9	565.0	584.6	*615*	*675*	Net Profit ($mill)	*925*
32.0%	31.5%	26.5%	29.1%	30.6%	31.1%	32.3%	18.2%	19.2%	19.5%	*19.0%*	*19.0%*	Income Tax Rate	*19.0%*
34.1%	34.3%	36.0%	34.1%	33.2%	32.7%	31.7%	39.4%	37.0%	34.5%	*33.2%*	*33.2%*	Net Profit Margin	*34.3%*
301.2	436.0	627.2	645.4	592.2	630.3	661.7	786.4	860.4	990.4	*1100*	*1250*	Working Cap'l ($mill)	*1000*
53.1	- -	- -	- -	- -	- -	- -	- -	423.5	798.1	*780*	*740*	Long-Term Debt ($mill)	*Nil*
1754.5	1940.3	2136.2	2217.5	2194.4	2208.4	2245.8	2649.5	3453.4	4097.9	*4500*	*5000*	Shr. Equity ($mill)	*6900*
13.3%	14.3%	14.6%	14.5%	14.3%	14.6%	15.5%	19.4%	14.6%	12.1%	*11.5%*	*12.0%*	Return on Total Cap'l	*13.5%*
13.6%	14.3%	14.6%	14.5%	14.3%	14.6%	15.5%	19.4%	16.4%	14.3%	*13.5%*	*13.5%*	Return on Shr. Equity	*13.5%*
13.6%	14.3%	14.6%	14.5%	14.3%	14.6%	15.5%	19.4%	16.4%	14.3%	*13.5%*	*13.5%*	Retained to Com Eq	*13.5%*
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	All Div'ds to Net Prof	*Nil*

CAPITAL STRUCTURE as of 3/31/21
Total Debt $798.2 mill. **Due in 5 Yrs** $800.0 mill.
LT Debt $793.5 mill. **LT Interest** $13.0 mill. (16% of Cap'l)

Leases, Uncapitalized Annual rentals $27.3 mill.

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 87,151,573 shs.
as of 4/30/21
MARKET CAP: $31.7 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	3/31/21
Cash Assets	872.4	913.2	987.9
Receivables	433.5	537.6	394.3
Other	249.6	268.4	278.8
Current Assets	1555.5	1719.2	1661.0
Accts Payable	14.3	18.7	17.0
Debt Due	75.0	- -	4.7
Deferred Revenue	351.4	372.1	366.6
Other	254.4	338.0	235.7
Current Liab.	695.1	728.8	624.0

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	12.0%	11.5%	*9.0%*
"Cash Flow"	12.5%	13.0%	*8.0%*
Earnings	16.5%	14.0%	*8.0%*
Dividends	- -	- -	*NMF*
Book Value	10.5%	10.5%	*11.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	283.7	308.8	293.0	418.0	1303.5
2019	319.9	370.5	345.5	492.5	1528.4
2020	308.9	389.7	369.1	627.8	1695.5
2021	372.1	*430*	*405*	*642.9*	*1850*
2022	*400*	*475*	*445*	*715*	*2035*

Calendar	EARNINGS PER SHARE [A,D] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1.20	1.35	1.31	2.13	5.98
2019	1.29	1.61	1.42	2.24	6.58
2020	.83	1.55	1.36	2.96	6.70
2021	1.12	*1.52*	*1.33*	*3.03*	*7.00*
2022	*1.25*	*1.59*	*1.46*	*3.35*	*7.65*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017					
2018	NO CASH DIVIDENDS BEING PAID				
2019					
2020					
2021					

BUSINESS: ANSYS, Inc. develops and markets software and technologies widely used by engineers and designers across a broad spectrum of disciplines, including aerospace, automotive, manufacturing, electronics, and biomedical. Product/market emphasis includes: Structures, Fluids, Electronics, Multiphysics, Embedded Software, Systems, 3-D Modeling, and Academic. Software licenses, 46% of '20 revenue; Maintenance and service, 54%. '20 R&D expense, 21.1% of revenue. Employed 4,800 (3/31/21). Stock owners: two fin'l inst., 19.4%; Off. & dir., less than 1% (3/21 proxy). Chrmn.: Ronald W. Hovsepian; Pres. & CEO: Dr. Ajei S. Gopal. Inc.: DE. Address: 2600 ANSYS Drive, Cannonsburg, PA 15317. Tel.: 844-462-6797. Internet: www.ansys.com.

ANSYS continues to advance nicely. Software revenues grew 51.0% in the first quarter, benefiting from strong interest from its larger customers and better-than-anticpated contracting for perpetual license agreements (more revenue is recognized up front than with lease agreements). The high-tech and semiconductor, aerospace and defense, and automotive industries continued to be fruitful ground for ANSYS and its simulation products and services, reflecting applications in 5G and in cloud computing, in advanced defense systems, and in electric and autonomous vehicles. Meanwhile, annual contract value (ACV) grew 6.1% in the March period, reaching $319.4 million, with 77.6% of the total being recurring in nature. As is usually the case, operating expenses were managed well in the first quarter, and much of the strong revenue performance was carried through to the bottom line

We have updated our estimates for this year. Our revenue target has been increased $15 million, and is somewhat above the midpoint of the company's latest forecast range. Meanwhile, our quarterly presentation has been modified to encompass what ANSYS sees as normal seasonality for its business, with strong results likely to be realized in the fourth quarter. Share earnings are now estimated at $7.00, up $0.25 from our early-May review, following executive commentary regarding the company's prospects for 2021. The latest forecast range for ACV is $1.760 billion to $1.825 billion, suggesting 11.0% growth at the midpoint, which seems within reach.

ANSYS' long-term prospects look good. The company should continue to perform well in its targeted markets. On point, simulation software is playing a recurring role in its customers' new product development programs, as the ability to simulate designs and potential interactions with operating environments has become more important, given the increasing level of complexity. And, as ANSYS has grown, it has markedly expanded the range of applications where simulation can aid development efforts. That said, the shares continue to trade at a high relative valuation, in our view, making them best suited for venturesome investors.

Charles Clark *August 6, 2021*

(A) Diluted earnings; nonGAAP 2011 forward. Next earnings report date early Nov. Excluded items: '06, d73¢; '11, d62¢; '12, d77¢ '13, d69¢; '14, d71¢; '15, d66¢; '16, d64¢; '17, d$1.03; '18, d$1.10, '19, d$1.32; '20, d$1.73.
(B) Includes intangibles, in '20: $3,038 mill., $35.10 per share.
(C) In millions.
(D) Quarters may not sum to annual figure, due to rounding or changes in shares outstanding.

Company's Financial Strength	A++
Stock's Price Stability	85
Price Growth Persistence	85
Earnings Predictability	85

BOOZ ALLEN NYSE-BAH

RECENT PRICE **80.97** | P/E RATIO **19.5** (Trailing: 20.1 Median: 16.0) | RELATIVE P/E RATIO **1.02** | DIV'D YLD **1.9%** | VALUE LINE **376**

TIMELINESS 3 Lowered 12/25/20
SAFETY 3 New 11/30/12
TECHNICAL 3 Raised 8/13/21
BETA .90 (1.00 = Market)

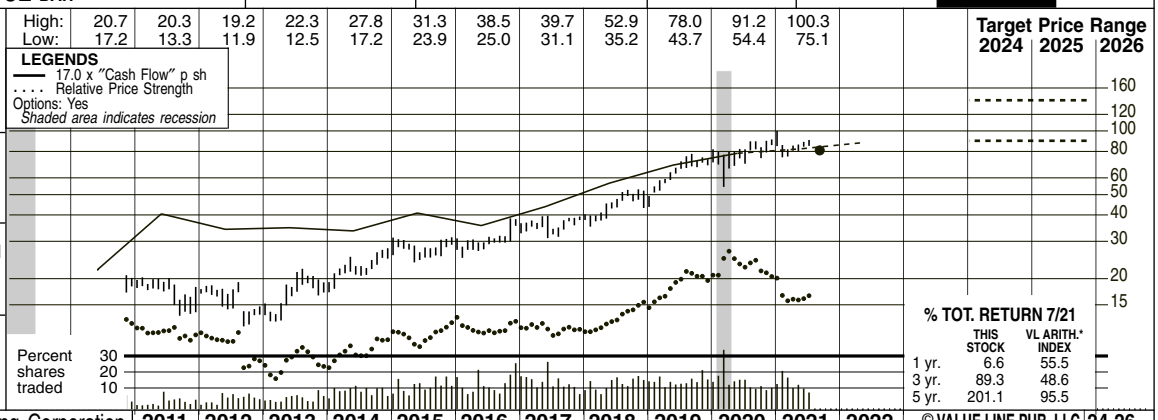
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$68-$149 $109 (35%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	140	(+75%)	*16%*
Low	90	(+10%)	*5%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	222	247	262
to Sell	257	245	255
Hld's(000)	124054	123337	120546



Booz Allen Hamilton Holding Corporation completed its initial public offering on November 16, 2010. At that time, 16.1 million shares were sold to the public at an average price of $17.00 per share. The underwriting syndicate was led by Bank of America Merrill Lynch, Barclays, and Credit Suisse.

CAPITAL STRUCTURE as of 6/30/21
Total Debt $2848.7 mill. **Debt Due 5 Yrs** $1.3 bill.
LT Debt $2770.8 mill. **LT Interest** $80.0 mill.
(Total interest coverage: 9.2x) (73% of Cap'l)

Leases, Uncapitalized: Annual Rentals $68.5 mill.

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 135,185,617 shs.
as of 7/27/21
MARKET CAP: $10.9 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	741.9	991.0	621.9
Receivables	1459.5	1411.9	1672.8
Inventory	- -	- -	- -
Other	126.8	233.3	182.1
Current Assets	2328.2	2636.2	2476.8
Accts Payable	698.0	667.0	823.2
Debt Due	177.9	77.9	77.9
Other	451.8	546.2	469.8
Current Liab.	1327.7	1291.1	1370.9

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	2.0%	8.0%	*7.0%*
"Cash Flow"	12.0%	13.5%	*8.0%*
Earnings	17.5%	15.0%	*8.5%*
Dividends	- -	17.5%	*10.5%*
Book Value	-1.0%	29.5%	*19.5%*

Fiscal Year Begins	QUARTERLY REVENUES ($ mill.) A Jun.30	Sep.30	Dec.31	Mar.31	Full Fiscal Year
2018	1646.8	1614.0	1663.1	1780.1	6704.0
2019	1825.2	1819.6	1849.4	1969.6	7463.8
2020	1956.5	2019.2	1904.0	1979.2	7858.9
2021	1989.1	*2025*	*2125*	*2285.9*	*8425*
2022	*2050*	*2175*	*2250*	*2425*	*8900*

Fiscal Year Begins	EARNINGS PER SHARE AB Jun.30	Sep.30	Dec.31	Mar.31	Full Fiscal Year
2018	.72	.68	.72	.64	2.76
2019	.83	.80	.80	.98	3.41
2020	.93	1.03	1.04	.89	3.90
2021	1.07	*1.05*	*1.04*	*.99*	*4.15*
2022	*1.10*	*1.12*	*1.13*	*1.10*	*4.45*

Cal-endar	QUARTERLY DIVIDENDS PAID D Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.17	.17	.17	.17	.68
2018	.19	.19	.19	.19	.76
2019	.23	.23	.23	.27	.96
2020	.31	.31	.31	.31	1.24
2021	.37	.37			

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
	44.25	39.49	36.85	35.38	36.53	38.98	43.03	47.88	53.81	57.68	*62.40*	*66.90*	Revenues per sh A	*78.90*
	2.38	2.01	2.05	1.98	2.40	2.10	2.58	3.33	4.06	4.61	*4.85*	*5.20*	"Cash Flow" per sh	*6.40*
	1.70	1.45	1.54	1.52	1.94	1.67	2.05	2.76	3.41	3.90	*4.15*	*4.45*	Earnings per sh AB	*5.50*
	.09	.36	.40	.46	.54	.62	.70	.80	1.04	1.30	*1.50*	*1.62*	Div'ds Decl'd per sh D	*1.90*
	.58	.23	.14	.24	.45	.36	.55	.68	.92	.64	*.65*	*.75*	Cap'l Spending per sh	*.90*
	8.95	1.56	1.15	1.25	2.76	3.85	3.87	4.82	6.17	7.86	*9.40*	*11.25*	Book Value per sh C	*18.50*
	132.41	145.80	148.69	149.09	147.99	148.89	143.45	140.03	138.72	136.25	*135.00*	*133.00*	Common Shs Outst'g E	*128.00*
	10.1	10.0	11.9	16.4	14.3	19.2	17.9	17.3	20.3	20.9	*Bold figures are*		Avg Ann'l P/E Ratio	*21.0*
	.63	.64	.67	.86	.72	1.01	.90	.93	1.08	1.07	*Value Line*		Relative P/E Ratio	*1.15*
	.5%	2.5%	2.2%	1.8%	1.9%	1.9%	1.9%	1.7%	1.5%	1.6%	*estimates*		Avg Ann'l Div'd Yield	*1.6%*
	5859.2	5758.1	5478.7	5274.8	5405.7	5804.3	6171.9	6704.0	7463.8	7858.9	*8425*	*8900*	Revenues ($mill)	*10100*
	8.2%	9.0%	9.7%	9.9%	9.4%	9.4%	9.5%	10.0%	10.1%	10.7%	*10.5%*	*10.5%*	Operating Margin	*11.0%*
	75.2	74.0	72.3	62.7	61.5	59.5	64.8	68.6	81.1	84.3	*88.0*	*93.0*	Depreciation ($mill)	*105*
	240.0	219.1	232.2	232.6	294.1	252.5	305.1	397.1	482.6	543.8	*565*	*600*	Net Profit ($mill)	*715*
	30.2%	40.5%	39.0%	39.7%	22.5%	38.7%	30.3%	23.0%	16.7%	17.9%	*21.0%*	*22.0%*	Income Tax Rate	*25.0%*
	4.1%	3.8%	4.2%	4.4%	5.4%	4.4%	4.9%	5.9%	6.5%	6.9%	*6.7%*	*6.7%*	Net Profit Margin	*7.1%*
	743.2	459.7	338.9	314.2	249.9	193.1	452.5	520.1	1000.5	1345.1	*1250*	*1350*	Working Cap'l ($mill)	*1500*
	922.9	1659.6	1585.2	1569.3	1484.4	1470.2	1755.5	1701.8	2008.0	2278.7	*2700*	*2700*	Long-Term Debt ($mill)	*3000*
	1185.2	226.8	171.6	186.5	408.5	573.6	554.6	675.4	856.4	1071.2	*1270*	*1495*	Shr. Equity ($mill)	*2370*
	12.5%	13.4%	15.3%	15.2%	17.3%	13.6%	14.8%	18.3%	18.3%	17.4%	*15.0%*	*15.0%*	Return on Total Cap'l	*14.0%*
	20.2%	96.6%	135.3%	124.7%	72.0%	44.0%	55.0%	58.8%	56.4%	50.8%	*44.5%*	*40.0%*	Return on Shr. Equity	*30.0%*
	19.2%	75.3%	100.6%	88.2%	52.4%	27.4%	36.2%	41.9%	39.2%	33.9%	*28.5%*	*25.5%*	Retained to Com Eq	*20.0%*
	5%	22%	26%	29%	27%	38%	34%	29%	30%	33%	*33%*	*37%*	All Div'ds to Net Prof	*35%*

BUSINESS: Booz Allen Hamilton Corp. provides management and technology consulting services to the U.S. government (both defense and civil), major corporations, institutions, and not-for-profit organizations. In fiscal 2020, 97% of revenues were derived from contracts where the end client was an agency or department of the U.S. government, with the Navy Marine Corps accounting for 13% of the top line. Has had contracts with the U.S. Army and Navy for more than 70 years. At 3/31/20, total backlog was $24.0 billion. Has about 27,700 employees. CEO & Pres.: Horacio Rozanski. Off./dir. own 1.9% of common stock; T.Rowe Price Assoc. 11.2%; (6/21 Proxy). Inc.: DE. Addr.: 8283 Greensboro Dr., McLean, Virginia 22102. Telephone: (703) 902-5000. Internet: www.boozallen.com.

Booz Allen Hamilton stock has struggled thus far in 2021. As of August 9th, this issue was down 6% calendar year to date, versus a gain of 18% for the S&P 500 Index. This is uncharted waters for a stock that has been on a steady climb over the last decade. We think there are a few factors at play here, including some uninspiring quarterly performances.

The company started fiscal 2021 (year ends March 31, 2022) with a mixed showing. Booz Allen posted adjusted share earnings of $1.07, which was 15% above the previous-year period and exceeded our call of $0.95. However, much like the final quarter of fiscal 2020, the investment community was not pleased with BAH's top-line performance. Specifically, the management and technology consulting services company followed an uninspiring 0.5% revenue advance in the March quarter with a 1.6% improvement in the June period. The company did accomplish a number of priorities in the fiscal first quarter, including the completion of its acquisition of Liberty IT Solutions for slightly north of $650 million and a ramp-up in its number of hirings, but that was not enough to get investors to look past the lackluster top-line performance.

We maintain a cautious near-term outlook for Booz Allen Hamilton. Our fiscal 2021 share-net estimate sits at the lower end of the company's non-GAAP guidance range of $4.10 to $4.30. It is worth noting that the company's June-quarter book-to-bill ratio of 1.30 times, which does indicate that new orders are exceeding completed projects, was still down more than 40% from the prior-year figure. Although the backlog of projects still remained at a healthy level ($26.8 billion (up 16.5% year over year) in the June quarter), we are concerned that the pace of new projects may slow with the change in the White House. The Biden Administration is unlikely to spend as much on military projects as the Trump White House did the last four years.

This stock is neutrally ranked for Timeliness. However, the issue does offer above-average 18-month and 3- to 5-year appreciation potential, and the possible wait to realize such returns is made easier by a competitive dividend.

William G. Ferguson *August 20, 2021*

(A) Fiscal years end March 31st of the following calendar year. **(B)** Diluted egs. Excludes nonrecurring gain/(loss): '18, 15¢; '20 47¢; '21 Q1; (40¢). Next egs. report due late October. **(C)** Incl. Intang. In fiscal 2020: $1888.3 mill., $13.86/sh. **(D)** Payments in February, June, August, and November. Paid special dividend of $1.50 per share on 6/29/12, $6.50 per share on 8/31/12, $1.00 per share on 11/29/13, $1.00 per share on 2/28/14, and $1.00 per share on 8/29/14. **(E)** In millions.

Company's Financial Strength	B++
Stock's Price Stability	80
Price Growth Persistence	75
Earnings Predictability	85

BALL CORP. NYSE-BLL

RECENT PRICE **97.38** | P/E RATIO **33.0** (Trailing: 37.3 Median: 31.0) | RELATIVE P/E RATIO **1.74** | DIV'D YLD **0.8%** | VALUE LINE **1173**

TIMELINESS 3 Lowered 3/26/21
SAFETY 2 Raised 10/5/07
TECHNICAL 5 Lowered 9/10/21
BETA 1.00 (1.00 = Market)

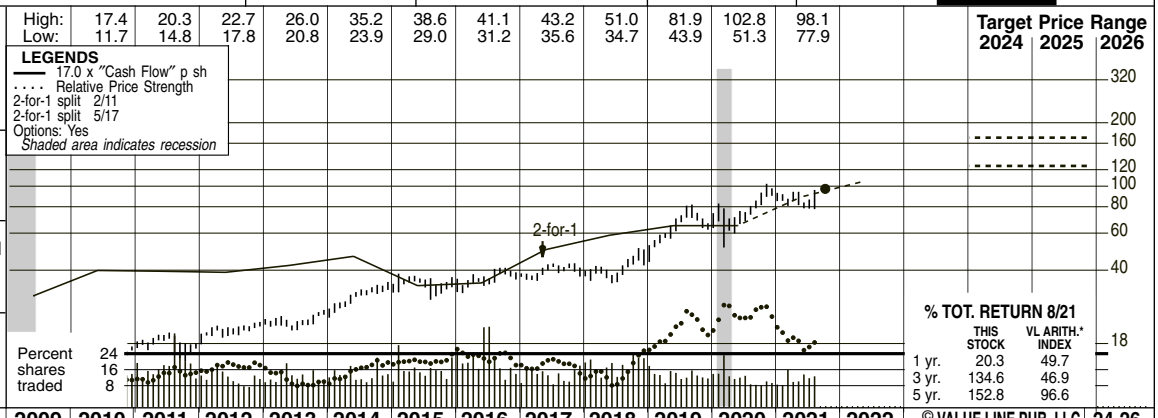
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$67-$146 $107 (10%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	170	(+75%)	*16%*
Low	125	(+30%)	*7%*

Institutional Decisions

	4Q2020	1Q2021	2Q2021
to Buy	354	341	354
to Sell	267	329	300
Hld's(000)	263778	266637	265337



Target Price Range 2024 | 2025 | 2026
320 200 160 120 100 80 60 40 18

% TOT. RETURN 8/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	20.3	49.7
3 yr.	134.6	46.9
5 yr.	152.8	96.6

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
13.79	16.06	18.26	20.16	19.52	22.16	26.92	29.17	29.79	31.29	28.10	25.91	31.39	34.70	35.34	35.96	*41.85*	*45.35*	Sales per sh	*55.55*
1.20	1.35	1.58	1.73	1.78	2.35	2.33	2.30	2.49	2.74	1.99	2.05	2.95	3.45	3.83	3.83	*5.25*	*6.25*	"Cash Flow" per sh	*8.20*
.66	.73	.88	.90	1.01	1.48	1.33	1.30	1.37	1.65	1.00	.82	.85	1.29	1.66	1.75	*2.85*	*3.65*	Earnings per sh A	*4.95*
.10	.10	.10	.10	.10	.10	.14	.20	.26	.26	.26	.26	.37	.40	.55	.60	*.70*	*.80*	Div'ds Decl'd per sh B■	*.80*
.70	.68	.76	.82	.50	.73	1.38	1.02	1.33	1.43	1.86	1.73	1.59	2.43	1.84	3.40	*4.90*	*4.50*	Cap'l Spending per sh	*2.85*
2.00	2.83	3.32	2.89	4.20	4.41	3.80	3.72	4.22	3.77	4.40	9.82	11.26	10.31	9.08	10.00	*12.00*	*14.70*	Book Value per sh C	*24.65*
417.14	412.35	404.74	375.11	376.34	344.32	320.63	299.46	284.24	273.93	284.58	349.73	349.88	335.26	324.64	327.59	*326.00*	*324.00*	Common Shs Outst'g D	*315.00*
15.1	14.0	14.2	12.2	11.2	9.6	13.6	16.0	16.9	18.3	34.8	45.2	46.6	32.0	38.9	43.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*30.0*
.80	.76	.75	.73	.75	.61	.85	1.02	.95	.96	1.75	2.37	2.34	1.73	2.07	2.23			Relative P/E Ratio	*1.65*
1.0%	1.0%	.8%	.9%	.9%	.7%	.8%	1.0%	1.1%	.9%	.8%	.7%	.9%	1.0%	.9%	.8%			Avg Ann'l Div'd Yield	*.5%*
8630.9	8735.7	8468.1	8570.0	7997.0	9061.0	10983	11635	11474	11781	*13650*	*14700*	Sales ($mill)	*17500*
13.5%	13.5%	13.9%	14.0%	13.6%	13.8%	16.0%	15.7%	16.2%	16.4%	*16.5%*	*18.0%*	Operating Margin	*18.0%*
301.1	282.9	299.9	280.9	285.5	453.0	729.0	702.0	678.0	668.0	*760*	*820*	Depreciation ($mill)	*1000*
446.3	406.3	406.4	470.0	280.9	263.0	303.0	454.0	566.0	585.0	*945*	*1205*	Net Profit ($mill)	*1590*
30.5%	27.7%	25.6%	23.2%	13.6%	--	45.9%	29.2%	11.7%	14.4%	*21.0%*	*21.0%*	Income Tax Rate	*23.0%*
5.2%	4.7%	4.8%	5.5%	3.5%	2.9%	2.8%	3.9%	4.9%	5.0%	*6.9%*	*8.2%*	Net Profit Margin	*9.1%*
465.8	653.6	538.3	306.7	42.4	684.0	d349.0	d155.0	d693.0	231.0	*490*	*2020*	Working Cap'l ($mill)	*3665*
2696.7	3085.3	3182.5	2993.8	5054.2	7310.0	6518.0	6510.0	6337.0	7783.0	*7800*	*9100*	Long-Term Debt ($mill)	*9500*
1219.1	1114.6	1199.9	1033.1	1251.3	3435.0	3941.0	3458.0	2949.0	3275.0	*3910*	*4765*	Shr. Equity ($mill)	*7760*
13.7%	11.8%	11.4%	13.7%	5.6%	3.5%	4.3%	6.1%	7.8%	6.5%	*8.0%*	*8.5%*	Return on Total Cap'l	*9.2%*
36.6%	36.5%	33.9%	45.5%	22.4%	7.7%	7.7%	13.1%	19.2%	17.9%	*24.0%*	*25.5%*	Return on Shr. Equity	*20.5%*
32.9%	30.9%	27.6%	38.5%	16.7%	5.2%	4.4%	9.2%	13.0%	11.8%	*18.5%*	*20.0%*	Retained to Com Eq	*17.0%*
10%	15%	19%	15%	26%	32%	43%	30%	32%	34%	*24%*	*22%*	All Div'ds to Net Prof	*17%*

CAPITAL STRUCTURE as of 6/30/21
Total Debt $7741 mill. **Due in 5 Yrs** $5128 mill.
LT Debt $6970 mill. **LT Interest** $385 mill.
(Total int. coverage: 3.5x)
(65% of Cap'l)
Leases, Uncapitalized Annual rentals $64.0 mill.

Pfd Stock None
Common Stock 326,610,304 shares
as of 7/31/21

MARKET CAP: $31.8 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	1798	1366	571
Receivables	1186	1344	2620
Inventory (FIFO)	1274	1353	1490
Other	626	612	348
Current Assets	4884	4675	5029
Accts Payable	3136	3430	3961
Debt Due	1480	17	771
Other	961	997	1185
Current Liab.	5577	4444	5917

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	5.5%	3.5%	*8.0%*
"Cash Flow"	6.5%	9.0%	*14.0%*
Earnings	3.5%	3.5%	*21.0%*
Dividends	18.0%	14.5%	*7.5%*
Book Value	10.0%	19.0%	*16.5%*

Calendar	QUARTERLY SALES ($ mill.) E Mar.Per	Jun.Per	Sep.Per	Dec.31	Full Year
2018	2785	3101	2946	2803	11635
2019	2785	3017	2953	2719	11474
2020	2785	2801	3092	3103	11781
2021	3125	3459	*3525*	*3541*	*13650*
2022	*3475*	*3800*	*3725*	*3700*	*14700*

Calendar	EARNINGS PER SHARE AE Mar.Per	Jun.Per	Sep.Per	Dec.31	Full Year
2018	.35	.34	.17	.44	1.29
2019	.34	.58	.27	.48	1.66
2020	.07	.28	.72	.68	1.75
2021	.60	.61	*.80*	*.84*	*2.85*
2022	*.70*	*.70*	*1.10*	*1.15*	*3.65*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.065	.10	.10	.10	.37
2018	.10	.10	.10	.10	.40
2019	.10	.15	.15	.15	.55
2020	.15	.15	.15	.15	.60
2021	.15	.15	.20		

BUSINESS: Ball Corporation manufactures metal and plastic packaging (85% of sales), primarily for the beverage and food industries for a variety of end users around the world. It has 18 locations in the United States and 51 facilities internationally. The company also supplies government and commercial customers with aerospace and other high-technology products (15%). Its largest product line is aluminum beverage containers. Acquired Rexam, 6/16. Has about 21,500 employees. Officers/directors own 1.6% of stock; The Vanguard Group, 10.8%; T. Rowe Price Associates, 7.2%; BlackRock, 7.9% (3/21 proxy). Chairman & CEO: John A. Hayes. Inc.: Indiana. Address: 9200 West 108th Circle, Westminster, Colorado 80021. Telephone: 303-469-3131. Internet: www.ball.com.

Ball Corporation registered mixed results in the June interim. Sales just shy of $3.5 billion easily topped our $3.2 billion call thanks to strong beverage can demand, most notably in the specialty can line. Earnings of $0.61 a share, on the other hand, fell short of our $0.85-a-share call owing to elevated expenses, particularly start-up costs related to its expansion efforts (more below).

The company is returning capital to stockholders. The board increased the dividend 33%, to $0.20 a share. Additionally, it announced a stock-repurchase program of at least $500 million.

Ball is expanding its business. The manufacturer has been adding facilities to increase its capacity amid heightened demand for aluminum packaging. Most recently, a plant in Pittson, Pennsylvania came on line. Further, the company announced plans to build new aluminum beverage packaging plants in the United Kingdom and Russia to support its strategic partners. These endeavors are not cheap, however, but should bolster results over the long haul, especially considering the favorable demand trends.

We are cautiously optimistic for the second half of 2021. The strong beverage can demand is the primary growth driver here. Consumers are seeking out more products in this packaging. A sizable backlog in the Aerospace business is also encouraging. Thus, we estimate $13.65 billion on the top line and $2.85 a share on the bottom line for 2021. For next year, we estimate sales of $14.7 billion and share net of $3.65, which both represent nice gains from this year's estimated marks. Still, supply-chain constraints, elevated debt levels, and start-up costs are worth monitoring.

The company is well positioned for the long term. The aforementioned expansion efforts offer promise. The uptick in costs should ease over time. Consequently, we look for profits to expand at a nice clip in the years ahead.

This equity is ranked to perform in line with the broader market in the year ahead. Total return potential 3 to 5 years hence is worthwhile on a risk-adjusted basis. Accordingly, we suggest patient accounts consider these shares.

Richard J. Gallagher September 17, 2021

(A) Diluted earnings. Excludes nonrecur. items/disc. ops.: '05, d12¢; '06, 12¢; '07, d38¢; '08, d16¢; '09, 2¢; '10, d21¢; '11, d1¢; '17, 20¢. Next earnings report due early November. May not sum due to rounding. **(B)** Div'd hist. paid in mid- Mar., Jun., Sep., and Dec. ■ Dividend reinvestment plan available. **(C)** Includes intang. At 12/31/20: $6,421 mill, $19.52/sh. **(D)** In mill., adj. for splits. **(E)** Fiscal years end Dec. 31. Fiscal quarters end Sun. nearest the cal. quarter.

Company's Financial Strength	B++
Stock's Price Stability	85
Price Growth Persistence	75
Earnings Predictability	50

CACI INT'L INC. NYSE-CACI

RECENT PRICE **267.89** | P/E RATIO **14.5** (Trailing: 16.4 / Median: 16.0) | RELATIVE P/E RATIO **0.75** | DIV'D YLD **Nil** | **VALUE LINE**

TIMELINESS 3 Lowered 12/18/20
SAFETY 3 New 5/31/02
TECHNICAL 3 Raised 5/7/21
BETA .95 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$195-$426 $311 (15%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	470	(+75%)	*15%*
Low	315	(+20%)	*4%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	169	181	169
to Sell	225	178	203
Hld's(000)	21451	21675	21258

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
54.11	57.33	64.65	80.11	91.09	104.11	118.49	153.20	158.56	151.68	137.01	153.93	178.02	180.86	200.42	227.95	*255.25*	*264.25*	Revenues per sh [A]	*300.00*
3.91	3.86	3.92	4.33	4.74	5.27	6.63	9.07	8.86	8.53	7.95	8.53	9.62	10.93	14.13	17.22	*24.45*	*23.85*	"Cash Flow" per sh	*29.40*
2.79	2.72[E]	2.51	2.72	3.14	3.47	4.61	5.96	6.35	5.38	5.17	5.76	6.53	7.84	10.46	12.61	*18.20*	*17.10*	Earnings per sh [AB]	*21.75*
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*Nil*	*Nil*	Div'ds Decl'd per sh	*Nil*
.29	.31	.26	.45	.41	.74	.48	.74	.66	.65	.72	.86	1.77	1.68	1.93	2.88	*2.95*	*3.15*	Cap'l Spending per sh	*3.60*
20.41	24.34	27.15	30.38	33.14	38.78	43.37	47.16	51.89	57.74	61.20	66.08	73.32	85.28	95.31	106.05	*110.75*	*129.70*	Book Value per sh [C]	*195.90*
29.99	30.62	29.98	30.22	29.97	30.25	30.20	24.64	23.22	23.50	24.18	24.32	24.46	24.70	24.88	25.09	*23.70*	*23.90*	Common Shs Outst'g [D]	*24.50*
20.2	22.4	20.9	17.4	13.6	13.6	11.5	9.3	8.7	13.2	15.8	15.9	17.5	18.2	17.2	18.5	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*18.0*
1.08	1.21	1.11	1.05	.91	.87	.72	.59	.49	.69	.80	.83	.88	.98	.92	.95			Relative P/E Ratio	*1.00*
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			Avg Ann'l Div'd Yield	*Nil*
3577.8	3774.5	3682.0	3564.6	3313.5	3744.1	4354.6	4467.9	4986.3	5720.0	*6050*	*6315*	Revenues ($mill) [A]	*7350*
8.6%	9.4%	8.8%	9.0%	9.1%	8.8%	8.5%	9.2%	9.3%	9.9%	*11.0%*	*11.5%*	Operating Margin	*12.5%*
56.1	56.0	54.1	65.2	66.1	64.8	71.8	72.2	85.9	110.7	*125*	*135*	Depreciation ($mill)	*155*
144.2	167.5	151.7	135.3	126.2	142.8	163.7	197.9	265.6	321.5	*455*	*435*	Net Profit ($mill)	*565*
36.4%	39.0%	37.7%	38.0%	37.4%	36.1%	34.2%	33.7%	19.0%	20.0%	*9.0%*	*21.5%*	Income Tax Rate	*22.5%*
4.0%	4.4%	4.1%	3.8%	3.8%	3.8%	3.8%	4.4%	5.3%	5.6%	*7.5%*	*6.9%*	Net Profit Margin	*7.7%*
344.9	200.9	d14.5	313.3	276.8	356.6	353.2	392.2	339.8	316.7	*390*	*930*	Working Cap'l ($mill)	*2800*
402.4	532.0	300.8	1238.7	1029.3	1402.1	1177.6	1015.4	1618.1	1357.5	*1775*	*1775*	Long-Term Debt ($mill)	*1775*
1309.6	1162.0	1204.9	1356.9	1480.1	1607.2	1793.6	2106.8	2371.3	2661.2	*2625*	*3100*	Shr. Equity ($mill)	*4800*
9.1%	10.6%	10.9%	5.9%	5.7%	5.4%	6.3%	7.0%	7.3%	8.7%	*11.0%*	*9.5%*	Return on Total Cap'l	*9.0%*
11.0%	14.4%	12.6%	10.0%	8.5%	8.9%	9.1%	9.4%	11.2%	12.1%	*17.5%*	*14.0%*	Return on Shr. Equity	*12.0%*
11.0%	14.4%	12.6%	10.0%	8.5%	8.9%	9.1%	9.4%	11.2%	12.1%	*17.5%*	*14.0%*	Retained to Com Eq	*12.0%*
--	--	--	--	--	--	--	--	--	--	*Nil*	*Nil*	All Div'ds to Net Prof	*Nil*

CAPITAL STRUCTURE as of 3/31/21
Total Debt $1822.0 mill. **Due in 5 Yrs** $1822 mill.
LT Debt $1775.1 mill. **LT Interest** $56.1 mill.
(Total interest coverage: 8.2x)
(41% of Cap'l)

Leases, Uncapitalized Annual rentals $78.3 mill.

No Defined Benefit Pension Plan

Common Stock 23,550,726 shs.
as of 4/14/21

MARKET CAP: $6.3 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	3/31/21
Cash Assets	72.0	107.2	105.6
Receivables	869.8	841.2	860.7
Other	89.7	137.5	162.4
Current Assets	1031.5	1085.9	1128.7
Accts Payable	118.9	90.0	109.7
Debt Due	46.9	46.9	46.9
Other	525.9	632.3	686.3
Current Liab.	691.7	769.2	842.9

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	8.5%	6.5%	*6.5%*
"Cash Flow"	11.5%	11.0%	*13.0%*
Earnings	12.5%	13.0%	*13.5%*
Dividends	--	--	*Nil*
Book Value	11.0%	11.0%	*12.5%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Sep.30	Dec.31	Mar.31	Jun.30	Full Fiscal Year
2018	1085.8	1087.9	1124.1	1170.1	4467.9
2019	1165.9	1181.6	1265.0	1373.8	4986.3
2020	1363.4	1395.5	1465.6	1495.5	5720.0
2021	1459.5	1468.7	1551.9	*1569.9*	*6050*
2022	*1520*	*1530*	*1620*	*1645*	*6315*

Fiscal Year Ends	EARNINGS PER SHARE [A] [B] Sep.30	Dec.31	Mar.31	Jun.30	Full Fiscal Year
2018	1.67	2.00	2.33	1.84	7.84
2019	3.10	2.71	2.69	1.96	10.46
2020	2.66	3.11	3.16	3.68	12.61
2021	3.67	4.18	4.78	*5.57*	*18.20*
2022	*3.85*	*4.25*	*4.50*	*4.50*	*17.10*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017					
2018	NO CASH DIVIDENDS BEING PAID				
2019					
2020					
2021					

BUSINESS: CACI International Inc is a provider of Expertise and Technology to Enterprise and Mission customers, on both a domestic and international basis, supporting national security missions and government modernization/transformation in the intelligence, defense, and federal civilian sectors. Fiscal 2020 revenue by customer type: Department of Defense (70%), Federal Civilian Agencies (26%) and Commercial and other (4%). Has about 22,900 employees. The Vanguard Group, Inc. owns 10.6% of common stock; Blackrock, Inc., 9.3%; Dimensional Fund Advisors LP, 5.1%; officers and directors, 1.6% (10/20 proxy). Pres. & CEO: John S. Mengucci. Inc.: DE. Addr.: 1100 North Glebe Rd., Arlington, VA 22201. Tel.: 703-841-7800. Internet: www.caci.com.

CACI International is scheduled to report its fiscal 2021 fourth-quarter (ended June 30th) results on August 11th. The provider of expertise and technology to government enterprise and mission customers has not provided any notable updates since our last review (dated May 7th). It has only announced a few contract awards, including a $373 million contract to provide geospatial intelligence expertise to U.S. Special Operations Command and an $82 million contract to provide cyber and ground electronic warfare expertise and technology to the U.S. Army, as well as a $1.4 billion task order with the Defense Threat Reduction Agency to counter and deter various threats. As of March 31st, trailing 12-month contract awards totaled $8.9 billion (book-to-bill of 1.5x), and the total backlog was $22.3 billion (+12% year over year and 3.6x annualized revenue). At that time, CACI's pipeline of submitted bids was $6.8 billion (70% for new business), and bids expected to be submitted in the next two quarters totaled $13.7 billion (80%).

Recall that the company had updated its fiscal 2021 guidance. Management trimmed its full-year revenue forecast to $6.00 billion-$6.08 billion (+6% year over year at the midpoint, including 5% organic growth) to account for higher-than-expected impacts from COVID-19, but raised its earnings-per-share target by a significant amount, to $18.00-$18.40 (+44% at the midpoint). The improved bottom-line outlook reflected its strong operating performance and tax item benefits. For the latter, CACI was looking for an effective tax rate of between 8% and 9% for the year just ended, versus 20% in fiscal 2020. This can be attributed to increased R&D tax credits and a material tax benefit realized in the fiscal fourth quarter. For fiscal 2022, we expect the tax rate will return to more historical levels. Thus, our share-net estimate of $17.10 implies a 6% decrease from our current-year call, despite our expectation for mid-single-digit revenue growth and continued margin expansion.

Overall, we continue to like these shares, as they offer above-average capital appreciation potential over the haul to 2024-2026.

Michelle Jensen *August 6, 2021*

(A) Fiscal year ends June 30th.
(B) Diluted earnings. Includes stock option expense starting in 2006. Excludes a nonrecurring gain of $4.09 in '18. May not sum to total due to rounding. Q1, FY'22 earnings report due early November.
(C) Includes intangibles. At 6/30/20: $3.8 billion, or $151.99/share.
(D) In millions.
(E) Stock option expense reduced F'06 profits by $0.22 a share.

Company's Financial Strength	B+
Stock's Price Stability	85
Price Growth Persistence	75
Earnings Predictability	85

CASEY'S GEN'L STRS NDQ-CASY

RECENT PRICE 195.10 | P/E RATIO 24.9 (Trailing: 23.2 Median: 20.0) | RELATIVE P/E RATIO 1.23 | DIV'D YLD 0.7% | VALUE LINE

TIMELINESS 3 Lowered 3/12/21
SAFETY 3 New 7/27/90
TECHNICAL 3 Raised 6/4/21
BETA .90 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$122-$283 $203 (5%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	285	(+45%)	11%
Low	190	(-5%)	Nil

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	160	188	203
to Sell	187	163	183
Hld's(000)	31441	31634	32159

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
69.79	79.79	95.15	92.20	91.06	148.43	183.21	189.06	203.60	199.74	182.36	193.64	227.56	255.09	249.29	235.65	*309.20*	*327.05*	Sales per sh [A]	*357.90*
2.39	2.46	3.01	3.17	3.74	4.66	5.59	5.80	6.90	8.72	10.16	9.68	9.87	12.23	13.99	15.65	*15.00*	*16.50*	"Cash Flow" per sh	*18.40*
1.24	1.20	1.67	1.82	2.31	2.22	3.07	2.86	3.46	4.68	5.73	4.48	3.73	5.51	7.10	8.38	*7.90*	*9.15*	Earnings per sh [A B]	*10.80*
.18	.20	.26	.29	.32	.46	.60	.66	.71	.80	.86	.96	1.04	1.16	1.28	1.30	*1.38*	*1.46*	Div'ds Decl'd per sh [C]	*1.70*
10.39	11.31	12.76	14.18	16.19	10.64	13.27	15.70	18.69	22.51	27.74	30.71	34.47	38.42	44.65	52.31	*55.40*	*59.45*	Book Value per sh	*69.75*
50.37	50.59	50.73	50.84	50.93	37.97	38.14	38.35	38.51	38.89	39.06	38.77	36.87	36.67	36.81	36.95	*37.00*	*37.00*	Common Shs Outst'g [D]	*38.00*
17.9	20.0	16.0	13.8	12.9	17.8	15.6	19.4	19.6	17.0	18.6	26.8	29.8	21.9	22.3	23.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*22.0*
.95	1.08	.85	.83	.86	1.13	.98	1.23	1.10	.89	.94	1.41	1.50	1.18	1.19	1.31			Relative P/E Ratio	*1.20*
.8%	.8%	1.0%	1.2%	1.1%	1.2%	1.2%	1.2%	1.0%	1.0%	.8%	.8%	.9%	1.0%	.8%	.8%			Avg Ann'l Div'd Yield	*.7%*
6987.8	7250.8	7840.3	7767.2	7122.1	7506.6	8391.1	9352.9	9175.3	8707.2	*11440*	*12100*	Sales ($mill) [A]	*13600*
14.4%	14.9%	15.7%	18.5%	22.7%	22.4%	21.1%	20.9%	23.4%	27.1%	*23.0%*	*23.5%*	Gross Margin	*24.0%*
4.5%	4.4%	4.8%	6.2%	7.9%	6.8%	5.8%	6.0%	7.0%	8.3%	*7.0%*	*7.0%*	Operating Margin	*7.0%*
1699	1749	1808	1878	1931	1978	2073	2146	2207	2243	*2285*	*2335*	Number of Stores [E]	*2550*
116.8	110.6	134.5	183.0	226.0	177.5	143.0	203.9	263.8	312.9	*290*	*340*	Net Profit ($mill)	*410*
36.4%	36.8%	34.9%	35.7%	35.2%	34.2%	33.3%	22.6%	22.9%	23.2%	*23.0%*	*23.0%*	Income Tax Rate	*23.0%*
1.7%	1.5%	1.7%	2.4%	3.2%	2.4%	1.7%	2.2%	2.9%	3.6%	*2.5%*	*2.8%*	Net Profit Margin	*3.0%*
d27.3	d125.0	15.2	d59.6	d61.7	d95.9	d111.1	d180.3	d676.1	110.9	*d500*	*d400*	Working Cap'l ($mill)	*d250*
667.9	653.1	853.6	838.2	822.9	907.4	1291.7	1283.3	714.5	1361.4	*1425*	*1450*	Long-Term Debt ($mill)	*1625*
506.0	602.3	719.9	875.2	1083.5	1190.6	1271.1	1408.8	1643.2	1932.7	*2050*	*2200*	Shr. Equity ($mill)	*2650*
11.4%	10.2%	9.8%	11.9%	12.9%	9.4%	6.6%	8.6%	12.3%	*10.2%*	*9.0%*	*10.0%*	Return on Total Cap'l	*10.0%*
23.1%	18.4%	18.7%	20.9%	20.9%	14.9%	11.2%	14.5%	16.1%	16.2%	*14.0%*	*15.5%*	Return on Shr. Equity	*15.5%*
18.6%	14.3%	14.9%	17.5%	17.8%	11.8%	8.2%	11.5%	13.3%	13.5%	*12.0%*	*13.0%*	Retained to Com Eq	*13.0%*
20%	22%	20%	16%	15%	21%	27%	20%	17%	16%	*17%*	*16%*	All Div'ds to Net Prof	*16%*

CAPITAL STRUCTURE as of 4/30/21
Total Debt $1363.7 mill. **Due in 5 Yrs** $489.0 mill.
LT Debt $1361.4 mill. **LT Interest** $46.0 mill.
(Incl. $20.7 mill. capitalized leases; total interest coverage: 15.4x)
(41% of Cap'l)

Leases, Uncapitalized Annual rentals $1.8 mill.
No Defined Benefit Pension Plan

Pfd Stock None
Common Stock 37,023,738 shs.

MARKET CAP: $7.2 billion (Large Cap)

CURRENT POSITION ($MILL.)	2018	2019	4/30/21
Cash Assets	63.3	78.3	336.5
Receivables	37.9	48.5	79.7
Inventory (LIFO)	273.0	236.0	286.6
Other	36.4	24.5	20.8
Current Assets	410.6	387.3	723.6
Accts Payable	335.2	184.8	355.5
Debt Due	92.2	690.3	2.3
Other	163.5	188.3	254.9
Current Liab.	590.9	1063.4	612.7

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '17-'19 to '24-'26
Sales	10.0%	4.5%	*5.5%*
"Cash Flow"	14.0%	11.0%	*6.5%*
Earnings	11.0%	8.0%	*10.5%*
Dividends	15.0%	10.0%	*5.5%*
Book Value	10.5%	15.5%	*8.5%*

Fiscal Year Begins	QUARTERLY SALES ($ mill.) [A] Jul.31	Oct.31	Jan.31	Apr.30	Full Fiscal Year
2018	2588	2538	2048	2178	9352.9
2019	2626	2487	2248	1812	9175.3
2020	2105	2216	2008	2378	8707.2
2021	*2990*	*3040*	*2620*	*2790*	*11440*
2022	*3160*	*3215*	*2770*	*2955*	*12100*

Fiscal Year Begins	EARNINGS PER SHARE [A B] Jul.31	Oct.31	Jan.31	Apr.30	Full Fiscal Year
2018	1.90	1.80	1.13	.68	5.51
2019	2.31	2.21	.91	1.67	7.10
2020	3.24	3.00	1.04	1.12	8.38
2021	*2.93*	*2.67*	*1.10*	*1.20*	*7.90*
2022	*3.00*	*2.85*	*1.60*	*1.70*	*9.15*

Cal-endar	QUARTERLY DIVIDENDS PAID [C] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.24	.24	.26	.26	1.00
2018	.26	.26	.29	.29	1.10
2019	.29	.29	.32	.32	1.22
2020	.32	.32	.32	.32	1.28
2021	.34	.34			

BUSINESS: Casey's General Stores operates convenience stores in sixteen Midwestern states, primarily in Iowa, Missouri, and Illinois. Stores sell gasoline and food (including pizza, doughnuts, hamburgers, etc.), beer and other beverages, and non-food items. In fiscal 2020, Casey's had 2,243 company-owned locations (2,207 in 2019). Gasoline accounted for 55% of net sales during fiscal 2020 (60% in 2019). Average retail sales/store were $3.9 mill. in fiscal 2020, down from $4.2 mill. in 2019. Has 17,960 full-time employees. Off. & Dir. own less than 1% of common stock outstanding (7/22/20 Proxy). Chair.: H. Lynn Horak. Pres. & CEO: Darren M. Rebelez. Incorporated: IA. Address: One Convenience Blvd., Ankeny, IA 50021. Tel.: 515-965-6100. Internet: www.caseys.com.

As expected, Casey's General Stores closed out fiscal 2020 with mixed results. (Year ended April 30, 2021.) On the one hand, sales declined 5% last year, from fiscal 2019, falling to a multiyear low of $8.71 billion. The COVID-19 pandemic led to decreased store traffic and lower demand for certain product categories. But, on the other hand, earnings jumped 18% in fiscal 2020, from the previous year, to an all-time high of $8.38 per share. The bottom line was aided by a 10% drop in the cost of goods sold in the latest year ended, and the gross margin expanded 370 basis points, to a company-record 27.1%.

The company continues to invest in the store base. The number of locations increased from 2,207 sites in fiscal 2019, to 2,243 last year. Casey's expended $450.6 million in fiscal 2020, primarily for the construction, acquisition, and remodeling of stores, which was a 4% reduction from the prior year. For fiscal 2021, management anticipates $500 million in capital spending, and we expect the store count to increase by 40–45 locations.

The balance sheet remains in good shape. Casey's closed out fiscal 2020 with $1.364 billion in total debt, marking a 3% decrease from 2019, and the ratio of debt-to-total capital was manageable at 41%. In addition, cash reserves increased more than fourfold, to a stout $336.5 million.

We have revised our sales and share-net targets for this fiscal year and next. Our top-line estimates for fiscal 2021 and 2022 now stand at $11.44 billion and $12.1 billion, respectively, versus our prior forecasts of $10.1 billion and $10.5 billion. With the number of Americans receiving the coronavirus vaccine rising sharply, and domestic economic activity picking up, Casey's ought to see an increase in store traffic and gasoline sales. However, we have trimmed $0.30 from our earnings call for the current year, to $7.90 per share, since we expect gasoline margins to contract slightly in fiscal 2020. Share net may rebound 15%–16% in 2022.

Casey's General shares do not stand out, at present. The stock is ranked to only keep pace with the broader market in the year ahead; total return potential to 2024–2026 is below average; and the dividend yield is underwhelming.

Sharif Abdou *July 16, 2021*

(A) Fiscal year ends April 30th of the following calendar year. Sales figures exclude royalty income and the revenues from franchised stores.
(B) Diluted egs. Excludes nonrecurring gain/(loss): '17, $4.61. Next earnings report due early September.
(C) Dividends historically paid early February, May, August, and November.
(D) In millions.
(E) Includes only company-owned stores.

Company's Financial Strength	B+
Stock's Price Stability	80
Price Growth Persistence	70
Earnings Predictability	65

CSW INDUSTRIALS NDK-CSWI

RECENT PRICE **112.02** | P/E RATIO **30.0** (Trailing: 42.1 Median: NMF) | RELATIVE P/E RATIO **1.58** | DIV'D YLD **0.5%** | **VALUE LINE**

TIMELINESS 3 Lowered 7/2/21
SAFETY 2 Raised 7/31/20
TECHNICAL 3 Lowered 7/16/21
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$66-$147	$107 (-5%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	180	(+60%)	*12%*
Low	135	(+20%)	*5%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	47	64	72
to Sell	98	85	83
Hld's(000)	11100	11233	11543

On September 30, 2015, Capital Southwest spun off its industrial subdidiaries to form a company called CSW Industrials. On November 15, 2015, the company became an independent publicly-traded entity when it issued 15 million shares to the public at $35.20 a share. The underwriting syndicate included BoFA Merril Lynch, Wells Fargo, and Citibank. The stock trades on the NASDAQ under the symbol CSWI.

CAPITAL STRUCTURE as of 3/31/21
Total Debt $242.4 mill. **Due in 5 Yrs** $.6 mill
LT Debt $241.8 mill. **LT Interest** $13.7 mill.
(Total interest coverage 1.6x) (37% of Cap'l)

Leases, Uncapitalized Annual rentals $.5 mill.
No Defined Benefit Pension Plan
Pfd Stock None
Common Stock 15,687,364 shs.
as of 5/12/21

MARKET CAP: $1.8 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2018	2019	3/31/21
Cash Assets	26.7	39.9	10.1
Receivables	66.1	57.6	96.7
Inventory	51.4	57.3	98.1
Other	7.1	3.8	9.7
Current Assets	151.3	158.6	214.6
Accts Payable	19.0	17.7	32.4
Debt Due	.6	.6	.6
Other	29.6	35.0	49.7
Current Liab.	49.2	53.3	82.7

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	- -	4.5%	*-.5%*
"Cash Flow"	- -	10.0%	*9.5%*
Earnings	- -	12.0%	*11.5%*
Dividends	- -	- -	*16.0%*
Book Value	- -	5.0%	*2.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Jun.30	Sep.30	Dec.31	Mar.31	Full Year
2018	89.6	91.6	77.5	91.5	350.2
2019	102.3	101.3	83.7	98.6	385.9
2020	91.0	104.9	89.9	133.4	419.2
2021	*135*	*130*	*130*	*140*	*535*
2022	*130*	*140*	*140*	*150*	*560*

Calendar	EARNINGS PER SHARE [A] Jun.30	Sep.30	Dec.31	Mar.31	Full Year
2018	.66	.58	.17	.68	2.09
2019	1.00	.58	.48	.96	3.02
2020	.81	1.10	.16	.59	2.66
2021	*1.25*	*1.20*	*.70*	*1.20*	*4.35*
2022	*1.30*	*1.30*	*.90*	*1.60*	*5.10*

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	- -	- -	- -	- -	- -
2018	- -	- -	- -	- -	- -
2019	- -	.135	.135	.135	.41
2020	.135	.135	.135	.135	.54
2021	.135	.15			

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
	- -	- -	- -	- -	20.42	20.64	20.55	23.28	26.17	26.78	*33.45*	*31.10*	Revenues per sh	*24.40*
	- -	- -	- -	- -	2.53	1.86	3.00	3.98	4.12	4.05	*5.95*	*6.50*	"Cash Flow" per sh	*7.00*
	- -	- -	- -	- -	1.62	.87	2.09	2.96	3.02	2.66	*4.35*	*5.10*	Earnings per sh [A]	*5.60*
	- -	- -	- -	- -	- -	- -	- -	- -	.54	.54	*.58*	*.62*	Div'ds Decl'd per sh	*.88*
	- -	- -	- -	- -	.71	.59	.35	.50	.78	.56	*.85*	*.95*	Cap'l Spending per sh	*1.10*
	- -	- -	- -	- -	16.48	17.19	16.74	17.53	18.77	26.33	*27.50*	*26.95*	Book Value per sh	*23.60*
	- -	- -	- -	- -	15.66	15.85	15.88	15.04	14.74	15.65	*16.00*	*18.00*	Common Shs Outst'g [B]	*25.00*
	- -	- -	- -	- -	21.1	39.0	20.4	17.3	22.8	34.5	*Bold figures are*		Avg Ann'l P/E Ratio	*28.0*
	- -	- -	- -	- -	1.06	2.05	1.03	.93	1.21	1.76	*Value Line*		Relative P/E Ratio	*1.55*
	- -	- -	- -	- -	- -	- -	- -	- -	.8%	.6%	*estimates*		Avg Ann'l Div'd Yield	*.6%*
	- -	- -	- -	- -	319.8	327.1	326.2	350.2	385.9	419.2	*535*	*560*	Revenues ($mill)	*610*
	- -	- -	- -	- -	19.3%	13.0%	20.1%	21.2%	17.4%	19.7%	*20.0%*	*23.5%*	Operating Margin	*27.5%*
	- -	- -	- -	- -	14.2	15.8	14.9	13.8	14.8	23.0	*25.0*	*27.0*	Depreciation ($mill)	*35.0*
	- -	- -	- -	- -	25.5	13.7	32.7	46.1	45.9	40.3	*70.0*	*90.0*	Net Profit ($mill)	*140*
	- -	- -	- -	- -	42.4%	46.4%	32.3%	25.0%	20.4%	21.2%	*22.0%*	*23.0%*	Income Tax Rate	*23.0%*
	- -	- -	- -	- -	8.0%	4.2%	10.0%	13.2%	11.9%	9.6%	*13.0%*	*16.4%*	Net Profit Margin	*23.0%*
	- -	- -	- -	- -	123.9	108.6	82.7	102.1	90.9	131.8	*125*	*130*	Working Cap'l ($mill)	*150*
	- -	- -	- -	- -	89.1	72.6	23.5	30.9	10.3	241.8	*240*	*250*	Long-Term Debt ($mill)	*300*
	- -	- -	- -	- -	258.0	272.4	265.8	263.7	276.7	412.0	*440*	*485*	Shr. Equity ($mill)	*590*
	- -	- -	- -	- -	7.8%	4.4%	11.7%	15.9%	16.2%	6.3%	*14.5%*	*14.5%*	Return on Total Cap'l	*19.5%*
	- -	- -	- -	- -	9.9%	5.0%	12.3%	17.5%	16.6%	9.8%	*16.0%*	*18.5%*	Return on Shr. Equity	*23.5%*
	- -	- -	- -	- -	9.9%	5.0%	12.3%	17.5%	13.6%	7.8%	*13.5%*	*16.5%*	Retained to Com Eq	*20.0%*
	- -	- -	- -	- -	- -	- -	- -	- -	18%	20%	*13%*	*12%*	All Div'ds to Net Prof	*16%*

BUSINESS: CSW Industrials, Inc., is a diversified industrial holding company. It has two business segments: Industrial Products (57% of 2020 sales and 62% of operating income), and Specialty Chemicals (43%, and 38%). CSW Industrials serves the following markets; HVAC, refrigeration, coatings and sealants, railroad, industrial, plumbing, building safety, energy, mining, and specialty lubricants. CSW has about 730 employees. Incorp. DE. Off. & Dir. own .9% of stock; Joseph Armes, 1.6%; T. Rowe Price, 9.5%, Wells Fargo, 8.3%; BlackRock, 7.9%; Janus Henderson Group, 5.3%; Newport Trust Co., 5.2% (8/20 Proxy). C.E.O.: Joseph B. Armes. Address: 5420 Lyndon B. Johnson Freeway, Suite 500, Dallas, TX 75240. Tel.: (214) 884-3777. Internet: www. cswindustrials.com.

We hope investors heeded the advice in our late-April report and sold some of their CSW holdings. Back then the stock was selling at almost $140 a share, and sported a forward P/E multiple of 31.9. We wrote that this was an unusually high multiple for a diversified industrial holdings company, particularly since the industry average at the time was 26.3. It appeared that all the good news was factored into the stock price, and that turned out to be the case, as the company guided 2021 earnings estimates marginally lower.

We look for fiscal 2021 share earnings of $4.35, down from our previous call of $4.90 (fiscal year ends March 31st). This figure is still a big jump from the fiscal 2020 tally of $2.66, thanks to the December acquisition of TRUaire. Raw material inflation caused by supply chain inefficiencies, and higher freight and transportation expenses are raising the cost of goods sold. So far, the company has done a decent job of passing these elevated costs onto the customer in the form of higher selling prices. However, the initial post-pandemic burst of demand for CSW's products and services is waning. This means consumers will probably start to think twice about paying the higher prices and will hunt around for better deals. Unless wages rise in tandem with general inflation, we fear demand for CSW's products will drop off, especially when supplemental unemployment benefits cease in all 50 states in September. CSW Industrials is a relatively small player in a large market, and we think it will have a difficult time making its recent price hikes stick.

Unless CSW consummates another large acquisition, profit growth will likely slow over the next few years. By 2022, we look for supply-chain constraints to have been relieved. This ought to lower raw material and inventory costs. Still, slower GDP growth will likely put a damper on CSW's sales advances, limiting margin expansion.

This higher-quality issue has above-average capital gains potential to 2024-2026. The recent stock-price drop has improved this equity's long-term fortunes. As a result, this may not be a bad time for new investors with a long-term perspective to take the plunge.

Jeremy J. Butler *July 30, 2021*

(A) Diluted earnings. Next earnings report due early August. Earnings may not sum due to change in shares outstanding. Fiscal year ends March 31st of following year.
(B) In millions.
(C) Quarterly dividend payment of $0.135 a share initiated in the second quarter of 2019. Dividends paid in mid Feb, May, August, and Nov.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	85
Earnings Predictability	55

QUEST DIAGNOST. NYSE-DGX

RECENT PRICE **150.53** | P/E RATIO **16.3** (Trailing: 9.6 Median: 15.0) | RELATIVE P/E RATIO **0.87** | DIV'D YLD **1.6%** | **VALUE LINE**

TIMELINESS 4 Lowered 9/3/21
SAFETY 2 Raised 3/20/09
TECHNICAL 5 Lowered 8/6/21
BETA .85 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$100-$204 $152 (0%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	200	(+35%)	*9%*
Low	145	(-5%)	*1%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	332	404	364
to Sell	343	316	364
Hld's(000)	116446	115314	113739

	High:	61.7	61.2	64.9	64.1	68.5	89.0	93.6	113.0	116.5	108.9	131.8	153.4
	Low:	40.8	45.1	53.3	52.5	50.5	60.1	59.7	90.1	78.9	79.9	73.0	113.4

LEGENDS
11.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2024 2025 2026

% TOT. RETURN 7/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	13.7	55.5
3 yr.	39.5	48.6
5 yr.	80.5	95.5

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
27.73	32.32	34.55	38.04	41.67	43.05	47.71	46.63	49.63	51.63	52.40	54.85	57.10	55.79	58.09	70.95	***79.30***	***71.70***	Revenues per sh	***101.65***
3.64	4.32	4.08	4.75	5.52	5.70	6.42	6.23	6.22	6.01	6.99	7.19	7.90	8.79	9.22	14.20	***14.45***	***11.70***	"Cash Flow" per sh	***16.55***
2.66	3.22	2.84	3.27	3.88	4.05	4.53	4.36	4.00	4.10	4.77	5.15	5.67	6.31	6.56	11.18	***11.20***	***8.20***	Earnings per sh [A]	***12.30***
.36	.40	.40	.40	.40	.40	.47	.81	1.20	1.32	1.52	1.65	1.80	1.95	2.12	2.21	***2.42***	***2.57***	Div'ds Decl'd per sh [B]	***3.20***
1.13	1.00	1.13	1.12	.93	1.20	1.03	1.15	1.60	2.14	1.84	2.14	1.87	2.84	3.01	3.14	***3.15***	***3.00***	Cap'l Spending per sh	***3.30***
13.92	15.57	17.13	18.92	22.30	23.57	23.46	26.29	27.42	29.87	32.76	33.78	36.45	38.64	42.41	50.82	***54.10***	***57.85***	Book Value per sh [C]	***75.00***
198.46	193.95	194.04	190.57	178.92	171.16	157.42	158.33	144.00	144.00	143.00	137.00	135.00	135.00	133.00	133.00	***122.00***	***121.00***	Common Shs Outst'g [D]	***120.00***
19.0	17.1	18.6	15.1	13.7	13.0	12.2	13.6	14.8	14.5	14.8	15.2	17.7	16.2	14.9	10.0	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***14.0***
1.01	.92	.99	.91	.91	.83	.77	.87	.83	.76	.75	.80	.89	.88	.79	.51			Relative P/E Ratio	***.80***
.7%	.7%	.8%	.8%	.8%	.8%	.9%	1.4%	2.0%	2.2%	2.2%	2.1%	1.8%	1.9%	2.2%	2.0%			Avg Ann'l Div'd Yield	***1.9%***
7510.5	7382.6	7146.0	7435.0	7493.0	7515.0	7709.0	7531.0	7726.0	9437.0	***9675***	***8675***	Revenues ($mill)	***12200***
21.4%	21.7%	19.6%	17.4%	18.4%	19.8%	18.6%	20.4%	19.7%	25.9%	***25.6%***	***22.0%***	Operating Margin	***25.0%***
281.1	286.6	283.0	314.0	304.0	249.0	270.0	309.0	329.0	361.0	***400***	***420***	Depreciation ($mill)	***510***
728.7	700.2	612.0	551.0	695.0	736.0	796.0	878.0	897.0	1528.0	***1365***	***995***	Net Profit ($mill)	***1475***
35.6%	37.8%	37.2%	30.9%	34.3%	36.4%	21.1%	17.0%	21.8%	23.5%	***23.0%***	***23.0%***	Income Tax Rate	***25.0%***
9.7%	9.5%	8.6%	7.4%	9.3%	9.8%	10.3%	11.7%	11.6%	16.2%	***14.1%***	***11.5%***	Net Profit Margin	***12.1%***
d159.9	513.4	251.0	d106.0	328.0	550.0	249.0	d95.0	500.0	1282.0	***750***	***850***	Working Cap'l ($mill)	***1700***
3370.5	3354.2	3120.0	3244.0	3492.0	3728.0	3748.0	3429.0	3966.0	4013.0	***4000***	***3800***	Long-Term Debt ($mill)	***3250***
3692.9	4163.0	3948.0	4301.0	4684.0	4628.0	4921.0	5216.0	5641.0	6759.0	***6600***	***7000***	Shr. Equity ($mill)	***9000***
11.4%	10.4%	9.8%	8.4%	9.4%	9.7%	10.0%	11.0%	10.1%	14.9%	***14.0%***	***10.0%***	Return on Total Cap'l	***13.0%***
19.7%	16.8%	15.5%	12.8%	14.8%	15.9%	16.2%	16.8%	15.9%	22.6%	***20.5%***	***14.0%***	Return on Shr. Equity	***16.5%***
18.0%	14.2%	10.8%	8.5%	10.3%	11.1%	11.2%	11.7%	10.8%	18.2%	***16.0%***	***10.0%***	Retained to Com Eq	***12.0%***
9%	15%	30%	34%	31%	30%	31%	30%	32%	19%	***22%***	***31%***	All Div'ds to Net Prof	***26%***

CAPITAL STRUCTURE as of 6/30/21
Total Debt $4155 mill. **Due in 5 Yrs** $2000 mill.
LT Debt $4008 mill. **LT Interest** $220 mill. (38% of Cap'l)

Leases, Uncapitalized: Ann'l rentals $200.0 mill.
No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 122,180,759 shares
as of 7/15/21
MARKET CAP: $18.4 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	1192	1158	560
Receivables	1063	1520	1255
Inventory (FIFO)	123	223	199
Other	112	157	132
Current Assets	2490	3058	2146
Payables & Other	1041	1633	1404
Debt Due	949	143	147
Current Liab.	1990	1776	1551

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	4.0%	4.0%	*8.5%*
"Cash Flow"	7.5%	11.0%	*7.5%*
Earnings	8.0%	13.5%	*7.5%*
Dividends	18.0%	9.0%	*7.5%*
Book Value	7.5%	8.0%	*9.5%*

Calendar	QUARTERLY REVENUES ($ mill.) [A] Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2018	1884	1919	1889	1839	7531
2019	1891	1953	1956	1926	7726
2020	1822	1827	2786	3002	9437
2021	2720	2550	***2225***	***2180***	***9675***
2022	***2125***	***2180***	***2195***	***2175***	***8675***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2018	1.52	1.75	1.68	1.36	6.31
2019	1.40	1.73	1.76	1.67	6.56
2020	.94	1.42	4.31	4.48	11.18
2021	3.76	3.18	***2.20***	***2.06***	***11.20***
2022	***1.80***	***2.15***	***2.15***	***2.10***	***8.20***

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.45	.45	.45	.45	1.80
2018	.45	.50	.50	.50	1.95
2019	.53	.53	.53	.53	2.12
2020	.53	.56	.56	.56	2.21
2021	.56	.62	.62		

BUSINESS: Quest Diagnostics provides diagnostic testing, information, and services to patients, physicians, hospitals, insurers, employers, government agencies, and other commercial clinical labs. It operates a network of more than 2,200 patient-service centers and principal labs, and approximately 3,200 phlebotomists in physicians offices. Offers routine tests, anatomic pathology services, and central laboratory testing performed with clinical research trials. Employs 43,000. Vanguard owns 10.6% of common; BlackRock, 8.5%; offs. & dirs. own less than 1.0% (4/21 proxy). Chairman and CEO: Stephen Rusckowski. Incorporated: DE. Address: 500 Plaza Drive, Secaucus, New Jersey 07094. Telephone: 973-520-2700. Internet: www.questdiagnostics.com.

Quest Diagnostics had a strong second quarter, powered by a faster-than-expected recovery in its base business. New hospital lab management contracts pitched in nicely, as people returned to the healthcare system. Add to this, COVID-19 flareups (due to the delta variant) in various areas aided the testing top line. On the heels of this success, leadership established guidance for the full year. Revenues are expected in a band of $9.54 billion to $9.79 billion, while earnings per share are pegged to be between $10.65 and $11.35. Given the strong showing of the base business, and the lingering coronavirus, we are placing our figures above the midpoints of these spreads.

For 2022, headline numbers will take a breather, in all likelihood. Vaccination rates continue to creep up, which hopefully lead to the true end to this pandemic. Backing out COVID-19 testing will lead to a dip in revenues and earnings. In fact, comparing the 2022 numbers to 2019 figures may be more of an apples-to-apples snapshot when all is said and done next year.

Management has been deploying cash in numerous ways, all of which should please the investment community. Perhaps most noticeable to subscribers, the company repurchased more than 8 million shares in the most recently completed quarter, and we look for this to continue, on a diminishing scale, out to 2024-2026. Also, the dividend was increased for this year already, and is well supported by growing cash flow. Lastly, acquiring lab assets remains on the agenda. Most recently, the outreach laboratory services of Mercy were purchased. The addition broadens DGX's network in Arkansas, Kansas, Missouri, and Oklahoma

Good-quality Quest Diagnostics shares are not very appealing using our primary investment criteria. The equity has an untimely ranking for year-ahead relative price performance. Too, the quotation trades within our 3- to 5-year Target Price Range, leaving capital appreciation potential over that span at a below-average reading. The dividend yield is good for the medical services field, but it is still a bit below the *Value Line* median for all the selections in our coverage universe.

Erik M. Manning *September 3, 2021*

(A) Diluted earnings. Excludes nonrecurring: '06, d28¢; '07, d$1.10; '08, d1¢; '11, d$1.61; '12, d8¢; '13, $1.58; '17, 17¢; '18, $1.02; '19, 43¢; '20, 71¢. Excludes disc. operations gain: '19, 15¢. Quarterly figures may not sum due to rounding. Next earnings report due late October.
(B) Dividends historically paid mid-January, April, July, October.
(C) Includes intangibles. In '20: $8.04 billion, $60.45/sh.
(D) In millions.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	65
Earnings Predictability	60

EBAY INC. NDQ-EBAY

RECENT PRICE **73.26** | P/E RATIO **18.3** (Trailing: 19.0 / Median: 19.0) | RELATIVE P/E RATIO **0.94** | DIV'D YLD **1.0%** | **VALUE LINE**

TIMELINESS 1 Raised 4/16/21
SAFETY 3 Lowered 8/14/15
TECHNICAL 4 Lowered 8/6/21
BETA 1.00 (1.00 = Market)

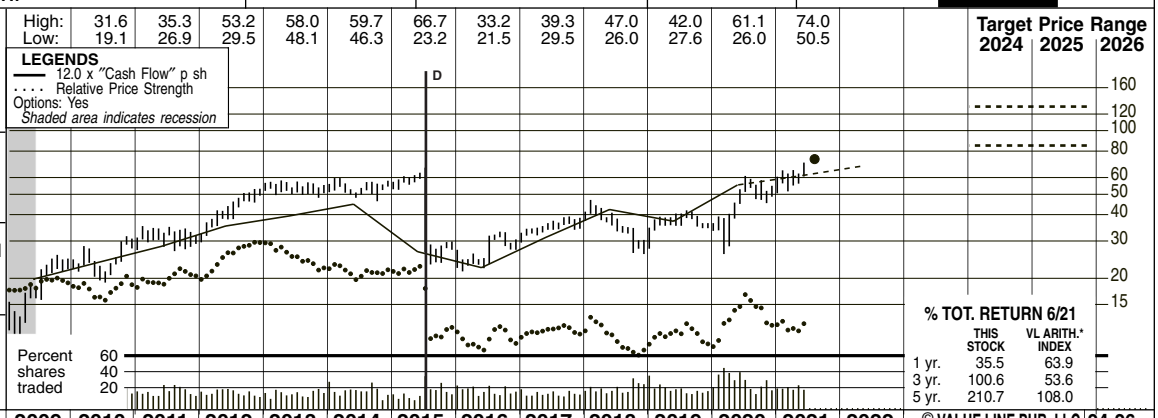
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$52-$119 $86 (15%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	130	(+75%)	*16%*
Low	85	(+15%)	*5%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	421	469	516
to Sell	467	467	455
Hld's(000)	624257	609402	593104



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
3.24	4.36	5.68	6.66	6.72	7.06	9.06	10.87	12.40	14.63	7.26	8.26	9.30	11.74	13.57	15.02	*17.80*	*19.85*	Revenues per sh	*29.10*
1.04	1.22	1.66	1.95	1.65	1.98	2.36	2.94	3.29	3.74	2.22	1.87	2.60	3.52	3.11	4.61	*4.95*	*5.60*	"Cash Flow" per sh	*8.65*
.78	.79	1.19	1.36	1.02	1.36	1.60	1.99	2.18	2.45	1.60	1.16	1.84	2.55	2.10	3.54	*4.00*	*4.50*	Earnings per sh [A]	*6.75*
--	--	--	--	--	--	--	--	--	--	--	--	--	--	.56	.54	*.72*	*.80*	Div'ds Decl'd per sh	*1.00*
.24	.38	.34	.44	.44	.56	.75	.97	.97	1.04	.56	.58	.65	.71	.70	.72	*.75*	*.90*	Cap'l Spending per sh	*1.65*
7.16	7.97	8.67	8.65	10.62	11.79	13.94	16.12	18.27	16.26	5.55	9.70	7.84	6.86	3.61	5.21	*7.40*	*8.85*	Book Value per sh [C]	*12.75*
1404.2	1368.5	1350.2	1282.0	1297.8	1297.7	1286.5	1294.0	1294.0	1224.0	1184.0	1087.0	1029.0	915.00	796.00	684.00	*675.00*	*650.00*	Common Shs Outst'g [B]	*550.00*
51.2	41.9	28.2	17.9	18.1	18.1	19.5	21.2	24.5	21.9	17.1	23.3	19.0	14.1	17.8	13.0	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*16.0*
2.73	2.26	1.50	1.08	1.21	1.15	1.22	1.35	1.38	1.15	.86	1.22	.96	.76	.95	.67			Relative P/E Ratio	*.90*
--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.5%	1.2%			Avg Ann'l Div'd Yield	*.9%*
11652	14072	16047	17902	8592.0	8979.0	9567.0	10746	10800	10271	*12000*	*12900*	Revenues ($mill)	*16000*
35.2%	35.6%	36.6%	34.8%	37.2%	36.1%	34.0%	27.2%	27.8%	32.3%	*31.5%*	*31.0%*	Operating Margin	*32.0%*
940.0	1200.0	1400.0	1490.0	687.0	682.0	676.0	696.0	681.0	609.0	*600*	*700*	Depreciation ($mill)	*1000*
2100.7	2609.0	2856.0	3082.9	1947.0	1348.0	1998.0	2528.0	1792.0	2541.7	*2730*	*2950*	Net Profit ($mill)	*3745*
46.3%	15.4%	17.6%	12.7%	19.1%	63.1%	12.2%	7.0%	18.8%	25.7%	*21.0%*	*21.0%*	Income Tax Rate	*21.0%*
18.0%	18.5%	17.8%	17.2%	22.7%	15.0%	20.9%	23.5%	16.6%	24.7%	*22.8%*	*22.9%*	Net Profit Margin	*23.4%*
5927.3	10474	10644	9000.0	5641.0	5028.0	4204.0	2672.0	640.0	3188.0	*2000*	*2500*	Working Cap'l ($mill)	*4250*
1525.0	4106.0	4117.0	6777.0	6779.0	7509.0	9234.0	7685.0	6738.0	7745.0	*7000*	*8000*	Long-Term Debt ($mill)	*10000*
17930	20865	23647	19906	6576.0	10539	8063.0	6281.0	2870.0	3561.0	*5000*	*5750*	Shr. Equity ($mill)	*7000*
10.8%	10.6%	10.5%	11.8%	15.1%	8.0%	12.3%	19.1%	20.1%	23.8%	*24.0%*	*22.5%*	Return on Total Cap'l	*23.5%*
11.7%	12.5%	12.1%	15.5%	29.6%	12.8%	24.8%	40.2%	62.4%	71.4%	*54.5%*	*51.5%*	Return on Shr. Equity	*53.5%*
11.7%	12.5%	12.1%	15.5%	29.6%	12.8%	24.8%	40.2%	46.0%	61.0%	*45.0%*	*42.5%*	Retained to Com Eq	*45.5%*
--	--	--	--	--	--	--	--	26%	15%	*18%*	*18%*	All Div'ds to Net Prof	*15%*

CAPITAL STRUCTURE as of 3/31/21
Total Debt $7027 mill. **Due in 5 Yrs** $5422 mill.
LT Debt $5855 mill. **LT Interest** $305.0 mill. (61% of Cap'l)
Leases, Uncapitalized Annual Rentals $183 mill.

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 681,261,636 shs.
as of 4/26/21
MARKET CAP: $49.9 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	3/31/21
Cash Assets	2825	3826	3367
Receivables	700	412	348
Inventory (FIFO)	--	--	--
Other	1181	2952	2976
Current Assets	4706	7190	6691
Accts Payable	270	332	324
Debt Due	1022	18	1172
Other	2774	3652	3634
Current Liab.	4066	4002	5130

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	6.0%	-2.0%	*13.5%*
"Cash Flow"	6.0%	-1.5%	*15.0%*
Earnings	6.0%	-.5%	*16.5%*
Dividends	--	--	*16.5%*
Book Value	-4.0%	-18.5%	*21.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	2580	2640	2649	2877	10746
2019	2643	2687	2649	2821	10800
2020	2129	2668	2606	2868	10271
2021	3023	*2950*	*2900*	*3127*	*12000*
2022	*3200*	*3200*	*3150*	*3350*	*12900*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.40	.64	.73	.80	2.55
2019	.57	.46	.37	.70	2.10
2020	.57	1.01	.89	1.14	3.54
2021	.82	*1.05*	*.98*	*1.15*	*4.00*
2022	*.95*	*1.20*	*1.10*	*1.25*	*4.50*

Calendar	QUARTERLY DIVIDENDS PAID [E] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	--	--	--	--	--
2018	--	--	--	--	--
2019	.14	.14	.14	.14	.56
2020	.16	.16	.16	.16	.64
2021	.18	.18			

BUSINESS: eBay Inc. provides an Internet service through which buyers and sellers are brought together in auction and fixed price formats to buy and sell a wide variety of items. Operates in more than 190 markets. Had 187 million active buyers at 3/31/21, and gross merchandise volume of $27.5 billion. Acquired PayPal, 10/02. Spun off PayPal, 7/15. Sold StubHub, 2/20. Had approximately 12,700 employees worldwide as of 12/31/2020. Officers and directors own less than 1% of common stock; The Vanguard Group, 7.4%; BlackRock, Inc., 6.5% (4/21 proxy). Chief Executive Officer: Jamie Iannone. Chairman: Paul S. Pressler. Incorporated: Delaware. Address: 2025 Hamilton Avenue, San Jose, California 95125. Telephone: 408-376-7008. Internet: www.ebay.com.

Shares of eBay have advanced nicely in price in recent months. The company reported strong results for the March quarter. The top line increased more than 40%, year to year. During the period, eBay continued to experience growth across its core categories. Gross merchandise volume rose 29%, to $27.5 billion. Annual active buyers increased 7%, to a total of 187 million. Earnings per share advanced nearly 44%, to $0.82.

The company has agreed to divest most of its operations in South Korea. eBay will sell 80% of its interest in these businesses for gross proceeds of $3 billion. It will retain an ownership interest of 20% in these operations. The deal is expected to close by early next year at the latest, assuming regulatory approvals are granted. Moreover, eBay has agreed to sell a portion of its stake in Adevinta to Permira for $2.25 billion. The transaction is expected to close at the end of the year, subject to regulatory approvals.

eBay has been active in repurchasing shares. During the first quarter, the company spent roughly $304 million on this front. Buybacks should continue to benefit earnings per share going forward.

The company will likely report healthy growth in the coming years. eBay appears to be well positioned in the e-commerce arena. Initiatives by the company to enhance its platform and improve the user experience should bear fruit. Efforts by eBay to scale its payments platform will likely also pay off.

Investors should be aware of several risks. The company operates in a very competitive environment, which can be subject to rapid technological change. Operating performance has been uneven over the past decade. In addition, leverage is somewhat greater than we would prefer.

This stock is ranked to outperform the broader market averages for the coming six to 12 months. From the recent quotation, these shares offer decent long-term capital gains potential. We anticipate solid growth in revenues and earnings per share for the company over the pull to mid-decade. Risk-tolerant accounts may find something to like here. But conservative subscribers ought to tread carefully, given the aforementioned risks.

Michael Napoli, CFA *August 6, 2021*

(A) Diluted earnings. Excludes nonrecurring items: '07, (94¢); '09, 81¢; '11, 86¢; '14, ($2.41); '16, $5.21; '17, ($2.79). Excludes discontinued items: '15, (18¢); '16, (2¢); '19, (1¢). Next earnings report due early November. Totals may not sum due to rounding. **(B)** In millions, adjusted for stock splits. **(C)** Includes intangibles. In 2020: $4.7 billion. **(D)** PayPal spun off in July of 2015. **(E)** Quarterly dividend initiated in March of 2019. Dividend paid in March, June, September, and December.

Company's Financial Strength	B++
Stock's Price Stability	70
Price Growth Persistence	50
Earnings Predictability	55

LAUDER (ESTEE) COS. NYSE-EL

RECENT PRICE **343.48** | P/E RATIO **47.8** (Trailing: 53.5 Median: 26.0) | RELATIVE P/E RATIO **2.50** | DIV'D YLD **0.6%** | **VALUE LINE**

TIMELINESS 2 Raised 9/3/21
SAFETY 2 Raised 1/4/02
TECHNICAL 3 Raised 8/20/21
BETA .95 (1.00 = Market)

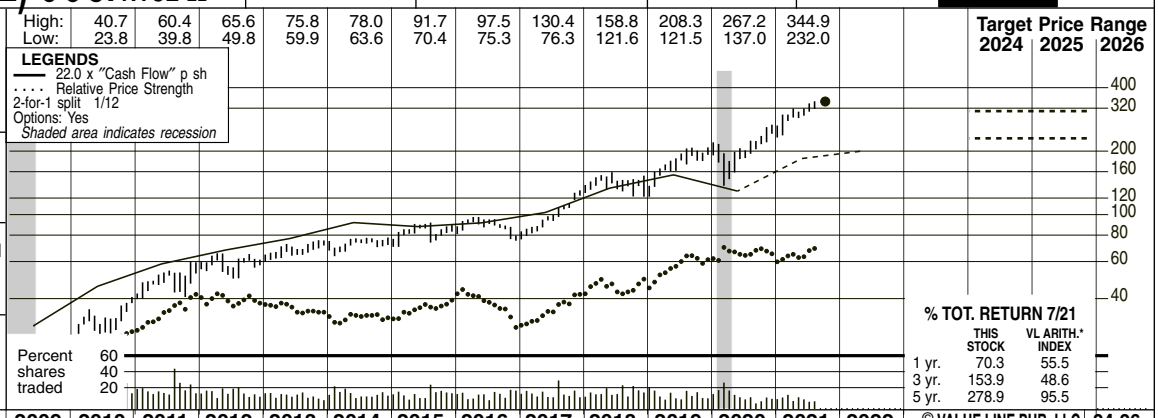
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$233-$461 $347 (0%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	310	(-10%)	*-2%*
Low	230	(-35%)	*-8%*

Institutional Decisions

	4Q2020	1Q2021	2Q2021
to Buy	514	563	579
to Sell	406	445	441
Hld's(000)	199947	202099	204419



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
14.34	15.26	18.11	20.32	18.62	19.80	22.59	25.09	26.28	28.77	28.76	30.62	32.12	37.27	41.16	39.65	44.82	*51.95*	Sales per sh [A]	*65.70*
1.43	1.45	1.69	1.86	1.35	2.08	2.66	3.09	3.50	4.17	4.00	4.16	4.65	6.06	7.02	5.88	8.37	*9.15*	"Cash Flow" per sh	*10.85*
.95	.96	1.08	1.20	.71	1.38	1.85	2.27	2.58	3.06	2.82	2.96	3.35	4.51	5.34	4.12	6.45	*7.40*	Earnings per sh [A]	*9.00*
.20	.20	.25	.28	.28	.28	.38	.53	1.08	.78	.92	1.14	1.32	1.48	1.67	1.39	2.12	*2.32*	Div'ds Decl'd per sh [E]	*2.68*
.52	.62	.80	.92	.71	.69	.90	1.09	1.19	1.34	1.26	1.43	1.37	1.71	2.06	1.73	1.76	*1.75*	Cap'l Spending per sh	*1.80*
3.83	3.83	3.09	4.25	4.17	4.95	6.74	7.06	8.48	10.11	9.72	9.71	11.91	12.77	12.15	10.91	16.74	*16.95*	Book Value per sh [B]	*16.55*
441.98	423.56	388.54	389.22	393.40	393.67	389.93	387.20	387.41	381.31	374.88	367.76	368.10	367.15	361.10	360.53	361.76	*360.00*	Common Shs Outst'g [C]	*350.00*
22.8	19.2	19.9	18.4	24.3	18.1	21.6	24.1	24.2	23.2	27.9	29.7	25.9	28.2	27.7	45.9	39.6		Avg Ann'l P/E Ratio	*30.0*
1.21	1.04	1.06	1.11	1.62	1.15	1.35	1.53	1.36	1.22	1.40	1.56	1.30	1.52	1.48	2.35	2.10		Relative P/E Ratio	*1.65*
.9%	1.1%	1.2%	1.2%	1.6%	1.1%	.9%	1.0%	1.7%	1.1%	1.2%	1.3%	1.5%	1.2%	1.1%	.7%	.8%		Avg Ann'l Div'd Yield	*1.0%*
8810.0	9713.6	10182	10969	10780	11262	11824	13683	14863	14294	16215	*18700*	Sales ($mill)	*23000*
16.7%	17.2%	18.6%	20.2%	18.7%	18.0%	18.2%	20.4%	21.5%	19.0%	21.4%	*21.0%*	Operating Margin	*19.5%*
294.4	295.8	336.9	384.6	409.3	414.7	464.0	531.0	557.0	611.0	651.0	*630*	Depreciation ($mill)	*640*
741.7	900.9	1019.8	1204.1	1088.9	1114.6	1249.0	1695.0	1977.0	1510.0	2376.0	*2660*	Net Profit ($mill)	*3150*
33.1%	31.5%	30.6%	32.0%	29.9%	27.9%	22.3%	22.3%	21.5%	23.2%	18.7%	*23.0%*	Income Tax Rate	*23.0%*
8.4%	9.3%	10.0%	11.0%	10.1%	9.9%	10.6%	12.4%	13.3%	10.6%	14.7%	*14.2%*	Net Profit Margin	*13.7%*
1743.2	1729.3	2362.6	2768.5	2332.9	1544.6	2141.0	2858.0	2607.0	3713.0	4470.0	*5200*	Working Cap'l ($mill)	*6000*
1080.1	1069.1	1326.0	1324.7	1607.5	1910.0	3383.0	3361.0	2896.0	4914.0	5537.0	*5200*	Long-Term Debt ($mill)	*4000*
2629.4	2733.2	3286.9	3854.9	3643.2	3571.9	4384.0	4688.0	4386.0	3935.0	6057.0	*6100*	Shr. Equity ($mill)	*5800*
20.8%	24.5%	22.7%	23.7%	21.3%	21.0%	16.7%	21.8%	28.0%	17.9%	*21.5%*	*24.5%*	Return on Total Cap'l	*32.0%*
28.2%	33.0%	31.0%	31.2%	29.9%	31.2%	28.5%	36.2%	45.1%	38.4%	39.2%	*43.5%*	Return on Shr. Equity	*54.0%*
22.6%	25.5%	18.3%	23.4%	20.3%	19.4%	17.4%	24.5%	31.2%	25.6%	26.6%	*30.0%*	Retained to Com Eq	*45.0%*
20%	23%	41%	25%	32%	38%	39%	32%	31%	33%	32%	*31%*	All Div'ds to Net Prof	*30%*

CAPITAL STRUCTURE as of 6/30/21
Total Debt $5569.0 mill. **Due in 5 Yrs** $1613.0 mill.
LT Debt $5537.0 mill. **LT Interest** $193.0 mill. (48% of Cap'l)
Leases, Uncapitalized Annual rentals $431.0 mill.
Pension Assets-6/21 $1662.0 mill.
Oblig. $1775.0 mill
Pfd Stock None
Common Stock 361,287,242 shs.
as of 8/20/21
(Class A: 233,045,213 shs.;
Class B: 128,242,029 shs., have 10 votes and are conv. into Cl. A shs. on a share-for-share basis.)
MARKET CAP: $124.1 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	2987	5022	4958
Receivables	1831	1194	1702
Inventory (FIFO)	2006	2062	2505
Other	388	614	603
Current Assets	7212	8892	9768
Accts Payable	1490	1177	1692
Debt Due	516	1222	32
Other	2599	2780	3574
Current Liab.	4605	5179	5298

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	7.0%	7.0%	*9.0%*
"Cash Flow"	13.5%	10.0%	*9.5%*
Earnings	15.5%	10.5%	*11.5%*
Dividends	18.5%	10.5%	*10.0%*
Book Value	10.5%	5.0%	*5.5%*

Fiscal Year Ends	QUARTERLY SALES ($ mill.)[A] [D] Sep.30	Dec.31	Mar.31	Jun.30	Full Fiscal Year
2018	3274	3744	3370	3295	13683
2019	3524	4005	3744	3590	14863
2020	3895	4624	3345	2430	14294
2021	3562	4853	3864	3936	16215
2022	*4250*	*5500*	*4600*	*4350*	*18700*

Fiscal Year Ends	EARNINGS PER SHARE [A] [D] Sep.30	Dec.31	Mar.31	Jun.30	Full Fiscal Year
2018	1.21	1.52	1.17	.61	4.51
2019	1.41	1.74	1.55	.64	5.34
2020	1.67	2.11	.85	d.53	4.12
2021	1.44	2.61	1.59	.78	6.45
2022	*1.70*	*2.80*	*1.90*	*1.00*	*7.40*

Cal-endar	QUARTERLY DIVIDENDS PAID[E] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.34	.34	.34	.38	1.40
2018	.38	.38	.38	.43	1.57
2019	.43	.43	.43	.48	1.77
2020	.48	- -	.48	.53	1.49
2021	.53	.53	.53		

BUSINESS: The Estee Lauder Companies Inc. makes and markets skin care, makeup, fragrance, and hair care products worldwide. Brand names include *Estee Lauder*, *Clinique*, *Aramis*, *Prescriptives*, *Origins*, *M.A.C.*, *Bobbi Brown essentials*, and *Aveda*. EL is the global licensee for *Tommy Hilfiger* fragrances and cosmetics. Sells mostly through upscale dept. stores and perfumeries, specialty retailers, and pharmacies. Int'l. bus.: 66% of '20 op. inc., 73% of sales. Sales by product: makeup, 34.0%; skin care, 52.0%; frag., 12.0%; hair care, 2.0%; Has about 45,000 employees. Off. & dir. control 30.0% of voting stock (10/20 Proxy). Chairman: William P. Lauder. CEO: Fabrizio Freda. Inc.: DE. Addr.: 767 Fifth Ave., NY, NY 10153. Tel.: 212-572-4200. Internet: www.elcompanies.com.

Estee Lauder closed out fiscal 2021 on a positive note. The company reported adjusted earnings of $0.78 a share on total sales of $3.94 billion in its fiscal fourth quarter (ended June 30th), marking strong improvement versus a deficit of $0.53 on $2.43 billion in the comparable year-ago period. The performance benefited from easing COVID-19-related disruption across the retail landscape, which in turn fueled an impressive recovery in virtually all of the company's key markets and product lines. From a geographic standpoint, the Americas region led the way (sales +86% year over year), followed by EMEA (+70%), and Asia/Pacific (+40%). Fragrance (+162%) was the notable standout on the product side, with Makeup (+76%) and Skin Care (+47%) also providing support.

The company is well positioned to build on this momentum in fiscal 2022. Estee Lauder's June-period results surpassed consensus expectations on both lines and management offered up some encouraging near-term guidance. Specifically, the company expects adjusted earnings in the range of $7.23 to $7.38 a share for fiscal 2022, implying year-over-year growth of 13% at the midpoint, on a 13% to 16% increase in total sales. Comps should benefit from further macroeconomic recovery, acquisition-related contributions, the company's recently increased ownership in Deciem Beauty Group, and continued implementation of management's post-COVID business acceleration program (expected to yield annual cost savings of $300 million to $400 million by fiscal 2023). All told, we are currently targeting adjusted earnings of $7.40 a share in fiscal 2022 (previously $7.00) on total sales of $18.7 billion (previously $17.9 billion).

The stock holds an Above Average (2) rank for Timeliness. EL shares have risen about 12% in value since our last report went to press in June, and are now up more than 30% in calendar 2021. While our ranking system suggests that there is still some upside to be had over these next six to 12 months, our longer-term projections reflect below-average total-return potential over the 18-month and 2024-2026 time frames. It is worth noting that the equity is currently trading at a historically high P/E multiple.

Michael Ratty *September 10, 2021*

(A) Diluted earnings. Fiscal year ends June 30th. Excl. non-rec. losses: '06, ($0.15); '09, ($0.31); '10, ($0.38); disc. ops, '06, ($0.43); '11, ($0.21); '16, ($0.03). Next earnings report due Nov. 2nd. **(B)** Includes intangibles. In '21: $6,711.0 mill., $18.55/share. **(C)** In millions, adjusted for stock split. **(D)** Year-end sales or earnings may not tally due to rounding. **(E)** Dividend paid in fourth quarter through 2012, quarterly thereafter. Div'd suspended on May 1st, 2020, reinstated on Aug. 20th, 2020.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	90
Earnings Predictability	75

EXPONENT, INC. NYSE-EXPO

RECENT PRICE **113.32** | P/E RATIO **NMF** (Trailing: 62.6 Median: 30.0) | RELATIVE P/E RATIO **NMF** | DIV'D YLD **0.7%** | VALUE LINE **439**

TIMELINESS 4 Lowered 7/30/21
SAFETY 3 New 2/21/20
TECHNICAL 5 Lowered 8/13/21
BETA .90 (1.00 = Market)

18-Month Target Price Range

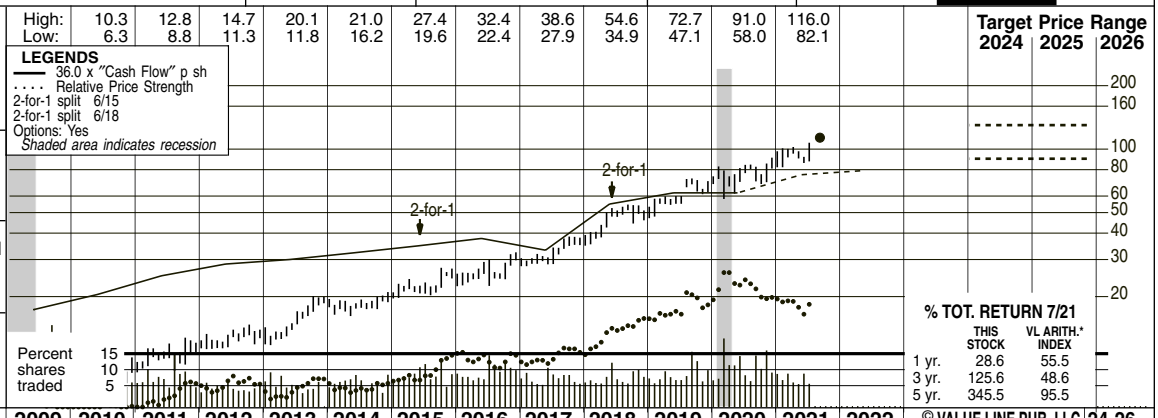
Low-High	Midpoint (% to Mid)
$73-$160	$117 (5%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	130	(+15%)	*5%*
Low	90	(-20%)	*-4%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	151	149	139
to Sell	141	147	150
Hld's(000)	46668	46456	46668



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
2.40	2.86	3.57	4.18	4.15	3.96	4.64	5.05	5.36	5.92	6.08	6.15	6.75	7.37	8.06	7.72	*8.70*	*9.10*	Revenues per sh	*11.10*
.27	.30	.42	.50	.48	.57	.70	.79	.83	.90	.97	1.05	.92	1.53	1.72	1.73	*2.10*	*2.20*	"Cash Flow" per sh	*3.00*
.20	.21	.31	.37	.37	.46	.56	.65	.69	.74	.80	.88	.77	1.33	1.53	1.55	*1.85*	*2.00*	Earnings per sh [A]	*2.90*
- -	- -	- -	- -	- -	- -	- -	- -	.15	.25	.30	.36	.42	.52	.64	.76	*.80*	*.90*	Div'ds Decl'd per sh [D]	*1.40*
.05	.05	.06	.10	.04	.04	.07	.09	.12	.10	.10	.28	.09	.32	.45	.10	*.15*	*.30*	Cap'l Spending per sh	*.45*
2.06	2.11	2.30	2.34	2.73	3.28	3.51	4.10	4.50	4.75	5.11	5.34	5.61	6.10	6.77	6.98	*7.35*	*7.65*	Book Value per sh [B]	*9.65*
64.77	58.85	57.44	54.76	54.95	55.98	53.20	52.82	52.26	51.48	51.44	51.19	51.54	51.50	51.76	51.80	*53.00*	*55.00*	Common Shs Outst'g [C]	*60.00*
16.7	19.7	18.6	20.9	18.0	17.0	19.0	19.5	22.8	25.2	28.3	30.1	42.1	34.8	40.0	49.1	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*38.0*
.89	1.06	.99	1.26	1.20	1.08	1.19	1.24	1.28	1.33	1.42	1.58	2.12	1.88	2.13	2.52			Relative P/E Ratio	*2.10*
- -	- -	- -	- -	- -	- -	- -	- -	1.0%	1.3%	1.3%	1.4%	1.3%	1.1%	1.0%	1.0%			Avg Ann'l Div'd Yield	*1.2%*
246.7	266.6	280.0	304.7	312.8	315.1	347.8	379.5	417.2	399.9	*460*	*500*	Revenues ($mill)	*665*
32.9%	32.2%	30.8%	36.3%	38.1%	26.6%	27.7%	25.8%	22.0%	22.5%	*28.0%*	*29.0%*	Operating Margin	*34.0%*
4.4	4.7	5.0	5.4	6.1	6.1	6.3	6.3	6.8	6.9	*10.0*	*10.0*	Depreciation ($mill)	*10.0*
32.7	37.2	38.6	40.7	43.6	47.5	41.3	72.3	82.5	82.6	*100*	*110*	Net Profit ($mill)	*170*
40.4%	39.7%	39.6%	40.1%	38.7%	31.3%	49.9%	22.6%	20.9%	14.8%	*20.0%*	*20.0%*	Income Tax Rate	*20.0%*
13.3%	14.0%	13.8%	13.4%	13.9%	15.1%	11.9%	19.0%	19.8%	20.6%	*21.7%*	*22.0%*	Net Profit Margin	*25.6%*
137.8	163.6	179.5	187.1	192.3	193.8	222.4	228.3	240.0	249.5	*275*	*300*	Working Cap'l ($mill)	*400*
- -	- -	- -	- -	1.9	- -	- -	- -	- -	- -	*Nil*	*Nil*	Long-Term Debt ($mill)	*Nil*
186.7	216.4	235.1	244.3	262.8	273.3	289.1	313.9	350.3	361.5	*390*	*420*	Shr. Equity ($mill)	*580*
17.5%	17.2%	16.4%	16.7%	16.5%	17.4%	14.3%	23.0%	23.5%	22.8%	*25.5%*	*26.0%*	Return on Total Cap'l	*29.5%*
17.5%	17.2%	16.4%	16.7%	16.6%	17.4%	14.3%	23.0%	23.5%	22.8%	*25.5%*	*26.0%*	Return on Shr. Equity	*29.5%*
17.5%	17.2%	13.1%	11.3%	10.6%	10.5%	6.7%	14.3%	14.0%	11.8%	*14.5%*	*14.5%*	Retained to Com Eq	*15.0%*
- -	- -	21%	32%	36%	40%	53%	38%	41%	48%	*42%*	*45%*	All Div'ds to Net Prof	*48%*

CAPITAL STRUCTURE as of 7/2/21
Total Debt None

Leases, Uncapitalized: Annual rentals $6.6 mil.

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 52,058,748 shares.
MARKET CAP: $5.9 billion (Mid Cap)

CURRENT POSITION ($MILL)	2019	2020	7/2/21
Cash Assets	176.4	242.5	240.0
Receivables	120.1	111.6	142.7
Inventory	- -	- -	- -
Other	67.5	12.7	15.1
Current Assets	364.0	366.8	397.8
Accts Payable	4.7	3.3	27.0
Debt Due	- -	- -	- -
Other	119.3	114.0	96.0
Current Liab.	124.0	117.3	123.0

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	6.5%	6.0%	*6.0%*
"Cash Flow"	12.5%	13.0%	*10.5%*
Earnings	14.0%	14.5%	*12.0%*
Dividends	- -	22.5%	*14.0%*
Book Value	9.0%	6.5%	*6.5%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Fiscal Year
2018	96.5	95.6	95.3	92.1	379.5
2019	99.0	106.5	101.5	110.1	417.2
2020	106.0	92.5	98.7	103.2	399.9
2021	116.5	119.9	*115*	*108.6*	*460*
2022	*120*	*120*	*130*	*130*	*500*

Fiscal Year Ends	EARNINGS PER SHARE [AD] Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Fiscal Year
2018	.37	.34	.32	.30	1.33
2019	.42	.39	.36	.36	1.53
2020	.49	.31	.34	.41	1.55
2021	.58	.48	*.40*	*.39*	*1.85*
2022	*.45*	*.50*	*.50*	*.55*	*2.00*

Cal-endar	QUARTERLY DIVIDENDS PAID [D] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.105	.105	.105	.105	.42
2018	.13	.13	.13	.13	.52
2019	.16	.16	.16	.16	.64
2020	.19	.19	.19	.19	.76
2021	.20	.20			

BUSINESS: Exponent, Inc. is a science and engineering consulting company that provides solutions to complex problems. Its team of scientists, engineers, and business and regulatory consultants bring together more than 90 different technical disciplines to solve complicated issues facing industry and government. The company's services include: analysis of product development, product recall, regulatory compliance, and the discovery of potential problems related to products, people, property, and impending litigation. Has 1,168 employees. Officers & directors own 1.8% of common stock; BlackRock, 15.4%; Vanguard, 10.4% (4/21 Proxy). CEO: Paul R. Johnston Address: 149 Commonwealth Dr., Menlo Park, CA 94025. Tel.: (650) 326-9400. Internet: www.exponent.com.

Exponent experienced record utilization en route to a solid June-period performance. Relaxation of pandemic-related restrictions helped accelerate the timing of certain human participant studies. Courts were also able to resume activity, and the company commenced some new engagements, as well. This resulted in staff utilization of 79%, and revenues of $119.9 million for the term.

Project activity is likely to take a modest step back in the coming months. Exponent management sighted a combination of strong demand and convenient timing as a reason for its success in the second quarter. However, common seasonality ought to play a role in normalization of its utilization rates, while deceleration is also expected in its human participant studies. That said, demand across the Engineering and Other Scientific segment should remain stout, with international arbitration and strength across multiple end markets likely to drive modest improvements relative to 2019. The Environmental and Health segment should also continue to gain ground through litigation of chemical regulatory and food safety practice cases.

The company is striving to expand its workforce to address strong demand. Exponent requires candidates with high levels of expertise to handle the workloads that come with a position in its core practices. And though utilization levels are expected to tick back down to the mid-70% vicinity, the company wants to be ready for another potential spike in demand, given the way that businesses are changing their approach in the wake of the pandemic. Developments in supply chain operations servicing the transportation, utility, and medical services industries ought to keep revenues on the rise in the near term. Meanwhile, general expenses associated with marketing and recruitment are likely to come in at about $15 million this year.

Exponent stock is ranked 4 (Below Average) for Timeliness. Shares of the company have risen more than 20% in value dating back to our late-May report. However, this has discounted much of the price appreciation potential to 2024-2026 that we had envisioned here.

Robert J. Scrudato *August 20, 2021*

(A) Diluted shares. May not sum due to rounding. Fiscal years end Friday closest to December 31st. Next earnings report late October.
(B) Incl. intang. In 2020, $8.6 mill., about $0.17/sh.
(C) In millions.
(D) Dividends historically paid in late March, June, September, and December.

Company's Financial Strength	B+
Stock's Price Stability	90
Price Growth Persistence	100
Earnings Predictability	75

FASTENAL COMPANY NDQ-FAST

RECENT PRICE **55.89** | P/E RATIO **35.4** (Trailing: 37.0 Median: 26.0) | RELATIVE P/E RATIO **1.86** | DIV'D YLD **2.0%** | VALUE LINE **1138**

TIMELINESS 5 Lowered 6/4/21
SAFETY 2 Raised 10/2/09
TECHNICAL 3 Raised 9/17/21
BETA .95 (1.00 = Market)

18-Month Target Price Range

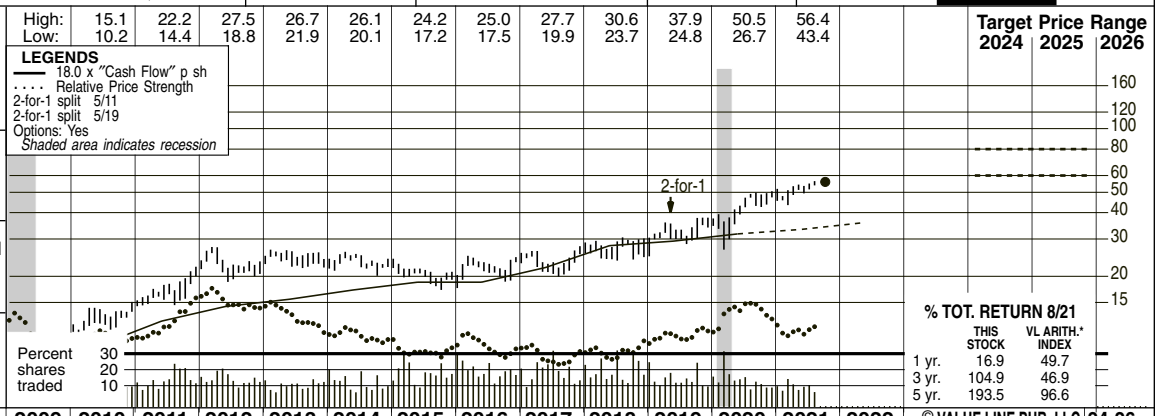
Low-High	Midpoint (% to Mid)
$41-$82	$62 (10%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	80	(+45%)	*11%*
Low	60	(+5%)	*4%*

Institutional Decisions

	4Q2020	1Q2021	2Q2021
to Buy	426	426	431
to Sell	385	399	378
Hld's(000)	444228	442391	453002



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
High:	15.1	22.2	27.5	26.7	26.1	24.2	25.0	27.7	30.6	37.9	50.5	56.4						
Low:	10.2	14.4	18.8	21.9	20.1	17.2	17.5	19.9	23.7	24.8	26.7	43.4						

Target Price Range 2024 | 2025 | 2026

% TOT. RETURN 8/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	16.9	49.7
3 yr.	104.9	46.9
5 yr.	193.5	96.6

2.52	2.99	3.46	3.94	3.27	3.85	4.69	5.28	5.60	6.31	6.68	6.85	7.63	8.68	9.29	9.84	***10.15***	***10.70***
.32	.38	.45	.54	.38	.52	.68	.80	.86	.96	1.04	1.04	1.22	1.55	1.63	1.76	***1.85***	***2.00***
.28	.33	.39	.48	.31	.45	.61	.71	.76	.84	.89	.87	1.01	1.31	1.38	1.49	***1.55***	***1.70***
.08	.10	.11	.13	.18	.21	.33	.37	.40	.50	.56	.60	.64	.77	.86	1.00	***1.12***	***1.24***
1.30	1.52	1.69	1.92	2.02	2.17	2.47	2.63	2.99	3.24	3.11	3.34	3.65	4.03	4.64	4.76	***4.95***	***5.20***
604.22	604.83	596.48	594.12	589.72	589.72	590.52	593.13	593.51	591.74	579.16	578.32	575.18	571.80	574.13	574.16	***574.00***	***573.00***
28.7	30.4	26.6	23.0	28.6	27.9	28.2	31.7	32.3	27.9	23.2	25.3	23.3	20.8	23.6	28.0		
1.53	1.64	1.41	1.38	1.90	1.77	1.77	2.02	1.81	1.47	1.17	1.33	1.17	1.12	1.26	1.45		
1.0%	1.0%	1.1%	1.2%	2.0%	1.6%	1.9%	1.6%	1.6%	2.1%	2.7%	2.7%	2.7%	2.8%	2.6%	2.4%		
2766.9	3133.6	3326.1	3733.5	3869.2	3962.0	4390.5	4965.1	5333.7	5647.3	***5835***	***6130***
53.4%	53.2%	53.6%	52.8%	52.6%	52.2%	49.3%	51.0%	47.2%	45.5%	***49.5%***	***50.0%***
22.4%	23.2%	23.3%	23.0%	23.6%	22.7%	20.1%	22.8%	19.8%	20.2%	***20.0%***	***20.5%***
2585	2652	2687	2637	2622	2512	2388	2227	2114	2003	***1895***	***1810***
357.9	420.5	448.6	494.2	516.4	499.5	578.6	751.9	790.9	859.1	***890***	***975***
37.8%	37.6%	37.1%	37.2%	37.5%	36.8%	33.7%	23.8%	24.2%	24.2%	***24.0%***	***24.0%***
12.9%	13.4%	13.5%	13.2%	13.3%	12.6%	13.2%	15.1%	14.8%	15.2%	***15.3%***	***15.9%***
1048.3	1082.5	1168.7	1207.9	1291.6	1445.2	1584.7	1878.8	1912.5	1886.9	***1900***	***1900***
--	--	--	--	303.0	379.5	412.0	497.0	342.0	365.0	***380***	***400***
1459.0	1560.4	1772.7	1915.2	1801.3	1933.1	2096.9	2302.7	2665.6	2733.2	***2850***	***2990***
24.5%	27.0%	25.3%	25.8%	24.5%	21.7%	23.2%	27.1%	26.5%	27.9%	***27.0%***	***28.0%***
24.5%	27.0%	25.3%	25.8%	28.7%	25.8%	27.6%	32.7%	29.7%	31.4%	***31.0%***	***32.5%***
11.4%	12.9%	11.9%	10.3%	10.5%	7.9%	10.0%	13.5%	11.0%	10.4%	***8.5%***	***9.5%***
54%	52%	53%	60%	63%	69%	64%	59%	63%	67%	***72%***	***73%***

Bold figures are Value Line estimates

© VALUE LINE PUB. LLC | 24-26

Sales per sh	*11.65*
"Cash Flow" per sh	*3.15*
Earnings per sh [A]	*2.40*
Div'ds Decl'd per sh [B]	*1.54*
Book Value per sh	*5.90*
Common Shs Outst'g [C]	*572.00*
Avg Ann'l P/E Ratio	*29.0*
Relative P/E Ratio	*1.60*
Avg Ann'l Div'd Yield	*2.2%*
Sales ($mill)	*6675*
Gross Margin	*52.0%*
Operating Margin	*22.0%*
Number of Stores	*1520*
Net Profit ($mill)	*1375*
Income Tax Rate	*21.0%*
Net Profit Margin	*20.6%*
Working Cap'l ($mill)	*1925*
Long-Term Debt ($mill)	*500*
Shr. Equity ($mill)	*3370*
Return on Total Cap'l	*37.0%*
Return on Shr. Equity	*41.0%*
Retained to Com Eq	*14.5%*
All Div'ds to Net Prof	*64%*

CAPITAL STRUCTURE as of 6/30/21
Total Debt $405.0 mill. **Due in 5 Yrs** $40.0 mill.
LT Debt $365.0 mill. **LT Interest** $24.9 mill.
(11% of Cap'l)
Leases, Uncapitalized Annual rentals $58.3 mill.

No Defined Benefit Pension Plan

Preferred Stock None

Common Stock 574,739,178 shs.
as of 7/16/21

MARKET CAP: $32.1 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	174.9	245.7	321.8
Receivables	741.8	769.4	908.9
Inventory (FIFO)	1366.4	1337.5	1327.9
Other	174.1	147.0	146.7
Current Assets	2457.2	2499.6	2705.3
Accts Payable	192.8	207.0	236.1
Debt Due	3.0	40.0	40.0
Other	348.9	365.7	374.1
Current Liab.	544.7	612.7	650.2

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	9.5%	8.5%	*7.0%*
"Cash Flow"	13.0%	11.5%	*10.5%*
Earnings	13.0%	11.0%	*9.0%*
Dividends	17.5%	12.5%	*12.0%*
Book Value	8.0%	7.5%	*6.5%*

Calendar	QUARTERLY SALES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1185.8	1267.9	1279.8	1231.6	4965.1
2019	1309.3	1368.4	1379.1	1276.9	5333.7
2020	1367.0	1509.0	1413.3	1358.0	5647.3
2021	1417.0	1507.7	***1450***	***1460.3***	***5835***
2022	***1480***	***1500***	***1550***	***1600***	***6130***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.30	.37	.35	.29	1.31
2019	.34	.36	.37	.31	1.38
2020	.35	.42	.38	.34	1.49
2021	.37	.42	***.40***	***.36***	***1.55***
2022	***.40***	***.45***	***.45***	***.40***	***1.70***

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.16	.16	.16	.16	.64
2018	.185	.185	.20	.20	.77
2019	.215	.215	.215	.215	.86
2020	.25	.25	.25	.25	1.00
2021	.28	.28	.28		

BUSINESS: Fastenal Company sells and delivers industrial and construction supplies through stores in the U.S., Puerto Rico, Canada, Mexico, Singapore, China, and the Netherlands. Sells threaded fasteners; tools and equipment; cutting tool blades and abrasives; components and accessories for hydraulics, pneumatics, plumbing and HVAC; metals; and janitorial, welding, safety and electrical supplies. At 12/31/20 it had 2,003 stores, 1,265 Onsite locations, 94,033 vending machines, and 18,253 employees. Off. & dir. own less than 1% of stock; Vanguard, 11.6%; BlackRock, 8.1%; BONY Mellon, 5.9% (2/21 proxy). Chrmn.: Willard D. Oberton. Pres. & CEO: Daniel L. Florness. Inc.: MN. Addr.: 2001 Theurer Boulevard, Winona, MN 55987. Tel.: 507-454-5374. Web: www.fastenal.com.

Fastenal makes good use of its capital. It generates strong profits in comparison to the amount of equity it carries, far more so than the average construction supply company. That's why its return on shareholders' equity is so high. It's also why the gross margin consistently trends around the 50% mark, the highest in the business. This is a major reason why the stock price has always commanded a market premium (see average annual relative P/E ratios). Another reason for the above-average P/E ratio is the company's Earnings Predictability, a metric that hasn't dropped below 95 (out of 100) for three years.

The company has a loyal customer base. The supplier of construction materials has been around a long time, and boasts a long list of contractors as its clients, both big and small. This is one reason why major competitors like Lowe's, Home Depot, and Amazon find it hard to compete. Another reason is that Fastenal has made a big selling point of going to the consumer, rather than have the consumer come to it. The company is creating an increasing number of onsite locations that are usually on (or in close proximity to) the customer's place of work. Many of these onsite locations also have vending machines, which can be utilized at any time. In the second quarter, the number of onsite locations rose 9.2%, to 1,323, and the number of vending machines increased 9.3%, to 87,567. Meantime, the number of brick-and-mortar stores declined 6.7%, to 1,921.

This is a good holding for the more conservative investor. Fastenal has very good control over its supply chains, This was one of the reasons it performed so well during the pandemic last year. In addition, its products are always in demand from a wide variety of markets and geographies. A business model that has ease of purchase, a comprehensive service backup network, consistently high unit volume, with products very competitively priced, and with very little overhead, makes for a winner. Although the stock is currently untimely and has below-average long-term capital gains potential, its Above-Average Safety rank of 2, and the solid and consistent dividend make up for these minor drawbacks.

Jeremy J. Butler *September 17, 2021*

(A) Basic earnings. Excludes non-recurring gains/(losses): '08, ($0.03). Next earnings report due mid-October. May not sum due to rounding.

(B) Dividends historically paid in late February, May, August, and November. Switched from semi-annual dividend to quarterly dividend in April, 2011. Special dividends paid: $0.27 on 12/15/08, $0.42 on 12/6/10, $0.50 on 12/21/12, $0.40 on 12/22/20.

(C) In millions, adjusted for splits.

Company's Financial Strength	A+
Stock's Price Stability	80
Price Growth Persistence	35
Earnings Predictability	95

FIRSTCASH, INC. NDQ-FCFS

RECENT PRICE **77.96** | P/E RATIO **24.7** (Trailing: 29.2 / Median: 22.0) | RELATIVE P/E RATIO **1.27** | DIV'D YLD **1.5%** | **VALUE LINE**

TIMELINESS 4 Raised 5/14/21
SAFETY 3 New 5/21/10
TECHNICAL 2 Raised 7/30/21
BETA .90 (1.00 = Market)

18-Month Target Price Range

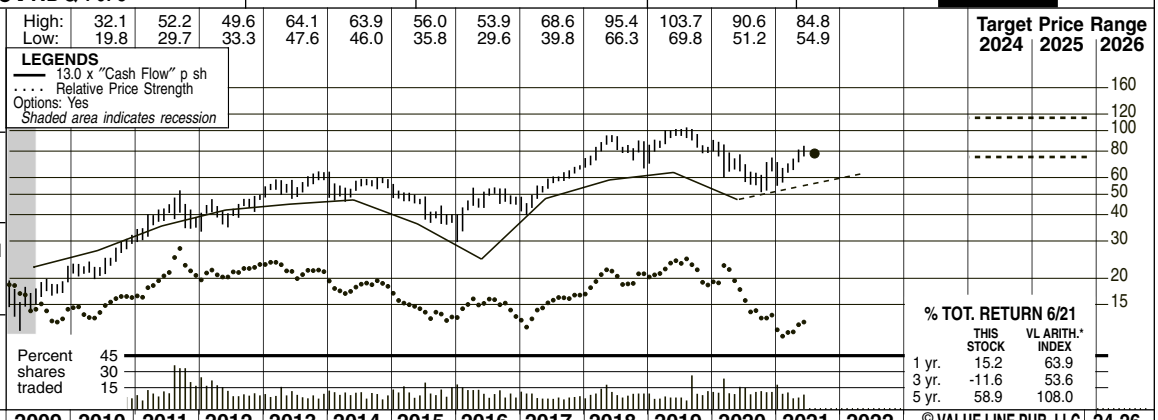
Low-High	Midpoint (% to Mid)
$44-$100	$72 (-10%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	115	(+50%)	*11%*
Low	75	(-5%)	*1%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	113	87	93
to Sell	105	130	103
Hld's(000)	39388	38859	38160



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
6.60	8.40	12.64	11.41	12.26	13.84	17.32	20.48	22.83	25.01	24.95	22.44	37.94	40.84	44.05	39.75	***39.00***	***41.45***	Revenues per sh	***53.75***
.99	1.24	1.43	1.72	1.74	2.08	2.72	3.23	3.45	3.61	2.79	1.90	3.66	4.50	4.88	3.62	***4.20***	***4.85***	"Cash Flow" per sh	***6.95***
.76	.97	1.00	1.26	1.39	1.75	2.25	2.73	2.86	2.94	2.14	1.72	2.43	3.42	3.81	2.55	***3.15***	***3.70***	Earnings per sh [A]	***5.55***
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	.57	.77	.91	1.02	1.08	***1.17***	***1.20***	Div'ds Decl'd per sh	***1.50***
.38	.46	.78	.69	.52	.59	.96	.75	.92	.84	.75	.70	.79	1.28	2.81	2.02	***.95***	***.95***	Cap'l Spending per sh	***1.00***
5.17	5.88	6.55	5.28	7.12	9.56	10.48	12.11	14.31	15.73	15.28	29.89	31.45	30.23	31.89	31.28	***33.30***	***34.55***	Book Value per sh [B]	***46.40***
31.50	32.10	30.72	29.24	29.86	31.16	30.09	29.10	28.95	28.51	28.24	48.51	46.91	43.60	42.33	41.04	***41.00***	***41.00***	Common Shs Outst'g [C]	***40.00***
15.4	20.4	21.6	11.7	12.4	13.9	17.4	15.6	19.5	18.6	20.6	26.7	22.7	23.9	23.8	26.9	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***17.0***
.82	1.10	1.15	.70	.83	.88	1.09	.99	1.10	.98	1.04	1.40	1.14	1.29	1.27	1.40			Relative P/E Ratio	***.95***
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	1.2%	1.4%	1.1%	1.1%	1.6%			Avg Ann'l Div'd Yield	***1.6%***
521.3	595.9	660.8	712.9	704.6	1088.4	1779.8	1780.9	1864.4	1631.3	***1600***	***1700***	Revenues ($mill)	***2150***
22.8%	23.0%	21.0%	20.7%	17.2%	16.8%	15.3%	15.9%	16.1%	14.6%	***15.5%***	***16.5%***	Operating Margin	***18.0%***
11.0	12.9	15.4	17.5	17.9	31.9	55.2	43.0	41.9	42.1	***42.5***	***47.0***	Depreciation ($mill)	***57.0***
70.9	81.1	84.5	85.4	60.7	60.1	116.6	153.2	164.6	106.6	***130***	***150***	Net Profit ($mill)	***220***
34.5%	33.9%	29.7%	27.0%	30.8%	35.7%	32.3%	25.4%	26.7%	25.8%	***27.0%***	***27.0%***	Income Tax Rate	***27.0%***
13.6%	13.6%	12.8%	12.0%	8.6%	5.5%	6.6%	8.6%	8.8%	6.5%	***8.1%***	***8.9%***	Net Profit Margin	***10.3%***
175.1	210.2	241.4	265.3	279.2	748.5	721.6	656.8	538.1	418.2	***455***	***420***	Working Cap'l ($mill)	***755***
- -	110.9	187.0	222.4	258.0	456.5	402.2	590.9	631.6	615.9	***495***	***450***	Long-Term Debt ($mill)	***450***
315.4	352.4	414.4	448.6	431.4	1450.0	1475.3	1318.1	1350.0	1283.8	***1365***	***1415***	Shr. Equity ($mill)	***1855***
22.5%	17.7%	14.3%	13.7%	10.0%	3.7%	6.9%	8.8%	9.2%	6.4%	***7.0%***	***8.0%***	Return on Total Cap'l	***9.5%***
22.5%	23.0%	20.4%	19.0%	14.1%	4.1%	7.9%	11.6%	12.2%	8.3%	***9.5%***	***10.5%***	Return on Shr. Equity	***12.0%***
22.5%	23.0%	20.4%	19.0%	14.1%	2.8%	5.4%	8.5%	8.9%	4.8%	***6.0%***	***7.0%***	Retained to Com Eq	***8.5%***
- -	- -	- -	- -	- -	33%	32%	27%	27%	42%	***37%***	***33%***	All Div'ds to Net Prof	***27%***

CAPITAL STRUCTURE as of 3/31/21
Total Debt $537.1 mill. **Due in 5 Yrs** $123.0 mill.
LT Debt $537.1 mill. **LT Interest** $12.5 mill. (29% of Cap'l)

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 41,027,426 shs. **as of 4/20/21**

MARKET CAP: $3.2 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2019	2020	3/31/21
Cash Assets	46.5	65.9	54.6
Pawn loans & Receiv.	416.2	349.3	300.8
Inventory (for sale)	265.3	190.4	185.3
Other	13.0	19.0	16.9
Current Assets	741.0	624.6	557.6
Debt Due	- -	- -	- -
Accounts Payable	12.2	13.2	79.6
Other	190.7	193.2	132.4
Current Liab.	202.9	206.4	212.0

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	13.0%	11.5%	*4.5%*
"Cash Flow"	9.0%	5.5%	*8.0%*
Earnings	8.5%	4.5%	*9.5%*
Dividends	- -	- -	*7.0%*
Book Value	15.5%	15.5%	*7.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	449.8	420.0	429.9	481.2	1780.9
2019	467.6	446.0	452.5	498.4	1864.5
2020	466.5	412.7	359.9	392.2	1631.3
2021	407.9	389.6	***375***	***427.5***	***1600***
2022	***410***	***400***	***415***	***475***	***1700***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.90	.67	.76	1.09	3.42
2019	.98	.76	.81	1.27	3.81
2020	.78	.62	.36	.79	2.55
2021	.82	.70	***.65***	***.98***	***3.15***
2022	***1.00***	***.80***	***.80***	***1.10***	***3.70***

Calendar	QUARTERLY DIVIDENDS PAID [D] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.19	.19	.19	.20	.77
2018	.22	.22	.22	.25	.91
2019	.25	.25	.25	.27	1.02
2020	.27	.27	.27	.27	1.08
2021	.27	.30			

BUSINESS: FirstCash, Inc. is an operator of retail-based pawn and consumer finance stores in the United States and Latin America. As of December 31, 2020, the company had 2,748 locations in 24 U.S. states and 32 states in Mexico. Its primary business is the operation of pawn stores, which engage in retail sales, purchasing second-hand goods and conducting consumer finance activities. Sold the bulk of its payday/short-term loan stores, 12/09; Acquired Cash America, 9/16. Has about 17,000 employees. Pres. & CEO: Rick L. Wessel. Officers & directors own 2.7% of the common stock; BlackRock, 11.8%; FMR LLC, 11.0%; The Vanguard Group, 8.8% (4/21 proxy). Inc.: DE. Address: 1600 West 7th Street, Fort Worth, TX 76192. Tele.: 817-460-3947. Internet: www.firstcash.com.

FirstCash registered a solid showing in the June interim. The company posted revenues of $389.6 million, which were higher than our $365 million target. Earnings of $0.70 a share were in line with our expectations. Management cited an accelerating recovery in pawn receivables and strength in its retail operations as the reasons for the performance amid a tough operating backdrop related to business disruptions from the pandemic. As a result, pawn loans remain down from pre-pandemic levels, but have improved.

The board increased the dividend. The company raised the quarterly payout by $0.03, to $0.30 a share. This coupled with the stock-repurchase plan announced earlier this year represent two shareholder-friendly initiatives for FCFS investors.

The company continues to expand its store base. FirstCash purchased 26 pawn stores in Texas, focused in the Houston and San Antonio markets, for approximately $51 million. It also opened 12 de novo locations (10 in Mexico, one in Columbia, and one in the United States.)

Both the top and bottom lines will likely head higher in the second half. The improved market trends should continue in the third and fourth quarters as business starts to normalize. The emergence of the Delta variant may slow progress some, but we expect continued improvement overall. Management's focus on operational efficiency ought to strengthen profits. Therefore, we estimate revenues of $1.6 billion and share net of $3.15 for the full year based on year-over-year improvement in the final two quarters in sales and earnings.

FirstCash is well positioned for the long term. Business conditions ought to be more favorable over the long term. Further, management's focus on expansion should continue to bear fruit. The company's expanded presence in Latin America is particularly encouraging, and we expect continued acquisitions there.

This equity is ranked to trail the broader market averages over the coming six to 12 months. Moreover, capital gains potential for the 18-month and 2024-2026 time frames are subpar. Accordingly, we recommend subscribers stay on the sidelines, for now.

Richard J. Gallagher *August 6, 2021*

(A) Diluted earnings. Excludes nonrecurring gains/(losses): '07, $0.08; '08, ($1.97); '09, $0.26; '10, $0.11; '11, $0.22. Earnings may not sum due to change in shares outstanding. Next earnings report due late October.
(B) Includes intangibles. In 20: $1.0 bill., $25.85 per share.
(C) In millions.
(D) Dividends paid Feb., May, Aug., and Nov.

Company's Financial Strength	B++
Stock's Price Stability	80
Price Growth Persistence	45
Earnings Predictability	60

FRANKLIN ELECTRIC NDQ-FELE

RECENT PRICE **80.66** | P/E RATIO **25.9** (Trailing: 28.6 Median: 22.0) | RELATIVE P/E RATIO **1.40** | DIV'D YLD **0.9%** | **VALUE LINE**

TIMELINESS 2 Lowered 7/9/21
SAFETY 2 Raised 6/25/21
TECHNICAL 3 Raised 9/24/21
BETA .95 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$65-$130 $98 (20%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	110	(+35%)	*9%*
Low	80	(Nil)	*1%*

Institutional Decisions

	4Q2020	1Q2021	2Q2021
to Buy	101	94	116
to Sell	98	114	102
Hld's(000)	35883	35712	35774

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
High:	20.9	26.1	31.5	46.1	44.8	39.8	44.6	47.2	51.4	57.7	72.6	87.7								
Low:	12.5	16.4	22.2	29.7	33.6	22.7	23.8	36.0	38.4	41.7	41.3	67.7								
	9.77	12.12	13.04	16.20	13.53	15.17	17.59	18.91	20.23	22.01	20.01	20.48	24.12	28.02	28.34	26.99	*33.35*	*36.95*	Sales per sh [A]	*42.80*
	1.38	1.62	1.06	1.48	1.11	1.34	1.89	2.38	2.39	2.27	2.36	2.46	2.71	3.15	2.90	3.00	*3.90*	*4.35*	"Cash Flow" per sh	*5.10*
	1.02	1.22	.61	.95	.56	.83	1.33	1.73	1.68	1.42	1.50	1.65	1.86	2.26	2.07	2.18	*3.00*	*3.25*	Earnings per sh [AB]	*3.80*
	.19	.22	.24	.25	.25	.26	.27	.29	.31	.35	.38	.40	.42	.47	.58	.62	*.70*	*.78*	Div'ds Decl'd per sh [C]	*1.00*
	.40	.50	.61	.56	.26	.29	.47	.83	1.42	.75	.57	.84	.72	.48	.47	.49	*.55*	*.65*	Cap'l Spending per sh	*1.00*
	5.95	7.52	8.20	7.58	8.39	8.88	9.60	10.91	12.48	12.54	12.07	13.23	15.03	15.84	17.17	18.34	*19.90*	*21.75*	Book Value per sh [D]	*26.65*
	44.97	46.02	46.18	46.04	46.26	47.05	46.68	47.13	47.72	47.59	46.22	46.38	46.63	46.33	46.39	46.22	*46.50*	*46.00*	Common Shs Outst'g [E]	*45.00*
	19.8	20.8	36.6	19.7	23.8	19.4	16.3	15.5	21.6	27.5	21.7	20.9	22.4	19.8	23.7	26.2	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*25.0*
	1.05	1.12	1.94	1.19	1.59	1.23	1.02	.99	1.21	1.45	1.09	1.10	1.13	1.07	1.26	1.36			Relative P/E Ratio	*1.40*
	.9%	.9%	1.1%	1.3%	1.9%	1.6%	1.2%	1.1%	.9%	.9%	1.2%	1.2%	1.0%	1.0%	1.2%	1.1%			Avg Ann'l Div'd Yield	*1.1%*
	821.1	891.3	965.5	1047.8	924.9	949.9	1124.9	1298.1	1314.6	1247.3	*1550*	*1700*	Sales ($mill) [A]	*1925*
	14.6%	15.9%	16.5%	14.7%	13.9%	15.3%	13.3%	13.3%	12.7%	13.6%	*14.5%*	*15.0%*	Operating Margin	*15.5%*
	25.3	28.3	31.4	37.2	35.5	35.5	38.5	38.6	37.0	36.5	*42.0*	*46.0*	Depreciation ($mill)	*55.0*
	63.1	83.7	82.7	70.9	73.7	78.7	87.8	107.1	97.6	102.4	*140*	*155*	Net Profit ($mill)	*175*
	26.9%	27.8%	25.9%	21.1%	14.6%	23.8%	14.8%	12.5%	17.8%	18.3%	*19.0%*	*19.0%*	Income Tax Rate	*19.0%*
	7.7%	9.4%	8.6%	6.8%	8.0%	8.3%	7.8%	8.3%	7.4%	8.2%	*9.0%*	*9.1%*	Net Profit Margin	*9.1%*
	276.4	283.3	333.9	268.4	293.4	326.0	343.2	324.0	381.6	415.6	*400*	*450*	Working Cap'l ($mill)	*550*
	150.0	150.7	174.2	143.7	188.1	156.5	125.6	94.4	93.1	92.0	*90.0*	*90.0*	Long-Term Debt ($mill)	*90.0*
	448.1	514.4	595.7	596.8	557.7	613.4	700.7	733.9	796.5	847.8	*925*	*1000*	Shr. Equity ($mill) [D]	*1200*
	11.4%	13.4%	11.4%	10.3%	10.6%	10.8%	11.2%	13.5%	11.4%	11.1%	*14.0%*	*14.5%*	Return on Total Cap'l	*13.5%*
	14.1%	16.3%	13.9%	11.9%	13.2%	12.8%	12.5%	14.6%	12.3%	12.1%	*15.0%*	*15.5%*	Return on Shr. Equity	*14.5%*
	11.2%	13.6%	11.3%	9.0%	9.8%	9.7%	9.6%	11.5%	8.8%	8.6%	*11.5%*	*12.0%*	Retained to Com Eq	*11.0%*
	20%	16%	18%	25%	26%	24%	23%	21%	28%	29%	*23%*	*23%*	All Div'ds to Net Prof	*26%*

% TOT. RETURN 8/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	44.5	49.7
3 yr.	79.0	46.9
5 yr.	133.7	96.6

CAPITAL STRUCTURE as of 6/30/21
Total Debt $223.7 mill. **Due in 5 Yrs** $83.0 mill.
LT Debt $91.3 mill. **LT Interest** $4.5 mill.
(Total int. coverage: over 25.0x) (10% of Cap'l)

Leases, Uncapitalized Annual rentals $11.9 mill.
Pension Assets-12/20 $153 mill. **Oblig.** $189 mill.
Pfd Stock None

Common Stock 46,432,448 shs.
as of 7/30/21

MARKET CAP: $3.7 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	64.4	130.8	81.5
Receivables	173.3	159.8	226.0
Inventory (LIFO)	300.2	301.0	350.1
Other	29.5	27.7	33.6
Current Assets	567.4	619.3	691.2
Accts Payable	82.6	95.9	148.8
Debt Due	21.9	2.5	132.4
Other	81.3	105.3	105.8
Current Liab.	185.8	203.7	387.0

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	6.5%	6.0%	*7.5%*
"Cash Flow"	8.5%	5.0%	*9.0%*
Earnings	11.0%	7.0%	*10.0%*
Dividends	8.0%	10.0%	*10.5%*
Book Value	7.5%	6.5%	*7.5%*

Calendar	QUARTERLY SALES ($ mill.) [A] Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Year
2018	295.6	344.0	341.9	316.6	1298.1
2019	290.7	355.4	348.4	320.1	1314.6
2020	266.7	308.3	351.2	321.1	1247.3
2021	333.0	437.3	*420*	*359.7*	*1550*
2022	*350*	*475*	*450*	*425*	*1700*

Calendar	EARNINGS PER SHARE [A B] Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Year
2018	.45	.65	.64	.52	2.26
2019	.21	.70	.73	.43	2.07
2020	.24	.54	.83	.57	2.18
2021	.59	.83	*.90*	*.68*	*3.00*
2022	*.70*	*.90*	*.95*	*.70*	*3.25*

Calendar	QUARTERLY DIVIDENDS PAID [C] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.100	.1075	.1075	.1075	.42
2018	.1075	.12	.12	.12	.47
2019	.145	.145	.145	.145	.58
2020	.155	.155	.155	.155	.62
2021	.175	.175	.175		

BUSINESS: Franklin Electric Company, Inc. designs, manufactures, and distributes water and fuel pumping systems. Operating segments: Water Systems (54% of '20 sales) produces groundwater and surface pumps, motors, and controls for residential, agricultural, and industrial applications; Fueling Systems (20%) provides products for fuel pumping, containment, monitoring, and control; Distribution (26%) sells groundwater equipment products to well installation contractors. Foreign sales: 39% of '20 total. Has about 5,400 employees. Offs. & dirs. own 2.9% of stock; BlackRock, 15.0%; Vanguard, 9.8% (3/21 Proxy). Chrmn. & CEO: Gregg C. Sengstack. Inc.: IN. Addr.: 9255 Coverdale Road, Fort Wayne, IN 46809. Tel.: 260-824-2900. Internet: www.franklin-electric.com.

Franklin Electric recorded strong 2021 second-quarter results. During the June period, year-over-year sales and earnings advanced 41.8% and 53.7%, respectively, to $437.3 million and $0.83 a share. Top-line gains were driven by double-digit growth in all three operating segments: Water Systems, Distribution, and Fueling Systems. Pent-up demand trends were noted in all geographic regions, particularly within North American territories. Business fundamentals continued to improve for the water treatment company, as pandemic-induced constrained spending patterns have subsided during the first six months of the year. The healthy sales stream, coupled with cost-containment initiatives, buoyed the bottom line as well, and drove the better-than-expected results. Overall, we maintain our near-term forecasts, which predicates double-digit sales and earnings advances for 2021 and high-single-digit progress next year.

The company recently acquired Aqua LLC. for $150 million in an all-cash transaction. The deal will help diversify Franklin's reach within the water treatment business for both residential and commercial customers. The acquisition is expected to boost share earnings between $0.04 to $0.06 this year. The move is a good one, in our view, since it ought to further solidify Franklin's position within the ground water pumping business. To wit, consolidation efforts are expected to provide synergistic benefits and eliminate competition.

Despite recent solid performances, investors appear to be exercising some caution. Indeed, the stock has traded in a tight range over the past three months. The encouraging news is that these shares are still on the high end of their 52-week trading range. Furthermore, waiting on the sidelines is not too surprising. Although the operating landscape remains vibrant, likely challenges are present. For instance, the inflationary climate and supply-chain disruptions are concerns. Moreover, the Delta variant of COVID-19 remains a threat.

These shares suit nimble investors (Timeliness: 2). Patient accounts should wait for a better entry point.

Nira Maharaj *September 24, 2021*

(A) Year ends Sat. closest to Dec. 31st.
(B) Diluted earnings. Excludes nonrecurring losses: '17, 20¢; '18, 3¢; '19, 4¢; '20, 4¢. Next earnings report due late October.
(C) Dividends historically paid in mid-February, May, August, and November.
(D) Includes intangibles. In 2020: $415.6 mill., or $8.67 per share.
(E) In millions, adjusted for split.

Company's Financial Strength	A
Stock's Price Stability	80
Price Growth Persistence	70
Earnings Predictability	85

GATX CORP. NYSE-GATX

RECENT PRICE	P/E RATIO	RELATIVE P/E RATIO	DIV'D YLD	VALUE LINE
90.99	19.4 (Trailing: 26.4 Median: 14.0)	1.02	2.2%	342

TIMELINESS 3 Lowered 4/2/21
SAFETY 3 New 7/27/90
TECHNICAL 3 Lowered 8/6/21
BETA .95 (1.00 = Market)

18-Month Target Price Range
Low-High Midpoint (% to Mid)
$68-$133 $101 (10%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	135	(+50%)	12%
Low	90	(Nil)	2%

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	82	100	94
to Sell	127	108	131
Hld's(000)	38650	37774	36419

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
High:	36.9	45.0	46.0	54.2	69.9	63.4	64.5	66.3	91.1	86.0	88.8	106.3								
Low:	25.4	28.9	35.5	43.5	50.8	37.9	33.5	55.4	61.0	67.6	50.7	80.8								
	22.98	23.64	28.10	29.63	25.03	25.99	28.05	26.51	28.80	32.83	34.55	35.96	36.33	37.17	40.01	34.50	*36.55*	*38.30*	Revenues per sh [A]	*46.20*
	6.26	6.24	7.87	7.84	6.49	6.42	7.23	7.99	9.25	10.68	12.43	13.53	13.02	14.25	15.29	13.07	*14.15*	*15.85*	"Cash Flow" per sh	*19.55*
	2.07	2.63	3.44	3.43	1.70	1.72	2.35	2.88	3.59	4.34	5.30	5.75	4.72	5.20	5.51	3.54	*4.45*	*5.15*	Earnings per sh [B]	*6.65*
	.80	.84	.96	1.08	1.12	1.12	1.16	1.20	1.24	1.32	1.52	1.60	1.68	1.76	1.84	1.92	*2.00*	*2.08*	Div'ds Decl'd per sh [C■]	*2.20*
	8.23	19.13	12.91	10.83	8.65	11.22	10.68	15.79	16.22	22.97	19.06	18.07	17.91	27.20	21.32	24.56	*15.00*	*15.00*	Cap'l Spending per sh	*15.00*
	20.20	22.37	24.00	23.09	23.92	24.02	24.16	26.53	30.46	29.73	30.50	34.16	47.31	48.84	52.68	55.85	*57.85*	*60.70*	Book Value per sh	*75.75*
	50.62	52.00	47.90	48.70	46.10	46.36	46.65	46.90	45.87	44.20	41.97	39.44	37.90	36.61	34.83	35.05	*35.00*	*35.00*	Common Shs Outst'g [D]	*33.00*
	16.8	15.7	13.1	11.2	15.2	17.3	15.8	14.5	13.7	14.4	9.9	8.0	12.8	14.4	14.0	19.3	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*17.0*
	.89	.85	.70	.67	1.01	1.10	.99	.92	.77	.76	.50	.42	.64	.78	.75	.99			Relative P/E Ratio	*.95*
	2.3%	2.0%	2.1%	2.8%	4.3%	3.8%	3.1%	2.9%	2.5%	2.1%	2.9%	3.5%	2.8%	2.4%	2.4%	2.8%			Avg Ann'l Div'd Yield	*1.9%*
	1308.5	1243.2	1321.0	1451.0	1449.9	1418.3	1376.9	1360.9	1393.8	1209.2	*1280*	*1340*	Revenues ($mill) [A]	*1525*
	45.3%	38.3%	40.1%	42.6%	46.8%	45.7%	46.4%	47.3%	46.4%	51.1%	*52.0%*	*53.0%*	Operating Margin	*55.0%*
	226.5	237.4	255.0	273.5	290.5	297.2	307.3	321.9	331.9	330.5	*340*	*375*	Depreciation ($mill)	*425*
	110.8	137.3	169.3	198.5	231.3	236.5	186.1	199.8	200.8	127.5	*155*	*180*	Net Profit ($mill)	*220*
	25.2%	18.2%	41.2%	32.6%	37.9%	34.5%	33.7%	26.9%	32.1%	47.9%	*22.0%*	*22.0%*	Income Tax Rate	*24.0%*
	8.5%	11.0%	12.8%	13.7%	16.0%	16.7%	13.5%	14.7%	14.4%	10.5%	*12.1%*	*13.4%*	Net Profit Margin	*14.4%*
	549.6	379.0	612.8	332.4	276.9	360.0	354.2	25.4	173.1	287.1	*500*	*500*	Working Cap'l ($mill)	*500*
	3518.5	3503.7	3838.5	4195.8	4196.8	4268.1	4384.2	4441.0	4788.3	5362.3	*6350*	*6350*	Long-Term Debt ($mill)	*4500*
	1127.3	1244.2	1397.0	1314.0	1280.2	1347.2	1792.7	1788.1	1835.1	1957.4	*2025*	*2125*	Shr. Equity ($mill)	*2500*
	4.2%	4.6%	4.8%	5.0%	5.6%	5.5%	4.3%	4.6%	4.4%	3.0%	*2.5%*	*3.0%*	Return on Total Cap'l	*4.0%*
	9.8%	11.0%	12.1%	15.1%	18.1%	17.6%	10.4%	11.2%	10.9%	6.5%	*7.5%*	*8.5%*	Return on Shr. Equity	*9.0%*
	4.9%	6.3%	7.8%	10.4%	12.7%	12.6%	6.6%	7.3%	7.2%	2.9%	*4.0%*	*5.0%*	Retained to Com Eq	*6.0%*
	51%	43%	36%	31%	29%	28%	37%	35%	35%	56%	*45%*	*40%*	All Div'ds to Net Prof	*33%*

CAPITAL STRUCTURE as of 6/30/21
Total Debt $5821.0 mill. **Due in 5 Yrs** $1716 mill.
LT Debt $5821.0 mill. **LT Interest** $120.0 mill.
Incl. $7.9 mill. of cap. leases. (LT interest earned: 4.4x; total interest coverage: 3.4x.)
(75% of Cap'l)
Leases, Uncapitalized Annual rentals $68.2 mill.
Pension Assets-12/20 $481.6 mill.
Oblig. $465.5 mill.
Pfd. Stock None

Common Stock 35,400,000 shares
MARKET CAP: $3.2 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	151.0	292.2	417.9
Restricted Cash	- -	- -	.2
Receivables	171.2	142.2	143.3
Current Assets	322.2	434.4	561.4
Payables	149.1	147.3	165.8
Debt Due	- -	- -	- -
Other	- -	- -	- -
Current Liab.	149.1	147.3	165.8

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	3.5%	3.0%	*3.5%*
"Cash Flow"	7.5%	5.5%	*5.5%*
Earnings	7.5%	1.5%	*6.0%*
Dividends	5.0%	6.0%	*3.0%*
Book Value	8.5%	11.5%	*6.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	305.3	349.5	349.7	356.4	1360.9
2019	317.0	359.4	360.7	356.7	1393.8
2020	299.4	300.5	304.4	304.9	1209.2
2021	305.8	317.1	*330*	*327.1*	*1280*
2022	*330*	*330*	*340*	*340*	*1340*

Calendar	EARNINGS PER SHARE [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1.98	1.16	1.22	.84	5.20
2019	1.12	1.78	1.25	1.36	5.51
2020	1.31	1.05	.68	.50	3.54
2021	1.02	1.25	*1.10*	*1.08*	*4.45*
2022	*1.25*	*1.25*	*1.35*	*1.30*	*5.15*

Calendar	QUARTERLY DIVIDENDS PAID [C■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.42	.42	.42	.42	1.68
2018	.44	.44	.44	.44	1.76
2019	.46	.46	.46	.46	1.84
2020	.48	.48	.48	.48	1.92
2021	.50	.50			

BUSINESS: GATX Corp. specializes in tank car, freight car, and locomotive leasing. The company owns or has an interest in 146,729 railcars, and manages 323 railcars for third-party owners. Specialty unit finances marine and industrial equipment. The company sold in February of 2020 the American Steamship unit, which provided waterborne transportation of dry bulk commodities. Invests in joint ventures that complement existing businesses. Has about 2,165 employees. Off. & dir. own 3.4% of common; State Farm, 17.2%; BlackRock, 12.1%; GAMCO, 9.5%; Vanguard, 9.4%; Dimensional Fund, 7.2% (3/21 Proxy). Chrmn., Pres. & CEO: Brian A. Kenney. Inc.: NY. Addr.: 222 West Adams Street, Chicago, Ill. 60606. Tel.: 312-621-6200. Internet: www.gatx.com.

GATX reported solid results in the June period. The railcar lessor bested our top-line and bottom-line estimates of $315 million and $0.98 a share, respectively. Utilization and lease rates improved sequentially in the North America railcar business. Gains on asset dispositions came in higher than expected, while the maintenance expense was lower than anticipated. GATX's Lease Price Index renewal lease rate change registered at a decline of 6.7%, which was a vast improvement from the 18% drop in the March period. With new leases being negotiated at lower rates than their historical average, the company is keeping contract terms shorter. Indeed, the average length for a railcar is now 29 months versus 31 months last year. The International business continues to benefit from higher utilization and more cars on lease. The railcar lessor raised its 2021 full-year bottom-line guidance from $4.00 to $4.30, to $4.30 to $4.50 a share, respectively. We have increased our 2021 and 2022 share-net estimates by $0.20 and $0.15, owing mostly to higher revenue assumptions, as well as more remarketing and scrapping activity.

Carload growth ought to remain healthy in the second half of the year. We suspect other sectors will probably recover at faster clips, but intermodal may well still see strength. However, GATX has to contend with higher-priced leases coming off contract that will be renegotiated at lower rates. Railcars have come out of storage, and higher steel prices are likely to encourage more scrapping activity. Deteriorating rail service would likely force the railroads to add new cars. Train velocity has slowed since the start of the year, while dwell time has also worsened over the last month. We still think more railcars will need to be taken out of storage to handle the incoming demand, but carloads on the network will likely not approach levels reached in the summer of 2019 just before every railroad implemented the Precision Scheduled Railroading model.

This neutrally ranked stock is trading around the low end of our 3- to 5-year Target Price Range. Consequently, we would remain on the sidelines at this juncture.

Michael Collins, CFA *August 20, 2021*

(A) Revenue figure represents Total Gross Income before 2012. For 2012 and after, revenue figure represents Total Revenues.
(B) Diluted earnings. Excludes nonrecurring gains/(losses): '05, ($2.36); '06, (63¢); '07, 32¢; '08, 46¢; '11, 30¢; '12, 69¢; '14, 14¢; '15, ($0.61); '17, $8.03; '18, 32¢. Quarterly figures may not sum due to rounding. Next egs. report due late October. **(C)** Div. hist. paid in late March, June, Sept., and December. ■ Div. reinv. plan available. **(D)** In millions.

Company's Financial Strength	B+
Stock's Price Stability	80
Price Growth Persistence	50
Earnings Predictability	70

INT'L FLAVORS & FRAG. NYSE-IFF

RECENT PRICE **155.56** | P/E RATIO **25.7** (Trailing: 26.7 Median: 21.0) | RELATIVE P/E RATIO **1.35** | DIV'D YLD **2.1%** | **VALUE LINE**

TIMELINESS 1 Raised 8/20/21
SAFETY 1 Raised 3/11/11
TECHNICAL 3 Raised 7/30/21
BETA .90 (1.00 = Market)

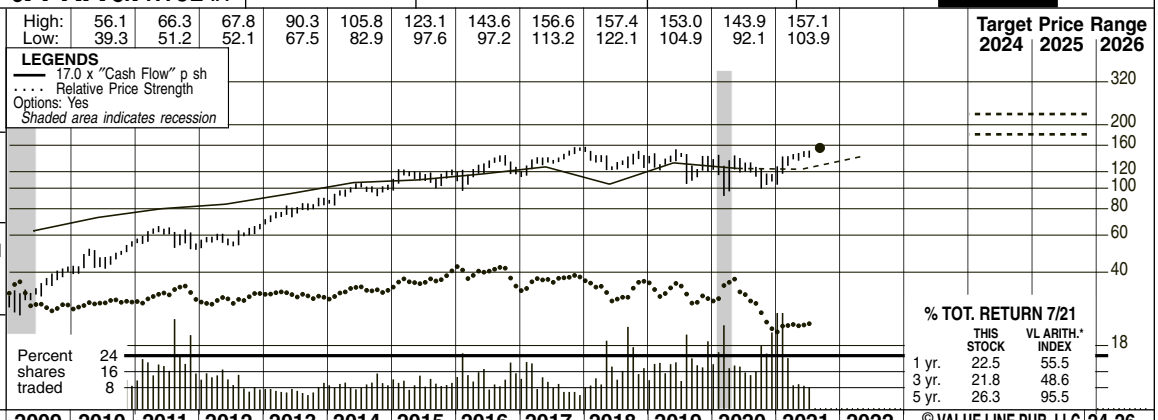
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$72-$177 $125 (-20%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	225	(+45%)	*11%*
Low	180	(+15%)	*6%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	207	314	547
to Sell	275	231	153
Hld's(000)	100599	114137	226666



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
21.97	23.43	28.10	30.38	29.39	32.68	34.45	34.57	36.28	38.24	37.78	39.34	43.05	37.31	48.13	47.54	*45.60*	*49.20*	Sales per sh	*62.00*
3.04	3.39	3.94	3.77	3.70	4.27	4.71	4.95	5.54	6.26	6.45	6.87	7.43	6.15	7.77	7.31	*7.70*	*8.40*	"Cash Flow" per sh	*11.30*
1.96	2.34	2.70	2.76	2.69	3.26	3.74	3.98	4.47	5.08	5.25	5.51	5.89	6.00	6.17	5.70	*6.00*	*6.60*	Earnings per sh [A]	*9.20*
.72	.74	.88	.96	1.00	1.04	1.16	1.30	1.46	1.72	2.06	2.40	2.66	2.84	2.96	3.04	*3.12*	*3.28*	Div'ds Decl'd per sh [B] ■	*4.60*
1.03	.65	.81	1.09	.84	1.32	1.58	1.55	1.65	1.77	1.26	1.60	1.63	1.60	2.21	1.79	*1.50*	*1.70*	Cap'l Spending per sh	*2.20*
10.09	10.12	7.62	7.29	9.71	12.45	13.65	15.30	17.98	18.80	19.87	20.53	21.33	56.58	58.22	59.02	*88.00*	*91.20*	Book Value per sh [C]	*100.00*
90.74	89.42	81.02	78.66	79.16	80.26	80.92	81.63	81.38	80.78	80.02	79.21	78.95	106.62	106.79	106.94	*250.00*	*250.00*	Common Shs Outst'g [D]	*250.00*
18.9	16.3	18.4	14.3	12.7	14.4	15.7	14.8	17.7	19.1	21.6	22.6	23.1	22.7	21.3	21.4	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*22.0*
1.01	.88	.98	.86	.85	.92	.98	.94	.99	1.01	1.09	1.19	1.16	1.23	1.13	1.10			Relative P/E Ratio	*1.20*
1.9%	1.9%	1.8%	2.4%	2.9%	2.2%	2.0%	2.2%	1.8%	1.8%	1.8%	1.9%	2.0%	2.1%	2.3%	2.5%			Avg Ann'l Div'd Yield	*2.3%*
2788.0	2821.4	2952.9	3088.5	3023.2	3116.4	3398.7	3977.5	5140.1	5084.2	*11400*	*12300*	Sales ($mill)	*15500*
19.7%	20.0%	21.1%	22.4%	22.8%	23.9%	22.8%	23.3%	21.7%	20.8%	*22.5%*	*23.5%*	Operating Margin	*25.0%*
75.3	76.7	83.2	89.4	89.6	102.5	118.0	125.7	130.2	132.8	*400*	*425*	Depreciation ($mill)	*520*
306.2	327.5	368.0	416.3	426.6	441.4	468.3	529.6	699.6	649.1	*1520*	*1680*	Net Profit ($mill)	*2300*
27.1%	26.4%	25.7%	25.3%	24.2%	23.8%	20.7%	18.8%	19.5%	18.5%	*22.0%*	*22.0%*	Income Tax Rate	*23.0%*
11.0%	11.6%	12.5%	13.5%	14.1%	14.2%	13.8%	13.3%	13.6%	12.8%	*13.3%*	*13.7%*	Net Profit Margin	*14.8%*
752.6	949.9	1092.5	1191.2	713.8	710.7	1127.7	1813.6	1390.3	1156.1	*2200*	*2400*	Working Cap'l ($mill)	*2800*
778.2	881.1	932.7	934.2	937.8	1066.9	1632.2	4504.4	3997.4	3779.4	*11000*	*10000*	Long-Term Debt ($mill)	*10000*
1104.4	1248.8	1463.1	1518.6	1590.3	1626.2	1684.2	6033.0	6217.3	6311.2	*22000*	*22800*	Shr. Equity ($mill) [C]	*25000*
17.4%	16.4%	16.3%	17.9%	17.8%	17.4%	15.1%	5.7%	7.5%	7.1%	*6.0%*	*6.0%*	Return on Total Cap'l	*7.0%*
27.7%	26.2%	25.1%	27.4%	26.8%	27.1%	27.8%	8.8%	11.3%	10.3%	*7.0%*	*7.5%*	Return on Shr. Equity	*9.0%*
19.5%	15.7%	19.2%	18.6%	16.8%	15.8%	15.6%	5.0%	6.2%	5.2%	*3.5%*	*4.0%*	Retained to Com Eq	*4.5%*
29%	40%	24%	32%	37%	42%	44%	43%	45%	50%	*52%*	*50%*	All Div'ds to Net Prof	*50%*

CAPITAL STRUCTURE as of 6/30/21
Tot. Debt $11970.0 mill. **Due in 5 Yrs** $1750 mill.
LT Debt $11354.0 mill. **LT Interest** $300.0 mill.
(Interest coverage: 7.1x)
(34% of Capital)
Pension Assets-12/20 $1.8 bill. **Oblig.**$2.0 bill.

Pfd Stock None

Common Stock 249,064,711
As of 7/29/21
MARKET CAP: $38.7 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	606.8	649.5	935.0
Receivables	876.1	929.3	2059.0
Inventory	1123.1	1131.9	2464.0
Other	336.5	349.1	839.0
Current Assets	2942.5	3059.8	6297.0
Accts Payable	510.4	555.7	1389.0
Debt Due	385.0	634.2	616.0
Other	656.8	713.8	1222.0
Current Liab.	1552.2	1903.7	3227.0

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	3.5%	3.5%	*6.0%*
"Cash Flow"	6.0%	3.0%	*8.0%*
Earnings	7.5%	4.0%	*7.5%*
Dividends	11.5%	11.0%	*7.5%*
Book Value	19.5%	25.0%	*9.5%*

Calendar	QUARTERLY SALES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	930.9	920.0	907.5	1219.0	3977.5
2019	1297.4	1292.6	1266.3	1283.8	5140.1
2020	1347.3	1198.7	1268.1	1270.1	5084.2
2021	2465.0	3089.0	*3000*	*2846*	*11400*
2022	*2900*	*3150*	*3150*	*3100*	*12300*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1.69	1.66	1.54	1.22	6.00
2019	1.57	1.61	1.53	1.46	6.17
2020	1.62	1.36	1.40	1.32	5.70
2021	1.60	1.50	*1.50*	*1.40*	*6.00*
2022	*1.65*	*1.70*	*1.65*	*1.60*	*6.60*

Calendar	QUARTERLY DIVIDENDS PAID [B] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.64	.64	.64	.69	2.61
2018	.69	.69	.69	.73	2.80
2019	.73	.73	.73	.75	2.94
2020	.75	.75	.75	.77	3.02
2021	.77	.77	.77	.79	

BUSINESS: International Flavors & Fragrances, Inc. is a leading manufacturer of flavor and fragrance chemicals sold to consumer products manufacturers worldwide. The company currently operates in four distinct business segments: Nourish; Health & Bioscience; Scent; and Pharma Solutions. Its products are used in prepared food products, beverages, confectionery and tobacco products, perfumes, cosmetics, soaps and detergents, and pharmaceuticals. R&D spending accounted for approx. 7% of 2020 sales. Had about 13,700 employees as of 12/20. Off. and dir. own less than 1% of stock. Winder Inv. Ltd. owns 10.1% (3/21 proxy). CEO: Andreas Fibig. Inc.: NY. Address: 521 W. 57th St., New York, NY 10019. Tele.: 212-765-5500. Internet: www.iff.com.

International Flavors & Fragrances (IFF) is performing well. The specialty chemical company posted sales of $3.1 billion for the second quarter. This figure was nicely above the year-ago number, and better than we had anticipated. The improvement reflects strength at IFF's core operations and contributions from DuPont's Nutrition & Biosciences business (acquired in February). Elsewhere, earnings settled at $1.50 per share, in line with our expectations. Costs were controlled, despite inflationary pressures. For full-year 2021, we have lifted our sales forecast to $11.4 billion, while leaving unchanged our earnings estimate at $6.00 per share.

The company is doing a good job integrating the acquisition. IFF has reorganized its business segments and is positioned to capture top-line synergies. In addition, it has been reducing duplicate costs by consolidating office space and trimming staff. Meanwhile, plans are in place to exit noncore lines, such as the food preparation business.

IFF's four main business segments made positive contributions during the second quarter. The larger Nourish unit (flavors, ingredients, and food design) posted impressive results. The Scent segment (fine and consumer fragrances) also made notable progress. Elsewhere, the Health & Biosciences unit (home & personal care, animal nutrition, grain processing, etc.) provided smaller contributions. Finally, the Pharma Solutions business delivered flat results.

The company is in sound financial shape. At the end of June, IFF had cash of $935 million and a manageable amount of debt on its balance sheet. Nonetheless, we think IFF will take measures to refinance and reduce some obligations. Meanwhile, capital spending should run $375 million this year, with funds used to enhance R&D facilities and production plants. Elsewhere, the board of directors just increased the quarterly dividend.

These shares are favorably ranked for year-ahead price performance. Moreover, our projections suggest that this issue holds worthwhile appreciation potential for the next 3 to 5 years. The stock carries our top mark for Safety, and may appeal to conservative investors.

Adam Rosner *August 27, 2021*

(A) Excludes one-time gains/(losses): '05, (8¢); '06, 14¢; '07, 12¢; '08, 11¢; '09, 16¢; '10, 11¢; '11, 48¢; '12, (44¢); '13, (18¢); '14, (2¢); '15, (9¢); '16 (46¢).; '17 ($2.17); '18 ($2.21); '19 ($2.17); '20 ($2.50). Ex. disc.: '05, (2¢). Next egs rept. due early Nov. Egs. may not sum due to rounding and change in shares. **(B)** Div's. hist. paid in early Jan, April, July, and Oct. ■ Div. reinvestment plan available. **(C)** Includes intangibles. In 2020: $8320.5 million, $77.80 per share. **(D)** In millions.

Company's Financial Strength	A+
Stock's Price Stability	80
Price Growth Persistence	60
Earnings Predictability	100

INGREDION INC. NYSE-INGR

RECENT PRICE **91.44** | P/E RATIO **12.1** (Trailing: 14.7 Median: 14.0) | RELATIVE P/E RATIO **0.60** | DIV'D YLD **2.8%** | **VALUE LINE**

TIMELINESS 4 Lowered 5/14/21
SAFETY 2 Raised 1/15/21
TECHNICAL 2 Lowered 7/16/21
BETA .90 (1.00 = Market)

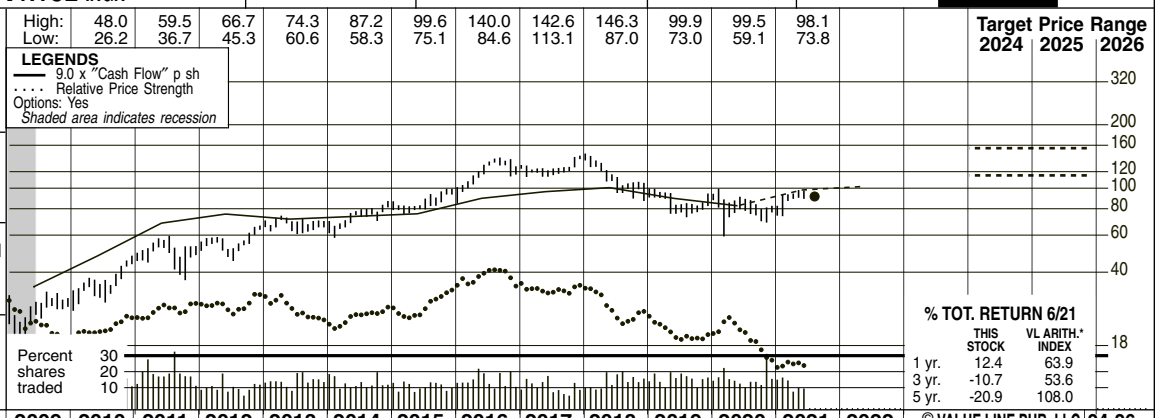
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$52-$115 $84 (-10%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	155	(+70%)	*16%*
Low	115	(+25%)	*9%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	210	238	216
to Sell	212	220	238
Hld's(000)	57115	57211	57473



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
High:	48.0	59.5	66.7	74.3	87.2	99.6	140.0	142.6	146.3	99.9	99.5	98.1						
Low:	26.2	36.7	45.3	60.6	58.3	75.1	84.6	113.1	87.0	73.0	59.1	73.8						

% TOT. RETURN 6/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	12.4	63.9
3 yr.	-10.7	53.6
5 yr.	-20.9	108.0

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
31.85	35.37	45.91	52.77	49.36	57.44	81.96	84.83	85.16	79.47	78.49	78.77	81.01	87.80	92.92	89.34	***99.40***	***103.70***	Sales per sh	***135.70***
2.65	3.21	4.37	5.28	3.79	5.31	7.60	8.39	7.94	8.17	8.42	9.97	10.72	11.18	9.97	9.18	***10.90***	***11.35***	"Cash Flow" per sh	***15.15***
1.19	1.63	2.59	3.52	2.02	3.24	4.68	5.57	5.05	5.18	5.63	7.05	7.67	6.92	6.61	5.94	***7.55***	***7.80***	Earnings per sh [A]	***10.00***
.28	.32	.40	.51	.56	.56	.60	.86	1.40	1.68	1.71	1.85	2.10	2.43	2.51	2.53	***2.57***	***2.61***	Div'ds Decl'd per sh [B]	***3.25***
1.93	2.31	2.40	3.05	1.96	2.09	3.47	4.07	4.01	3.87	3.91	3.92	4.36	5.26	4.91	5.07	***5.10***	***5.20***	Cap'l Spending per sh	***6.40***
16.33	17.95	21.73	18.52	22.60	25.99	27.73	31.65	32.35	30.52	29.94	35.42	40.16	35.90	40.71	44.03	***45.95***	***48.15***	Book Value per sh [D]	***59.30***
74.09	74.09	73.87	74.74	74.39	76.02	75.88	77.00	74.31	71.32	71.62	72.41	72.00	66.53	66.82	67.02	***67.50***	***67.50***	Common Shs Outst'g [C]	***70.00***
20.1	18.8	15.4	10.6	13.1	11.1	10.7	10.0	13.4	14.3	15.2	16.9	16.1	16.4	13.0	13.8	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***13.5***
1.07	1.02	.82	.64	.87	.71	.67	.64	.75	.75	.77	.89	.81	.89	.69	.72			Relative P/E Ratio	***.75***
1.2%	1.0%	1.0%	1.4%	2.1%	1.6%	1.2%	1.5%	2.1%	2.3%	2.0%	1.6%	1.7%	2.1%	2.9%	3.1%			Avg Ann'l Div'd Yield	***2.4%***
6219.0	6532.0	6328.0	5668.0	5621.0	5704.0	5832.0	5841.0	6209.0	5987.0	***6710***	***7000***	Sales ($mill)	***9500***
12.8%	13.7%	12.5%	13.8%	15.7%	17.9%	18.4%	17.2%	14.8%	14.3%	***15.0%***	***15.5%***	Operating Margin	***21.0%***
211.0	211.0	194.0	195.0	194.0	196.0	209.0	247.0	220.0	213.0	***225***	***240***	Depreciation ($mill)	***360***
366.0	435.0	396.0	388.0	409.3	525.8	563.0	497.0	446.0	402.0	***510***	***525***	Net Profit ($mill)	***700***
28.7%	27.8%	26.3%	30.2%	31.3%	33.2%	30.8%	26.9%	27.2%	30.0%	***28.5%***	***29.0%***	Income Tax Rate	***33.5%***
5.9%	6.7%	6.3%	6.8%	7.3%	9.2%	9.7%	8.5%	7.2%	6.7%	***7.6%***	***7.5%***	Net Profit Margin	***7.4%***
1176.0	1427.0	1394.0	1423.0	1208.0	1274.0	1458.0	1192.0	1193.0	1189.0	***1230***	***1250***	Working Cap'l ($mill)	***1400***
1801.0	1724.0	1717.0	1804.0	1819.0	1850.0	1744.0	1931.0	1766.0	1748.0	***1765***	***1790***	Long-Term Debt ($mill)	***1850***
2104.0	2437.0	2404.0	2177.0	2144.0	2565.0	2891.0	2388.0	2720.0	2951.0	***3100***	***3250***	Shr. Equity ($mill)	***4150***
10.3%	11.2%	10.4%	10.5%	11.1%	12.6%	12.9%	12.5%	10.8%	9.4%	***11.5%***	***11.5%***	Return on Total Cap'l	***12.5%***
17.4%	17.8%	16.5%	17.8%	19.1%	20.5%	19.5%	20.8%	16.4%	13.6%	***16.5%***	***16.0%***	Return on Shr. Equity	***17.0%***
15.0%	15.0%	11.8%	11.9%	13.2%	15.0%	13.8%	13.2%	10.0%	7.6%	***11.0%***	***10.5%***	Retained to Com Eq	***11.5%***
14%	16%	28%	33%	31%	27%	29%	37%	39%	44%	***34%***	***34%***	All Div'ds to Net Prof	***33%***

CAPITAL STRUCTURE as of 3/31/21
Total Debt $2197 mill. **Due in 5 Yrs** $440 mill.

LT Debt $1749 mill. **LT Interest** $105 mill.

(40% of Cap'l)
Leases, Uncapitalized Annual rentals $51 mill.
Pension Assets-12/20 $688 mill. **Oblig.** $684 mill.
Preferred Stock None

Common Stock 66,975,448 shares
as of 4/30/21

Market Cap: $6.1 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	3/31/21
Cash Assets	268	665	577
Receivables	977	1011	1025
Inventory (FIFO)	861	917	950
Other	54	54	58
Current Assets	2160	2647	2610
Accts Payable	504	599	932
Debt Due	82	438	448
Other	381	421	- -
Current Liab.	967	1458	1380

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	5.5%	2.0%	*7.0%*
"Cash Flow"	7.5%	4.5%	*7.0%*
Earnings	8.5%	4.0%	*7.5%*
Dividends	16.5%	9.5%	*4.5%*
Book Value	6.0%	5.5%	*6.5%*

Calendar	QUARTERLY SALES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1469.0	1496.0	1450.0	1426.0	5841.0
2019	1536.0	1550.0	1574.0	1549.0	6209.0
2020	1543.0	1349.0	1502.0	1593.0	5987.0
2021	1614.0	***1680***	***1700***	***1716***	***6710***
2022	***1720***	***1740***	***1760***	***1780***	***7000***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1.94	1.66	1.70	1.61	6.92
2019	1.53	1.66	1.82	1.60	6.61
2020	1.59	1.10	1.59	1.66	5.94
2021	1.86	***1.91***	***1.93***	***1.85***	***7.55***
2022	***1.91***	***1.92***	***1.99***	***1.98***	***7.80***

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.50	.50	.50	.60	2.10
2018	.60	.60	.60	.625	2.43
2019	.625	.625	.625	.63	2.51
2020	.63	.63	.63	.64	2.53
2021	.64	.64	.64		

BUSINESS: Ingredion Incorporated (formerly Corn Products International) one of the world's largest corn refiners, produces high-quality food ingredients (high fructose, glucose, and maltose corn syrups) and industrial products (starches, enzymes, co-products) derived from the wet milling of corn and other starch-based materials. Geographic sales breakdown for 2020: North America (61.2%), South America (15.3%), Asia Pacific (13.6%), Europe, Middle East and Africa (9.9%). The Vanguard Group owns 9.1% of common stock; BlackRock, 8.7%; officers and directors, less than 1.0% (4/21 proxy). Chairman: Ilene S. Gordon. CEO: James P. Zallie. Inc.: DE. Address: 5 Westbrook Corporate Center, Westchester, Illinois 60154. Tel.: 708-551-2600. Internet: www.ingredion.com.

Ingredion got off to a strong start in 2021. Share net was $1.86 for the first quarter, 17% above the year-ago total of $1.59, stemming partly from diminished net corn costs in North America and a favorable price mix in South America. It's also important to mention that despite the ongoing presence of COVID-19 the company managed to avoid any major supply chain interruptions, and was able to continue to ship products from its global network of manufacturing facilities (numbering 46) during the March period. Right now, we expect share net to jump 27%, to $7.55, versus 2020's $5.94 tally. Concerning 2022, profits might reach $7.80 a share, as operating margins widen further. **Please be aware that first-quarter earnings exclude an impairment charge of $5.35 a share.** This was incurred for the "held for sale" treatment of certain net assets that will be contributed to the pending joint venture with Grupo Arco, which is expected to serve customers in Argentina, Chile, and Uruguay. (Ingredion would hold a 49% stake in the business, estimated to generate annual sales of more than $300 million.)

Good things appear to be in store out to the 2024-2026 horizon. The company is a leading provider of ingredients to some industries with promising growth potential, including food, beverage, and animal nutrition, with a presence in over 120 countries. Also, more innovations are quite possible, assuming, of course, adequate expenditures on research and development. Another plus is partnerships, like the one Ingredion set up recently with Amyris, Inc. for an exclusive license to sell the latter's zero-calorie, nature-based, fermented Reb M sweetener. In addition, Ingredion holds a minority ownership interest (31%) in Amyris' Brazilian manufacturing facility that is currently under construction. Finally, thanks to the solid balance sheet, acquisitions are plausible. To that end, it paid $42 million for KaTech, a Germany-based provider of advanced texture and stabilization solutions to the food and beverage industry.

Although the equity possesses a 4 (Below Average) Timeliness rank, it does offer healthy long-term total return potential.

Frederick L. Harris, III *July 16, 2021*

(A) Diluted shares. Excludes nonrecurring gains/(losses): '09, ($1.58); '10, ($1.04); '11, $0.64; '12, ($0.09); '14, ($0.44); '15, ($0.10); '16, ($0.55); '17, ($0.59); '18, ($0.75); '19, ($0.49); '20, ($0.79); Q1 '21, ($5.52). Quarters may not add due to rounding. Next earnings report due late July.
(B) Dividends historically paid in late January, April, July, and October.
(C) In millions.
(D) Includes intangibles. At 12/31/20: $1,346 mill., $20.08 per share.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	45
Earnings Predictability	90

IRON MOUNTAIN NYSE-IRM

RECENT PRICE **45.31** | P/E RATIO **31.7** (Trailing: 34.9 Median: 28.0) | RELATIVE P/E RATIO **1.66** | DIV'D YLD **5.5%** | VALUE LINE **393**

TIMELINESS 3 Raised 8/20/21
SAFETY 3 New 9/14/01
TECHNICAL 4 Lowered 8/20/21
BETA .90 (1.00 = Market)

18-Month Target Price Range

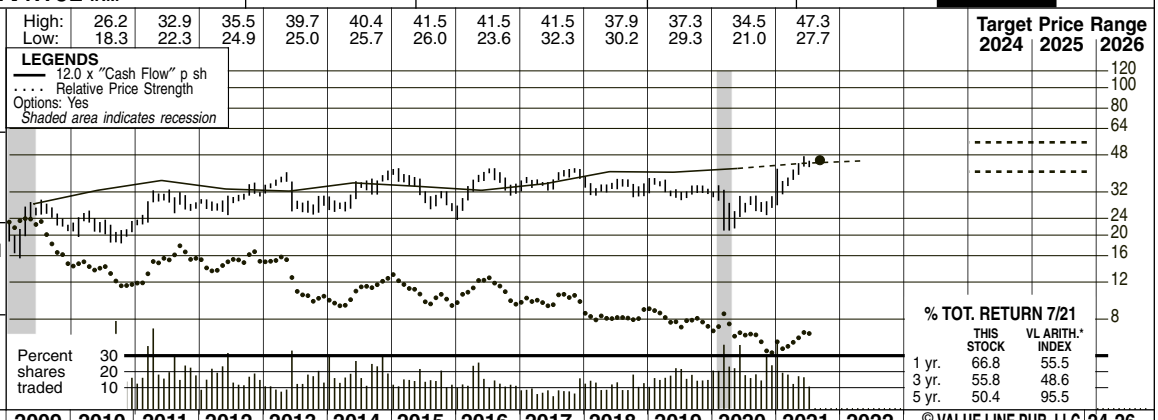
Low-High	Midpoint (% to Mid)
$21-$55	$38 (-15%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	55	(+20%)	*10%*
Low	40	(-10%)	*3%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	305	324	319
to Sell	226	252	265
Hld's(000)	239325	229152	225353



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
9.66	10.84	12.49	13.90	13.60	14.36	16.08	15.82	15.81	14.86	14.23	13.32	13.58	14.76	14.84	14.39	*15.30*	*15.65*	Revenues per sh	*16.80*
1.40	1.56	1.84	2.01	2.34	2.72	3.03	2.76	2.70	2.95	2.84	2.72	2.92	3.34	3.31	3.45	*3.65*	*3.75*	"Cash Flow" per sh	*4.15*
.53	.59	.70	.72	.88	1.06	1.15	1.21	1.02	1.36	1.21	1.07	1.16	1.10	1.02	1.19	*1.40*	*1.50*	Earnings per sh [A]	*1.75*
- -	- -	- -	- -	- -	.34	.86	1.00	1.08	1.49	1.91	2.01	2.24	2.38	2.45	2.47	*2.48*	*2.48*	Div'ds Decl'd per sh [E]	*2.48*
1.27	1.76	1.77	1.76	1.41	1.27	1.12	1.27	1.50	1.73	1.37	1.25	1.21	1.61	2.41	1.52	*1.55*	*1.60*	Cap'l Spending per sh	*1.70*
6.37	7.16	8.22	8.20	9.66	8.98	6.65	6.05	5.47	5.01	2.41	7.34	8.12	6.58	5.10	3.94	*2.85*	*1.85*	Book Value per sh [C]	*d.60*
215.03	216.79	218.51	219.86	221.62	217.83	187.43	190.01	191.43	209.82	211.34	263.68	283.11	286.32	287.30	288.27	*290.00*	*291.00*	Common Shs Outst'g [B]	*293.00*
38.5	42.0	38.7	34.6	26.6	20.6	24.5	24.5	30.5	23.7	27.4	32.1	31.8	30.9	32.4	23.5	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*27.0*
2.05	2.27	2.05	2.08	1.77	1.31	1.54	1.56	1.71	1.25	1.38	1.68	1.60	1.67	1.73	1.20			Relative P/E Ratio	*1.50*
- -	- -	- -	- -	- -	1.6%	3.1%	3.4%	3.5%	4.6%	5.8%	5.8%	6.1%	7.0%	7.4%	8.9%			Avg Ann'l Div'd Yield	*4.9%*
3014.7	3005.3	3025.9	3117.7	3008.0	3511.5	3845.6	4225.8	4262.6	4147.3	*4435*	*4550*	Revenues ($mill)	*4915*
31.0%	30.7%	29.7%	29.7%	25.5%	31.0%	30.6%	32.8%	33.7%	34.7%	*36.0%*	*36.5%*	Operating Margin	*37.0%*
325.8	316.3	322.0	353.1	345.5	452.3	522.4	639.5	658.2	652.1	*650*	*660*	Depreciation ($mill)	*700*
241.6	208.4	194.4	265.3	254.1	264.7	305.1	315.7	293.3	342.7	*405*	*435*	Net Profit ($mill)	*510*
31.5%	38.4%	38.9%	14.1%	- -	18.4%	19.5%	11.4%	18.3%	15.2%	*19.0%*	*19.0%*	Income Tax Rate	*18.0%*
8.0%	6.9%	6.4%	8.5%	8.4%	7.5%	7.9%	7.5%	6.9%	8.3%	*9.1%*	*9.6%*	Net Profit Margin	*10.5%*
65.5	119.1	d25.5	61.0	16.1	65.5	620.1	d254.6	d713.2	d725.9	*d850*	*d1100*	Working Cap'l ($mill)	*d1500*
3280.3	3732.1	4119.1	4611.4	4757.6	6078.2	6897.0	8016.4	8275.6	8509.6	*8900*	*9000*	Long-Term Debt ($mill)	*9000*
1245.7	1150.0	1047.3	1051.7	508.8	1936.5	2297.4	1884.2	1464.0	1136.7	*820*	*535*	Shr. Equity ($mill)	*d175*
7.5%	6.7%	6.2%	7.0%	7.3%	5.2%	5.2%	5.3%	5.2%	5.7%	*4.0%*	*4.5%*	Return on Total Cap'l	*6.0%*
19.4%	18.1%	18.6%	25.2%	49.9%	13.7%	13.3%	16.8%	20.0%	30.1%	*NMF*	*NMF*	Return on Shr. Equity	*NMF*
5.5%	3.8%	NMF	1.5%	NMF	NMF	NMF	NMF	NMF	NMF	*NMF*	*NMF*	Retained to Com Eq	*NMF*
71%	79%	NMF	94%	NMF	NMF	NMF	NMF	NMF	NMF	*NMF*	*NMF*	All Div'ds to Net Prof	*NMF*

CAPITAL STRUCTURE as of 6/30/21
Total Debt $8867.0 mill. **Due in 5 Yrs** $1577 mill.
LT Debt $8760.7 mill. **LT Interest** $418.0 mill.
(Total int. coverage: 1.8x) (90% of Cap'l)

Leases, Uncapitalized: Ann'l rentals $380.6 mill.
No Defined Benefit Pension Plan
Pfd Stock None
Common Stock 289,460,314 shs.
as of 7/30/21

MARKET CAP: $13.1 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	193.5	205.1	315.9
Receivables	850.7	859.3	852.4
Inventory	- -	- -	- -
Other	192.1	205.4	222.3
Current Assets	1236.3	1269.8	1390.6
Accts Payable	289.9	359.9	321.3
Debt Due	389.0	193.8	106.3
Other	1270.6	1422.0	1320.6
Current Liab.	1949.5	1995.7	1748.2

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	.5%	-.5%	*2.5%*
"Cash Flow"	3.5%	3.5%	*3.5%*
Earnings	2.0%	-1.5%	*8.0%*
Dividends	- -	10.5%	*.5%*
Book Value	-5.5%	4.0%	*NMF*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1042.5	1060.8	1061.0	1061.5	4225.8
2019	1053.9	1066.9	1062.2	1079.6	4262.6
2020	1068.7	982.2	1036.7	1059.7	4147.3
2021	1082.0	1119.8	*1115*	*1118.2*	*4435*
2022	*1110*	*1140*	*1140*	*1160*	*4550*

Calendar	EARNINGS PER SHARE [AD] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.24	.33	.28	.25	1.10
2019	.17	.23	.32	.31	1.02
2020	.27	.22	.31	.29	1.19
2021	.32	.38	*.35*	*.35*	*1.40*
2022	*.35*	*.35*	*.40*	*.40*	*1.50*

Calendar	QUARTERLY DIVIDENDS PAID [E] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	- -	.550	.550	.550	2.24
2018	.588	.588	.588	.588	2.35
2019	.611	.611	.611	.611	2.44
2020	.619	.619	.619	.619	2.48
2021	.619	.619	.619		

BUSINESS: Iron Mountain Incorporated, the leading provider of records, documents, and information-management services, converted to a Real Estate Investment Trust in 2014. The company services more than 90,000 corporate clients, operating more than 1,450 facilities in 50 countries worldwide. Merged with Pierce Leahy Corp., 2/00. Since 1998, the company has acquired more than 45 records and information-management services providers. Sold digital storage business, 5/11. Has about 24,000 employees. The Vanguard Group owns 16.8% of common stock; Officers & Directors, 2.1% (4/21 Proxy). Chrmn: Al Verrecchia. CEO & Pres.: William Meaney. Inc.: DE. Add.: One Federal Street., Boston, MA 02111. Tel.: 617-535-4766. Internet: www.ironmountain.com.

Iron Mountain is managing through the changing business environment. Today there are few legal requirements to store paper versions of documents, so there is generally less demand for the type of secure storage the company provides. Storing contracts and documents electronically is cheaper than physical paper storage, and now that is even easier with the shift to the cloud. Many companies are slow to change existing processes, and Iron Mountain maintains relationships with 95% of the Fortune 1000. In the latest quarter, management was able to continue to grow its core storage business, increasing volumes there 0.5% year over year organically. Plus, price increases of about 2% more than offset some higher costs.

Service fees saw solid growth with the reopening of the economy. IRM charges customers a fee to retrieve their documents. While it would seem electronic file storage may have additional advantages here as well, this business saw solid growth in the second quarter, and was up 7% sequentially and 32% year over year.

The data center business should benefit from the large customer base. In an effort to capitalize on the trends towards electronic storage, the company is offering server hosting. While still relatively small at less then $100 million per quarter, revenues in the period were up 15% over last year. It's a more competitive environment, but IRM does enjoy the benefit of existing relationships.

The company owns almost $6 billion of real estate assets. From time to time, the company sells a building and leases it back to take advantage of market conditions and to raise cash. In the second quarter, the company sold about $200 million of property. This follows an even-larger sale and leaseback implemented during the final quarter of last year.

We think investors should look elsewhere than these neutrally ranked shares (Timeliness: 3) due to the slow organic growth and heavy debt load. While the dividend is well above the *Value Line* median, it is not covered by earnings or annual free cash flow. However, the company does have real estate to continue to sell to make up any shortfall for quite some time.

Tom Mulle *August 20, 2021*

(A) Diluted egs. Excl. extraordinary gains/(losses): '08, ($0.38); '09, $0.12; '10, ($1.24); '17, (55¢). Excludes losses from disc. ops.: '08, $0.17; '12, $0.07; '18, $0.17. Excl. nonrecurring gains: '12, $0.16. Next egs report due early November. **(B)** In millions. **(C)** Includes intangibles in '20, $5.885 bill., $20.41/share. **(D)** Qtly figures may not sum due to rounding. **(E)** Div'd initiation 3/10. Reg. div'd paid around early Jan., Apr., Jul., and Oct. Special div'd of $4.06 paid 11/21/12 in stock (8.9%) or cash ($1.05); Special div'd of $3.62 paid 11/4/14.

Company's Financial Strength	B+
Stock's Price Stability	80
Price Growth Persistence	15
Earnings Predictability	90

J.B. HUNT TRANSPORT NDQ-JBHT

RECENT PRICE **165.37** | P/E RATIO **24.0** (Trailing: 29.5 Median: 22.0) | RELATIVE P/E RATIO **1.26** | DIV'D YLD **0.7%** | VALUE LINE **323**

TIMELINESS 3 Lowered 2/19/21
SAFETY 1 Raised 2/19/21
TECHNICAL 3 Lowered 7/23/21
BETA .95 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$125-$255 $190 (15%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	200	(+20%)	*6%*
Low	165	(Nil)	*1%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	232	205	209
to Sell	180	237	230
Hld's(000)	75892	76188	77604

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
High:	41.2	49.1	61.2	78.6	85.5	93.5	102.4	116.8	131.7	122.3	144.3	183.8								
Low:	29.5	34.4	43.9	60.1	69.3	69.7	63.6	83.4	88.4	83.6	75.3	133.4								
	20.34	23.02	28.02	29.60	25.18	31.22	38.71	43.01	47.63	52.89	54.30	58.90	65.51	79.25	86.29	91.21	***107.60***	***115.95***	Revenues per sh	***130.00***
	2.52	2.79	3.33	3.21	2.61	3.27	4.03	4.59	5.08	5.74	6.73	7.13	7.29	9.75	10.01	9.78	***11.90***	***13.50***	"Cash Flow" per sh	***15.30***
	1.38	1.44	1.52	1.57	1.10	1.56	2.11	2.59	2.87	3.16	3.66	3.81	3.75	5.64	5.21	4.74	***6.60***	***7.70***	Earnings per sh [A]	***8.30***
	.24	.32	.36	.40	.44	.48	.52	.71	.45	.80	.84	.88	.92	.96	1.04	1.08	***1.18***	***1.26***	Div'ds Decl'd per sh [B]	***1.60***
	1.86	3.34	2.92	2.41	2.78	2.16	4.30	3.74	4.21	6.94	6.36	5.74	4.80	9.16	8.04	6.99	***7.60***	***8.20***	Cap'l Spending per sh	***10.00***
	5.31	5.26	2.76	4.20	5.06	4.72	4.85	6.74	8.64	10.33	11.41	12.70	16.76	19.33	21.34	24.61	***29.35***	***34.35***	Book Value per sh	***51.00***
	153.81	144.56	124.57	126.06	127.24	121.49	116.93	117.53	117.24	116.58	113.95	111.31	109.75	108.71	106.21	105.65	***105.00***	***103.50***	Common Shs Outst'g [C]	***100.00***
	15.0	15.6	18.0	19.9	25.8	22.5	20.4	21.2	25.2	24.2	22.2	21.6	26.0	20.7	20.0	25.1	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***22.0***
	.80	.84	.96	1.20	1.72	1.43	1.28	1.35	1.42	1.27	1.12	1.13	1.31	1.12	1.07	1.29			Relative P/E Ratio	***1.20***
	1.2%	1.4%	1.3%	1.3%	1.5%	1.4%	1.2%	1.3%	.6%	1.0%	1.0%	1.1%	.9%	.8%	1.0%	.9%			Avg Ann'l Div'd Yield	***.9%***
							4526.8	5055.0	5584.6	6165.4	6187.6	6555.5	7189.6	8614.9	9165.3	9636.6	***11300***	***12000***	Revenues ($mill)	***13000***
							14.5%	15.0%	14.9%	15.0%	17.1%	16.5%	14.0%	14.5%	14.0%	12.9%	***13.5%***	***14.0%***	Operating Margin	***14.0%***
							213.9	229.2	253.4	294.5	339.6	361.5	383.5	435.9	499.1	527.4	***550***	***600***	Depreciation ($mill)	***700***
							257.0	310.4	342.4	374.8	427.2	432.1	416.3	623.6	564.0	506.0	***700***	***800***	Net Profit ($mill)	***830***
							38.2%	38.5%	38.2%	38.0%	38.1%	37.9%	30.1%	19.5%	22.6%	24.0%	***24.5%***	***24.5%***	Income Tax Rate	***25.0%***
							5.7%	6.1%	6.1%	6.1%	6.9%	6.6%	5.8%	7.2%	6.2%	5.3%	***6.3%***	***6.7%***	Net Profit Margin	***6.4%***
							75.0	51.7	d32.1	109.0	327.0	372.6	416.9	150.6	445.5	757.3	***975***	***1150***	Working Cap'l ($mill)	***1450***
							699.2	585.3	458.4	683.5	1005.0	986.3	1085.6	898.4	1295.7	1305.4	***1300***	***1450***	Long-Term Debt ($mill)	***2250***
							567.5	791.9	1012.5	1204.5	1300.4	1414.1	1839.3	2101.4	2267.0	2600.1	***3080***	***3555***	Shr. Equity ($mill)	***5105***
							21.4%	23.5%	24.1%	20.6%	19.1%	18.5%	14.7%	21.5%	16.6%	13.6%	***16.5%***	***16.5%***	Return on Total Cap'l	***11.5%***
							45.3%	39.2%	33.8%	31.1%	32.9%	30.6%	22.6%	29.7%	24.9%	19.5%	***23.0%***	***22.5%***	Return on Shr. Equity	***16.0%***
							34.3%	28.7%	28.6%	23.3%	25.4%	23.6%	17.1%	24.7%	19.9%	15.1%	***18.5%***	***19.0%***	Retained to Com Eq	***13.0%***
							24%	27%	15%	25%	23%	23%	24%	17%	20%	23%	***18%***	***16%***	All Div'ds to Net Prof	***19%***

CAPITAL STRUCTURE as of 6/30/21
Total Debt $1303.5 mill. **Due in 5 Yrs** $612.5 mill.
LT Debt $1303.5 mill. **LT Interest** $48.0 mill.
(Total interest coverage: 15.0X)
(32% of Cap'l)

No Defined Benefit Pension Plan
Leases, Uncapitalized Annual Rentals $49.1 mill.
Pfd Stock None

Common Stock 105,196,031 shs.

MARKET CAP: $17.4 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	35.0	313.3	570.9
Receivables	1011.8	1124.4	1293.9
Other	434.5	404.4	344.5
Current Assets	1481.3	1842.1	2209.3
Accts Payable	602.6	587.5	674.9
Debt Due	- -	- -	- -
Other	433.2	497.3	553.5
Current Liab.	1035.8	1084.8	1228.4

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	11.5%	10.5%	*7.0%*
"Cash Flow"	12.5%	11.0%	*7.5%*
Earnings	14.0%	10.0%	*8.0%*
Dividends	9.0%	8.0%	*7.5%*
Book Value	16.5%	16.5%	*15.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1948.2	2139.0	2209.8	2317.9	8614.9
2019	2089.6	2261.8	2363.7	2450.2	9165.3
2020	2280.8	2145.6	2472.5	2737.7	9636.6
2021	2618.1	2908.4	***2770***	***3003.5***	***11300***
2022	***2775***	***3000***	***3025***	***3200***	***12000***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1.07	1.37	1.47	1.73	5.64
2019	1.09	1.37	1.40	1.35	5.21
2020	.98	1.14	1.18	1.44	4.74
2021	1.37	1.61	***1.75***	***1.87***	***6.60***
2022	***1.65***	***1.90***	***2.00***	***2.15***	***7.70***

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.23	.23	.23	.23	.92
2018	.24	.24	.24	.24	.96
2019	.26	.26	.26	.26	1.04
2020	.27	.27	.27	.27	1.08
2021	.28	.30	.30		

LEGENDS
12.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2024 | 2025 | 2026

% TOT. RETURN 7/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	31.2	55.5
3 yr.	44.0	48.6
5 yr.	111.7	95.5

BUSINESS: J.B. Hunt Transport Services, Inc. is a holding company for J.B. Hunt Transport, Inc., one of the largest irregular-route truckload carriers in the United States, transporting general merchandise throughout the continental U.S., Canada, and Mexico. Has truckload, intermodal, and dedicated contract operations. As of 12/31/20, owned 16,627 tractors and 125,979 trailers and containers. Labor costs: 24.4% of revenues. Has about 30,310 employees. Johnelle Hunt owns 17.3% of stock; Vanguard Group, 9.3%; T. Rowe Price Associates, 8.9%; off./dir., 3.3% (3/21 Proxy). Chairman: Kirk Thompson. CEO & President: John N. Roberts III. Inc.: AR. Address: 615 J.B. Hunt Corporate Drive, Lowell, Arkansas 72745-0130. Telephone: 479-820-0000. Internet: www.jbhunt.com.

J.B. Hunt Transport Services recorded strong June-period results. Revenues jumped 36%, year over year, with all of the segments producing double-digit gains. Intermodal, J.B. Hunt's largest division, was able to overcome a lack of available rail capacity, with volumes increasing a healthy 6%. A good showing from the Eastern Network was the primary catalyst. Meantime, the Integrated Capacity Solutions and JB Truck segments produced respective revenue gains of 100% and 70%, with both able to source and secure shipping capacity for customers via its Marketplace for J.B. Hunt 360 (more below). These gains helped J.B. Hunt offset a mixed performance from the Dedicated Contract Services business, where a 17% revenue advance was not enough to overcome higher operating costs. All told, share earnings jumped an impressive 41%.

We expect the spirited performance to continue. The freight and shipping company should continue to benefit from the sharp recovery in the domestic economy. The strong consumer sector (the Conference Board's July consumer confidence reading was at its highest level since prior to the coronavirus pandemic), combined with an industrywide truck shortage, should enable J.B. Hunt to raise prices to offset higher operating (i.e., driver salaries and fuel) costs. Accordingly we look for respective year-to-year earnings advances of 40% and 15%-20% in 2021 and 2022.

Business secured through the Marketplace for J.B. Hunt 360 continues to expand. Indeed, total freight transactions for the digital platform reached $500 million in the June quarter, up nearly 80% from the year-earlier period. Continued expansion of the digital platform, which is a faster and more cost-efficient way of securing customers, would likely support operating margins over the 3- to 5-year pull.

Our investment advice has not changed since the time of the mid-May review. Even with the pullback in price on profit taking following the last quarterly report, we think this neutrally ranked stock is a bit expensive. Appreciation potential, save for those with an 18-month investment horizon, has been discounted by the phenomenal recovery in share price over the last 15-plus months.

William G. Ferguson *August 20, 2021*

(A) Based on diluted shares. Excludes net nonrecurring gains (losses): '05, (10¢); '07, 3¢; '08, (1¢); '09, (5¢); '17, $2.43; '18, ($1.21); '19, (44¢). Next earnings report due mid-October.

(B) Dividend payment dates mid-February, May, August, and late November. Raised quarterly dividend by $0.01 a share and paid out normal Q1 outlay in Q4 of 2012.

(C) In millions.

Company's Financial Strength	A+
Stock's Price Stability	85
Price Growth Persistence	85
Earnings Predictability	80

J&J SNACK FOODS NDQ-JJSF

RECENT PRICE 172.58 | P/E RATIO NMF (Trailing:NMF Median: 28.0) | RELATIVE P/E RATIO NMF | DIV'D YLD 1.5% | VALUE LINE

TIMELINESS 3 Raised 5/14/21
SAFETY 1 Raised 4/20/18
TECHNICAL 2 Raised 7/16/21
BETA .95 (1.00 = Market)

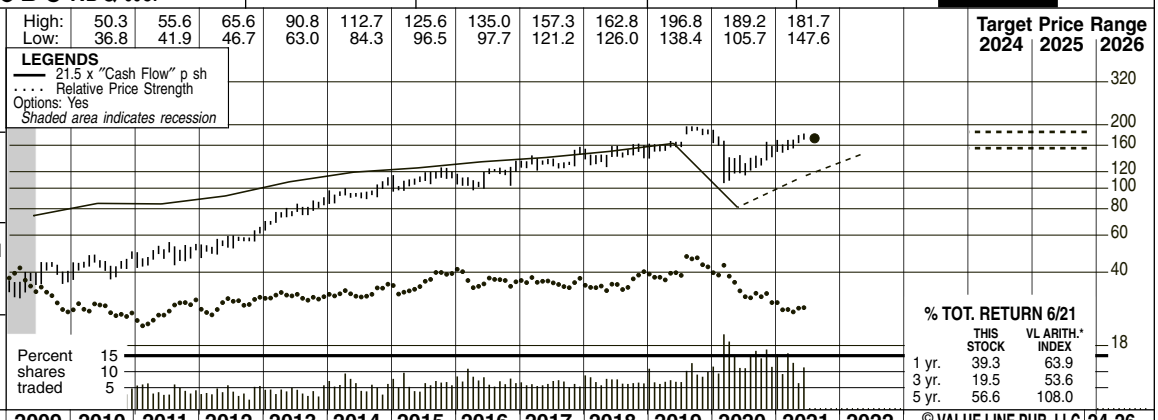
18-Month Target Price Range
Low-High Midpoint (% to Mid)
$84-$216 $150 (-15%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	185	(+5%)	3%
Low	155	(-10%)	-1%

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	104	106	101
to Sell	102	100	104
Hld's(000)	14011	13906	14124



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
25.02	27.88	30.42	33.57	35.25	37.68	39.73	44.24	46.46	49.26	52.27	53.18	58.09	60.69	62.79	54.03	*56.85*	*63.15*	Sales per sh [A]	*71.45*
2.74	2.91	3.13	2.92	3.45	3.94	3.93	4.28	4.99	5.54	5.81	6.22	6.52	6.95	7.59	3.77	*5.20*	*6.85*	"Cash Flow" per sh	*8.40*
1.40	1.57	1.69	1.47	2.21	2.59	2.58	2.86	3.41	3.82	3.73	4.05	4.21	4.46	5.00	.96	*2.30*	*4.10*	Earnings per sh [A B]	*5.65*
.25	.30	.34	.37	.39	.43	.47	.52	.64	1.28	1.44	1.56	1.68	1.80	2.00	2.30	*2.35*	*2.50*	Div'ds Decl'd per sh [C■]	*3.00*
1.18	1.07	1.22	1.22	1.47	1.81	1.56	2.28	1.92	2.08	2.68	2.61	3.87	3.20	3.02	3.06	*2.35*	*2.90*	Cap'l Spending per sh	*2.75*
12.85	14.23	15.80	16.90	18.51	20.58	23.09	25.32	27.66	30.13	32.12	34.17	36.56	40.48	44.13	42.80	*42.55*	*44.15*	Book Value per sh [D]	*48.90*
18.27	18.47	18.70	18.75	18.53	18.49	18.73	18.78	18.68	18.67	18.68	18.67	18.66	18.75	18.90	18.92	*19.00*	*19.00*	Common Shs Outst'g [E]	*20.00*
17.7	20.0	22.5	20.6	16.1	16.2	18.3	18.7	20.9	23.8	28.8	27.9	30.7	32.0	32.3	NMF	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*30.0*
.94	1.08	1.19	1.24	1.07	1.03	1.15	1.19	1.17	1.25	1.45	1.46	1.54	1.73	1.72	NMF			Relative P/E Ratio	*1.65*
1.0%	1.0%	.9%	1.2%	1.1%	1.0%	1.0%	1.0%	.9%	1.4%	1.3%	1.4%	1.3%	1.3%	1.2%	1.5%			Avg Ann'l Div'd Yield	*1.3%*
744.1	830.8	867.7	919.5	976.3	992.8	1084.2	1138.3	1186.5	1022.0	*1080*	*1200*	Sales ($mill) [A]	*1430*
13.7%	13.4%	14.5%	15.1%	15.3%	15.4%	14.8%	13.8%	14.0%	6.9%	*14.0%*	*15.0%*	Operating Margin	*18.0%*
25.0	26.2	28.8	31.7	38.3	40.1	42.4	46.4	48.6	53.0	*55.0*	*55.0*	Depreciation ($mill)	*55.0*
48.5	54.1	64.4	71.8	70.2	76.0	79.2	83.9	94.8	18.3	*45.0*	*80.0*	Net Profit ($mill)	*115*
37.0%	37.3%	36.1%	35.4%	37.3%	35.0%	35.2%	29.0%	25.1%	14.7%	*27.5%*	*27.5%*	Income Tax Rate	*27.5%*
6.5%	6.5%	7.4%	7.8%	7.2%	7.7%	7.3%	7.4%	8.0%	1.8%	*4.0%*	*6.5%*	Net Profit Margin	*7.9%*
184.0	226.6	181.5	179.6	229.7	252.8	262.8	264.9	385.2	365.5	*375*	*400*	Working Cap'l ($mill)	*540*
.5	.3	.1	.4	1.2	1.2	.9	.8	.7	.4	*.5*	*.5*	Long-Term Debt ($mill)	*.5*
432.4	475.5	516.6	562.5	599.9	638.0	682.3	759.1	833.8	809.5	*810*	*840*	Shr. Equity ($mill)	*980*
11.2%	11.4%	12.5%	12.8%	11.7%	11.9%	11.6%	11.0%	11.4%	2.3%	*6.0%*	*10.0%*	Return on Total Cap'l	*12.0%*
11.2%	11.4%	12.5%	12.8%	11.7%	11.9%	11.6%	11.1%	11.4%	2.3%	*5.5%*	*9.5%*	Return on Shr. Equity	*11.5%*
9.2%	9.4%	10.2%	9.0%	7.3%	7.4%	7.1%	6.7%	7.0%	NMF	*NMF*	*3.5%*	Retained to Com Eq	*5.5%*
18%	18%	18%	29%	37%	38%	39%	39%	39%	NMF	*102%*	*61%*	All Div'ds to Net Prof	*53%*

CAPITAL STRUCTURE as of 3/27/21
Total Debt $.6 mill. **Due in 5 Yrs** $.6 mill.
LT Debt $.3 mill. **LT Interest** $.02 mill.

Leases, Uncapitalized Annual rentals $14.8 mill.

No Defined Pension Benefit Plan
Pfd Stock None

Common Stock 19,035,968 shs.
4/23/21
MARKET CAP: $3.3 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2018	2019	3/27/21
Cash Assets	132.5	243.5	259.8
Receivables	132.3	140.9	137.7
Inventory (FIFO)	112.9	116.2	115.6
Other	5.1	5.8	17.2
Current Assets	382.8	506.4	530.3
Accts Payable	69.6	72.0	83.5
Debt Due	.3	.3	.3
Other	48.0	48.9	56.1
Current Liab.	117.9	121.2	143.2

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	5.0%	3.5%	*2.0%*
"Cash Flow"	6.0%	2.5%	*7.0%*
Earnings	5.0%	-1.0%	*10.0%*
Dividends	18.0%	12.5%	*8.0%*
Book Value	8.5%	7.0%	*3.0%*

Fiscal Year Ends	QUARTERLY SALES ($ mill.) [A] Dec.Per	Mar.Per	Jun.Per	Sep.Per	Full Fiscal Year
2018	265.2	266.1	306.3	300.7	1138.3
2019	271.6	276.3	326.7	311.9	1186.5
2020	282.9	272.0	214.6	252.5	1022.0
2021	241.0	256.2	*282*	*300.8*	*1080*
2022	*270*	*300*	*315*	*315*	*1200*

Fiscal Year Ends	EARNINGS PER SHARE [A B] Dec.Per	Mar.Per	Jun.Per	Sep.Per	Full Fiscal Year
2018	.88	.95	1.39	1.24	4.46
2019	.93	1.08	1.63	1.36	5.00
2020	.89	.38	d.67	.35	.96
2021	.09	.32	*.76*	*1.13*	*2.30*
2022	*.85*	*.95*	*1.10*	*1.20*	*4.10*

Cal-endar	QUARTERLY DIVIDENDS PAID [C■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.42	.42	.42	.42	1.68
2018	.45	.45	.45	.45	1.80
2019	.50	.50	.50	.50	2.00
2020	.575	.575	.575	.575	2.30
2021	.575	.633			

BUSINESS: J&J Snack Foods Corp. manufactures nutritional snack foods and distributes frozen carbonated and juice beverages mainly in the United States, Mexico and Canada. It sells to snack bars, food stands, fast food operators, stadiums, sports arenas, warehouse club stores, schools, colleges, movie theaters, and others. In addition, it sells various food products through a chain of specialty snack food retail outlets. Has 4,600 employees. Officers/directors own 21% of company; BlackRock Fund Advisors, 13%; The Vanguard Group, 9%; (12/20 proxy). Incorporated: New Jersey. Pres. & CEO: Dan Fachner. Chairman: Gerald B. Schreiber. Address: 6000 Central Highway, Pennsauken, New Jersey 08109. Telephone: 856-665-9533. Internet: www.jjsnack.com.

Despite a poor March-quarter performance, J&J Snack Foods profits ought to perk up over the course of fiscal 2021. While the March-quarter top and bottom lines declined 6% and 16%, respectively, from the previous-year tallies, performance improved on a sequential basis. Moreover, sales to customers in the Food Service segment (which accounted for 66% of total sales) declined only 1% from the previous-year period as volumes are beginning to recover nicely, reflecting a return to more-favorable pre-COVID-19 levels. To wit, expanded capacity at key venues (namely theaters, amusement parks, and sports arenas), especially amid the rise in vaccination in North America, is allowing more consumers to confidently leave their homes. These are signs that business momentum is picking up previously lost distribution. The Retail unit remains strong as sales grew 17% from the previous-year period, with an increase in consumer traffic and greater sales of soft pretzels and frozen juices. The Frozen Beverages unit also improved on a sequential basis, as sales declined at a lesser rate. Improved volumes and a strong focus on cost efficiencies should lift margins and profits in the back half of the year.

Looking at the next year, the top and bottom lines may climb about 11% and 78%, respectively, to $1.2 billion and $4.10 a share. This is based on our assumption that schools will be back in full swing in the fall (early 2022) and theaters are expected to reach 80%-85% capacity by the end of fiscal 2021. As a result, the prolonged impact of COVID-19 on consumer behavior ought to taper. This should help the mainstay Food Service segment make a comeback. Too, new product distribution and promotional planning initiatives should begin to materialize by then. In early June, the company debuted three new *ICEE* products for the summer season that expands its frozen portfolio.

A new CEO is at the helm. Effective May 11th, the company appointed Dan Fachner (who became president in May, 2020), as chief executive officer. Mr. Fachner succeeded Gerald Schreiber (founder), who will remain chairman.

At the recent price, we recommend most investors wait on the sidelines.

Oriatal J. Haiby *July 16, 2021*

(A) Fiscal year ends last Saturday in September. **(B)** Diluted earnings. Qrtly may not sum due to changes in share count. Excludes nonrecurring gain: 2011, $0.35; 2018, $1.05. Next earnings report due early Aug. **(C)** Dividends historically paid early January, April, July, and October. ■ Div'd reinvest. plan available. **(D)** Includes intangibles. At 9/26/20: $203.5 million, or $10.76 a share. **(E)** In millions.

Company's Financial Strength	A+
Stock's Price Stability	85
Price Growth Persistence	95
Earnings Predictability	35

J. HENRY & ASSOC. NDQ-JKHY

RECENT PRICE **175.81** | P/E RATIO **40.7** (Trailing: 45.3 Median: 25.0) | RELATIVE P/E RATIO **2.10** | DIV'D YLD **1.0%** | **VALUE LINE**

TIMELINESS 3 Raised 6/4/21
SAFETY 1 Raised 8/11/17
TECHNICAL 5 Lowered 7/2/21
BETA .85 (1.00 = Market)

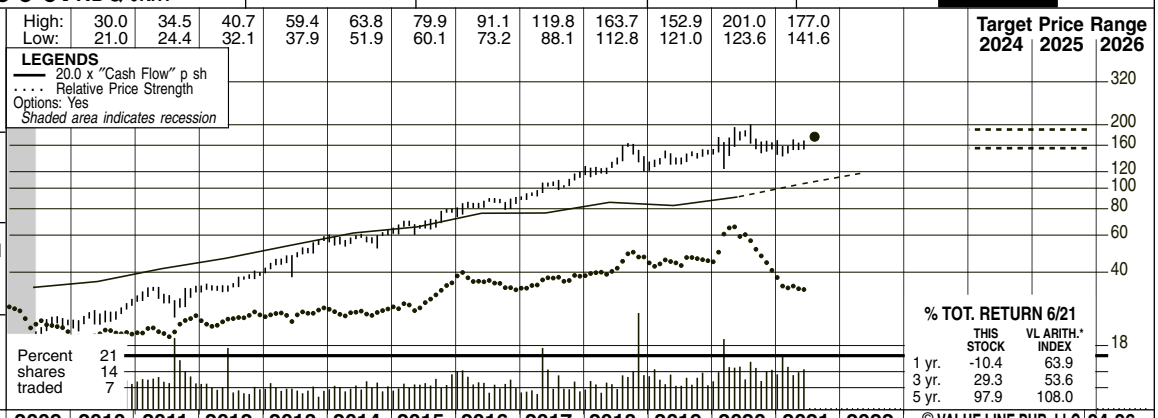
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$122-$262 $192 (10%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	190	(+10%)	*3%*
Low	155	(-10%)	*-2%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	296	308	272
to Sell	274	266	311
Hld's(000)	67786	67572	66614



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
5.82	6.30	7.50	8.60	8.92	9.80	11.20	11.94	13.25	14.64	15.54	17.21	18.48	19.91	20.17	22.15	***23.50***	***25.50***	Revenues per sh [A]	***30.35***
1.14	1.31	1.58	1.68	1.70	1.81	2.08	2.33	2.68	3.07	3.28	3.81	3.82	4.29	4.15	4.55	***5.25***	***5.95***	"Cash Flow" per sh	***8.05***
.81	.96	1.14	1.17	1.22	1.38	1.59	1.78	2.04	2.36	2.59	3.12	3.14	3.65	3.52	3.86	***4.05***	***4.65***	Earnings per sh [A]	***6.35***
.17	.20	.24	.28	.32	.36	.40	.44	.56	.84	.94	1.06	1.18	1.36	1.54	1.66	***1.80***	***1.92***	Div'ds Decl'd per sh [B]	***2.45***
.63	.48	.38	.36	.38	.64	.37	.48	.54	.40	.67	.72	.54	.52	.70	.70	***.85***	***.90***	Cap'l Spending per sh	***.95***
5.62	6.12	6.72	6.96	7.49	8.79	10.19	11.43	12.58	12.56	12.26	12.66	13.33	16.42	18.56	20.22	***21.95***	***23.45***	Book Value per sh [D]	***27.20***
92.05	93.96	89.10	86.40	83.61	85.40	86.36	86.03	85.24	82.64	80.85	78.70	77.42	77.17	76.99	76.63	***74.00***	***72.50***	Common Shs Outst'g [C]	***70.00***
23.5	20.8	19.5	21.5	15.3	17.0	18.1	18.0	20.1	23.3	24.1	24.8	29.1	31.5	39.7	40.0	***39.9***		Avg Ann'l P/E Ratio	***27.0***
1.25	1.12	1.04	1.29	1.02	1.08	1.14	1.15	1.13	1.23	1.21	1.30	1.46	1.70	2.11	2.05	***2.02***		Relative P/E Ratio	***1.40***
.9%	1.0%	1.1%	1.1%	1.7%	1.5%	1.4%	1.4%	1.4%	1.5%	1.5%	1.4%	1.3%	1.2%	1.1%	1.1%	***1.1%***		Avg Ann'l Div'd Yield	***1.4%***
						966.9	1027.1	1129.4	1210.1	1256.2	1354.6	1431.1	1536.6	1552.7	1697.1	***1740***	***1850***	Revenues ($mill) [AE]	***2125***
						26.7%	27.4%	28.1%	30.2%	29.6%	30.4%	29.2%	28.5%	25.4%	25.5%	***28.5%***	***29.5%***	Operating Margin	***32.5%***
						41.9	45.3	52.0	52.9	54.2	50.6	49.7	48.0	47.4	52.2	***90.0***	***95.0***	Depreciation ($mill)	***120***
						137.5	155.0	176.6	201.1	211.2	248.9	245.8	283.1	271.9	296.7	***300***	***335***	Net Profit ($mill)	***445***
						33.8%	33.1%	32.0%	35.4%	33.3%	31.0%	33.0%	27.6%	21.7%	22.2%	***22.0%***	***22.0%***	Income Tax Rate	***22.0%***
						14.2%	15.1%	15.6%	16.6%	16.8%	18.4%	17.2%	18.4%	17.5%	17.5%	***17.2%***	***18.2%***	Net Profit Margin	***20.9%***
						d26.5	66.5	35.6	d44.4	49.9	d11.8	48.8	d19.4	99.5	174.2	***250***	***300***	Working Cap'l ($mill)	***350***
						127.9	106.2	7.4	3.7	50.1	- -	50.0	- -	50.0	.2	***200***	***150***	Long-Term Debt ($mill)	***Nil***
						879.8	983.1	1072.2	1038.2	991.5	996.2	1032.1	1266.8	1429.0	1549.7	***1625***	***1700***	Shr. Equity ($mill)	***1905***
						14.0%	14.4%	16.7%	19.4%	20.4%	25.1%	22.8%	22.4%	19.1%	19.2%	***16.5%***	***18.0%***	Return on Total Cap'l	***23.5%***
						15.6%	15.8%	16.5%	19.4%	21.3%	25.0%	23.8%	22.3%	19.0%	19.1%	***18.5%***	***20.0%***	Return on Shr. Equity	***23.5%***
						11.7%	11.9%	12.0%	12.5%	13.6%	16.5%	14.9%	14.1%	10.7%	10.9%	***10.5%***	***11.5%***	Retained to Com Eq	***14.5%***
						25%	25%	27%	35%	36%	34%	37%	37%	44%	43%	***43%***	***41%***	All Div'ds to Net Prof	***39%***

CAPITAL STRUCTURE as of 3/31/21
Total Debt $200.1 mill. **Due in 5 Yrs** $200.1 mill.
LT Debt $200.1 mill. **LT Interest** $1.2 mill. (11% of Cap'l)
Leases, Uncapitalized: Annual rentals $13.4 mill.

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 74,282,912 shs.
as of 4/29/21
MARKET CAP: $13.1 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	3/31/21
Cash Assets	96.6	213.3	70.1
Receivables	310.1	300.9	207.7
Other	162.8	154.8	164.9
Current Assets	569.5	669.0	442.7
Accts Payable	9.9	9.9	7.8
Debt Due	- -	- -	- -
Other	460.1	484.9	293.9
Current Liab.	470.0	494.8	301.7

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	8.5%	7.5%	*6.5%*
"Cash Flow"	9.5%	7.5%	*11.0%*
Earnings	11.5%	9.5%	*9.5%*
Dividends	17.0%	14.5%	*8.5%*
Book Value	9.0%	8.0%	*6.5%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [AE] Sep. 30	Dec. 31	Mar. 31	Jun. 30	Full Fiscal Year
2018	359.9	374.8	384.7	417.2	1536.6
2019	392.5	386.3	380.4	393.5	1552.7
2020	438.0	419.1	429.4	410.6	1697.1
2021	451.8	422.4	433.8	***432***	***1740***
2022	***485***	***455***	***465***	***445***	***1850***

Fiscal Year Ends	EARNINGS PER SHARE [A] Sep. 30	Dec. 31	Mar. 31	Jun. 30	Full Fiscal Year
2018	.82	.80	.93	1.10	3.65
2019	1.08	.88	.77	.79	3.52
2020	1.16	.94	.96	.80	3.86
2021	1.19	.94	.95	***.97***	***4.05***
2022	***1.30***	***1.10***	***1.15***	***1.10***	***4.65***

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	June.30	Sept.30	Dec.31	Full Year
2017	.31	.31	.31	.31	1.24
2018	.37	.37	.37	.37	1.48
2019	.40	.40	.40	.40	1.60
2020	.43	.43	.43	.43	1.72
2021	.46	.46			

BUSINESS: Jack Henry & Associates Inc. provides integrated computer systems and services to banks and other financial institutions. It has developed several banking application software systems that it markets, along with computer hardware, to financial institutions. In addition, it performs data conversion, software installation, and software customization for the implementation of its systems. Acquired BancData Solutions, 4/00; Symitar Systems, 6/00; Transcend Systems, 3/02. It has a business partnership with SEDONA, an IBM Advanced Business Partner. Has about 6,717 employees. Off. & dir. own less than 1% of stock (10/20 Proxy). Chrmn.: John Prim. CEO: Dave Foss. Inc.: DE. Addr.: 663 Highway 60, P.O. Box 807, Monett, MO 65708. Tel.: 417-235-6652. Web: www.jackhenry.com.

Jack Henry reported decent fiscal third-quarter results (year ended June 30, 2021). On both an annual and sequential basis, revenues of $434 million improved modestly, while earnings of $0.95 a share were about on par with respective tallies. During the March period, Jack Henry completed its card processing system conversion and continued to capitalize on strong technological and cloud demand trends among financial institutions (inked 15 core deals and established strategic collaborations). However, Services and Support segment revenues remained under pressure from lower deconversion and hardware fees. On balance, we suspect that the integrated IT services provider registered fourth-quarter financial results that probably mirrored the third-quarter showing.

Share net is poised to meaningfully accelerate this fiscal year. Operating margin expansion is apt to be the main growth driver, supported by our expectation for more-modest cost of goods as a percentage of total sales. Meanwhile, SG&A and R&D expenses ought to trend relatively flat. In sum, we are maintaining our fiscal 2022 bottom-line estimate of $4.65 per share, representing a healthy double-digit year-over-year advance.

The company recently replenished its nearly tapped stock repurchase authorization. Specifically, the board announced it has boosted its ongoing repurchase program by five million shares. The balance sheet is rock solid, suggesting that most of the buyback activity, which will likely span several years, may be funded primarily through strong cash flow. Furthermore, Jack Henry boasts an enviable track record of annual dividend increases, despite offering a subpar yield at present.

The equity is neutrally ranked for relative year-ahead price performance (Timeliness: 3). Jack Henry shares have regained some momentum in recent weeks, and are trading at their highest level thus far in 2021. Looking toward the pull to 2024-2026, much of the growth we envision over that time frame appears to already be factored into the recent quotation. All told, interested subscribers should continue to wait for a more attractive entry point before committing funds here.

Nicholas P. Patrikis *August 6, 2021*

(A) Fiscal year ends June 30th. Diluted earnings per share. Next earnings report due mid-August. Quarterly earnings may not sum due to rounding.
(B) Dividends historically paid in early March, June, September, and December.
(C) In millions.
(D) Includes intangibles, as of fiscal '20: $716.3 million, $9.35/share.
(E) Adopted accounting standards update No. 2014-09 as of 7/1/18.

Company's Financial Strength	A+
Stock's Price Stability	95
Price Growth Persistence	100
Earnings Predictability	95

JUNIPER NETWORKS NYSE-JNPR

RECENT PRICE **29.44** | P/E RATIO **16.7** (Trailing: 17.2 Median: 17.0) | RELATIVE P/E RATIO **0.87** | DIV'D YLD **2.7%** | **VALUE LINE**

TIMELINESS 4 Raised 8/13/21
SAFETY 2 Raised 12/11/20
TECHNICAL 4 Lowered 9/10/21
BETA 1.00 (1.00 = Market)

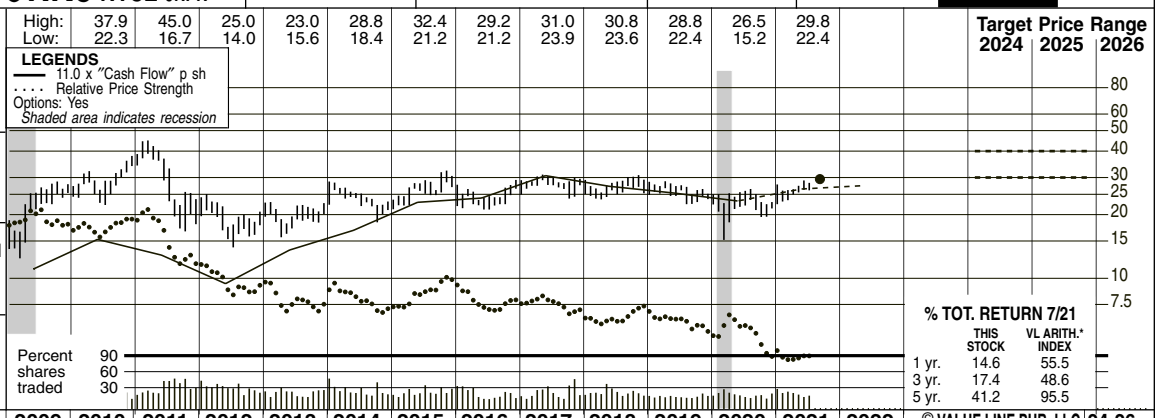
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$15-$34 $25 (-15%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	40	(+35%)	*11%*
Low	30	(Nil)	*4%*

Institutional Decisions

	4Q2020	1Q2021	2Q2021
to Buy	201	206	202
to Sell	218	205	211
Hld's(000)	301686	298735	302291



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
3.63	4.05	5.42	6.78	6.38	7.79	8.45	8.59	9.43	11.12	12.65	13.09	13.75	13.42	13.23	13.56	*14.60*	*15.25*	Sales per sh	*17.40*
.85	.81	1.03	1.31	1.01	1.39	1.17	.86	1.24	1.53	2.08	2.18	2.78	2.48	2.30	2.11	*2.40*	*2.50*	"Cash Flow" per sh	*3.35*
.72	.63	.75	1.04	.73	1.08	.88	.53	.89	1.05	1.61	1.65	2.11	1.88	1.72	1.55	*1.75*	*1.85*	Earnings per sh [A]	*2.60*
- -	- -	- -	- -	- -	- -	- -	- -	- -	.20	.40	.40	.40	.72	.76	.80	*.80*	*.84*	Div'ds Decl'd per sh [E]	*1.05*
.17	.18	.28	.31	.29	.35	.51	.69	.47	.46	.55	.56	.41	.43	.33	.31	*.60*	*.70*	Cap'l Spending per sh	*1.00*
12.14	10.74	10.24	11.20	11.21	12.58	13.47	13.77	14.75	11.82	11.91	13.02	12.81	13.92	13.73	13.86	*12.05*	*11.15*	Book Value per sh [D]	*8.80*
568.24	569.23	522.82	526.75	519.34	525.38	526.41	508.40	495.20	416.20	384.00	381.10	365.50	346.40	335.90	327.70	*322.50*	*317.50*	Common Shs Outst'g [B]	*305.00*
32.7	28.1	36.3	22.5	30.4	27.0	34.6	35.8	22.3	22.8	16.4	14.8	13.3	14.5	15.0	14.7	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*14.0*
1.74	1.52	1.93	1.35	2.02	1.72	2.17	2.28	1.25	1.20	.83	.78	.67	.78	.80	.75			Relative P/E Ratio	*.80*
- -	- -	- -	- -	- -	- -	- -	- -	- -	.8%	1.5%	1.6%	1.4%	2.6%	2.9%	3.5%			Avg Ann'l Div'd Yield	*2.8%*
4448.7	4365.4	4669.1	4627.1	4857.8	4990.1	5027.2	4647.5	4445.4	4445.1	*4715*	*4850*	Sales ($mill)	*5300*
18.6%	13.7%	16.5%	18.5%	22.6%	22.5%	26.9%	22.2%	20.6%	19.3%	*19.5%*	*20.0%*	Operating Margin	*23.5%*
142.9	159.4	158.0	149.8	156.5	190.5	208.1	193.1	175.7	171.8	*185*	*190*	Depreciation ($mill)	*200*
473.4	276.8	453.8	487.9	643.0	639.7	809.0	666.4	597.5	519.7	*590*	*610*	Net Profit ($mill)	*825*
26.0%	29.9%	19.8%	24.8%	25.5%	26.7%	26.4%	17.2%	18.7%	19.0%	*19.0%*	*19.0%*	Income Tax Rate	*19.0%*
10.6%	6.3%	9.7%	10.5%	13.2%	12.8%	16.1%	14.3%	13.4%	11.7%	*12.5%*	*12.6%*	Net Profit Margin	*15.6%*
2973.0	2178.7	2262.5	1444.2	1110.5	2236.0	2446.3	2739.3	1665.9	1110.1	*1100*	*1125*	Working Cap'l ($mill)	*1300*
999.0	999.2	999.3	1349.0	1648.8	2133.7	2136.3	1789.1	1683.9	1705.8	*1675*	*1700*	Long-Term Debt ($mill)	*1750*
7089.2	6999.0	7302.2	4919.1	4574.4	4962.5	4680.9	4823.2	4610.6	4543.5	*3890*	*3550*	Shr. Equity ($mill)	*2680*
6.1%	3.8%	5.8%	8.3%	11.0%	9.7%	12.6%	10.8%	10.1%	8.9%	*11.5%*	*12.5%*	Return on Total Cap'l	*19.5%*
6.7%	4.0%	6.2%	9.9%	14.1%	12.9%	17.3%	13.8%	13.0%	11.4%	*15.0%*	*17.0%*	Return on Shr. Equity	*31.0%*
6.7%	4.0%	6.2%	8.2%	10.6%	9.8%	14.1%	8.6%	7.3%	5.6%	*8.0%*	*9.5%*	Retained to Com Eq	*18.5%*
- -	- -	- -	18%	24%	24%	19%	37%	44%	51%	*46%*	*45%*	All Div'ds to Net Prof	*40%*

CAPITAL STRUCTURE as of 6/30/21
Total Debt $1,694.4 mill. **Due in 5 Yrs** $1,245 mill.
LT Debt $1,694.4 mill. **LT Interest** $85 mill.
(Total Interest Coverage: 8.8x) (28% of Cap'l)

Leases, Uncapitalized Annual rentals $52.9 mill.

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 325,151,000 shares
as of 7/28/21
MARKET CAP: $9.6 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets [C]	1953.8	1774.0	1322.2
Receivables	879.7	964.1	768.3
Other	376.3	533.1	555.6
Current Assets	3209.8	3271.2	2646.1
Accts Payable	219.5	277.0	259.8
Debt Due	- -	421.5	- -
Deferred Sales	812.9	867.3	891.2
Other	511.5	595.3	539.9
Current Liab.	1543.9	2161.1	1690.9

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	6.5%	4.0%	*4.5%*
"Cash Flow"	6.5%	7.5%	*6.5%*
Earnings	6.0%	7.5%	*7.0%*
Dividends	- -	30.5%	*5.5%*
Book Value	1.5%	1.5%	*-7.5%*

Calendar	QUARTERLY SALES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1082.6	1204.1	1179.8	1181.0	4647.5
2019	1001.7	1102.5	1133.1	1208.1	4445.4
2020	998.0	1086.3	1138.2	1222.6	4445.1
2021	1074.4	1172.3	*1200*	*1268.3*	*4715*
2022	*1110*	*1195*	*1235*	*1310*	*4850*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.27	.48	.54	.59	1.88
2019	.26	.40	.48	.58	1.72
2020	.23	.35	.43	.55	1.55
2021	.30	.43	*.46*	*.56*	*1.75*
2022	*.31*	*.44*	*.50*	*.60*	*1.85*

Calendar	QUARTERLY DIVIDENDS PAID[E] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.10	.10	.10	.10	.40
2018	.18	.18	.18	.18	.72
2019	.19	.19	.19	.19	.76
2020	.20	.20	.20	.20	.80
2021	.20	.20			

BUSINESS: Juniper Networks is a leading provider of high-performance network infrastructure. Designs, develops and sells products and services for routing, switching, Wi-Fi, network security, and software-defined networking technologies. Cloud customers accounted for 24% of 2020 revs.; Telecom/Cable, 40%; Enterprise, 36%. Subcontracts most manufacturing. Int'l sales were 50% of total in 2020. Had 9,950 employees at 12/31/20. Officers & directors own about 1.3% of common shares; Dodge & Cox, 15.0%; Vanguard, 11.3%; BlackRock, 9.0% (4/21 Proxy). Chairman: Scott Kriens. CEO: Rami Rahim. Chief Scientist: Pradeep Sindhu. Incorporated: Delaware. Address: 1133 Innovation Way, Sunnyvale, CA 94089. Telephone: 408-936-5396. Internet: www.juniper.net.

Juniper Networks has been making solid progress of late. Revenues and earnings have declined in each of the past three years, but the company appears well on its way to ending that streak in 2021. In the recent June quarter, the top line rose 8% year over year, with low double-digit gains in the Cloud and Enterprise verticals, and 2% growth in the Service Provider space. Meanwhile, earnings advanced 23%, to $0.43 a share, at the high end of management's guidance ($0.33-$0.43), as lower service delivery costs helped to amplify the revenue advance.

The company should be able to maintain the momentum in the second half. Granted, concerns about elevated freight costs and other supply-related challenges have prompted management to trim 50 basis points from its full-year gross margin outlook. And while Juniper is among the many feeling the effects of semiconductor shortages, it remains confident in its revenue prospects, even bumping up the 2021 growth guidance from 4%-5% to 6%. Notably, product orders reached record levels in the second quarter. The strength partly reflects some customers acting to secure their own supply by placing orders early, though year-over-year growth would have likely been in the mid-teens even without this.

The balance sheet remains in good shape. Earlier this year, the company used cash on hand to complete its $179 million purchase of Apstra. That deal, which should enhance Juniper's ability to capitalize on data center opportunities, probably won't move the needle much on revenues this year, but ought to support top- and bottom-line growth in 2022. Meanwhile, operating cash flow should continue to be more than sufficient to fund the dividend, while also providing the flexibility to repurchase stock or make additional acquisitions.

This stock will likely have the most appeal with conservative investors. It gets high marks for Price Stability and offers a dividend yield that exceeds the *Value Line* median (1.8%) by nearly 100 basis points. Still, this equity has traded mostly sideways in recent years and is pegged to lag the broader market in the six to 12 months ahead.

Robert M. Greene *September 10, 2021*

(A) Diluted earnings. Stock-comp. expense excluded, beginning in '17. Excls. nonrecur. gain/(losses): '06, ($2.30); '07, (13¢); '08, (13¢); '09, (32¢); '10, 7¢; '11, (9¢); '12, (17¢); '13, (3¢); '14, ($1.76); '15, (2¢); '16, (12¢); '17, ($1.31); '18, (28¢); '19, (73¢); '20, (78¢). Next egs. report due late Oct. Quart. egs may not add to total due to changes in shares out. **(B)** In millions. **(C)** Excludes LT investments. At 12/31/20: $656.6 mill. **(D)** Includes goodwill. At 12/31/20: $3.936 bill., $12.01 per share. **(E)** Div'ds paid late March, June, Sep., and Dec.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	30
Earnings Predictability	80

MANTECH INT'L NDQ-MANT

RECENT PRICE **86.80** | P/E RATIO **27.6** (Trailing: 28.5 / Median: 23.0) | RELATIVE P/E RATIO **1.42** | DIV'D YLD **1.8%** | **VALUE LINE**

TIMELINESS 3 Raised 4/30/21
SAFETY 3 New 8/26/05
TECHNICAL 2 Raised 8/6/21
BETA .85 (1.00 = Market)

18-Month Target Price Range

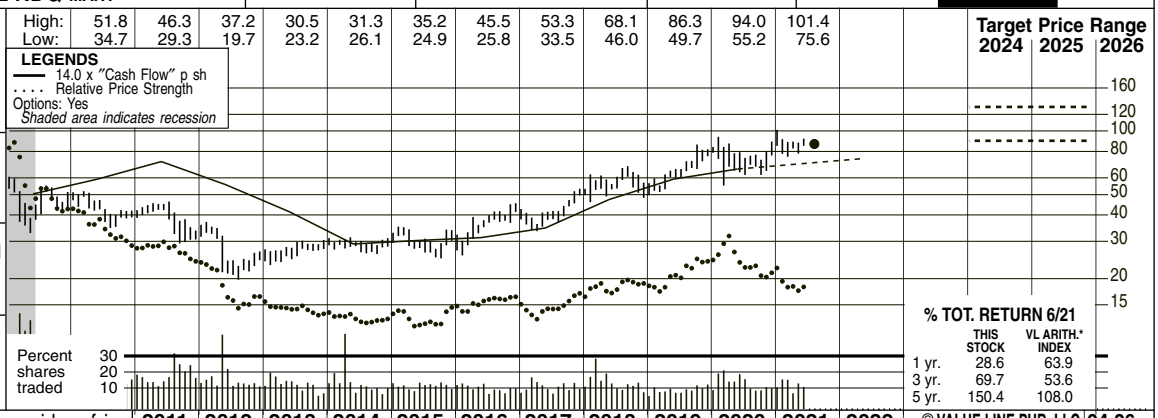
Low-High	Midpoint (% to Mid)
$68-$141	$105 (20%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	130	(+50%)	*12%*
Low	90	(+5%)	*3%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	103	112	121
to Sell	124	117	109
Hld's(000)	26263	26734	26158



ManTech International is a provider of information technology services to the U.S. government, mainly for the Department of Defense and the intelligence community. The company completed an IPO in February of 2002 and a secondary offering in December of that same year. Net proceeds were used to fund several acquisitions.

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
	77.82	69.71	62.11	47.47	41.14	41.34	43.77	49.26	55.32	62.23	*65.10*	*67.60*	Revenues per sh	*80.25*
	5.11	3.99	2.96	2.08	2.16	2.23	2.48	3.39	4.23	4.72	*5.00*	*5.30*	"Cash Flow" per sh	*6.75*
	3.63	2.57	2.14	1.27	1.36	1.47	1.62	2.06	2.83	2.97	*3.15*	*3.35*	Earnings per sh A	*4.40*
	.84	.84	.84	.84	.84	.84	.84	1.00	1.08	1.28	*1.52*	*1.62*	Div'ds Decl'd per sh D	*2.12*
	1.48	.32	.30	.11	.14	.20	.79	.76	1.36	1.76	*1.65*	*1.70*	Cap'l Spending per sh	*2.00*
	29.54	31.46	30.48	30.90	31.42	32.05	34.23	35.24	37.10	39.03	*40.85*	*42.75*	Book Value per sh C	*50.00*
	36.88	37.04	37.19	37.37	37.68	38.74	39.23	39.76	40.18	40.47	*41.00*	*41.50*	Common Shs Outst'g B	*43.00*
	10.8	10.5	12.8	23.0	22.2	24.5	25.4	27.5	23.0	25.2	*Bold figures are*		Avg Ann'l P/E Ratio	*25.0*
	.68	.67	.72	1.21	1.12	1.29	1.28	1.49	1.23	1.29	*Value Line*		Relative P/E Ratio	*1.40*
	2.1%	3.1%	3.1%	2.9%	2.8%	2.3%	2.0%	1.8%	1.7%	1.7%	*estimates*		Avg Ann'l Div'd Yield	*1.9%*
	2870.0	2582.3	2310.1	1774.0	1550.1	1601.6	1717.0	1958.6	2222.6	2518.4	*2670*	*2805*	Revenues ($mill)	*3450*
	9.8%	8.7%	7.4%	7.1%	7.4%	7.6%	7.7%	8.4%	8.7%	9.1%	*9.5%*	*9.5%*	Operating Margin	*10.0%*
	55.2	52.7	30.5	30.4	30.3	30.2	33.8	52.6	55.9	70.3	*75.0*	*80.0*	Depreciation ($mill)	*100*
	133.3	95.0	79.6	47.3	51.1	56.4	63.5	82.1	113.9	120.5	*130*	*140*	Net Profit ($mill)	*190*
	38.1%	38.7%	35.7%	39.9%	40.3%	37.5%	34.7%	25.8%	16.3%	22.9%	*24.0%*	*24.0%*	Income Tax Rate	*24.0%*
	4.6%	3.7%	3.4%	2.7%	3.3%	3.5%	3.7%	4.2%	5.1%	4.8%	*4.9%*	*5.0%*	Net Profit Margin	*5.5%*
	300.4	358.0	453.6	195.4	189.3	229.6	138.9	196.7	154.7	147.6	*195*	*235*	Working Cap'l ($mill)	*395*
	200.0	200.0	200.0	--	--	--	31.0	7.5	36.5	15.0	*25.0*	*25.0*	Long-Term Debt ($mill)	*Nil*
	1089.3	1165.2	1133.8	1154.8	1183.7	1241.7	1343.0	1401.2	1490.6	1579.4	*1675*	*1775*	Shr. Equity ($mill)	*2150*
	11.0%	7.6%	6.6%	4.1%	4.3%	4.5%	4.7%	5.9%	7.5%	7.6%	*7.5%*	*8.0%*	Return on Total Cap'l	*9.0%*
	12.2%	8.2%	7.0%	4.1%	4.3%	4.5%	4.7%	5.9%	7.6%	7.6%	*8.0%*	*8.0%*	Return on Shr. Equity	*9.0%*
	9.4%	5.5%	4.3%	1.4%	1.7%	2.0%	2.3%	3.0%	4.7%	4.4%	*4.0%*	*4.0%*	Retained to Com Eq	*4.5%*
	23%	33%	39%	66%	62%	57%	51%	48%	38%	43%	*48%*	*48%*	All Div'ds to Net Prof	*48%*

CAPITAL STRUCTURE as of 3/31/21

Total Debt $21.5 mill. **Due in 5 Yrs** $21.5 mill.
LT Debt $21.5 mill. **LT Interest** $1.9 mill. (1% of Cap'l)
Leases, Uncapitalized Annual rentals $33.2 mill.

Pension Assets-12/20 None
Oblig. $.7 mill.
Common Stock 40,601,384 shs.
as of 5/3/21
Class A: 27,424,689 shs. (1 vote per sh.)
Class B: 13,176,695 shs. (10 votes per sh.)
MARKET CAP: $3.5 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2019	2020	3/31/21
Cash Assets	8.9	41.2	6.9
Receivables	399.0	400.6	428.8
Inventory	--	--	--
Other	46.8	54.6	51.4
Current Assets	454.7	496.4	487.1
Accts Payable	146.0E	142.4	122.5
Debt Due	--	--	--
Other	154.0	206.4	191.7
Current Liab.	300.0	348.8	314.2

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	-1.0%	2.0%	*6.5%*
"Cash Flow"	1.5%	11.5%	*8.5%*
Earnings	-1.5%	10.5%	*9.0%*
Dividends	--	6.0%	*11.0%*
Book Value	5.0%	3.5%	*5.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	473.2	491.0	497.2	497.2	1958.6
2019	501.9	537.0	579.2	604.5	2222.6
2020	610.9	632.5	636.2	638.8	2518.4
2021	633.2	*665*	*680*	*691.8*	*2670*
2022	*680*	*690*	*715*	*720*	*2805*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.51	.50	.55	.50	2.06
2019	.53	.60	.69	1.00	2.83
2020	.71	.74	.73	.79	2.97
2021	.79	*.78*	*.79*	*.79*	*3.15*
2022	*.80*	*.80*	*.85*	*.90*	*3.35*

Calendar	QUARTERLY DIVIDENDS PAID D Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.21	.21	.21	.21	.84
2018	.25	.25	.25	.25	1.00
2019	.27	.27	.27	.27	1.08
2020	.32	.32	.32	.32	1.28
2021	.38	.38			

BUSINESS: ManTech International Corporation provides innovative, mission-focused technology solutions and services for U.S. intelligence community, defense, and federal civilian agencies. Areas of expertise include full-spectrum cyber; secure mission and enterprise information technology (IT); advanced data analytics; intelligent systems engineering; software and systems development; and national security mission support. Employs approx. 9,400. Off./dir. have 83.0% of the total voting power, primarily through George J. Pedersen's 100% ownership of Class B common stock (4/21 proxy). Chairman, CEO & President: Kevin M. Phillips. Incorporated: Delaware. Address: 2251 Corporate Park Dr., Herndon, VA 20171. Tel.: 703-218-6000. Internet: www.mantech.com.

ManTech International had a mixed start to 2021, and similar trends may well continue in the near term. While the provider of technologies and solutions for mission-critical national security programs reported strong profitability, with earnings of $0.79 a share up 11% year over year and above our $0.72 estimate, revenues came in below our expectations. Year over year, the top line advanced a modest 4%, and was tempered by lighter other direct costs (ODCs) and new business procurement delays. An uneven market environment, created by the pandemic, also contributed to the muted growth.

Management reiterated its guidance for 2021. Revenues are expected to increase 5%-9% year over year, to between $2.65 billion and $2.75 billion. Meantime, adjusted earnings per share are targeted to be in a range of $3.48-$3.60, a 4%-7% climb from 2020. Indeed, our earnings presentation is based on GAAP results and includes amortization of acquired intangibles and the related tax impact. For our part, we estimate share net will land between $3.10 and $3.20. (Second-quarter results were set to be released shortly after we rolled the presses on this Issue.)

The long-term fundamentals and positioning of the business still remain rather favorable. Overall, contributions from acquisitions, as well as healthy contract award and pipeline activity, should continue to drive growth. To wit, March-period contract awards totaled $561 million, representing a book-to-bill ratio of 0.9x. And as a result of these bookings, the company's backlog of business at quarter end was $10.1 billion (+8%), of which $1.4 billion was funded.

The company's capital deployment strategy is a positive here. With ample financial capacity, ManTech is able to fund organic investments and pursue growth-oriented acquisitions, as well as return cash to shareholders through the quarterly dividend. Of note, the issue's dividend yield is in line with the *Value Line* median. However, total return potential is below average, with the stock trading near the low end of our 3- to 5-year Target Price Range. With a Timeliness rank of 3 (Average), these shares are also just a middling choice for the near term.

Michelle Jensen *August 6, 2021*

(A) Diluted earnings. Includes stock option expense. Excludes nonrecurring items: '13, ($2.31); 17, $1.29. May not sum to total due to rounding. Q3'21 earnings report due early November. **(B)** In millions. **(C)** Includes goodwill and other intangibles. At 12/31/20: $1440.1 million, or $35.58 a share. **(D)** Dividend initiated in June, 2011. Historically paid during late March, June, September, and December. **(E)** Includes accrued expenses.

Company's Financial Strength	B++
Stock's Price Stability	85
Price Growth Persistence	55
Earnings Predictability	75

MONSTER BEVERAGE NDQ-MNST

RECENT PRICE **90.86** | P/E RATIO **34.3** (Trailing: 37.1 Median: 31.0) | RELATIVE P/E RATIO **1.69** | DIV'D YLD **Nil** | **VALUE LINE**

TIMELINESS 2 Raised 4/30/21
SAFETY 2 Raised 10/16/20
TECHNICAL 3 Raised 5/21/21
BETA .85 (1.00 = Market)

18-Month Target Price Range

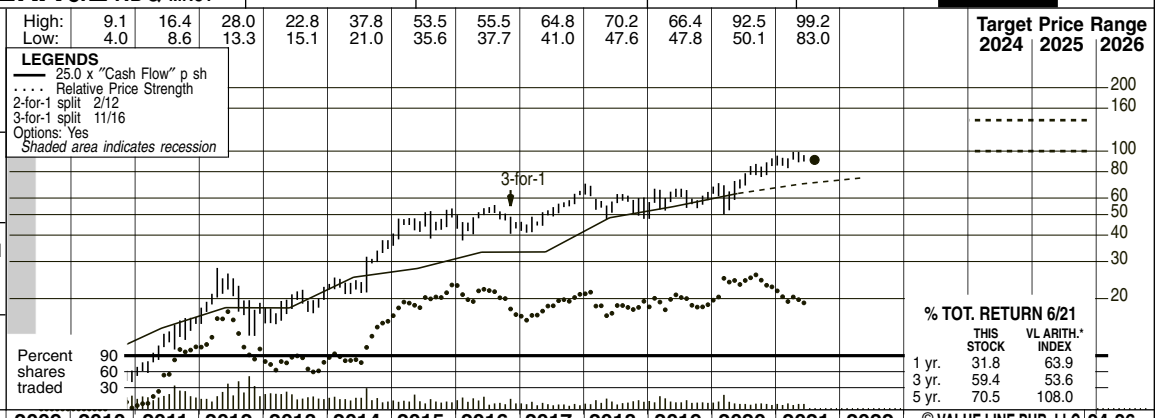
Low-High	Midpoint (% to Mid)
$77-$152	$115 (25%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	140	(+55%)	*11%*
Low	100	(+10%)	*3%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	331	354	354
to Sell	274	298	322
Hld's(000)	336489	336120	333309



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
.66	1.12	1.62	1.91	2.16	2.44	3.26	4.14	4.49	4.90	4.47	5.38	5.41	7.00	7.83	8.71	*9.65*	*10.70*	Sales per sh	*11.70*
.12	.18	.27	.21	.41	.42	.58	.73	.72	1.01	1.11	1.33	1.33	1.93	2.19	2.52	*2.80*	*3.00*	"Cash Flow" per sh	*4.15*
.11	.17	.25	.19	.37	.38	.51	.62	.65	.92	1.12	1.19	1.35	1.76	2.03	2.38	*2.65*	*2.85*	Earnings per sh A	*4.00*
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	Div'ds Decl'd per sh	*Nil*
- -	.01	.01	.01	.04	.02	.05	.09	.08	.06	.06	.18	.13	.11	.19	.09	*.15*	*.20*	Cap'l Spending per sh	*.30*
.24	.42	.76	.81	1.11	1.55	1.87	1.30	1.98	3.01	7.90	5.88	6.25	6.64	7.77	9.77	*10.00*	*10.95*	Book Value per sh C	*17.60*
532.65	540.35	559.15	541.97	528.95	533.88	522.83	497.33	500.47	503.17	608.70	566.57	623.20	543.68	536.70	528.10	*525.00*	*520.00*	Common Shs Outst'g B	*500.00*
16.3	33.5	28.9	28.6	15.8	19.3	24.4	31.8	28.8	29.1	40.5	40.1	38.2	32.8	29.2	30.7	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*30.0*
.87	1.81	1.53	1.72	1.05	1.23	1.53	2.02	1.62	1.53	2.04	2.10	1.92	1.77	1.56	1.59			Relative P/E Ratio	*1.65*
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -			Avg Ann'l Div'd Yield	*Nil*
1703.2	2060.7	2246.4	2464.9	2722.6	3049.4	3369.0	3807.2	4200.8	4598.6	*5060*	*5565*	Sales ($mill)	*5850*
27.8%	27.7%	26.5%	31.4%	34.0%	36.9%	35.4%	35.2%	34.9%	33.4%	*34.0%*	*35.0%*	Operating Margin	*37.0%*
17.0	20.5	22.7	25.7	30.9	40.8	48.9	57.0	64.8	61.0	*65.0*	*70.0*	Depreciation ($mill)	*80.0*
286.2	340.0	338.7	483.2	646.1	712.7	780.9	993.0	1107.8	1270.6	*1390*	*1480*	Net Profit ($mill)	*2000*
37.4%	38.1%	39.9%	35.2%	27.5%	34.0%	32.0%	23.2%	21.5%	13.3%	*25.0%*	*25.0%*	Income Tax Rate	*25.0%*
16.8%	16.5%	15.1%	19.6%	23.7%	23.4%	23.2%	26.1%	26.4%	27.6%	*27.5%*	*26.6%*	Net Profit Margin	*34.2%*
916.6	546.5	867.0	1338.2	3068.4	961.7	1526.0	1203.0	1655.3	2391.0	*1700*	*1800*	Working Cap'l ($mill)	*2500*
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	Long-Term Debt ($mill)	*Nil*
979.2	644.4	992.3	1515.2	4809.4	3329.7	3895.2	3610.9	4171.3	5160.9	*5250*	*5700*	Shr. Equity ($mill)	*8800*
29.2%	52.8%	34.1%	31.9%	13.4%	21.4%	20.0%	27.5%	26.6%	24.6%	*26.5%*	*26.0%*	Return on Total Cap'l	*23.0%*
29.2%	52.8%	34.1%	31.9%	13.4%	21.4%	20.0%	27.5%	26.6%	24.6%	*26.5%*	*26.0%*	Return on Shr. Equity	*23.0%*
29.2%	52.8%	34.1%	31.9%	13.4%	21.4%	20.0%	27.5%	26.6%	24.6%	*26.5%*	*26.0%*	Retained to Com Eq	*23.0%*
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	All Div'ds to Net Prof	*Nil*

CAPITAL STRUCTURE as of 3/31/21
Total Debt None

Leases, Uncapitalized: Annual rentals $9.4 mill.

No Defined Benefit Pension Plan
Common Stock 528,562,217 shs
as of 4/30/21

MARKET CAP: $48.0 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	3/31/21
Cash Assets	1331.0	2061.7	2159.0
Receivables	540.3	666.0	802.5
Inventory (FIFO)	360.7	333.0	368.4
Other	84.3	80.2	103.9
Current Assets	2316.3	3140.9	3433.8
Accts Payable	274.0	296.8	334.0
Debt Due	- -	- -	- -
Other	387.0	453.1	454.8
Current Liab.	661.0	749.9	788.8

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	13.5%	11.0%	*7.0%*
"Cash Flow"	20.5%	18.5%	*11.0%*
Earnings	21.0%	18.0%	*11.5%*
Dividends	- -	- -	*Nil*
Book Value	21.5%	13.5%	*14.0%*

Calendar	QUARTERLY SALES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2018	851.0	1015.9	1016.1	924.2	3807.2
2019	946.0	1104.0	1133.6	1017.2	4200.8
2020	1062.1	1093.8	1246.4	1196.3	4598.6
2021	1243.8	*1225*	*1325*	*1266.2*	*5060*
2022	*1350*	*1275*	*1475*	*1465*	*5565*

Calendar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2018	.38	.48	.48	.43	1.76
2019	.48	.53	.55	.47	2.03
2020	.52	.59	.65	.62	2.38
2021	.59	*.66*	*.75*	*.65*	*2.65*
2022	*.60*	*.75*	*.80*	*.70*	*2.85*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017					
2018	NO CASH DIVIDENDS BEING PAID				
2019					
2020					
2021					

BUSINESS: Monster Beverage Corporation develops, markets, sells, and distributes a line of all-natural beverages. The company's product line includes bottled juices, natural sodas, energy drinks, iced teas, lemonades, and cocktails, and functional beverages. Functional beverages are intended to have added health benefits, as they are fortified with vitamins, minerals and herbs. Markets its products through retail chains, club stores, and specialty stores. Has 3,666 employees. Officers & directors own about 10.4% of comm. shares, The Coca-Cola Company, 19.3%. (4/21 Proxy). 2020 depreciation rate: 2.5%. Chairman & CEO: Rodney C. Sacks. Inc.: DE. Addr.: 1 Monster Way, Corona, California 92879. Telephone: 951-739-6200. Internet: www.monsterbevcorp.com.

Monster Beverage is on track to deliver double-digit sales and earnings growth in 2021. Better-than-expected results in the first quarter set the stage for the company to generate healthy gains throughout the year (discussed below). And, although the stock has traded in a narrow range over the past three months, the equity has a favorable year-ahead Timeliness rank (2). Thus, investor sentiment toward MNST stock should strengthen as 2021 progresses.

The operational environment ought to improve. Notably, the distribution of COVID-19 vaccines throughout the United States and the world has been met with full state and country reopenings after a long period of lockdowns. This should be beneficial to Monster's end markets, especially in its high-growth channels including gas stations and convenience stores as customer traffic should increase.

Company initiatives to enhance business conditions are ongoing. Monster has solidified its position within the high-growth, high-margined energy drink market with its array of energy drink offerings, some enhanced with caffeine. Throughout the years, aggressive marketing and promotional activities have paid off, and these drinks have resounded well with many consumers. Furthermore, distribution channels have been augmented in recent years with Monster's distribution partnership with The Coca-Cola Company. This strategic alliance opened the international market base, and Monsters drinks are now available in many foreign lands including France and Italy. This scenario brings notable top- and bottom-line benefits.

Actions to stave off the negative impact of an inflationary environment are being executed. First, higher pricing will likely be passed onto consumers. This measure is geared toward offsetting rising manufacturing and ingredient costs. Also, cost-saving programs ought to help drive near-term profitability.

Patient investors should consider other selections at this time. Although the company is likely to realize ongoing top- and bottom-line increases over the 3- to 5-year mark, capital appreciation potential over that span is unexciting.

Nira Maharaj *July 16, 2021*

(A) Fully diluted earnings. Excludes non recurring gains and (losses): '15, ($0.53); '17, $0.07; '20, $0.26. May not sum due to rounding. Next earnings report due early August.
(B) In millions, adjusted for stock splits.
(C) Includes intangibles. In '20: $2,390.6 million, $4.52 share.

Company's Financial Strength	A+
Stock's Price Stability	90
Price Growth Persistence	85
Earnings Predictability	95

ALTRIA GROUP, INC. NYSE-MO

RECENT PRICE **47.53** | P/E RATIO **10.3** (Trailing: 11.0 Median: 16.0) | RELATIVE P/E RATIO **0.51** | DIV'D YLD **7.2%** | **VALUE LINE**

TIMELINESS 4 Lowered 4/30/21
SAFETY 3 Lowered 4/17/20
TECHNICAL 3 Lowered 7/16/21
BETA .95 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$27-$64 $46 (-5%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	115	(+140%)	*29%*
Low	75	(+60%)	*17%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	698	712	869
to Sell	703	768	715
Hld's(000)	1157231	1125081	1119075

	2005	2006	2007	2008[H]	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
High:	26.2	30.4	36.3	38.6	51.7	61.7	70.1	77.8	71.9	57.9	51.8	52.6								
Low:	19.1	23.2	28.0	31.8	33.8	47.3	56.2	60.0	46.5	39.3	31.0	40.0								
Sales per sh	46.93	48.36	35.02	9.39	11.35	11.66	11.64	12.25	12.27	12.45	12.98	13.25	13.45	13.53	13.51	14.07	*14.20*	*14.65*	Sales per sh	*16.10*
"Cash Flow" per sh	5.92	6.59	4.81	1.78	1.89	2.00	1.78	2.19	2.38	2.68	2.79	3.15	3.55	4.14	4.37	4.51	*4.80*	*5.10*	"Cash Flow" per sh	*6.20*
Earnings per sh [A]	5.15	5.76	4.36	1.66	1.76	1.87	1.64	2.06	2.26	2.56	2.67	2.73	3.39	3.99	4.22	4.36	*4.60*	*4.90*	Earnings per sh [A]	*5.95*
Div'ds Decl'd per sh [B] ■	3.06	3.32	3.16	1.68	1.32	1.46	1.58	1.70	1.84	2.08	2.17	2.35	2.54	3.00	3.28	3.40	*3.52*	*3.68*	Div'ds Decl'd per sh [B] ■	*4.64*
Cap'l Spending per sh	1.06	1.17	2.10	.12	.13	.08	.05	.06	.07	.08	.12	.10	.10	.13	.13	.12	*.10*	*.15*	Cap'l Spending per sh	*.20*
Book Value per sh [C]	17.13	18.89	8.80	1.37	1.96	2.49	1.80	1.58	2.07	1.53	1.47	6.57	8.09	7.89	3.35	1.53	*1.90*	*2.20*	Book Value per sh [C]	*3.20*
Common Shs Outst'g [D]	2085.0	2097.1	2107.7	2061.4	2076.0	2088.7	2044.4	2009.9	1993.5	1969.3	1960.1	1943.3	1901.3	1874.1	1858.0	1858.4	*1830.0*	*1810.0*	Common Shs Outst'g [D]	*1700.0*
Avg Ann'l P/E Ratio	13.2	13.4	16.3	11.9	9.9	11.8	16.2	15.7	15.7	16.5	20.1	23.4	20.6	15.1	11.6	9.5	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*16.0*
Relative P/E Ratio	.70	.72	.87	.72	.66	.75	1.02	1.00	.88	.87	1.01	1.23	1.04	.82	.62	.49			Relative P/E Ratio	*.90*
Avg Ann'l Div'd Yield	4.5%	4.3%	4.5%	8.5%	7.6%	6.6%	6.0%	5.3%	5.2%	4.9%	4.0%	3.7%	3.6%	5.0%	6.7%	8.2%			Avg Ann'l Div'd Yield	*4.9%*
Sales ($mill)	23800	24618	24466	24522	25434	25744	25576	25364	25110	26153	*26000*	*26500*	Sales ($mill)	*27400*
Operating Margin	26.5%	30.5%	34.1%	31.9%	33.1%	35.5%	38.3%	41.7%	42.7%	42.5%	*44.5%*	*45.5%*	Operating Margin	*49.5%*
Depreciation ($mill)	253.0	225.0	212.0	208.0	225.0	204.0	209.0	227.0	226.0	257.0	*260*	*270*	Depreciation ($mill)	*295*
Net Profit ($mill)	3390.0	4180.0	4535.0	5070.0	5243.0	5925.0	6531.0	7539.0	7895.9	8117.0	*8500*	*8935*	Net Profit ($mill)	*10220*
Income Tax Rate	39.2%	35.4%	34.7%	34.8%	35.1%	56.2%	33.5%	23.1%	23.8%	24.8%	*25.0%*	*25.0%*	Income Tax Rate	*25.0%*
Net Profit Margin	14.2%	17.0%	18.5%	20.7%	20.6%	23.0%	25.5%	29.7%	31.4%	31.0%	*32.7%*	*33.7%*	Net Profit Margin	*37.3%*
Working Cap'l ($mill)	d512.0	d1936	d468.0	d795.0	d992.0	d115.0	d2448	d16894	d3350	d1946	*d2500*	*d2200*	Working Cap'l ($mill)	*d1850*
Long-Term Debt ($mill)	13089	12419	13992	13693	12915	13881	13030	11898	27042	27971	*27500*	*27000*	Long-Term Debt ($mill)	*26000*
Shr. Equity ($mill)	3680.0	3168.0	4119.0	3014.0	2880.0	12770	15377	14787	6222.0	2839.0	*3500*	*4000*	Shr. Equity ($mill)	*5400*
Return on Total Cap'l	23.7%	30.4%	27.9%	32.8%	35.8%	23.6%	24.2%	29.4%	25.5%	26.3%	*27.5%*	*29.0%*	Return on Total Cap'l	*32.5%*
Return on Shr. Equity	92.1%	NMF	NMF	NMF	NMF	46.4%	42.5%	51.0%	NMF	NMF	*NMF*	*NMF*	Return on Shr. Equity	*NMF*
Retained to Com Eq	4.6%	24.6%	22.4%	39.1%	36.9%	11.1%	11.2%	14.4%	29.4%	40.9%	*33.0%*	*31.0%*	Retained to Com Eq	*19.5%*
All Div'ds to Net Prof	95%	81%	80%	77%	80%	76%	74%	72%	77%	78%	*77%*	*75%*	All Div'ds to Net Prof	*78%*

CAPITAL STRUCTURE as of 3/31/21
Total Debt $29680 mill. **Due in 5 Yrs** $10350 mill.
LT Debt $28180 mill. **LT Interest** $1175 mill.
(Total interest coverage: 10.0x) (90% of Cap'l)

Pension Assets-12/20 $8.9 bill. **Oblig.** $9.5 bill.
Pfd Stock None

Common Stock 1,851,777,199 shs.

MARKET CAP: $88.0 billion (Large Cap)

CURRENT POSITION[E] ($MILL.)	2019	2020	3/31/21
Cash Assets	2117	4945	5792
Receivables	152	137	142
Inventory (LIFO)	2293	1966	1948
Other	262	69	147
Current Assets	4824	7117	8029
Accts Payable	425	380	271
Debt Due	1000	1500	1500
Other	6749	7183	8233
Current Liab.	8174	9063	10004

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	-3.0%	2.0%	*2.5%*
"Cash Flow"	3.5%	10.5%	*6.0%*
Earnings	4.0%	11.0%	*6.0%*
Dividends	3.5%	9.5%	*6.0%*
Book Value	5.0%	30.0%	*-4.5%*

Calendar	QUARTERLY SALES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	6108	6305	6837	6114	25364
2019	5628	6619	6856	6007	25110
2020	6359	6367	7123	6304	26153
2021	6036	*6550*	*7000*	*6414*	*26000*
2022	*6400*	*6600*	*7100*	*6400*	*26500*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.95	1.01	1.08	.95	3.99
2019	.90	1.10	1.19	1.02	4.22
2020	1.09	1.09	1.19	.99	4.36
2021	1.07	*1.17*	*1.25*	*1.11*	*4.60*
2022	*1.13*	*1.25*	*1.32*	*1.20*	*4.90*

Calendar	QUARTERLY DIVIDENDS PAID [B] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.61	.61	.61	.66	2.49
2018	.66	.70	.70	.80	2.86
2019	.80	.80	.80	.84	3.24
2020	.84	.84	.84	.86	3.38
2021	.86	.86	.86		

LEGENDS
15.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2024 2025 2026

% TOT. RETURN 6/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	31.0	63.9
3 yr.	4.4	53.6
5 yr.	-7.1	108.0

BUSINESS: Altria Group, Inc. is the parent company of Philip Morris USA, John Middleton and Philip Morris Capital Corp. In 2020, the company operated 3 segments: Cigarettes (92% of operating profits) include *Marlboro, Benson & Hedges, Merit, Virginia Slims*; Oral Tobacco (16%); Other (-8%). Sold *Miller*, 6/02. Has a 10.0% interest in *Anheuser-Busch In InBev*. Acq'd Nabisco, 12/00, Spun off Kraft, 4/07; Spun off Philip Morris Int'l, 3/08; Acq'd, UST, 1/09. Has 7,100 employees. Vanguard Group owns 8.2% of common shares; BlackRock owns 7.0%; officers and directors own less than 1.0% (4/21 proxy). CEO: Billy Gifford. Chairman: Thomas Farrell. Incorporated: VA. Address: 6601 W. Broad Street, Richmond, Virginia 23230. Telephone: 804-274-2200. Internet: www.altria.com.

Altria Group is facing an increasingly challenging regulatory environment. On April 29th, the U.S. Food and Drug Administration (FDA) announced that it was moving forward with a nationwide ban on menthol cigarettes and other flavored tobacco products. The decision, which could take 18 months or longer to implement, kicks off the official rule-making process and comment period by the agency. The push to ban menthol comes less than three years after the Trump Administration pursued a similar tactic, only to abandon it over concerns about the legality of such a move. Altria controls roughly a quarter of the menthol cigarette market in the United States—second only to British American Tobacco—and we estimate they account for 15%-20% of its overall shipment volumes. An outright ban would therefore be a huge blow to the company, though we remain skeptical about the agency's authority on this matter. If the FDA does see it through, we expect the final rule to be swiftly challenged in court. The entire process could take several years to play out, so we don't necessarily view this as a near-term threat.

The Biden Administration is also considering requiring tobacco companies to lower the amount of nicotine in all cigarettes sold in the United States. The goal would be to reduce nicotine to levels at which cigarettes are no longer addictive. The FDA did not comment on this matter when it unveiled the aforementioned policy on menthols, though we expect the agency to decide by yearend on whether or not to move forward.

The increasingly onerous environment puts Altria's alternative strategy into focus. The company is well behind peers when it comes to shifting consumers toward reduced-risk products. Altria's Oral Tobacco segment, which includes smokeless products like *iQOS* and the popular nicotine pouch *on!*, accounts for just 10% of revenues, well below where most rivals are. Even if the FDA's move to ban menthols does not ultimately go through, it may end up being the push that leadership needs to accelerate investments in the alternatives space.

This high-yielding stock offers strong total return potential to 2024-2026.

Daniel Henigson, CFA *July 16, 2021*

(A) Diluted earnings. Excl. nonrecur. gains (losses): '08, (17¢); '09, (21¢); '11, (21¢); '16, $4.55; '17, $1.92; '18, (31¢); '20, ($1.96). Next egs. rpt due July 29th. Quarterly totals may not sum due to changes in share count. **(B)** Divd's historically paid in early-Jan., late-Apr., early-Jul., and early-Oct. ■ Div'd reinvestment plan available. **(C)** Incl. intangibles. '20: $17.79 bill., $9.57/sh. **(D)** In millions. **(E)** Excl. fin'l services and real estate subsidiary **(F)** Spun-off Kraft Foods. **(G)** Spun-off Philip Morris Int'l. **(H)** Pro forma, reflects spinoff of Philip Morris Int'l.

Company's Financial Strength	B++
Stock's Price Stability	85
Price Growth Persistence	40
Earnings Predictability	95

MSA SAFETY, INC. NYSE-MSA

RECENT PRICE **164.16** | P/E RATIO **34.9** (Trailing: 38.4 Median: 20.0) | RELATIVE P/E RATIO **1.70** | DIV'D YLD **1.1%** | **VALUE LINE**

TIMELINESS 3 Lowered 8/21/20
SAFETY 2 Raised 4/9/21
TECHNICAL 4 Lowered 7/9/21
BETA 1.00 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$121-$267 $194 (20%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	195	(+20%)	*5%*
Low	145	(-10%)	*-3%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	106	122	102
to Sell	129	119	146
Hld's(000)	30034	30564	30627

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
High:	32.6	40.9	44.3	55.4	61.1	54.5	71.3	86.4	110.8	128.2	155.5	172.8						
Low:	22.4	24.5	32.7	43.0	46.3	38.3	37.7	65.9	71.5	90.8	83.6	145.6						

LEGENDS
18.0 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2024 2025 2026: 320 200 160 120 100 80 60 40 18

% TOT. RETURN 5/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	43.0	68.0
3 yr.	87.7	54.6
5 yr.	260.4	106.2

Percent shares traded: 15 10 5

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
24.84	25.37	27.77	31.70	25.30	26.74	31.97	31.59	29.89	30.28	30.26	30.46	31.31	35.25	36.10	34.51	*35.00*	*38.15*	Sales per sh	*45.00*
2.90	2.52	2.52	2.74	1.96	1.84	2.80	3.30	3.13	3.31	3.38	3.71	4.69	5.54	5.82	5.62	*5.75*	*6.65*	"Cash Flow" per sh	*8.10*
2.19	1.85	1.80	1.96	1.21	1.05	1.87	2.42	2.28	2.52	2.52	2.77	3.65	4.50	4.80	4.50	*4.70*	*5.50*	Earnings per sh [A]	*6.75*
.52	.68	.84	.94	.96	.99	1.03	1.10	1.18	1.23	1.27	1.31	1.38	1.49	1.64	1.71	*1.75*	*1.83*	Div'ds Decl'd per sh [B]	*2.25*
.59	.63	.92	1.24	.72	.69	.83	.87	.98	.90	.97	.68	.62	.88	.94	1.25	*1.20*	*1.35*	Cap'l Spending per sh	*1.45*
10.37	12.06	12.84	10.90	12.04	12.26	11.72	12.41	15.13	14.29	13.74	14.70	15.54	16.36	18.59	20.43	*21.25*	*23.15*	Book Value per sh	*27.50*
36.55	36.02	35.66	35.79	35.97	36.52	36.69	37.01	37.20	37.45	37.37	37.74	38.22	38.53	38.84	39.07	*40.00*	*40.00*	Common Shs Outst'g [C]	*40.00*
19.2	20.9	24.9	18.6	19.7	25.4	17.8	15.8	21.6	21.4	18.5	18.9	20.6	20.7	22.6	28.0	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*25.0*
1.02	1.13	1.32	1.12	1.31	1.62	1.12	1.01	1.21	1.13	.93	.99	1.04	1.12	1.20	1.45			Relative P/E Ratio	*1.40*
1.2%	1.8%	1.9%	2.6%	4.0%	3.7%	3.1%	2.9%	2.4%	2.3%	2.7%	2.5%	1.8%	1.6%	1.5%	1.4%			Avg Ann'l Div'd Yield	*1.3%*
1173.2	1168.9	1112.1	1133.9	1130.8	1149.5	1196.8	1358.1	1402.0	1348.2	*1400*	*1525*	Sales ($mill)	*1800*
12.7%	14.5%	14.5%	15.9%	15.9%	18.7%	21.9%	20.2%	20.5%	21.0%	*22.0%*	*22.5%*	Operating Margin	*23.0%*
32.9	31.7	30.8	29.9	31.7	35.3	37.9	37.9	38.0	39.7	*42.0*	*45.0*	Depreciation ($mill)	*55.0*
69.9	90.6	85.9	94.1	94.8	104.9	141.3	175.4	188.0	179.7	*188*	*220*	Net Profit ($mill)	*270*
33.2%	31.7%	29.3%	34.1%	29.8%	36.3%	24.2%	22.4%	23.4%	24.6%	*25.0%*	*23.0%*	Income Tax Rate	*23.0%*
6.0%	7.8%	7.7%	8.3%	8.4%	9.1%	11.8%	12.9%	13.4%	13.3%	*13.4%*	*14.4%*	Net Profit Margin	*15.0%*
287.1	274.8	309.4	263.8	253.1	251.4	333.0	374.5	415.9	443.8	*445*	*485*	Working Cap'l ($mill)	*525*
334.0	272.3	260.7	245.0	460.0	363.8	447.8	341.3	328.4	287.2	*320*	*225*	Long-Term Debt ($mill)	*200*
433.7	463.0	566.5	538.6	517.1	558.2	597.6	633.9	725.8	801.9	*850*	*925*	Shr. Equity ($mill)	*1100*
9.9%	13.0%	11.0%	12.6%	10.3%	12.3%	14.3%	18.9%	18.4%	16.9%	*16.5%*	*20.0%*	Return on Total Cap'l	*21.0%*
16.1%	19.6%	15.2%	17.5%	18.3%	18.8%	23.6%	27.7%	25.9%	22.4%	*22.0%*	*24.0%*	Return on Shr. Equity	*24.5%*
7.5%	11.0%	7.4%	9.1%	9.2%	10.1%	14.9%	18.8%	17.2%	14.2%	*14.0%*	*16.0%*	Retained to Com Eq	*16.5%*
54%	44%	51%	48%	50%	47%	37%	33%	34%	37%	*37%*	*33%*	All Div'ds to Net Prof	*33%*

CAPITAL STRUCTURE as of 3/31/21
Total Debt $360.4 mill. **Due in 5 Yrs** $284.8 mill.
LT Debt $340.4 mill. **LT Interest** $7.2 mill.
(Total interest coverage: 23.2x)
(29% of Cap'l)
Leases, Uncapitalized: Annual rentals $11.4 mill.
Pension Assets-12/20 $568.8 mill.
Oblig. $670.9 mill.
Preferred Stock 18,342 shs. 4½% cum., $50.00 par value, callable at $52.50
Common Stock 39,167,315 shs.
as of 4/23/21
MARKET CAP: $6.4 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	3/31/21
Cash Assets	202.1	235.7	184.7
Receivables	258.8	256.1	225.0
Inventory (LIFO)	185.0	197.8	220.0
Other	47.5	64.7	134.9
Current Assets	693.4	754.3	764.6
Accts Payable	89.1	86.9	90.7
Debt Due	20.0	20.0	20.0
Other	168.4	203.6	196.0
Current Liab.	277.5	310.5	306.7

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	2.5%	3.0%	*4.0%*
"Cash Flow"	10.0%	11.5%	*6.0%*
Earnings	12.5%	13.5%	*6.5%*
Dividends	5.5%	5.5%	*5.5%*
Book Value	4.5%	5.0%	*7.0%*

Calendar	QUARTERLY SALES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2018	325.9	339.3	331.1	361.8	1358.1
2019	326.0	349.7	351.0	375.3	1402.0
2020	341.1	314.4	304.4	388.3	1348.2
2021	308.4	*330*	*355*	*406.6*	*1400*
2022	*350*	*370*	*380*	*425*	*1525*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2018	1.01	1.07	1.16	1.27	4.50
2019	1.14	1.22	1.15	1.29	4.80
2020	1.18	1.11	.94	1.27	4.50
2021	.95	*1.10*	*1.25*	*1.40*	*4.70*
2022	*1.20*	*1.30*	*1.40*	*1.60*	*5.50*

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.33	.35	.35	.35	1.38
2018	.35	.38	.38	.38	1.49
2019	.38	.42	.42	.42	1.64
2020	.42	.43	.43	.43	1.71
2021	.43	.44			

BUSINESS: MSA Safety, Inc. (formerly Mine Safety Appliances Co.) is a global leader in the development, manufacture, and supply of a wide array of products that protect people's health and safety during work and military duties. It is composed of two business segments: MSA Americas and MSA International, which provided 65%, and 35% of revenues in 2020, respectively. Has about 4,800 employees. Officers & Directors own 6.3% (5.4% is John T. Ryan III) of common stock; AGF Asset Management, 11.0%; The Vanguard Gropu, 9.1%; BlackRock, Inc., 8.2% (4/21 Proxy). President & CEO: Nishan J. Vartanian. Inc.: PA. Address.: 1000 Cranberry Woods Drive, Cranberry Township, Pennsylvania 16066-5207 Telephone: 724-776-8600. Internet: www.msasafety.com.

Shares of MSA Safety have regained some lost ground. Indeed, the stock is up over 10% in value since our last full-page review in April, but is still off from its peak. Although March-period results were unexciting, there were encouraging signs towards the end of the quarter. Too, with mass vaccinations becoming more prevalent, especially in the U.S., industrial production is returning to normalcy.

First-quarter figures did not impress. Sales of $308.4 million fell shy of our estimate and sank nearly 10% year over year. The decline was broad based, as business was soft in most product lines and geographies. The fixed gas and flame detection segment was the hardest hit, owing to the sluggish pace of projects in the wake of the pandemic. Portable gas detection sales also lagged. On the positive side, firefighter equipment saw a nice bump as U.S. stimulus packages included funds for first responders. From a geographical perspective, overseas sales were hurt by continued lockdowns in France and Germany. Meanwhile, adjusted earnings of $0.95 per share represented a 20% decrease from 2020. Margins were pressured by higher input costs and a less favorable product mix.

We have trimmed our respective 2021 top- and bottom-line estimates by $40 million and $0.20 per share. While the first half of the year was still impacted by the COVID-19 pandemic, we expect nice improvement in the back half of 2021. Order rates have been increasing, and economic activity is expected to continue to pick up.

Finances are in good shape. MSA has plenty of cash on hand and a manageable debt load. This gives management the flexibility to pursue strategic, bolt-on acquisitions, which it has made a habit of in the past.

MSA Safety shares do not rate as an appealing investment choice at this time. The stock is ranked to track the broader market averages in the year ahead. Investors with a longer horizon will likely find better choices out there also, as MSA is already trading within our 3- to 5-year Target Price Range. Too, the yield lies below the *Value Line* median despite a recent dividend hike.

Kevin P. O'Sullivan *July 9, 2021*

(A) Diluted earnings. GAAP earnings through 2013, adjusted thereafter. Qtly earnings may not add due to rounding. Excludes disc. operations '13, 6¢; '14, 3¢; '15, 3¢; '16 (2¢). Excludes nonrecurring losses: '14, 22¢; '15, 68¢; '16, 33¢; '17, $2.98; '18, $1.32; '19, $1.45; '20, $1.45; '21, 3¢. Next egs. report due late July.
(B) Dividends historically paid in March, June, September, and December. Special one-time dividend of $0.28 per share was paid on 12/28/12.
(C) In millions.

Company's Financial Strength	A
Stock's Price Stability	80
Price Growth Persistence	85
Earnings Predictability	85

MSCI INC. NYSE-MSCI

RECENT PRICE **627.68** | P/E RATIO **NMF** (Trailing: NMF Median: 29.0) | RELATIVE P/E RATIO **NMF** | DIV'D YLD **0.7%** | VALUE LINE **444**

TIMELINESS 3 Lowered 7/30/21
SAFETY 3 New 11/25/16
TECHNICAL 5 Lowered 7/2/21
BETA .95 (1.00 = Market)

18-Month Target Price Range

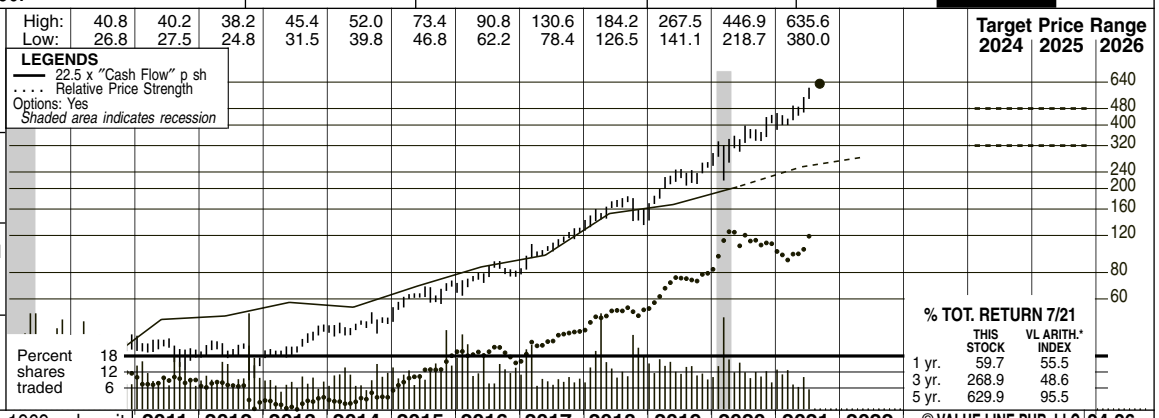
Low-High	Midpoint (% to Mid)
$447-$956	$702 (10%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	480	(-25%)	*-5%*
Low	320	(-50%)	*-14%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	312	399	345
to Sell	334	308	370
Hld's(000)	74053	73850	74804



MSCI Inc. was founded in 1969, when it first began licensing equity index products, and incorporated in 1998. Until going public in November of 2007, the company's only two shareholders were Morgan Stanley and Capital Group International. MSCI became a fully independent, stand-alone public outfit in May of 2009.

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
	7.43	7.91	8.77	8.89	10.64	12.61	14.14	17.04	18.37	20.53	*24.30*	*26.85*	Revenues per sh	*35.00*
	2.13	2.22	2.57	2.44	3.07	3.78	4.30	6.77	7.48	9.06	*11.25*	*12.60*	"Cash Flow" per sh	*17.75*
	1.41	1.48	1.83	1.70	2.09	2.70	3.31	5.35	6.44	7.83	*10.10*	*11.40*	Earnings per sh A	*16.00*
	- -	- -	- -	.18	.80	1.00	1.32	1.92	2.52	2.92	*3.64*	*4.28*	Div'ds Decl'd per sh C	*5.00*
	.19	.37	.34	.38	.40	.35	.37	.36	.34	.26	*.65*	*.75*	Cap'l Spending per sh	*1.00*
	10.77	11.87	13.35	12.78	8.92	3.48	4.45	d1.98	d.90	d5.37	*d3.65*	*d.60*	Book Value per sh	*15.00*
	121.21	120.11	118.08	112.07	101.01	91.28	90.10	84.17	84.80	82.57	*82.50*	*82.00*	Common Shs Outst'g B	*80.00*
	24.8	22.2	20.1	26.5	29.6	28.7	32.1	29.2	34.1	43.6	*Bold figures are*		Avg Ann'l P/E Ratio	*25.0*
	1.56	1.41	1.13	1.39	1.49	1.51	1.61	1.58	1.82	2.24	*Value Line*		Relative P/E Ratio	*1.40*
	- -	- -	- -	.4%	1.3%	1.3%	1.2%	1.2%	1.1%	.9%	*estimates*		Avg Ann'l Div'd Yield	*1.3%*
	900.9	950.1	1035.7	996.7	1075.0	1150.7	1274.2	1434.0	1557.8	1695.4	*2005*	*2200*	Revenues ($mill)	*2800*
	45.6%	45.1%	43.6%	41.3%	45.0%	49.8%	52.0%	53.9%	54.6%	57.3%	*60.5%*	*61.5%*	Operating Margin	*65.0%*
	85.2	82.0	80.5	74.5	79.9	84.4	83.4	89.3	83.5	86.7	*95.0*	*100*	Depreciation ($mill)	*140*
	173.5	184.2	222.6	198.9	230.0	260.9	304.0	480.3	550.8	661.4	*835*	*935*	Net Profit ($mill)	*1280*
	34.2%	36.3%	35.6%	35.5%	34.2%	32.4%	34.9%	20.7%	6.6%	13.2%	*15.5%*	*15.5%*	Income Tax Rate	*21.0%*
	19.3%	19.4%	21.5%	20.0%	21.4%	22.7%	23.9%	33.5%	35.4%	39.0%	*41.6%*	*42.5%*	Net Profit Margin	*45.7%*
	225.1	4.8	134.0	297.7	565.2	519.1	659.4	626.1	1181.0	903.8	*1500*	*1500*	Working Cap'l ($mill)	*2000*
	1066.5	811.6	788.0	800.0	1579.4	2075.2	2078.1	2575.5	3071.9	3366.8	*4000*	*4000*	Long-Term Debt ($mill)	*4000*
	1305.4	1425.2	1576.4	1432.8	901.5	317.6	401.0	d166.5	d76.7	d443.2	*d300*	*d50.0*	Shr. Equity ($mill)	*1200*
	8.4%	9.6%	9.9%	9.6%	10.5%	13.0%	14.6%	22.7%	20.9%	25.3%	*25.5%*	*26.0%*	Return on Total Cap'l	*29.0%*
	13.3%	12.9%	14.1%	13.9%	25.5%	82.1%	75.8%	- -	NMF	NMF	*NMF*	*NMF*	Return on Shr. Equity	*NMF*
	13.3%	12.9%	14.1%	12.5%	15.8%	51.8%	45.9%	- -	NMF	NMF	*NMF*	*NMF*	Retained to Com Eq	*73.5%*
	- -	- -	- -	10%	38%	37%	39%	36%	40%	37%	*36%*	*38%*	All Div'ds to Net Prof	*31%*

CAPITAL STRUCTURE as of 6/30/21
Total Debt $3963.6 mill. **Due in 5 Yrs** $500.0 mill.
LT Debt $3963.6 mill. **LT Interest** $200.0 mill. (110% of Cap'l)
Leases, Uncapitalized Annual rentals $28.2 mill.

No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 82,442,291 shs.
as of 7/20/21

MARKET CAP: $51.7 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	1506.6	1300.5	1972.0
Receivables	499.3	558.6	488.6
Inventory	- -	- -	- -
Other	75.9	66.5	97.9
Current Assets	2081.8	1925.6	2558.5
Accts Payable	6.5	14.3	11.3
Debt Due	- -	- -	- -
Other	894.3	1007.5	939.4
Current Liab.	900.8	1021.8	950.7

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	15.0%	14.0%	*11.0%*
"Cash Flow"	19.0%	21.0%	*15.0%*
Earnings	20.0%	24.5%	*16.0%*
Dividends	- -	- -	*12.5%*
Book Value	- -	- -	*NMF*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	351.3	363.1	357.9	361.7	1434.0
2019	371.4	385.6	394.2	406.6	1557.8
2020	416.8	409.6	425.3	443.7	1695.4
2021	478.4	498.2	*508.4*	*520*	*2005*
2022	*530*	*545*	*555*	*570*	*2200*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1.31	1.30	1.35	1.31	D5.35
2019	1.55	1.54	1.68	1.67	6.44
2020	1.90	1.77	2.20	1.96	7.83
2021	2.46	2.45	*2.54*	*2.65*	*10.10*
2022	*2.70*	*2.80*	*2.90*	*3.00*	*11.40*

Calendar	QUARTERLY DIVIDENDS PAID C Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.28	.28	.38	.38	1.32
2018	.38	.38	.58	.58	1.92
2019	.58	.58	.68	.68	2.52
2020	.68	.68	.78	.78	2.92
2021	.78	.78	1.04		

BUSINESS: MSCI Inc. provides portfolio construction and risk management tools and services for a diverse client roster, including asset owners (pension funds, endowments, foundations, central banks, insurance companies), asset management firms (mutual funds, hedge funds, ETF marketers), and private wealth managers (banks, broker-dealers, exchanges, custodians, trust companies, investment consultants). Business lines include indices/ETFs, risk management analytics, portfolio management analytics, and governance. Has about 3,630 employees. Officers & directors own 2.9% of common (3/21 Proxy). CEO: Henry A. Fernandez. Inc.: DE. Addr.: 7 World Trade Center, 250 Greenwich St., 49th Fl., New York, NY 10007. Tel.: 212-804-3900. Internet: www.msci.com.

Shares of MSCI Inc. have continued charging higher since our May write-up, rallying another roughly 30% in value over the three-month stretch. The New York-based company is benefiting from strong demand for its data services and support tools that help global investors build better portfolios. This was evident in the second quarter, when MSCI delivered results that handily topped Wall Street's lofty expectations. In fact, share net of $2.45 for the June stanza bested our $2.28 call and marked a hefty 38% improvement over the year-earlier tally, as the top line increased 22% and good operating leverage bolstered margins. Growth, in particular, was fueled by a 12.3% advance in recurring subscription revenues and a 54.6% surge in asset-based fees. MSCI shored up its important customer-retention rate, too, which rose to 94.4%, versus 93.5% in the prior year. And it continued to generate robust free cash flow, which prompted the board to hike the quarterly dividend payout by 33%, from $0.78 to $1.04 a share.

We expect the fundamentals to remain excellent here. The company is well managed, and has a very resilient business (its high base of recurring sales helps), one that ought to stand up well even if the financial markets hit a rough patch. Indeed, in the coming periods, MSCI should continue to benefit from several powerful secular trends, including the shift toward passive investing via ETFs (exchange traded funds) and the growing popularity of socially responsible ESG (environmental, social, and governance) investing. A large exposure to emerging geographies, especially relative to rival S&P Global, also augurs well for future growth. And we think that the company will continue to expand its addressable market by further branching out into new arenas, from fixed income to derivatives and private assets. All in all, we like the MSCI story, and now envision share earnings climbing to $10.10 and $11.40 in 2021 and 2022, respectively. That said . . .

The stock looks quite expensive, so we would encourage subscribers to wait on the sidelines. At the recent quote, the market already seems to be discounting all of the growth we project to mid-decade.

Justin Hellman *August 20, 2021*

Company's Financial Strength	B+
Stock's Price Stability	85
Price Growth Persistence	85
Earnings Predictability	100

(A) Earnings based on diluted shares outstanding. Excludes nonrecurring gains: '18, $0.31; '19, $0.15. Next earnings report due late October.
(B) In millions.
(C) Dividend initiated in late '14. Payments typically made in March, May, August, and November.
(D) Quarters don't sum to yearend total due to rounding/changes in the share base.

VAIL RESORTS, INC. NYSE-MTN

RECENT PRICE **302.26** | P/E RATIO **47.2** (Trailing:NMF Median: 42.0) | RELATIVE P/E RATIO **2.48** | DIV'D YLD **Nil** | **VALUE LINE**

TIMELINESS 3 Lowered 6/18/21
SAFETY 3 New 8/18/06
TECHNICAL 3 Lowered 6/11/21
BETA .95 (1.00 = Market)

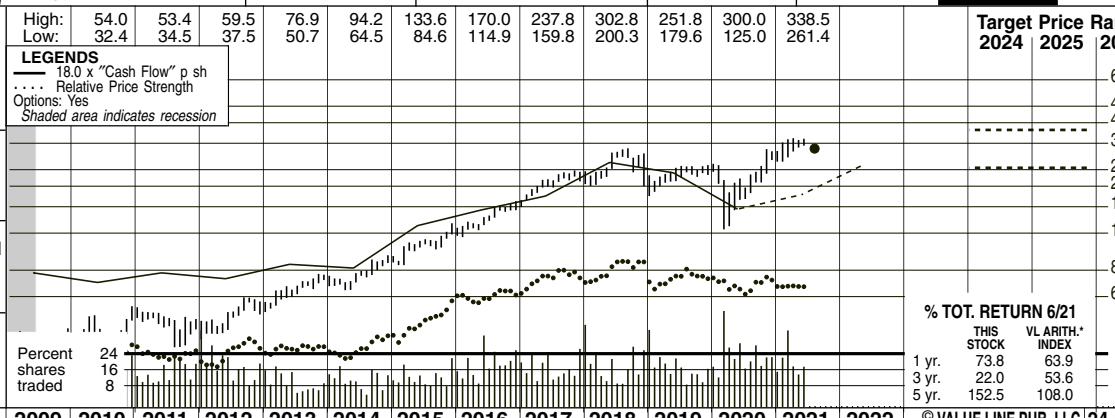
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$158-$407 $283 (-5%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	370	(+20%)	*6%*
Low	245	(-20%)	*-4%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	147	171	208
to Sell	200	186	177
Hld's(000)	40308	39223	38265



High:	54.0	53.4	59.5	76.9	94.2	133.6	170.0	237.8	302.8	251.8	300.0	338.5
Low:	32.4	34.5	37.5	50.7	64.5	84.6	114.9	159.8	200.3	179.6	125.0	261.4

Target Price Range

2024	2025	2026
		640
		480
		400
		320
		240
		200
		160
		120
		80
		60

% TOT. RETURN 6/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	73.8	63.9
3 yr.	22.0	53.6
5 yr.	152.5	108.0

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
22.13	21.65	24.20	31.20	27.01	24.19	32.35	28.79	31.17	34.66	38.34	44.26	47.67	49.63	56.31	48.82	*49.00*	*60.50*	Revenues per sh [A]	*72.75*
3.23	3.40	3.84	5.33	4.32	3.89	4.32	4.05	4.74	4.56	7.22	8.59	9.99	14.42	12.87	8.66	*10.15*	*14.20*	"Cash Flow" per sh	*17.70*
.78	1.14	1.54	2.64	1.33	.79	1.03	.45	1.03	.66	3.07	4.01	5.22	9.13	7.32	2.42	*3.75*	*7.40*	Earnings per sh [AB]	*9.60*
- -	- -	- -	- -	- -	- -	.15	.68	.79	1.25	2.08	2.87	3.73	5.05	6.46	5.28	*Nil*	*3.80*	Div'ds Decl'd per sh [C]	*4.50*
4.16	5.64	3.07	4.09	2.94	1.92	2.65	3.73	2.64	3.27	3.39	3.02	3.61	3.47	4.76	4.28	*2.85*	*4.95*	Cap'l Spending per sh	*6.05*
14.77	16.59	18.37	19.74	21.16	22.35	23.39	22.94	23.30	23.06	24.12	24.17	39.27	39.22	37.20	32.73	*36.45*	*40.00*	Book Value per sh [D]	*53.35*
36.60	38.75	38.86	36.92	36.17	35.91	36.07	35.58	35.95	36.20	36.51	36.18	40.01	40.53	40.34	40.23	*40.30*	*40.50*	Common Shs Outst'g [E]	*41.25*
29.8	29.7	31.6	18.8	20.8	47.4	43.8	NMF	NMF	NMF	30.2	30.7	33.9	25.5	32.3	NMF	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*32.0*
1.59	1.60	1.68	1.13	1.39	3.02	2.75	NMF	NMF	NMF	1.52	1.61	1.70	1.38	1.72	NMF			Relative P/E Ratio	*1.80*
- -	- -	- -	- -	- -	- -	.3%	1.6%	1.4%	1.7%	2.2%	2.3%	2.1%	2.2%	2.7%	2.5%			Avg Ann'l Div'd Yield	*1.5%*
						1167.0	1024.4	1120.8	1254.6	1399.9	1601.3	1907.2	2011.6	2271.6	1963.7	*1975*	*2450*	Revenues ($mill) [A]	*3000*
						18.5%	18.4%	20.0%	20.8%	24.4%	28.0%	30.6%	30.6%	30.8%	25.3%	*28.5%*	*31.0%*	Operating Margin	*32.0%*
						118.0	127.6	132.7	140.6	149.1	161.5	189.2	204.5	218.1	249.6	*255*	*270*	Depreciation ($mill)	*325*
						37.7	16.5	37.7	24.4	114.6	149.5	210.6	379.9	301.2	98.8	*155*	*305*	Net Profit ($mill)	*405*
						35.7%	41.7%	36.5%	48.5%	23.2%	38.4%	33.5%	- -	18.9%	6.3%	*20.0%*	*20.0%*	Income Tax Rate	*20.0%*
						3.2%	1.6%	3.4%	1.9%	8.2%	9.3%	11.0%	18.9%	13.3%	5.0%	*7.8%*	*12.4%*	Net Profit Margin	*13.5%*
						2.4	d16.9	30.2	d49.1	d110.6	d183.6	d171.5	d54.9	d191.2	61.6	*370*	*500*	Working Cap'l ($mill)	*1050*
						490.7	489.8	795.9	625.6	806.7	686.9	1234.0	1234.3	1527.7	2387.1	*2400*	*2400*	Long-Term Debt ($mill)	*2500*
						843.7	816.3	837.9	834.8	880.6	874.5	1571.2	1589.4	1500.6	1316.7	*1470*	*1620*	Shr. Equity ($mill)	*2200*
						4.1%	2.5%	3.5%	3.9%	8.3%	10.9%	8.5%	14.6%	11.3%	4.0%	*4.0%*	*7.6%*	Return on Total Cap'l	*8.5%*
						4.5%	2.0%	4.5%	2.9%	13.0%	17.1%	13.4%	23.9%	20.1%	7.5%	*10.5%*	*19.0%*	Return on Shr. Equity	*18.5%*
						3.8%	NMF	1.1%	NMF	4.4%	5.2%	4.1%	11.1%	2.7%	NMF	*10.5%*	*9.0%*	Retained to Com Eq	*9.5%*
						14%	NMF	75%	NMF	66%	69%	69%	54%	87%	NMF	*Nil*	*52%*	All Div'ds to Net Prof	*47%*

CAPITAL STRUCTURE as of 4/30/21
Total Debt $2853.4 mill. **Due in 5 Yrs** $1919 mill.
LT Debt $2740.0 mill. **LT Interest** $156 mill.
Includes $346.0 mill. in capital leases
(Total interest coverage: 1.5x) (59% of Cap'l)

Leases, Uncapitalized: Annual rentals $47.0 mill.
No Defined Benefit Pension Plan

Pfd Stock None

Common Stock 40,268,257 shs.
as of 6/3/21
MARKET CAP: $12.2 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	4/30/21
Cash Assets	108.8	391.0	1356.4
Receivables	270.9	106.7	208.1
Inventory (Avg Cost)	96.5	101.8	73.0
Other	51.7	65.6	47.3
Current Assets	527.9	665.1	1684.8
Accts Payable	96.4	59.7	64.4
Debt Due	48.5	63.7	113.4
Other	574.2	480.1	539.3
Current Liab.	719.1	603.5	717.1

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	6.5%	8.0%	*6.0%*
"Cash Flow"	10.5%	17.0%	*6.5%*
Earnings	15.0%	31.5%	*7.5%*
Dividends	- -	32.5%	*-3.5%*
Book Value	5.5%	9.0%	*6.5%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Oct. 31	Jan. 31	Apr. 30	Jul. 31	Full Fiscal Year
2018	220.9	734.6	844.5	211.6	2011.6
2019	220.0	849.6	958.0	244.0	2271.6
2020	267.8	924.6	694.1	77.2	1963.7
2021	131.8	684.6	889.1	*269.5*	*1975*
2022	*250*	*950*	*1000*	*250*	*2450*

Fiscal Year Ends	EARNINGS PER SHARE [A B] Oct. 31	Jan. 31	Apr. 30	Jul. 31	Full Fiscal Year
2018	d.71	5.67	6.17	d2.07	9.13
2019	d2.66	5.02	7.12	d2.22	7.32
2020	d2.64	5.04	3.74	d3.82	2.42
2021	d3.82	3.62	6.72	*d2.77*	*3.75*
2022	*d3.30*	*5.75*	*7.85*	*d2.90*	*7.40*

Cal-endar	QUARTERLY DIVIDENDS PAID [C] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.81	1.053	1.053	1.053	3.97
2018	1.053	1.47	1.47	1.47	5.46
2019	1.47	1.76	1.76	1.76	6.75
2020	1.76	1.76	- -	- -	3.52
2021	- -	- -			

BUSINESS: Vail Resorts, Inc. is a mountain resort company, with a portfolio of assets in North America and Australia. Has three segments: Mountain (87.1% of fiscal '20 revenue); Lodging (12.7%); and Real Estate (.2%). North American resorts include Vail, Whistler Blackcomb, Breckenridge, Park City, Keystone, Kirkwood, Heavenly Mountain, Okemo. Australian Resorts: Perisher, Falls Creek, Hotham. Has about 7,300 year-round employees (employed 36,200 seasonal workers in 2020). Offs. & dirs. own 2.1% of stock; Ronald Baron/Baron Capital Mgmt., 11.3%; T. Rowe Price, 9.6%; Vanguard, 9.5% (10/20 proxy). Chairman & CEO: Robert A. Katz. Inc.: DE. Address: 390 Interlocken Crescent, Broomfield, CO 80021. Telephone: (303) 404-1800. Internet: www.vailresorts.com.

Vail Resorts had a solid winter ski season despite some COVID-19-related challenges. The closed Canadian border hurt sales at the company's Whistler resort in British Columbia. Nevertheless, the resort operator posted a 28% revenue increase over the prior pandemic-depressed April quarter. The results were only 7% below 2019, which was a fairly normal ski season, and exceeded our estimates by almost 10%.

The price of season ski lift tickets for the upcoming winter was cut by 20%. After analyzing the lifetime revenue of existing customers from repeat visits and the sale of ski lessons, lodging and meals, management believes that the price cuts will be a long-term positive. The company has also added capacity in the past years that can be absorbed by additional skiers. However, the timing of the price cut for its Epic pass seems like an aggressive approach, considering recent inflationary pressures. In fact, Vail is already raising starting wages to $15 an hour at several of its resorts, up from $12.50 an hour last year. Another factor that determines the success of the new pricing strategy will be competitor responses. So far, other ski areas have not cut prices to match.

Initial results from the Epic-pass price cut have been positive. At the time of the first-quarter report in late April, advanced sales for next year were up 33% compared to pre-pandemic levels on a 50% increase in the guest count. Almost half of ski revenues come from advanced sales and are generally non-refundable, pandemic closures excluded. The boost in advanced sales came from several directions. Not only was demand from renewals and new customers strong, but many one-day skiers transitioned to season pass holders to take advantage of the lower prices. Still Vail has yet to enter peak selling season. It typically sells more than half of the season passes after Memorial Day.

These shares are neutrally ranked for Timeliness. Investors may want to see the results of management's pricing moves before committing funds, especially as the dividend remains suspended and 3- to 5-year appreciation potential seems unappealing at current levels.

Tom Mulle *July 30, 2021*

(A) Fiscal year ends July 31st.
(B) Diluted earnings. Excludes non-recurring gains/(losses): '05, (14¢); '10, 4¢; '11, (9¢); '14, 11¢. Qly. figs. may not sum due to rounding or change in shares outstanding. Next earnings report due early Sept.
(C) Dividend suspended 4/20.
(D) Includes goodwill and intangibles. In 2020: $2.0 billion, $50.31 per share.
(E) In millions.

Company's Financial Strength	B+
Stock's Price Stability	80
Price Growth Persistence	95
Earnings Predictability	30

NORTHROP GRUMMAN NYSE-NOC

RECENT PRICE **362.92** | P/E RATIO **15.0** (Trailing: 11.2 Median: 14.0) | RELATIVE P/E RATIO **0.80** | DIV'D YLD **1.7%** | **VALUE LINE**

TIMELINESS 3 Lowered 1/22/21
SAFETY 1 Raised 9/21/07
TECHNICAL 3 Lowered 9/3/21
BETA .85 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$289-$505 $397 (10%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	575	(+60%)	*14%*
Low	470	(+30%)	*9%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	481	509	558
to Sell	493	526	516
Hld's(000)	137969	137152	134369

% TOT. RETURN 7/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	13.7	55.5
3 yr.	26.6	48.6
5 yr.	80.8	95.5

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
High:	69.8	72.5	71.3	116.2	153.2	194.0	253.8	311.2	360.9	383.9	385.0	379.0								
Low:	53.5	49.2	56.6	64.2	109.2	141.6	175.0	223.9	223.6	237.1	263.3	282.9								
	88.44	87.15	94.77	103.63	110.00	119.46	104.03	106.35	113.78	120.86	129.76	139.99	148.22	176.40	201.87	220.73	***223.15***	***237.20***	Revenues per sh	***288.85***
	5.83	6.50	7.30	7.77	7.52	8.52	10.36	10.49	11.29	12.76	13.55	15.17	14.30	23.62	27.58	31.37	***37.95***	***31.90***	"Cash Flow" per sh	***40.75***
	3.52	4.44	5.04	5.32	4.87	5.80	7.41	7.81	8.35	9.75	10.39	12.19	11.47	18.49	21.21	23.65	***31.70***	***25.60***	Earnings per sh [A]	***32.65***
	1.01	1.16	1.48	1.57	1.69	1.84	1.97	2.15	2.38	2.71	3.10	3.50	3.90	4.70	5.16	5.67	***6.16***	***6.30***	Div'ds Decl'd per sh [B]■	***8.50***
	2.37	2.13	2.03	2.08	2.13	2.65	1.92	1.40	1.68	2.83	2.60	5.26	5.33	7.32	7.54	8.52	***8.50***	***9.00***	Cap'l Spending per sh	***11.10***
	48.45	48.03	52.35	36.45	41.34	46.59	40.71	40.12	49.00	36.47	30.46	30.04	40.49	47.99	52.61	63.45	***90.85***	***111.30***	Book Value per sh [C]	***181.30***
	347.36	345.92	337.83	327.01	306.87	290.96	253.89	237.13	216.74	198.41	181.30	175.07	174.09	170.61	167.64	166.72	***162.00***	***160.00***	Common Shs Outst'g [D]	***155.00***
	15.6	14.9	15.2	12.4	9.9	10.5	8.3	8.2	10.4	12.9	16.1	17.4	23.0	16.8	15.1	13.8	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***16.0***
	.83	.80	.81	.75	.66	.67	.52	.52	.58	.68	.81	.91	1.16	.91	.80	.71			Relative P/E Ratio	***.90***
	1.8%	1.8%	1.9%	2.4%	3.5%	3.0%	3.2%	3.4%	2.7%	2.1%	1.9%	1.6%	1.5%	1.5%	1.6%	1.7%			Avg Ann'l Div'd Yield	***1.6%***
	26412	25218	24661	23979	23526	24508	25803	30095	33841	36799	***36150***	***37950***	Revenues ($mill)	***44775***
	14.5%	14.4%	14.7%	15.3%	15.1%	14.9%	14.6%	15.2%	18.7%	17.3%	***22.0%***	***18.0%***	Operating Margin	***18.0%***
	544.0	510.0	495.0	462.0	467.0	456.0	475.0	800.0	1018.0	1267.0	***1010***	***1060***	Depreciation ($mill) [E]	***1250***
	2086.0	1978.0	1952.0	2069.0	1990.0	2200.0	2015.0	3229.0	3606.0	3963.0	***5135***	***4095***	Net Profit ($mill)	***5050***
	32.3%	33.3%	31.8%	29.6%	28.7%	24.7%	33.9%	13.7%	7.7%	16.8%	***22.0%***	***22.0%***	Income Tax Rate	***20.0%***
	7.9%	7.8%	7.9%	8.6%	8.5%	9.0%	7.8%	10.7%	10.7%	10.8%	***14.2%***	***10.8%***	Net Profit Margin	***11.3%***
	1611.0	2336.0	3673.0	2292.0	877.0	1226.0	9384.0	1406.0	1251.0	5764.0	***3615***	***3035***	Working Cap'l ($mill)	***3580***
	3935.0	3930.0	5928.0	5925.0	6416.0	7058.0	14399	13883	12770	14261	***12650***	***12475***	Long-Term Debt ($mill)	***12100***
	10336	9514.0	10620	7235.0	5522.0	5259.0	7048.0	8187.0	8819.0	10579	***14700***	***17800***	Shr. Equity ($mill)	***28100***
	15.4%	15.5%	12.6%	16.8%	17.9%	19.1%	10.2%	15.9%	17.9%	17.1%	***19.0%***	***13.5%***	Return on Total Cap'l	***12.5%***
	20.2%	20.8%	18.4%	28.6%	36.0%	41.8%	28.6%	39.4%	40.9%	37.5%	***35.0%***	***23.0%***	Return on Shr. Equity	***18.0%***
	14.9%	15.2%	13.2%	20.8%	25.1%	29.7%	18.8%	29.4%	30.9%	28.5%	***28.0%***	***17.5%***	Retained to Com Eq	***13.5%***
	26%	27%	28%	27%	30%	29%	34%	25%	24%	24%	***19%***	***25%***	All Div'ds to Net Prof	***26%***

CAPITAL STRUCTURE as of 6/30/21
Total Debt $12764 mill. **Due in 5 Yrs** $4064 mill.
LT Debt $12764 mill. **Total Interest** $593 mill.
(Total interest coverage: 10.1x)
(59% of Cap'l)

Leases, Uncapitalized $298 mill.
Pension Assets-12/20 $34.5 bill. **Oblig.** $40.2 bill.

Pfd Stock None

Common Stock 160,109,103 shs.
as of 7/26/21

MARKET CAP: $58.1 billion (Large Cap)

CURRENT POSITION ($MILL)	2019	2020	6/30/21
Cash Assets	2245	4907	3941
Receivables	1326	1501	1910
Inventory (Avg Cst)	783	759	863
Other	6331	8177	6048
Current Assets	10685	15344	12762
Accts Payable	2226	1806	2001
Debt Due	- -	- -	- -
Other	7208	7774	6590
Current Liab.	9434	9580	8591

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	6.0%	10.5%	*6.5%*
"Cash Flow"	13.0%	17.0%	*7.0%*
Earnings	15.0%	17.5%	*7.5%*
Dividends	12.0%	13.5%	*8.5%*
Book Value	3.0%	7.0%	*22.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	6735	7119	8085	8156	30095
2019	8189	8456	8475	8721	33841
2020	8620	8884	9083	10212	36799
2021	9157	9151	***8925***	***8917***	***36150***
2022	***9100***	***9300***	***9650***	***9900***	***37950***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	4.79	4.52	7.11	2.07	18.49
2019	5.06	5.06	5.49	5.61	21.21
2020	5.15	6.01	5.89	6.60	23.65
2021	13.43	6.42	***5.85***	***6.00***	***31.70***
2022	***5.85***	***6.30***	***6.60***	***6.85***	***25.60***

Calendar	QUARTERLY DIVIDENDS PAID [B]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.90	1.00	1.00	1.00	3.90
2018	1.10	1.20	1.20	1.20	4.70
2019	1.20	1.32	1.32	1.32	5.16
2020	1.32	1.45	1.45	1.45	5.67
2021	1.45	1.57			

BUSINESS: Northrop Grumman Corporation operates in several main sectors. It is a leading maker of manned and unmanned airborne systems; a designer of electronic warfare items; makes space systems and provides advanced information systems. Acquired satellite and missile systems maker Orbital ATK in 2018. Has approximately 97,000 employees. Consolidated backlog at 12/31/20: $81.0 billion. U.S. Government accounted for 84% of total revenues in '20. Officers & directors own about .3% of common stock; State Street Corp., 9.7%; Capital Int'l. Investors, 8.8%; Vanguard Group, 7.5% (4/21 Proxy). CEO & Pres.: Kathy Warden. Inc.: DE. Address: 2980 Fairview Park Drive, Falls Church, VA 22042. Tele.: 703-280-2900. Internet: www.northropgrumman.com.

Northrop Grumman's June-period performance was supported largely by the Space Systems unit. We were looking for the company to report a revenue decline in the second quarter, due to the recent divestiture of its IT Services business. Loss of that segment represented a near-$585 million headwind on the top line. However, Northrop was able to widely outperform our estimate due to a 34% increase in Space Systems revenue, to $2.75 billion, as a ramp for Ground Based Strategic Deterrents (GBSD) and interceptors remained ongoing. Meantime, Northrop's Mission Systems division also achieved a gain of 6%, to $2.59 billion. These business segments together generated improvements in operating income of 44% and 18%, respectively, on a year-over-year basis.

The company should continue to witness deceleration of its Aeronautics business in the near term. Operating income for that segment improved 3% in the June period, due to an accounting matter that was resolved with the U.S. government. Discounting this benefit, top-line contributions would not have supported an advance. Northrop Grumman has been riding a wave of relatively unsustainable gains for its Aeronautics division over the last few years, but some of its strongest-performing product programs like the F-35 and the F-15 seem to be winding down. Too, the residual impact of the pandemic is not helping the commercial business.

The company recently raised its dividend distribution. Northrop Grumman has been able to consistently increase the quarterly payout for over a decade now. And though this most recent boost of 8%, to $1.57 per share, may still leave the stock with an underwhelming yield, relative to the *Value Line* median, investors seeking steady income should note the equity's top rank for Safety (1) and peak grade for Financial Strength (A++).

Neutrally ranked Northrop Grumman stock provides long-term investors with above-average price appreciation potential. Recent divestitures and a newfound strategic focus on ground-based air defense systems should provide the company with a stronger earnings profile 3 to 5 years hence.

Robert J. Scrudato *September 3, 2021*

(A) Diluted earnings. Excl. nonrecur. (losses) gains.: '05, 33¢; '06, (7¢); '07, 11¢; '08, ($9.09); '09, 34¢; '10, $1.02; '19, $7.99; '20, $4.62. Next earnings report due late October.
(B) Div'd historically paid mid-March, June, Sept., and Dec. ■ Div'd reinvest. plan available.
(C) Incl. intang. assets. In 2020: $18.3 bill., $109.19/sh.
(D) In millions.
(E) Depreciation on accelerated basis.

Company's Financial Strength	A++
Stock's Price Stability	90
Price Growth Persistence	90
Earnings Predictability	85

OLD DOMINION NDQ-ODFL

RECENT PRICE **272.19** | P/E RATIO **34.0** (Trailing: 37.1 / Median: 20.0) | RELATIVE P/E RATIO **1.78** | DIV'D YLD **0.3%** | VALUE LINE **325**

TIMELINESS 4 Lowered 5/14/21
SAFETY 1 Raised 8/21/20
TECHNICAL 3 Lowered 7/16/21
BETA .90 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$207-$423 $315 (15%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	230	(-15%)	-3%
Low	190	(-30%)	-8%

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	309	316	322
to Sell	236	273	301
Hld's(000)	83351	82213	82273

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
8.43	10.17	11.14	12.22	9.89	11.77	14.57	16.33	18.09	21.59	23.48	24.20	27.18	33.19	34.38	34.30	*42.60*	*46.95*	Revenues per sh	*53.65*
.87	1.11	1.21	1.24	1.03	1.24	1.78	2.17	2.58	3.21	3.71	3.93	4.57	6.86	7.27	7.98	*10.10*	*11.15*	"Cash Flow" per sh	*11.95*
.43	.58	.57	.55	.28	.60	1.08	1.31	1.59	2.07	2.38	2.37	2.91	4.92	5.11	5.68	*7.75*	*8.65*	Earnings per sh [A]	*9.00*
--	--	--	--	--	--	--	--	--	--	--	--	.27	.35	.45	.60	*.80*	*.88*	Div'ds Decl'd per sh [D]	*1.04*
1.32	1.74	1.48	1.44	1.68	.85	1.94	2.89	2.29	2.85	3.65	3.38	3.09	4.83	4.01	1.92	*5.25*	*5.05*	Cap'l Spending per sh	*5.25*
2.74	3.32	3.89	4.44	4.71	5.31	6.63	7.94	9.53	11.57	13.31	14.97	18.43	22.00	25.77	28.42	*31.20*	*36.90*	Book Value per sh	*54.75*
125.84	125.84	125.84	125.84	125.84	125.84	129.25	129.25	129.25	129.14	126.62	123.63	123.56	121.85	119.53	117.06	*115.00*	*114.00*	Common Shs Outst'g [C]	*110.00*
15.1	15.1	14.3	15.8	30.9	17.9	14.2	15.4	17.9	20.7	19.4	19.2	22.7	19.4	20.8	29.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*23.5*
.80	.82	.76	.95	2.06	1.14	.89	.98	1.01	1.09	.98	1.01	1.14	1.05	1.11	1.52			Relative P/E Ratio	*1.30*
--	--	--	--	--	--	--	--	--	--	--	--	.4%	.4%	.4%	.4%			Avg Ann'l Div'd Yield	*.5%*
1882.5	2110.5	2337.6	2787.9	2972.4	2991.5	3358.1	4043.7	4109.1	4015.1	*4900*	*5350*	Revenues ($mill)	*5900*						
17.3%	18.8%	19.9%	21.1%	22.3%	22.5%	23.3%	25.9%	26.1%	29.1%	*30.0%*	*30.0%*	Operating Margin [B]	*28.0%*						
90.8	110.7	127.1	146.5	165.3	189.9	205.8	230.4	253.7	261.3	*255*	*280*	Depreciation ($mill)	*315*						
139.5	169.5	206.1	267.5	304.7	295.8	359.1	605.7	615.5	672.7	*905*	*995*	Net Profit ($mill)	*1000*						
36.6%	38.0%	37.3%	38.1%	37.8%	38.1%	37.6%	25.7%	25.3%	25.4%	*25.3%*	*25.0%*	Income Tax Rate	*25.0%*						
7.4%	8.0%	8.8%	9.6%	10.3%	9.9%	10.7%	15.0%	15.0%	16.8%	*18.5%*	*18.6%*	Net Profit Margin	*17.0%*						
127.1	49.9	100.9	177.5	96.3	94.0	233.6	349.5	500.7	870.2	*800*	*975*	Working Cap'l ($mill)	*1200*						
229.8	201.4	155.7	120.0	107.3	105.0	45.0	45.0	45.0	99.9	*100*	*150*	Long-Term Debt ($mill)	*300*						
856.5	1026.0	1232.1	1494.1	1684.6	1851.2	2276.9	2680.5	3080.7	3326.3	*3590*	*4205*	Shr. Equity ($mill)	*6020*						
13.5%	14.3%	15.2%	16.8%	17.1%	15.2%	15.5%	22.2%	19.7%	19.7%	*24.5%*	*23.0%*	Return on Total Cap'l	*16.0%*						
16.3%	16.5%	16.7%	17.9%	18.1%	16.0%	15.8%	22.6%	20.0%	20.2%	*25.0%*	*23.5%*	Return on Shr. Equity	*16.5%*						
16.3%	16.5%	16.7%	17.9%	18.1%	16.0%	14.3%	21.0%	18.2%	18.1%	*22.5%*	*21.0%*	Retained to Com Eq	*14.5%*						
--	--	--	--	--	--	9%	7%	9%	11%	*10%*	*10%*	All Div'ds to Net Prof	*12%*						

CAPITAL STRUCTURE as of 6/30/21
Total Debt $99.9 mill. **Due in 5 Yrs** Nil
LT Debt $99.9 mill. **LT Interest** $2.0 mill.
(Total interest covered: over 25x)

Leases, Uncapitalized Annual rentals $16.0 mill.

No Defined Benefit Pension Plan

Pfd Stock None.

Common Stock 115,810,083 shs.
as of 8/3/21
MARKET CAP: $31.5 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	403.6	731.7	649.5
Receivables	397.5	444.7	548.7
Other	65.7	66.9	112.9
Current Assets	866.8	1243.3	1311.1
Accts Payable	70.3	68.5	91.0
Debt Due	--	--	--
Other	295.8	304.6	391.0
Current Liab.	366.1	373.1	482.0

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	11.5%	10.0%	*8.0%*
"Cash Flow"	20.0%	18.5%	*8.5%*
Earnings	27.0%	21.0%	*9.5%*
Dividends	--	--	*14.5%*
Book Value	18.0%	17.0%	*13.5%*

Calendar	QUARTERLY REVENUES ($ mill.)[A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	925.0	1033.5	1058.2	1027.0	4043.7
2019	990.8	1060.7	1048.5	1009.1	4109.1
2020	987.4	896.2	1058.2	1073.3	4015.1
2021	1126.5	1319.4	*1240*	*1214.1*	*4900*
2022	*1250*	*1390*	*1360*	*1350*	*5350*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.89	1.33	1.41	1.29	4.92
2019	1.09	1.44	1.37	1.21	5.11
2020	1.11	1.25	1.71	1.61	5.68
2021	1.70	2.31	*1.95*	*1.79*	*7.75*
2022	*1.95*	*2.25*	*2.25*	*2.20*	*8.65*

Calendar	QUARTERLY DIVIDENDS PAID[D] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.067	.067	.067	.067	.27
2018	.087	.087	.087	.087	.35
2019	.113	.113	.113	.113	.45
2020	.153	.15	.15	.15	.60
2021	.20	.20			

BUSINESS: Old Dominion Freight Line, Inc. is one of the largest North American less-than-truckload (LTL) motor carriers. Provides regional, inter-regional, and national LTL service and value-added logistics services from a single integrated organization. Revenue is generated primarily from customers throughout the U.S. and North America. In 2020, the company's largest customer accounted for 4.7% of revenues. Owned 9,288 tractors, 36,650 trailers and 244 service centers as of 12/31/20. Has about 19,780 employees. Off./dir. own 12.0% of common stock; The Vanguard Group, 9.4% (4/21 Proxy). Chairman: David S. Congdon. CEO & Pres.: Greg C. Gantt. Inc.: VA. Address: 500 Old Dominion Way, Thomasville, NC 27360. Tel.: (336) 889-5000. Internet: www.odfl.com.

Old Dominion Freight Line shares recently traded just off their all-time high. The stock also is up more than 150% from its coronavirus-driven nadir in March, 2020. The investment community continues to cheer the freight company's strong results, which included a vibrant June-quarter performance. Specifically, Old Dominion posted an 85% bottom-line advance, to $2.31 a share, on a 47% gain in revenues. The comparison was not tough, given the impact the COVID-19 pandemic had on year-earlier results, but it was still a terrific showing (earnings up 60% versus the like-2019 figure). The company's less than truckload (LTL) business continues to benefit from a sharply recovering domestic economy and an increase in shopping, which has led to a greater need for shipping services. Old Dominion's LTL tons, LTL revenue per hundredweight, and LTL shipment metrics jumped 28.1%, 14.9%, and 33.5%, respectively, during the June quarter.

We are raising our 2021 and 2022 share-net estimates. The recovering U.S. economy (GDP was up 6.5% in the second quarter) and resultant increased demand for freight and shipping services should drive strong second-half top- and bottom-line gains. It also is worth noting that despite higher operating costs (i.e., fuel and driver salaries), the company's operating ratio continues to improve (550 basis points, to a record 72.3%, in the June quarter). Investments in the service center network, new markets, and ODFL's digital capabilities are resulting in an improved cost structure and supporting the bottom line. Moreover, the company increased its number of full-time employees by 20.7% in the June quarter and was expected to ramp up its hirings in the current period. This is a sign of confidence among management that demand for shipping services will remain vibrant well into next year that, along with an industrywide capacity shortage, should allow Old Dominion to confidently raise prices to offset higher operating costs. That aside,

We would not be a buyer of this untimely stock at its lofty P/E multiple. The notable run-up in price over the last year has discounted the growth we envision to 2024-2026.

William G. Ferguson *August 20, 2021*

(A) Based on diluted shares outstanding. Excludes nonrecurring gain: '17, $0.85. Next earnings report due late October. **(B)** Expenses exclude operating taxes and licenses prior to 2008. **(C)** In millions, adjusted for splits. **(D)** Initiated dividend payment Q1 2017. Dividends paid late March, June, September, and December.

Company's Financial Strength	A++
Stock's Price Stability	85
Price Growth Persistence	95
Earnings Predictability	80

PACKAGING CORP. NYSE-PKG

RECENT PRICE **152.45** | P/E RATIO **17.1** (Trailing: 22.3 Median: 16.0) | RELATIVE P/E RATIO **0.90** | DIV'D YLD **2.6%** | VALUE LINE **1180**

TIMELINESS 2 Raised 8/6/21
SAFETY 2 Raised 12/18/20
TECHNICAL 4 Lowered 9/3/21
BETA .95 (1.00 = Market)

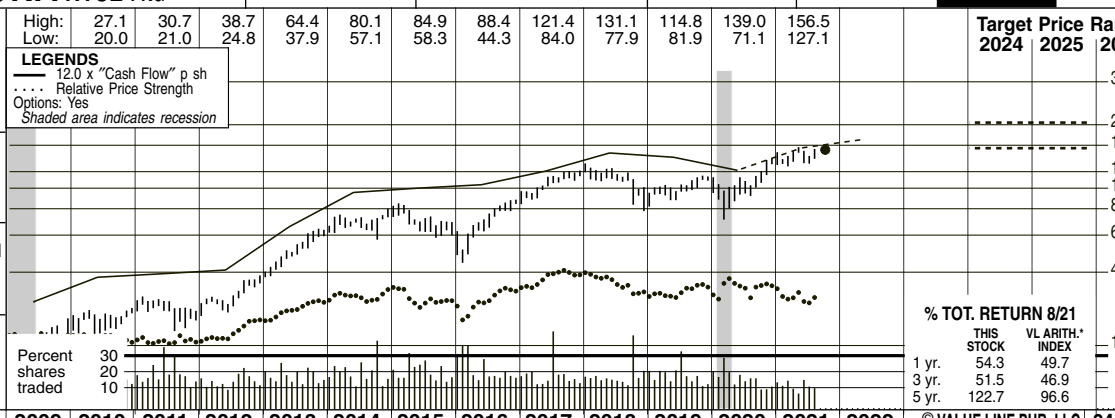
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$105-$227 $166 (10%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	205	(+35%)	*10%*
Low	155	(Nil)	*3%*

Institutional Decisions

	4Q2020	1Q2021	2Q2021
to Buy	271	255	284
to Sell	251	291	237
Hld's(000)	83763	84303	84493



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
19.21	20.91	22.05	23.05	20.85	23.81	26.65	28.98	37.34	59.50	59.73	61.34	68.31	74.23	73.58	70.21	***79.30***	***82.70***	Sales per sh	***90.10***
2.04	2.68	3.03	2.77	2.41	3.15	3.28	3.41	5.48	7.96	8.33	8.65	10.05	12.25	11.70	10.15	***12.95***	***14.25***	"Cash Flow" per sh	***14.90***
.49	1.20	1.62	1.31	.94	1.62	1.61	1.68	3.28	3.99	4.47	4.75	5.78	7.79	7.34	5.78	***8.45***	***9.50***	Earnings per sh [A]	***9.45***
1.00	1.00	1.00	1.20	.75	.60	.80	1.00	1.51	1.60	2.20	2.36	2.52	3.00	3.16	3.37	***4.00***	***4.05***	Div'ds Decl'd per sh [B]	***4.75***
1.21	.84	1.08	1.30	1.11	3.13	2.85	1.31	2.39	4.27	3.27	2.91	3.64	5.84	4.22	4.44	***6.60***	***7.70***	Cap'l Spending per sh	***5.75***
6.57	6.61	7.25	6.68	8.72	9.86	9.45	9.88	13.37	15.47	16.99	18.68	23.13	28.28	32.44	34.23	***38.60***	***43.10***	Book Value per sh	***54.85***
103.77	104.61	105.02	102.40	103.03	102.31	98.32	98.14	98.17	98.37	96.13	94.21	94.35	94.50	94.66	94.83	***95.00***	***94.00***	Common Shs Outst'g [C]	***91.00***
45.1	18.8	16.2	16.5	18.3	14.7	16.7	18.5	15.6	17.3	15.7	14.7	18.1	14.2	13.8	18.2	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***19.0***
2.40	1.02	.86	.99	1.22	.94	1.05	1.18	.88	.91	.79	.77	.91	.77	.74	.94			Relative P/E Ratio	***1.05***
4.5%	4.4%	3.8%	5.5%	4.4%	2.5%	3.0%	3.2%	3.0%	2.3%	3.1%	3.4%	2.4%	2.7%	3.1%	3.2%			Avg Ann'l Div'd Yield	***2.7%***
2620.1	2843.9	3665.3	5852.6	5741.7	5779.0	6444.9	7014.5	6964.3	6658.2	***7535***	***7775***	Sales ($mill)	***8200***
17.1%	18.7%	20.5%	19.7%	19.5%	20.3%	21.0%	21.8%	21.5%	18.7%	***21.0%***	***22.0%***	Operating Margin	***21.0%***
164.0	171.3	217.9	390.8	364.3	365.8	401.4	419.5	410.9	412.5	***430***	***450***	Depreciation ($mill)	***500***
158.0	163.8	320.2	392.6	436.8	449.6	546.5	738.0	696.4	550.0	***800***	***890***	Net Profit ($mill)	***855***
35.1%	57.0%	35.5%	36.1%	34.3%	34.7%	34.0%	24.0%	24.1%	25.0%	***25.0%***	***25.0%***	Income Tax Rate	***25.0%***
6.0%	5.8%	8.7%	6.7%	7.6%	7.8%	8.5%	10.5%	10.0%	8.3%	***10.6%***	***11.4%***	Net Profit Margin	***10.5%***
435.6	677.1	826.7	917.7	992.6	1070.9	1082.4	1421.5	1754.6	1967.7	***1800***	***1585***	Working Cap'l ($mill)	***1370***
814.6	803.5	2532.7	2371.7	2324.3	2640.3	2499.4	2501.3	2492.8	2493.8	***2350***	***2275***	Long-Term Debt ($mill)	***2100***
928.9	969.5	1313.0	1521.4	1633.3	1759.8	2182.6	2672.4	3071.0	3246.3	***3665***	***4055***	Shr. Equity ($mill)	***4995***
9.9%	11.0%	9.1%	11.2%	12.1%	11.3%	12.8%	15.2%	13.7%	10.4%	***13.5%***	***14.0%***	Return on Total Cap'l	***12.0%***
17.0%	16.9%	24.4%	25.8%	26.7%	25.5%	25.0%	27.6%	22.7%	16.9%	***22.0%***	***22.0%***	Return on Shr. Equity	***17.0%***
8.8%	4.7%	16.1%	15.5%	14.4%	13.3%	14.2%	17.6%	13.0%	7.7%	***11.5%***	***12.5%***	Retained to Com Eq	***8.5%***
48%	72%	34%	40%	46%	48%	43%	36%	43%	54%	***48%***	***43%***	All Div'ds to Net Prof	***50%***

CAPITAL STRUCTURE as of 6/30/21
Total Debt $2481.5 mill. **Due in 5 Yrs** $2481 mill.
LT Debt $2479.8 mill. **LT Interest** $90.0 mill.

(42% of Cap'l)
Leases, Uncapitalized Annual rentals $76.7 mill.
Pension Assets-12/20 $1565.6 mill.
Oblig. $1300.7 mill.

Pfd Stock None
Common Stock 94,992,190 shs.
as of 7/30/21

MARKET CAP: $14.5 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	767.4	1080.2	1073.9
Receivables	845.6	832.4	981.4
Inventory	794.1	787.9	827.2
Other	71.3	49.8	78.6
Current Assets	2478.4	2750.3	2961.1
Accts Payable	351.9	387.0	405.3
Debt Due	1.5	1.6	1.7
Other	370.4	394.0	409.8
Current Liab.	723.8	782.6	816.8

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	12.5%	7.0%	*3.5%*
"Cash Flow"	15.0%	9.5%	*4.5%*
Earnings	18.5%	12.0%	*5.0%*
Dividends	14.0%	12.5%	*7.0%*
Book Value	14.0%	15.5%	*9.5%*

Calendar	QUARTERLY SALES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1691.0	1767.0	1809.9	1746.6	7014.5
2019	1733.7	1759.9	1750.7	1720.0	6964.3
2020	1708.7	1541.6	1693.7	1714.2	6658.2
2021	1807.2	1879.9	***1925***	***1922.9***	***7535***
2022	***1875***	***1925***	***2000***	***1975***	***7775***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1.48	1.97	2.18	2.16	7.79
2019	1.97	2.04	1.89	1.43	7.34
2020	1.50	1.38	1.57	1.33	5.78
2021	1.77	2.17	***2.35***	***2.16***	***8.45***
2022	***2.25***	***2.45***	***2.50***	***2.30***	***9.50***

Calendar	QUARTERLY DIVIDENDS PAID[B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.63	.63	.63	.63	2.52
2018	.63	.79	.79	.79	3.00
2019	.79	.79	.79	.79	3.16
2020	.79	.79	.79	.79	3.16
2021	1.00	1.00	1.00		

BUSINESS: Packaging Corporation of America is the third-largest producer of containerboard and corrugated products in the United States in terms of production capacity. Revenue breakdown; Packaging (89% of 2020 sales), Paper (10%), and Corporate and Other and Eliminations (1%). In 2020, it produced 4.3 million tons of containerboard at its mills. Corrugated products manufacturing plants sold about 62.8 billion square feet. Has 15,200 employees. Acquired Boise (10/13). Off/dirs. own 1.6% of common stock; T.Rowe Price, 12.0%; The Vanguard Group, 11.1%; BlackRock, 8.4% (3/21 proxy). Chairman & CEO: Mark W. Kowlzan. Incorporated: DE. Address: 1 North Field Court, Lake Forest, IL. 60045. Telephone: 847-482-3000. Internet: www.packagingcorp.com.

Packaging Corporation of America posted better-than-expected results in the second quarter. Sales of $1.88 billion and earnings of $2.17 a share both easily topped our estimates of $1.77 billion and $1.75 a share, respectively. Management attributed the good showing to strong demand in the Packaging unit and some improvement in its Paper business. The Packaging segment benefited from higher volume, increased prices, and a more favorable mix. Volumes got back on track in the Paper unit, but lower prices and an unfavorable mix were drags.

Recent strategic efforts ought to bear fruit. Packaging has undertaken a few capital projects to increase operational efficiency and reduce costs. For example, the company has transitioned machinery to better meet demand trends. It has also implemented price hikes to contend with elevated input costs.

We have increased our top- and bottom-line estimates for 2021 and 2022. In light of the strong June interim, and favorable market fundamentals, we have upped our sales call from $7.25 billion to $7.54 billion and our share-net target from $7.50 to $8.45 for the full year. What's more, we expect the top- and bottom-line momentum to continue next year and beyond as the strategic efforts further take hold and market conditions turn more favorable.

There are some caveats. As mentioned, higher input costs should weigh on profits. The company ought to contend with other elevated operational costs, such as logistical costs, in the near term, too. The Paper business ought to have a tough time returning to pre-pandemic levels, given the accelerated shift to digital output.

Finances are no cause for concern. The cash balance is up year to year, and the debt load in manageable. Packaging should have no problem funding its business or its stockholder-friendly actions. Note: We expect stock buybacks and dividend hikes in the years ahead. The company's Financial Strength rating is A.

This stock is timely. However, this issue does not stand out for total return potential to 2024-2026 at the recent quotation. Income-oriented investors may want to take a look, given the nice yield.

Richard J. Gallagher September 17, 2021

(A) Diluted earnings. Excludes nonrecurring gains/(losses): '09, $0.46; '10, $0.38; '11, ($0.04); '13, $1.19; '17, $1.28; '18, $0.07; '20, ($0.94); GAAP accounting as of 2014, non-GAAP would have been '14, $4.66. Next earnings report due late October.
(B) Dividends paid in mid-January, April, July, and October.
(C) In millions.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	90
Earnings Predictability	75

PERKINELMER, INC. NYSE-PKI

RECENT PRICE **183.84** | P/E RATIO **23.2** (Trailing: 14.6 Median: 19.0) | RELATIVE P/E RATIO **1.21** | DIV'D YLD **0.2%** | **VALUE LINE**

TIMELINESS 2 Lowered 4/2/21
SAFETY 2 Raised 5/15/20
TECHNICAL 4 Lowered 7/16/21
BETA .90 (1.00 = Market)

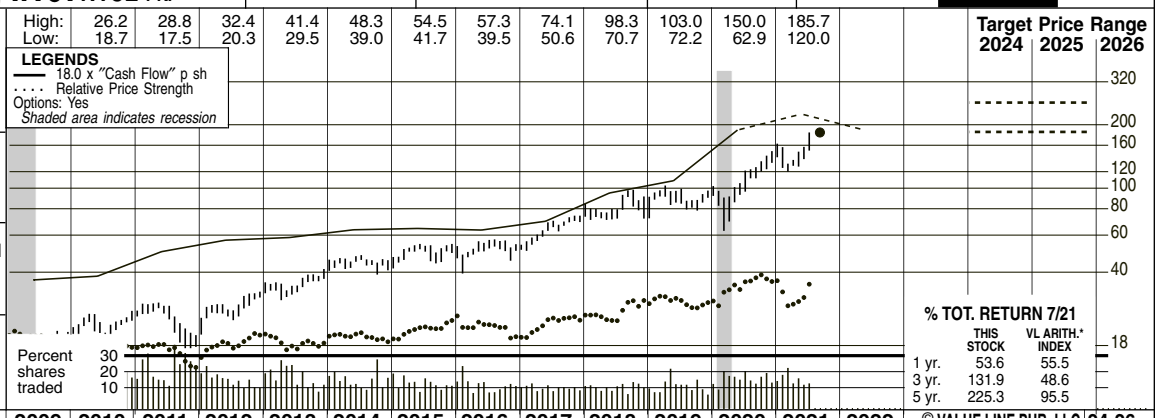
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$121-$259 $190 (5%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	255	(+40%)	*9%*
Low	185	(Nil)	*1%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	267	296	272
to Sell	198	233	283
Hld's(000)	100940	103729	104008



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
11.42	12.55	15.20	16.54	15.49	14.73	17.01	18.62	19.23	19.89	20.19	19.30	20.45	25.12	25.95	33.75	*41.04*	*36.35*	Sales per sh	*43.20*
1.37	1.45	1.98	2.22	2.05	2.13	2.78	3.16	3.25	3.53	3.59	3.53	3.87	5.28	6.04	10.50	*12.50*	*10.45*	"Cash Flow" per sh	*12.80*
.95	1.14	1.28	1.45	1.27	1.33	1.83	2.06	2.09	2.47	2.55	2.60	2.90	3.61	4.10	8.30	*9.90*	*7.75*	Earnings per sh A	*10.00*
.28	.28	.28	.28	.28	.28	.28	.28	.28	.28	.28	.28	.28	.28	.28	.28	*.28*	*.28*	Div'ds Decl'd per sh B■	*.32*
.19	.36	.40	.37	.27	.29	.27	.37	.35	.26	.26	.29	.35	.84	.69	.69	*.65*	*.65*	Cap'l Spending per sh	*.80*
12.79	12.80	13.40	13.39	13.92	16.64	16.31	16.86	17.71	18.16	18.84	19.65	22.68	23.37	25.32	33.33	*42.40*	*50.00*	Book Value per sh D	*68.20*
129.06	123.26	117.59	117.11	117.02	115.72	112.98	115.04	112.63	112.48	112.03	109.62	110.36	110.60	111.14	112.09	*112.00*	*110.00*	Common Shs Outst'g C	*110.00*
22.1	18.7	20.3	16.8	13.2	17.0	13.1	13.3	16.9	18.0	19.5	19.9	22.0	22.3	22.0	12.9	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*22.0*
1.18	1.01	1.08	1.01	.88	1.08	.82	.85	.95	.95	.98	1.04	1.11	1.20	1.17	.66			Relative P/E Ratio	*1.20*
1.3%	1.3%	1.1%	1.2%	1.7%	1.2%	1.2%	1.0%	.8%	.6%	.6%	.5%	.4%	.3%	.3%	.3%			Avg Ann'l Div'd Yield	*.1%*
1921.3	2141.5	2166.2	2237.2	2262.4	2115.5	2257.0	2778.0	2883.7	3782.7	*4600*	*4000*	Sales ($mill)	*4750*
11.4%	22.4%	21.8%	22.9%	22.6%	22.6%	23.9%	25.5%	28.1%	38.3%	*38.0%*	*35.0%*	Operating Margin	*36.0%*
110.9	126.9	128.5	116.7	112.0	100.0	105.0	180.6	214.0	246.5	*290*	*300*	Depreciation ($mill)	*310*
203.4	236.1	237.2	280.3	289.9	286.5	322.6	403.6	457.3	930.0	*1100*	*850*	Net Profit ($mill)	*1100*
23.7%	22.5%	19.5%	20.7%	18.9%	14.4%	24.4%	12.4%	10.6%	17.8%	*21.0%*	*18.0%*	Income Tax Rate	*18.0%*
10.6%	11.0%	10.9%	12.5%	12.8%	13.5%	14.3%	14.5%	15.9%	24.6%	*24.1%*	*21.3%*	Net Profit Margin	*23.2%*
262.1	390.7	442.0	471.3	471.7	586.5	249.1	463.0	611.6	586.7	*1170*	*945*	Working Cap'l ($mill)	*975*
944.9	938.8	932.1	1051.9	1011.8	1045.3	1788.8	1876.6	2064.0	1609.7	*2200*	*2000*	Long-Term Debt ($mill)	*1250*
1842.2	1939.8	1994.5	2042.1	2110.4	2153.6	2503.2	2585.0	2813.8	3735.5	*4750*	*5500*	Shr. Equity ($mill)	*7500*
7.8%	8.6%	9.0%	9.7%	9.9%	9.6%	8.0%	9.8%	10.0%	17.8%	*16.5%*	*11.5%*	Return on Total Cap'l	*13.0%*
11.0%	12.2%	11.9%	13.7%	13.7%	13.3%	12.9%	15.6%	16.3%	24.9%	*23.5%*	*15.5%*	Return on Shr. Equity	*14.5%*
9.3%	10.5%	10.3%	12.2%	12.2%	11.9%	11.7%	14.4%	15.1%	24.1%	*22.5%*	*15.0%*	Retained to Com Eq	*14.0%*
16%	14%	13%	11%	11%	11%	10%	8%	7%	3%	*3%*	*4%*	All Div'ds to Net Prof	*3%*

CAPITAL STRUCTURE as of 4/4/21
Total Debt $2578.1 mill. **Due in 5 Yrs** $550.0 mill.
LT Debt $2219.7 mill. **LT Interest** $48.5 mill.
(Total interest coverage: 32.0x) (36% of Cap'l)

Leases, Uncapitalized: Annual rentals $49.0 mill.
Pension Assets-12/20 $473.4 mill.
Oblig. $713.0 mill.

Pfd Stock None

Common Stock 112,091,175 shs.
as of 5/6/21
MARKET CAP: $20.6 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	4/4/21
Cash Assets	191.9	402.0	988.3
Receivables	725.2	1155.1	978.6
Inventory (LIFO)	356.9	514.6	529.9
Other	100.4	167.2	177.8
Current Assets	1374.4	2238.9	2674.6
Accts Payable	235.9	327.3	339.3
Debt Due	10.0	380.9	358.4
Other	516.9	944.0	822.8
Current Liab.	762.8	1652.2	1520.5

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	6.0%	7.5%	*7.5%*
"Cash Flow"	13.0%	16.0%	*10.0%*
Earnings	14.5%	17.5%	*11.0%*
Dividends	- -	- -	*2.5%*
Book Value	6.5%	8.5%	*16.5%*

Calendar	QUARTERLY SALES ($ mill.) Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Year
2018	644.0	703.4	674.3	756.3	2778.0
2019	648.8	722.5	706.9	805.5	2883.7
2020	652.4	811.7	964.0	1354.6	3782.7
2021	1308	1229	*1000*	*1063*	*4600*
2022	*925*	*975*	*1000*	*1100*	*4000*

Calendar	EARNINGS PER SHARE AE Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Year
2018	.63	.91	.90	1.17	3.61
2019	.69	1.00	1.06	1.35	4.10
2020	.67	1.57	2.09	3.96	8.30
2021	3.72	2.83	*1.65*	*1.70*	*9.90*
2022	*1.75*	*1.90*	*2.00*	*2.10*	*7.75*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.07	.07	.07	.07	.28
2018	.07	.07	.07	.07	.28
2019	.07	.07	.07	.07	.28
2020	.07	.07	.07	.07	.28
2021	.07	.07	.07		

BUSINESS: PerkinElmer (formerly EG&G), Inc. provides advanced technologies, solutions, and services to improve the health and safety of people and their environment. It operates two business segments: Discovery and Analytical Solutions (45% of 2020 sales) and Diagnostics (55%). Serves a variety of markets, including industrial and lab services. Acquired Perten Instruments, 2014; Euroimmun Medical, 2017. R&D: 5.4% of sales. Employs 14,000. Off./dir. own less than 1% of common stock; Capital Research Global, 10.9%; The Vanguard Group, 10.8%; Select Equity, 9.2% (3/21 proxy). CEO and President: Prahlad R. Singh. Inc.: MA. Address: 940 Winter Street, Waltham, Massachusetts 02451. Tel: (781) 663-6900. Internet: www.perkinelmer.com.

PerkinElmer has agreed to acquire privately held BioLegend for $5.25 billion. BioLegend is a global developer of antibodies and reagents used for biomedical research. The move is expected to expand PerkinElmer's footprint in the antibody space, which is a fast-growing market that usually delivers high margins. The deal will be financed by a combination of equity, cash on hand, and new debt. The transaction is likely to close by yearend. BioLegend is projected to generate revenues of roughly $380 million in 2022 and add $0.30 to the bottom line. (Note: Our estimates and projections will not include the business of BioLegend until the transaction closes.) At first glance, the deal makes sense and should complement the company's existing businesses.

Second-quarter results were strong. Sales of $1.23 billion easily topped consensus estimates and rose more than 50% from the previous-year period. The company continued to benefit from the COVID-19 pandemic, where its PCR testing and other solutions remain in high demand. Too, PerkinElmer's non-COVID-19 businesses grew at an impressive clip. In terms of operating segments, the larger Diagnostics unit advanced 70% year over year, thanks in part to solid immunodiagnostics growth. The Discovery and Analytics segment also did well, with food quality and cannabis testing seeing nice demand. Meanwhile, adjusted earnings of $2.83 per share exceeded our target by nearly $0.50. Besides the increased sales, margins widened significantly.

We have adjusted our 2021 estimates. Demand for COVID-19 testing solutions is likely to slow as vaccinations become more prevalent. The good news is that PerkinElmer's other businesses will likely get a bump. All told, we have added $230 million and $0.50 per share to our respective 2021 top- and bottom-line estimates.

These shares are ranked 2 (Above Average) for Timeliness. The stock has gained roughly 40% in value since our May review and may have more room to run in the near term. Too, although capital appreciation potential out to mid-decade does not stand out, a successful integration of BioLegend would improve the stock's long-term prospects.

Kevin P. O'Sullivan *August 13, 2021*

(A) Diluted egs. Excl. nonrec./discontinued gains/(losses): '05, $1.09; '06, ($0.20); '07, ($0.19); '08, ($0.39); '09, ($0.54); '10, $1.92; '11, ($1.76); '12, ($1.45); '13, ($0.60); '14, ($1.02); '15, ($0.67); '16, ($0.48); '17, $1.48;'18, ($1.48); '19, ($2.06); '20, ($1.80); '21, ($0.99). Next egs. report due early Nov. **(B)** Div'ds paid in Jan., May, Aug., and Nov. ■ Div'd reinv. plan avail. **(C)** In millions. **(D)** Includes intan. in '20: $4813 mill., $42.94/shr. **(E)** Qtrly EPS may not sum to total due to changes in shares outstanding.

Company's Financial Strength	B++
Stock's Price Stability	85
Price Growth Persistence	95
Earnings Predictability	60

PHILIP MORRIS INT. NYSE-PM

RECENT PRICE **100.30** | P/E RATIO **16.4** (Trailing: 18.1 Median: 17.0) | RELATIVE P/E RATIO **0.81** | DIV'D YLD **4.8%** | **VALUE LINE**

TIMELINESS 3 Lowered 2/12/21
SAFETY 3 Lowered 1/17/20
TECHNICAL 4 Lowered 7/16/21
BETA .95 (1.00 = Market)

18-Month Target Price Range

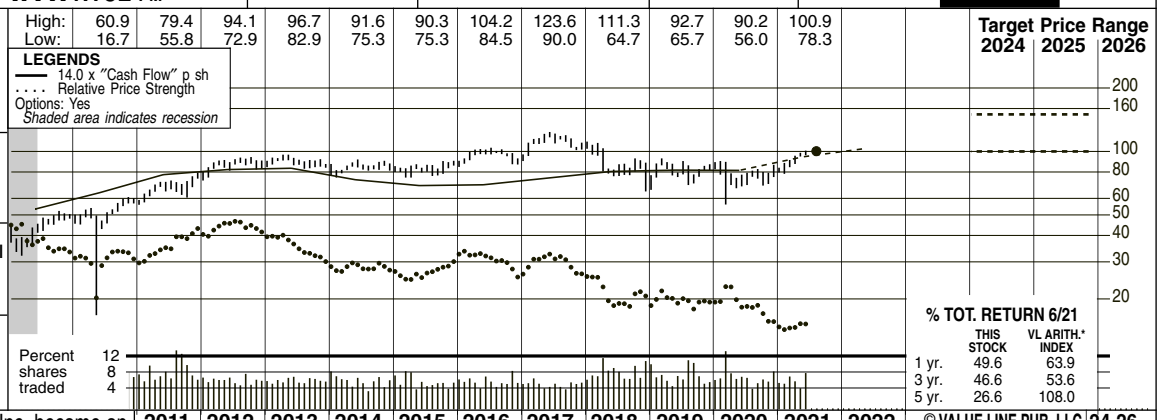
Low-High	Midpoint (% to Mid)
$72-$137	$105 (5%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	150	(+50%)	*14%*
Low	100	(Nil)	*5%*

U.S. Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	670	796	846
to Sell	791	779	760
Hld's(000)	1156458	1156718	1165624



Philip Morris International, Inc. became an independent publicly held company when it was spun off from parent company, Altria Group on March 28, 2008. The spinoff was instituted in order to separate Altria's domestic and international businesses. All Altria's shareholders of record as of March 19, 2008 received one share of PM for every share of MO they owned.

CAPITAL STRUCTURE as of 3/31/21
Total Debt $29398 mil. **Due in 5 Yrs** $14100 mil.
LT Debt $27276 mil. **LT Interest** $650 mil.
(Total interest coverage, 19.0x) (NMF of Cap'l)

Pfd Stock None
Pension Assets-12/20 $8.7 bill. **Oblig.** $12.2 bill.

Common Stock 1,558,513,284 shares

MARKET CAP: $156 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	3/31/21
Cash Assets	6861	7280	3902
Receivables	3717	3761	4087
Inventory (LIFO)	9235	9591	9019
Other	701	860	902
Current Assets	20514	21492	17910
Accts Payable	2299	2780	2537
Debt Due	4389	3368	2122
Other	12145	13467	10556
Current Liab.	18833	19615	15215

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	4.5%	.5%	*4.0%*
"Cash Flow"	4.0%	- -	*6.5%*
Earnings	4.5%	- -	*7.0%*
Dividends	9.0%	4.5%	*4.0%*
Book Value	- -	- -	*NMF*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	18426	21100	20439	19858	79823
2019	17705	19987	20380	19849	77921
2020	18253	17819	20444	19531	76047
2021	19355	***20500***	***21145***	***21000***	***82000***
2022	***20250***	***22000***	***22250***	***22000***	***86500***

Calendar	EARNINGS PER SHARE[A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1.00	1.41	1.44	1.25	5.10
2019	1.09	1.46	1.43	1.22	5.19
2020	1.21	1.29	1.42	1.26	5.17
2021	1.57	***1.55***	***1.60***	***1.38***	***6.10***
2022	***1.65***	***1.73***	***1.77***	***1.55***	***6.70***

Calendar	QUARTERLY DIVIDENDS PAID[B]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	1.04	1.04	1.04	1.07	4.19
2018	1.07	1.07	1.14	1.14	4.42
2019	1.14	1.14	1.14	1.17	4.59
2020	1.17	1.17	1.17	1.20	4.71
2021	1.20	1.20	1.20		

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
	44.24	46.80	50.36	51.78	47.70	48.31	50.28	51.35	50.08	48.83	***52.60***	***55.80***	Revenues per sh	***63.20***
	5.55	5.86	5.95	5.25	4.92	4.97	5.35	5.75	5.83	5.82	***6.75***	***7.40***	"Cash Flow" per sh	***8.55***
	4.85	5.17	5.26	4.76	4.42	4.48	4.72	5.10	5.19	5.17	***6.10***	***6.70***	Earnings per sh [A]	***7.75***
	2.82	3.24	3.58	3.88	4.04	4.12	4.22	4.49	4.62	4.74	***4.86***	***5.02***	Div'ds Decl'd per sh [B]■	***5.90***
	.52	.64	.76	.75	.62	.76	1.00	.92	.55	.39	***.50***	***.55***	Cap'l Spending per sh	***.65***
	.13	d2.10	d4.89	d8.16	d8.55	d8.18	d7.78	d8.01	d7.44	d8.07	***d6.40***	***d6.15***	Book Value per sh [C]	***d5.40***
	1725.9	1653.6	1589.0	1546.9	1549.3	1551.4	1553.2	1554.6	1555.9	1557.4	***1559.0***	***1550.0***	Common Shs Outst'g [D]	***1475.0***
	13.8	16.7	17.0	17.7	18.8	21.5	23.4	17.3	15.7	15.0	*Bold figures are*		Avg Ann'l P/E Ratio	***16.0***
	.87	1.06	.96	.93	.95	1.13	1.18	.93	.84	.72	*Value Line*		Relative P/E Ratio	***.90***
	4.2%	3.8%	4.0%	4.6%	4.9%	4.3%	3.8%	5.1%	5.7%	6.1%	*estimates*		Avg Ann'l Div'd Yield	***4.8%***
	76346	77393	80029	80106	73908	74953	78098	79823	77921	76047	***82000***	***86500***	Revenues ($mill)	***93200***
	17.7%	18.1%	17.4%	15.4%	15.4%	15.4%	16.0%	15.5%	16.3%	16.7%	***18.0%***	***18.5%***	Operating Margin	***19.0%***
	993.0	898.0	882.0	628.0	754.0	743.0	963.0	989.0	964.0	981.0	***1000***	***1025***	Depreciation ($mill)	***1100***
	8591.0	8800.0	8576.0	7493.0	6873.0	6967.0	7342.0	7942.0	8110.0	8077.0	***9500***	***10425***	Net Profit ($mill)	***11510***
	29.1%	29.5%	29.3%	29.1%	28.0%	27.9%	28.3%	22.8%	23.0%	21.7%	***22.0%***	***22.0%***	Income Tax Rate	***22.0%***
	11.3%	11.4%	10.7%	9.4%	9.3%	9.3%	9.4%	9.9%	10.4%	10.6%	***11.6%***	***12.1%***	Net Profit Margin	***12.3%***
	65.0	d426.0	d214.0	372.0	418.0	1141.0	5632.0	2251.0	1681.0	1877.0	***2400***	***2700***	Working Cap'l ($mill)	***3100***
	14828	17639	24023	26929	25250	25851	31334	26975	26656	28168	***27000***	***26500***	Long-Term Debt ($mill)	***25500***
	229.0	d3476	d7766	d12629	d13244	d12688	d12086	d12459	d11577	d12567	***d10000***	***d9500***	Shr. Equity ($mill)	***d8000***
	59.4%	65.2%	55.7%	56.1%	61.4%	56.3%	40.4%	56.9%	55.6%	51.8%	***56.0%***	***61.5%***	Return on Total Cap'l	***66.0%***
	NMF	NMF	NMF	NMF	NMF	NMF	NMF	NMF	NMF	NMF	***NMF***	***NMF***	Return on Shr. Equity	***NMF***
	NMF	NMF	NMF	NMF	NMF	NMF	NMF	NMF	NMF	NMF	***NMF***	***NMF***	Retained to Com Eq	***NMF***
	56%	61%	67%	81%	91%	92%	89%	87%	88%	92%	***80%***	***77%***	All Div'ds to Net Prof	***76%***

BUSINESS: Philip Morris International, Inc. manufactures, sells, and distributes a wide range of tobacco products in markets outside the United States. The company's operations are based in Lausanne, Switzerland. Brands include *Marlboro, Philip Morris, Chesterfield,* and *Parliament.* 2020 operating profit breakdown: European Union, 43.7%; Eastern Europe, Middle East and Africa, 16.3%, Asia, 35.2%, North America, 4.8%. Has 53 factories and 71,000 employees in various international markets. Officers & directors own less than 1% of stock; Vanguard Group, 7.9%; BlackRock, 5.8% (3/21 Proxy). Chairman: Lucio A. Noto. Chief Executive Officer: Andre Calantzopoulos. Inc.: VA. Addr. 120 Park Avenue, New York, NY 10017. Tel.: 917-663-2233. Internet: www.pmi.com.

Philip Morris International is on a roll. The *Marlboro*-maker reported better-than-expected first-quarter results, and recently boosted its outlook for the full year. It now expects share earnings to be between $5.95 and $6.05, up from previous guidance of $5.90-$6.00. The new range represents 15%-17% growth over last year's tally, and would mark the strongest advance in more than a decade. Leadership said the revision was mostly tied to strengthening *iQOS* shipments in Europe and Japan. The company also hiked its forecast for organic net revenue growth (excludes any impact from currency) to 5%-7%, from 4%-7% previously. Other assumptions include an estimated total cigarette industry volume decline (excluding China and the United States) of -3% to flat; 90 to 100 billion heated tobacco unit shipments; and a tax rate of around 22%.

The company expects smoke-free products to account for more than 50% of revenue by 2025. That is up from approximately 25% today. Much of this will come from increased *iQOS* usage. Right now, PMI estimates that 19.1 million people use its heated-tobacco device. Leadership is hoping to at least double that figure by 2025, with the majority of growth likely to come from developing countries. The tobacco manufacturer also wants to generate $1 billion in sales from "beyond nicotine" products by mid-decade, which may include things like botanicals and respiratory drug delivery technologies.

The U.S. Food and Drug Administration's decision to ban menthol cigarettes could help propel *iQOS*. Although PMI does not operate here, it has a licensing agreement with Altria Group for the distribution and sale of *iQOS* in the United States. While the device has thus far struggled to gain traction in the world's largest economy, we continue to think the market opportunity is huge. To that end, banning menthols could act as a tailwind for *iQOS* uptake, though the implementation process is expected to take years to play out and it is unclear if the FDA even has the legal authority to do so.

The dividend is the main draw here. Accordingly, shares of Philip Morris International will mostly appeal to conservative accounts seeking a steady income stream.

Daniel Henigson, CFA *July 16, 2021*

(A) Diluted earnings. Qtly. totals may not sum due to changes in share count. Next earnings report due July 20th. **(B)** Dividends historically paid in early January, April, July, and October. ■ Dividend reinvestment plan available. **(C)** Includes intangibles. At 12/31/20: $7,983 million ($5.13 per share). **(D)** In millions.

Company's Financial Strength	B++
Stock's Price Stability	80
Price Growth Persistence	20
Earnings Predictability	100

POOL CORP. NDQ-POOL

RECENT PRICE **453.52** | P/E RATIO **36.6** (Trailing: 42.6 Median: 26.0) | RELATIVE P/E RATIO **1.93** | DIV'D YLD **0.7%** | **VALUE LINE**

TIMELINESS 2 Raised 6/18/21
SAFETY 2 Raised 8/4/17
TECHNICAL 5 Lowered 7/30/21
BETA .85 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$329-$718 $524 (15%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	495	(+10%)	*3%*
Low	365	(-20%)	*-4%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	255	314	305
to Sell	220	234	280
Hld's(000)	36721	37761	37264

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
High:	26.2	31.6	43.5	58.9	64.7	84.4	108.0	131.8	175.9	228.2	391.5	478.7								
Low:	18.2	22.3	29.5	42.8	51.6	61.7	72.4	97.3	123.9	141.8	160.3	305.5								
	29.64	37.50	40.58	36.99	31.43	32.75	37.86	42.20	46.20	51.50	55.33	62.57	69.34	75.89	79.84	97.85	*125.00*	*127.50*	Revenues per sh	*150.00*
	1.78	2.12	1.75	1.44	1.19	1.40	1.73	2.02	2.46	2.87	3.39	4.12	4.75	6.60	7.22	9.81	*13.15*	*13.50*	"Cash Flow" per sh	*19.00*
	1.50	1.74	1.37	1.18	.95	1.15	1.47	1.71	2.05	2.44	2.90	3.47	3.99	5.62	6.40	8.97	*12.40*	*12.70*	Earnings per sh [A]	*18.00*
	.34	.41	.47	.51	.52	.52	.55	.62	.73	.85	1.00	1.19	1.42	1.72	2.10	2.29	*2.98*	*3.40*	Div'ds Decl'd per sh [C]	*5.00*
	.16	.29	.22	.15	.15	.16	.41	.35	.42	.40	.68	.84	.98	.80	.83	.54	*.80*	*.80*	Cap'l Spending per sh	*.90*
	5.21	5.45	4.39	5.01	5.15	5.79	5.91	6.08	6.36	5.60	5.99	4.99	5.55	5.66	10.24	15.89	*18.50*	*21.25*	Book Value per sh [B]	*40.00*
	52.39	50.93	47.52	48.22	48.99	49.28	47.37	46.30	45.01	43.62	42.71	41.09	40.21	39.51	40.07	40.23	*40.00*	*40.00*	Common Shs Outst'g [D]	*40.00*
	23.0	23.9	23.7	16.9	19.3	18.8	18.4	22.3	25.2	23.7	24.6	26.4	28.9	26.5	28.8	30.7	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*24.0*
	1.22	1.29	1.26	1.02	1.29	1.20	1.15	1.42	1.42	1.25	1.24	1.39	1.45	1.43	1.53	1.57			Relative P/E Ratio	*1.35*
	1.0%	1.0%	1.4%	2.6%	2.8%	2.4%	2.0%	1.6%	1.4%	1.5%	1.4%	1.3%	1.2%	1.2%	1.1%	.8%			Avg Ann'l Div'd Yield	*1.2%*
							1793.3	1954.0	2079.7	2246.6	2363.1	2570.8	2788.2	2998.1	3199.5	3936.6	*5000*	*5100*	Revenues ($mill)	*6000*
							7.5%	8.4%	8.6%	9.1%	9.8%	10.7%	11.1%	11.3%	11.5%	12.7%	*13.0%*	*13.5%*	Operating Margin	*17.0%*
							9.7	11.6	13.4	14.5	16.4	20.3	24.2	26.1	27.9	28.0	*30.0*	*30.0*	Depreciation ($mill)	*40.0*
							72.0	82.0	97.3	110.7	128.3	149.0	167.0	234.5	261.6	366.7	*495*	*510*	Net Profit ($mill)	*720*
							38.7%	41.0%	38.8%	38.9%	38.5%	38.5%	38.1%	20.1%	17.7%	18.9%	*20.0%*	*20.0%*	Income Tax Rate	*20.0%*
							4.0%	4.2%	4.7%	4.9%	5.4%	5.8%	6.0%	7.8%	8.2%	9.3%	*9.9%*	*10.0%*	Net Profit Margin	*12.0%*
							307.1	295.1	313.9	345.3	356.8	399.4	460.7	609.6	582.7	638.6	*680*	*720*	Working Cap'l ($mill)	*800*
							247.3	230.9	246.4	319.3	328.0	436.9	508.8	657.6	499.7	404.1	*360*	*330*	Long-Term Debt ($mill)	*200*
							279.7	281.6	286.2	244.4	255.7	205.2	223.1	223.6	410.2	639.5	*740*	*850*	Shr. Equity ($mill)	*1600*
							14.3%	16.5%	18.9%	20.3%	22.7%	24.3%	23.8%	27.7%	29.8%	35.7%	*45.0%*	*43.0%*	Return on Total Cap'l	*40.0%*
							25.7%	29.1%	34.0%	45.3%	50.2%	72.6%	74.9%	104.9%	63.8%	57.4%	*67.0%*	*60.0%*	Return on Shr. Equity	*45.0%*
							16.3%	18.8%	22.2%	29.9%	33.3%	48.3%	48.8%	73.8%	43.3%	43.0%	*51.0%*	*44.0%*	Retained to Com Eq	*32.5%*
							37%	36%	35%	34%	34%	33%	35%	30%	32%	25%	*24%*	*27%*	All Div'ds to Net Prof	*28%*

CAPITAL STRUCTURE as of 3/31/21
Total Debt $433.2 mill. **Due in 5 Yrs** $146.0 mill.
LT Debt $420.8 mill. **LT Interest** $12.0 mill.
(LT interest earned: 38.7x; total interest coverage: 38.7x)
(39% of Cap'l)
Leases, Uncapitalized: Annual rentals $56.4 mill.
No Defined Benefit Pension Plan
Pfd Stock None

Common Stock 40,106,026 shs.
as of 4/26/21
MARKET CAP: $18.2 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	3/31/21
Cash Assets	28.6	34.1	27.1
Receivables	76.5	122.2	122.9
Inventory (FIFO)	702.3	781.0	977.2
Other	166.1	184.6	390.2
Current Assets	973.5	1121.9	1517.3
Accts Payable	262.0	266.8	635.0
Debt Due	11.7	11.9	12.4
Other	117.1	204.6	195.9
Current Liab.	390.8	483.3	843.3

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	9.5%	10.5%	*9.0%*
"Cash Flow"	19.5%	22.0%	*13.5%*
Earnings	20.5%	23.0%	*15.0%*
Dividends	14.5%	19.0%	*16.0%*
Book Value	7.0%	12.0%	*22.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2018	585.9	1057.8	811.3	543.1	2998.1
2019	597.5	1121.3	898.5	582.2	3199.5
2020	677.3	1280.8	1139.2	839.3	3936.6
2021	1061	*1700*	*1300*	*939*	*5000*
2022	*1000*	*1650*	*1450*	*1000*	*5100*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2018	.75	2.80	1.66	.41	5.62
2019	.80	3.22	1.95	.43	6.40
2020	.74	3.87	2.92	1.44	8.97
2021	2.42	*5.15*	*3.35*	*1.48*	*12.40*
2022	*2.00*	*5.30*	*3.85*	*1.55*	*12.70*

Calendar	QUARTERLY DIVIDENDS PAID [C] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.31	.37	.37	.37	1.42
2018	.37	.45	.45	.45	1.72
2019	.45	.55	.55	.55	2.10
2020	.55	.58	.58	.58	2.29
2021	.58	.80			

BUSINESS: Pool Corporation distributes swimming pool supplies, equipment and leisure products on the wholesale level. Offers maintenance, repair and replacement parts, packaged pool kits, construction materials, and complementary products. Acquired Master Tile Network, 2/20; Jet Line Products, 10/20; TWC Distributors, 12/20. Has about 4,500 employees. BlackRock, Inc. owns 10% of outstanding common stock; The Vanguard Group, 10%; Kayne Anderson Rudnick Investment Management, 5%; Officers & Directors, 4% (3/21 proxy). Chairman: John E. Stokely; President & CEO: Manuel J. Perez de la Mesa. Incorporated: Delaware. Address: 109 Northpark Blvd., Covington, Louisiana 70433. Telephone: 985-892-5521. Internet: www.poolcorp.com.

Pool Corporation likely delivered extraordinary growth in the first half of 2021. (Second quarter financial results were due to be released shortly after this issue went to press.) In the March period, sales of $1.06 billion marked a 57% increase over the $677 million figure for the comparable quarter a year ago. The top-line surge was driven by elevated demand for residential pool products, as the COVID-19 pandemic steered people towards home-based activities. The bottom-line upswing was even more impressive, as earnings per share of $2.42 marked a 227% increase. We believe the strong trends continued through the June period and likely into the third quarter.

The company has raised its 2021 earnings outlook considerably. In light of strong demand trends and a solid backlog of orders, management has increased its annual earnings guidance to a range of $11.85 to $12.60 per share, up from the previous range of $9.12 to $9.62 per share. Accordingly, we have raised our 2021 share-net estimate from $9.50 to $12.40, and our 2022 call from $10.30 to $12.70. We have also increased our top-line estimate for 2021 from $4.3 billion to $5.0 billion, and our 2022 call from $4.5 billion to $5.1 billion.

Pool Corp. has a lucrative leadership position in swimming pool products. The company's niche in this arena has allowed it to deliver 20%-plus annual earnings growth over the past decade. Not surprisingly, it has been making small acquisitions to expand its network and build on its competitive advantage in this field.

The board of directors has boosted the cash dividend and the share repurchase authorization. In May, the board boosted the payout by 38%, to $0.80 per share. At the same time, it approved an additional $450 million worth of stock buybacks, bringing the current authorization available to about $557 million.

Our main concern here is the lofty valuation. These timely shares have consistently outpaced our expectations. However, Pool Corp.'s earnings growth is unlikely to continue at its recent pace indefinitely. At the recent quotation, POOL already trades within our 2024-2026 Target Price Range.

Adam J. Platt *July 30, 2021*

(A) Diluted earnings. Excludes nonrecurring loss: '09, 56¢; '12, 14¢; '17, 22¢. Next earnings report due late Oct.
(B) Includes intangibles: At 12/31/20: $280.3 mill., $6.98/sh.
(C) Dividends historically paid in early March, June, September, and December.
(D) In millions.

Company's Financial Strength	A
Stock's Price Stability	80
Price Growth Persistence	95
Earnings Predictability	95

POST HOLDINGS NYSE-POST

RECENT PRICE 109.47 | P/E RATIO 32.9 (Trailing: 46.8 Median: NMF) | RELATIVE P/E RATIO 1.62 | DIV'D YLD Nil | VALUE LINE

TIMELINESS 2 Raised 5/21/21
SAFETY 3 New 4/27/12
TECHNICAL 2 Raised 6/25/21
BETA .95 (1.00 = Market)

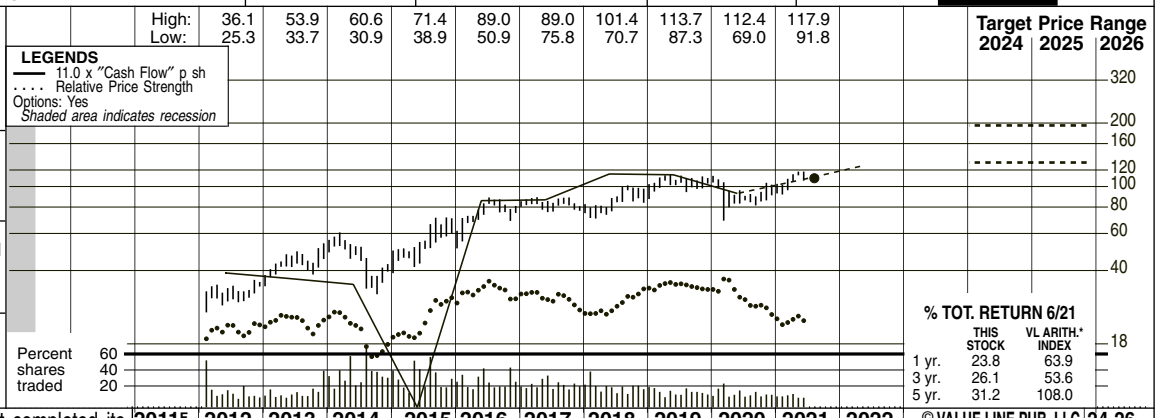
18-Month Target Price Range
Low-High Midpoint (% to Mid)
$63-$138 $101 (-10%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	195	(+80%)	*16%*
Low	130	(+20%)	*5%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	116	105	118
to Sell	152	167	168
Hld's(000)	58920	56971	56541



On February 3, 2012, Post completed its legal separation from Ralcorp Holdings via a tax-free spinoff. Shareholders of Ralcorp Holdings received one share of Post common stock for every two shares of Ralcorp common stock held. On February 6, 2012, Post Holdings began trading on the New York Stock Exchange.

CAPITAL STRUCTURE as of 3/31/21
Total Debt $7055.3 mill. **Due in 5 Yrs** $74.3 mill.
LT Debt $6981.0 mill. **LT Interest** $355 mill.
(Long-term interest earned: 1.7X)
(71% of Cap'l)

Leases, Uncapitalized Annual rentals $28.7 mill.

Pension Assets-9/20 $1114.7 mill.
Pension Oblig. $965.5 mill.

Pfd Stock: None

Common Stock 63,629,827 shs.
as of 5/3/21
MARKET CAP: $7.0 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	3/31/21
Cash Assets	1054.5	1193.4	742.6
Receivables	445.1	441.6	554.8
Inventory (FIFO)	579.8	599.4	639.7
Other	46.9	53.4	128.4
Current Assets	2126.3	2287.8	2065.5
Accts Payable	395.6	367.9	406.5
Debt Due	13.5	64.9	74.3
Other	393.8	541.6	409.3
Current Liab.	802.9	974.4	890.1

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	- -	9.5%	*5.0%*
"Cash Flow"	- -	NMF	*7.0%*
Earnings	- -	NMF	*9.5%*
Dividends	- -	- -	*Nil*
Book Value	- -	1.0%	*7.5%*

Fiscal Year Ends	QUARTERLY SALES ($ mill.) A Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2018	1433.1	1586.1	1608.1	1629.9	6257.2
2019	1411.3	1387.8	1439.2	1442.8	5681.1
2020	1456.8	1494.2	1336.4	1411.3	5698.7
2021	1458.0	1483.3	*1475*	*1533.7*	*5950*
2022	*1525*	*1550*	*1525*	*1600*	*6200*

Fiscal Year Ends	EARNINGS PER SHARE AB Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2018	.87	1.06	1.06	1.08	4.07
2019	1.11	1.28	1.19	1.40	4.98
2020	.73	.65	.75	.58	2.71
2021	.72	.29	*1.01*	*1.18*	*3.20*
2022	*.85*	*1.10*	*1.20*	*1.35*	*4.50*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017					
2018	NO CASH DIVIDENDS BEING PAID				
2019					
2020					
2021					

	2011F	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
	- -	29.37	31.62	53.82	77.08	77.45	79.06	93.81	78.79	85.82	*94.45*	*100.00*	Sales per sh A	*116.65*
	- -	3.55	3.34	3.13	d4.17	7.79	7.88	10.44	10.35	8.44	*9.80*	*11.50*	"Cash Flow" per sh	*14.65*
	- -	1.53	.94	d.42	.62	2.59	2.67	4.07	4.98	2.71	*3.20*	*4.50*	Earnings per sh B	*6.75*
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	Div'ds Decl'd per sh	*Nil*
	- -	.95	1.00	2.58	1.79	1.87	2.88	3.37	3.80	3.53	*3.15*	*3.65*	Cap'l Spending per sh	*4.60*
	- -	37.72	38.49	38.91	40.07	39.12	34.95	38.69	40.58	42.99	*43.35*	*47.20*	Book Value per sh C	*63.05*
	- -	32.65	32.70	44.80	60.30	64.90	66.10	66.70	72.10	66.40	*63.00*	*62.00*	Common Shs Outst'g D	*60.00*
	- -	20.0	42.6	- -	NMF	27.5	30.6	20.4	20.2	35.2	*Bold figures are*		Avg Ann'l P/E Ratio	*24.0*
	- -	1.27	2.39	- -	NMF	1.44	1.54	1.10	1.08	1.80	*Value Line*		Relative P/E Ratio	*1.35*
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*estimates*		Avg Ann'l Div'd Yield	*Nil*
	968.2	958.9	1034.1	2411.1	4648.2	5026.8	5225.8	6257.2	5681.1	5698.7	*5950*	*6200*	Sales ($mill) A	*7000*
	28.0%	21.4%	20.9%	13.8%	15.3%	17.1%	16.7%	17.8%	21.1%	21.5%	*21.0%*	*20.5%*	Operating Margin	*20.5%*
	58.7	63.2	76.8	155.8	272.8	302.8	323.1	398.4	379.6	370.3	*415*	*425*	Depreciation ($mill)	*475*
	d424.3	52.6	36.5	d1.2	52.7	217.4	211.0	308.6	370.7	190.1	*215*	*295*	Net Profit ($mill) E	*405*
	- -	36.7%	31.8%	- -	31.1%	29.7%	35.0%	- -	18.7%	20.5%	*21.0%*	*21.0%*	Income Tax Rate	*23.0%*
	NMF	5.5%	3.5%	NMF	1.1%	4.3%	4.0%	4.9%	6.5%	3.3%	*3.6%*	*4.8%*	Net Profit Margin	*5.8%*
	1.0	83.3	522.1	699.1	1170.7	1442.9	1911.5	1408.2	1323.4	1313.4	*1250*	*1150*	Working Cap'l ($mill)	*1750*
	716.5	930.3	1408.6	3830.5	4511.4	4551.2	7149.1	7232.1	7066.0	6959.0	*6950*	*6500*	Long-Term Debt ($mill)	*5750*
	1434.7	1231.5	1498.6	2283.2	2976.0	3008.6	2780.0	3050.4	2925.9	2854.5	*2730*	*2925*	Shr. Equity ($mill)	*3785*
	NMF	3.8%	2.7%	1.5%	2.6%	4.9%	3.7%	4.9%	5.3%	3.9%	*4.0%*	*5.0%*	Return on Total Cap'l	*6.0%*
	NMF	4.3%	2.4%	NMF	1.8%	7.2%	7.6%	10.1%	12.7%	6.7%	*8.0%*	*10.0%*	Return on Shr. Equity	*10.5%*
	NMF	4.3%	2.6%	NMF	NMF	8.0%	8.5%	11.5%	12.5%	6.7%	*8.0%*	*10.0%*	Retained to Com Eq	*10.5%*
	- -	- -	12%	NMF	32%	7%	6%	3%	1%	1%	*Nil*	*Nil*	All Div'ds to Net Prof G	*Nil*

BUSINESS: Post Holdings is a consumer packaged goods holding company, operating in the center-of-the-store, refrigerated, foodservice, food ingredient, and convenience nutrition categories. It has five operating units: Post Consumer Brands, Weetabix, Foodservice, Refrigerated Retail, and BellRing Brands. Brands include: *Honey Bunches of Oats*, *Shredded Wheat*, *Post Raisin Bran*, *Malt-O-Meal*, *Bob Evans*, and *Power Bar*. Spun off from Ralcorp Hldgs. 2/12; acquired Michael Foods, 6/14; MOM Brands, 5/15. Off./dir. own 9.7% of common stock; Route One Investment Co., 10.4% (12/20 Proxy). Has 11,550 emplys. CEO & Pres.: Robert V. Vitale. Inc.: MO. Addr.: 2503 S. Hanley Road, St. Louis, MO 63144. Telephone: (314) 644-7600. Internet: www.postholdings.com.

Post Holdings reported disappointing fiscal second-quarter (ended March 31st) results. Specifically, the packaged goods company posted adjusted earnings of $0.29 a share, which fell short of our $0.60 estimate and was another step down from a poor showing in the year-ago same period. The biggest problem was continued weakness in the Post Consumer Brands, Weetabix, and Foodservice units. The first two segments, where volumes fell 11.6% and 8.5%, respectively, were hurt by declines in ready-to-eat (RTE) cereal sales. The Foodservice division again suffered from reduced food consumption in away-from-home channels, which resulted in fewer sales of eggs and potato products to restaurants, educational facilities, and travel and lodging entities. The struggles of these segments more than offset sales gains in the BellRing Brands (active nutrition) and Refrigerated Retail units.

We are lowering our fiscal 2021 share-net estimate by $0.45, to $3.20. The downward revision primarily reflects our worries about the recent RTE cereal declines. Investors should recall that before the pickup in volume during the pandemic, RTE cereal sales growth was lackluster, at best. This, along with the expected near-term increases in ingredients, packaging, energy, and transportation costs, has us less optimistic about a notable earnings recovery this year.

The company is becoming more aggressive on the acquisition front. Post used to be under the Ralcorp umbrella before being spun off. That company (now part of Conagra Brands) was very active on the deal-making front, so it is not a stretch to say management is returning the company to its roots. So far in fiscal 2021, Post has added Henningsen Foods, the *Peter Pan* brand, Almark Foods, and TreeHouse Foods' RTE cereal business to its arsenal. Post Holdings believes it could drive sales growth and unlock more value through bolt-on purchases.

This timely stock has above-average appreciation potential to 2024-2026. We have raised our 3- to 5-year P/E multiple and with an expected rebound in earnings, driven, in part, by acquisitions, this equity offers more growth potential than most of its food processing peers.

William G. Ferguson *July 16, 2021*

(A) FY ends Sept. 30th. **(B)** Dil. egs. Excl. nonrecur. gains (charges): '12, (8¢); '13, (64¢); '14, ($8.61); '15, ($2.65); '17, ($2.17); '18, $2.09; '19, ($3.28); '20, ($2.70); '21 Q1-Q2, $1.89. May not sum due to shr. count change. Next egs. report due early Aug. **(C)** Inc. intangibles. At 3/31/21: $7.79 bill., $122.41/shr. **(D)** In mill. **(E)** Incl. goodwill impairment charge: $566.5 mill. in FY 2011. **(F)** FY 2011 data restated to reflect a change in the amount of goodwill impaired. **(G)** Paid quarterly div'ds. on Convertible Preferred Stock in years 2013-2019.

Company's Financial Strength	B++
Stock's Price Stability	85
Price Growth Persistence	70
Earnings Predictability	25

RLI CORP. NYSE-RLI

RECENT PRICE **111.48** | P/E RATIO **32.6** (Trailing: 35.6 Median: 26.0) | RELATIVE P/E RATIO **1.73** | DIV'D YLD **0.9%** | **VALUE LINE**

TIMELINESS 2 Lowered 6/18/21
SAFETY 2 Raised 6/5/20
TECHNICAL 4 Lowered 7/30/21
BETA .80 (1.00 = Market)

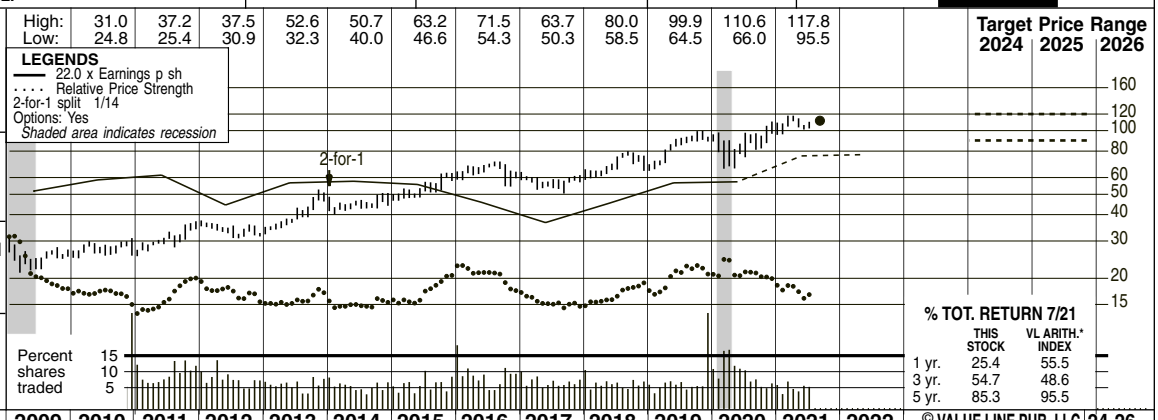
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$80-$169 $125 (10%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	120	(+10%)	*3%*
Low	90	(-20%)	*-4%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	108	113	102
to Sell	126	129	125
Hld's(000)	38035	37899	38243



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
9.61	10.92	12.29	12.31	11.57	11.77	12.72	13.56	14.68	15.95	16.08	16.58	16.72	17.78	18.70	19.18	***21.80***	***23.35***	P/C Prem Earned per sh	***30.00***
1.21	1.47	1.78	1.84	1.58	1.59	1.50	1.38	1.23	1.29	1.26	1.21	1.24	1.40	1.54	1.50	***1.55***	***1.70***	Investment Inc per sh	***2.50***
1.34	1.89	3.52	1.94	2.04	2.27	2.78	1.49	2.48	2.48	2.49	1.74	.60	.94	1.51	1.54	***16.35***	***1.65***	Underwriting Inc per sh	***3.00***
1.84	2.19	3.26	2.50	2.35	2.66	2.80	2.02	2.57	2.62	2.53	2.08	1.67	2.06	2.57	2.60	***3.45***	***3.50***	Earnings per sh [A]	***4.75***
.32	.38	.44	.49	.54	.57	.60	.63	.67	.71	.75	.79	.83	.87	.91	.95	***.99***	***1.03***	Div'ds Decl'd per sh [B]■	***1.14***
13.56	15.58	17.48	16.49	19.57	18.87	19.35	18.73	19.29	19.61	18.91	18.74	19.34	18.13	22.18	25.16	***28.35***	***32.20***	Book Value per sh	***44.45***
51.10	48.55	44.31	42.95	42.53	41.93	42.32	42.53	42.98	43.10	43.54	43.95	44.15	44.50	44.87	45.14	***45.00***	***45.00***	Common Shs Outst'g [C]	***45.00***
170%	166%	163%	163%	130%	146%	159%	182%	208%	230%	283%	346%	296%	379%	379%	349%			Price to Book Value	***235%***
12.5	11.8	8.8	10.8	10.8	10.4	11.0	16.9	15.6	17.2	21.1	31.1	34.3	33.4	32.7	33.8	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***22.0***
.67	.64	.47	.65	.72	.66	.69	1.08	.88	.91	1.06	1.63	1.73	1.80	1.74	1.75			Relative P/E Ratio	***1.20***
1.4%	1.5%	1.5%	1.8%	2.1%	2.1%	1.9%	1.8%	1.7%	1.6%	1.4%	1.2%	1.4%	1.3%	1.1%	1.1%			Avg Ann'l Div'd Yield	***1.1%***
538.5	576.6	630.8	687.4	700.2	728.6	737.9	791.3	839.1	865.7	***980***	***1050***	P/C Premiums Earned	***1350***
37.2%	47.1%	41.2%	43.2%	42.7%	48.0%	54.4%	54.1%	49.3%	51.2%	***52.0%***	***53.0%***	Loss to Prem Earned	***53.0%***
41.0%	41.9%	41.9%	41.3%	41.8%	41.5%	42.0%	40.6%	42.7%	40.8%	***40.5%***	***40.0%***	Expense to Prem Writ	***37.0%***
21.8%	11.0%	16.9%	15.6%	15.5%	10.5%	3.6%	5.3%	8.1%	8.0%	***7.5%***	***7.0%***	Underwriting Margin	***10.0%***
27.6%	19.7%	21.4%	20.5%	30.7%	26.5%	8.8%	12.3%	16.9%	35.3%	***15.0%***	***15.0%***	Income Tax Rate	***12.0%***
120.3	87.1	112.2	115.2	112.0	92.9	74.6	92.2	117.4	118.4	***155***	***160***	Net Profit ($mill)	***215***
3.5%	3.3%	2.8%	2.9%	2.7%	2.6%	2.5%	2.8%	2.6%	2.3%	***2.7%***	***3.0%***	Inv Inc/Total Inv	***5.0%***
2695	2645	2740	2776	2737	2778	2947	3105	3546	3938	***4400***	***4900***	Total Assets ($mill)	***6000***
818.9	796.4	829.0	845.1	823.5	823.6	853.6	806.8	995.4	1136.0	***1275***	***1450***	Shr. Equity ($mill)	***2000***
14.7%	10.9%	13.5%	13.6%	13.6%	11.3%	8.7%	11.4%	11.8%	10.4%	***12.0%***	***11.0%***	Return on Shr. Equity	***11.0%***
11.6%	7.6%	10.1%	10.0%	9.7%	7.1%	4.5%	6.6%	7.7%	6.7%	***8.5%***	***7.0%***	Retained to Com Eq	***8.0%***
21%	31%	26%	27%	29%	37%	49%	42%	35%	36%	***29%***	***29%***	All Div'ds to Net Prof	***24%***

CAPITAL STRUCTURE as of 6/30/21
Total Debt $149.6 mill. **Due in 5 Years** Nil

(11% of Cap'l)
Leases,Uncapitalized Annual rentals $6.0 million

No Defined Benefit Pension Plan
Pfd Stock None

Common Stock 45,225,943 shs.
as of 7/14/21

MARKET CAP: $5.0 billion (Large Cap)

FINANCIAL POSITION ($MILL.)	2019	2020	6/30/21
Bonds	1760.5	2196.6	2319.2
Stocks	340.5	524.0	566.9
Other	1004.1	1217.9	1394.5
Total Assets	3105.1	3938.5	4280.6
Unearned Prems	496.5	113.5	640.9
Reserves	1461.3	1750.0	1917.6
Other	340.3	939.0	480.3
Total Liab'ties	2298.2	2802.5	3038.8

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Premium Inc	4.5%	3.5%	*8.5%*
Invest Income	-1.0%	3.5%	*9.0%*
Earnings	-.5%	-1.5%	*12.0%*
Dividends	5.5%	5.0%	*4.0%*
Book Value	2.0%	2.5%	*12.5%*

Calendar	NET PREMIUMS EARNED ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	190.0	196.5	200.8	204.0	791.3
2019	204.7	207.5	211.3	215.6	839.1
2020	215.6	208.7	216.6	224.8	865.7
2021	228.6	241.0	***249***	***261.4***	***980***
2022	***240***	***250***	***270***	***290***	***1050***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.60	.60	.46	.40	2.06
2019	.71	.66	.57	.63	2.57
2020	.66	.77	.42	.75	2.60
2021	.87	1.09	***.72***	***.77***	***3.45***
2022	***.84***	***.90***	***.86***	***.90***	***3.50***

Calendar	QUARTERLY DIVIDENDS PAID [B]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.20	.21	.21	.21	.83
2018	.21	.22	.22	.22	.87
2019	.22	.23	.23	.23	.91
2020	.23	.24	.24	.24	.95
2021	.24	.25			

BUSINESS: RLI Corp., through its subsidiaries RLI Insurance and Mt. Hawley, writes multiple lines of insurance on an admitted basis in all 50 states. Also underwrites specialty property and casualty insurance on an admitted basis and excess and surplus business on a non-admitted basis. Underwrites earthquake risks (in California). Other companies in the group include: Replacement Lens, Inc.; License Express Services, Inc. Has 875 employees. State Street owns 10.2% of common stock; BlackRock 10.1%; The Vanguard Group 9.5%; officers & directors, 5.1% (3/21 proxy). President, Chairman, and Chief Executive Officer: Jonathan E. Michael. Inc.: Illinois. Address: 9025 North Lindbergh Drive, Peoria, Illinois 61615. Telephone: 309-692-1000. Internet: www.rlicorp.com.

RLI reported strong results for the June quarter. Looking at it with more granularity, operating share net, which excludes capital gains and losses from the investment portfolio, clocked in at $1.09, which represented a 42% increase from the previous year's tally. Net premiums earned climbed 15% on a year-over-year basis, to $241 million, thanks to new business wins and healthy price increases on policy renewals. The combined ratio also lent a helping hand, falling 3.6%, to 84.8%. This implies that the company made $16.20 on every $100 in policies insured and is a testament to management's strict underwriting standards. On the other hand, net investment income decreased 1.5%, to $16.7 million on a year-over-year basis. This doesn't come as much of a surprise to us, given low bond reinvestment rates, as interest rates have remained at or near historical lows.

Earnings might increase only slightly, at best, next year against tough comparisons. RLI, like many other insurers, has had all of its ducks in a row thus far in 2021. While we are optimistic regarding next year, a deterioration in any of the company's fundamentals would likely cause us to revisit our expectations. Low interest rates ought to continue to pressure investment income, too.

A strong insurance book ought to help propel share earnings higher over the 3 to 5 years ahead. We look for underwriting income to remain in positive territory, and above the industry average, thanks to management's stringent underwriting standards. It is also likely that net investment income will trend higher, as interest rates ultimately increase.

These shares are on our recommended list for the year ahead based on their favorable Timeliness ranking. They are also a solid choice for the 18 months ahead. However, when looking at them through a 3- to 5-year lens the outlook isn't as promising. Our forecast is based on a P/E multiple contraction over that time frame. While we like the RLI story and believe a premium valuation is warranted, we think the recent lofty level is unsustainable longer term. These shares currently trade within our 3- to 5-year Target Price Range.

Alan G. House *September 3, 2021*

(A) Dil. egs. Excl. nonrecurr. (net): '08, (70¢); '09, (19¢); '10, 35¢; '11, 25¢; 12, 38¢; '13, 66¢; '14, 47¢; '15, 59¢; '16, 48¢; 17, (69¢); '18, (63¢); '19, $1.66; '20, 86¢. Next egs. report due late Oct. **(B)** Div'ds. paid late March, June, Sept., and Dec. ■ Div'd. reinvest. plan avail. Excl. spec'l div'd.: $3.50/sh. on 12/29/10; $2.50/sh., 12/20/11; $2.50/sh., 12/20/12; $1.50/sh., 12/20/13; $3.00/sh., 12/22/14; $2.00/sh., 12/22/15; $2.00/sh., 12/23/16; $1.75, 12/27/17; $1.00/sh., 12/27/18, 12/20/19 & 12/18/20. **(C)** In mill., adj. for split.

Company's Financial Strength	A
Stock's Price Stability	90
Price Growth Persistence	80
Earnings Predictability	80

ROLLINS, INC. NYSE-ROL

RECENT PRICE **37.68** | P/E RATIO **NMF** (Trailing: NMF Median: 38.0) | RELATIVE P/E RATIO **NMF** | DIV'D YLD **0.8%** | VALUE LINE **400**

TIMELINESS 3 Lowered 3/19/21
SAFETY 2 Raised 3/6/09
TECHNICAL 5 Lowered 7/30/21
BETA .85 (1.00 = Market)

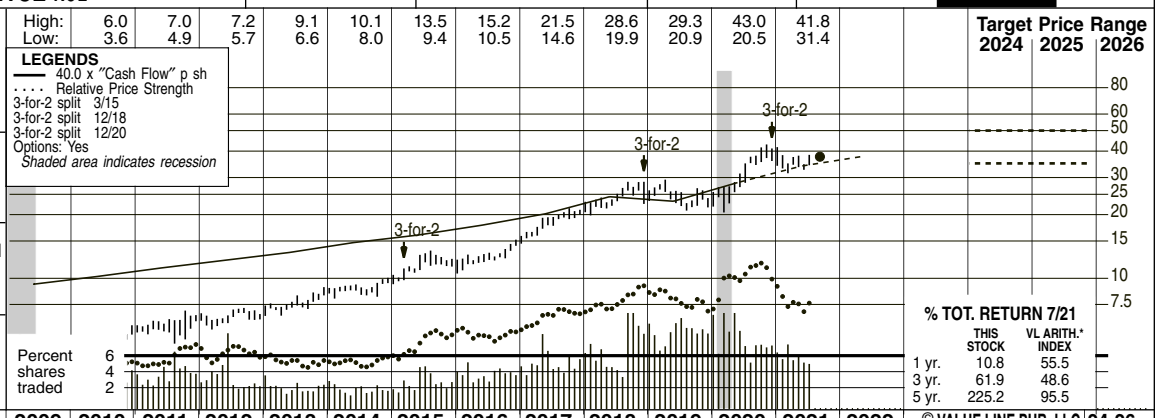
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$28-$62 $45 (20%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	50	(+35%)	*8%*
Low	35	(-5%)	*-1%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	230	433	235
to Sell	182	81	241
Hld's(000)	189417	191338	193649



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
1.55	1.67	1.76	2.02	2.15	2.29	2.44	2.58	2.72	2.87	3.02	3.21	3.41	3.71	4.10	4.40	***4.85***	***5.15***	Revenues per sh	***5.45***
.15	.16	.18	.20	.23	.25	.28	.30	.33	.37	.40	.45	.50	.61	.58	.71	***.85***	***.95***	"Cash Flow" per sh	***1.10***
.10	.11	.13	.14	.16	.18	.20	.23	.25	.28	.31	.34	.39	.47	.41	.53	***.70***	***.75***	Earnings per sh [A]	***.90***
.03	.03	.04	.05	.06	.07	.08	.09	.11	.12	.14	.18	.20	.25	.28	.24	***.32***	***.40***	Div'ds Decl'd per sh [B]■	***.50***
.05	.04	.03	.03	.03	.03	.04	.04	.04	.06	.08	.07	.05	.06	.06	.05	***.05***	***.05***	Cap'l Spending per sh	***.10***
.34	.41	.46	.45	.53	.60	.66	.72	.89	.94	1.06	1.16	1.33	1.45	1.66	1.91	***2.25***	***2.40***	Book Value per sh [C]	***2.65***
516.46	515.55	509.47	506.46	500.70	496.74	493.60	492.80	492.29	491.14	492.19	490.03	490.48	490.96	491.15	491.61	***492.50***	***493.00***	Common Shs Outst'g [D]	***493.50***
25.2	24.8	26.0	24.4	22.1	24.7	29.0	29.1	30.7	32.0	36.9	37.0	47.4	NMF	NMF	NMF	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***48.0***
1.34	1.34	1.38	1.47	1.47	1.57	1.82	1.85	1.72	1.68	1.86	1.94	2.38	NMF	NMF	NMF			Relative P/E Ratio	***2.65***
1.0%	1.2%	1.2%	1.5%	1.6%	1.6%	1.4%	1.4%	1.4%	1.4%	1.2%	1.4%	1.1%	1.0%	1.1%	.8%			Avg Ann'l Div'd Yield	***1.2%***
1205.1	1270.9	1337.4	1411.6	1485.3	1573.4	1674.0	1821.6	2015.5	2161.2	***2380***	***2550***	Revenues ($mill)	***2700***
16.6%	17.0%	17.2%	18.6%	19.2%	19.7%	20.9%	20.7%	19.8%	21.1%	***22.0%***	***22.5%***	Operating Margin	***25.5%***
37.5	38.7	39.6	43.5	44.5	50.9	56.6	66.8	81.1	88.3	***90.0***	***95.0***	Depreciation ($mill)	***100***
100.7	111.3	123.3	137.7	152.1	167.4	190.7	231.7	203.3	260.8	***340***	***370***	Net Profit ($mill)	***445***
37.5%	37.0%	35.6%	37.3%	37.5%	35.8%	35.2%	25.4%	22.1%	26.5%	***25.0%***	***25.0%***	Income Tax Rate	***25.0%***
8.4%	8.8%	9.2%	9.8%	10.2%	10.6%	11.4%	12.7%	10.1%	12.1%	***14.3%***	***14.5%***	Net Profit Margin	***16.5%***
d50.1	d22.4	38.6	31.3	60.9	13.2	d31.8	d13.0	d100.2	d157.7	***d120***	***d75.0***	Working Cap'l ($mill)	***100***
--	--	--	--	--	--	--	--	279.0	185.8	***50.0***	***30.0***	Long-Term Debt ($mill)	***Nil***
324.0	354.9	438.3	462.7	524.0	568.5	653.9	711.9	815.8	941.4	***1100***	***1175***	Shr. Equity ($mill)	***1300***
31.1%	31.4%	28.1%	29.8%	29.0%	29.4%	29.2%	32.5%	18.9%	23.4%	***29.5%***	***31.5%***	Return on Total Cap'l	***34.0%***
31.1%	31.4%	28.1%	29.8%	29.0%	29.4%	29.2%	32.5%	24.9%	27.7%	***31.0%***	***31.5%***	Return on Shr. Equity	***34.0%***
18.4%	18.2%	16.1%	16.6%	15.7%	14.1%	13.8%	15.4%	6.1%	10.7%	***16.5%***	***14.5%***	Retained to Com Eq	***15.5%***
41%	42%	43%	44%	46%	52%	53%	53%	76%	62%	***46%***	***53%***	All Div'ds to Net Prof	***55%***

CAPITAL STRUCTURE as of 6/30/21
Total Debt $88.1 mill. **Due in 5 Yrs** $88.1 mill.
LT Debt $69.3 mill. **LT Interest** $2.0 mill. (6% of Cap'l)
Leases, Uncapitalized Annual rentals $72.9 mill.

Pension Assets-12/20 $3.3 mill. **Oblig.** $3.0 mill.
Pfd Stock None

Common Stock 492,079,290 shs.

MARKET CAP: $18.5 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	94.3	98.5	128.5
Receivables	122.7	126.3	142.9
Inventory	19.5	30.8	30.0
Other	73.3	59.2	74.9
Current Assets	309.8	314.8	376.3
Accts Payable	35.2	64.6	74.8
Debt Due	12.5	17.2	18.8
Other	362.3	390.7	425.1
Current Liab.	410.0	472.5	518.7

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	6.5%	7.0%	*5.0%*
"Cash Flow"	10.5%	11.5%	*9.5%*
Earnings	11.5%	11.0%	*11.5%*
Dividends	16.0%	15.5%	*12.0%*
Book Value	12.5%	11.5%	*8.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	408.7	480.5	487.8	444.6	1821.6
2019	429.0	524.0	556.5	506.0	2015.5
2020	487.9	553.3	583.7	536.3	2161.2
2021	535.6	638.2	***640***	***566.2***	***2380***
2022	***560***	***660***	***675***	***655***	***2550***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.10	.13	.13	.11	.47
2019	.09	.13	.09	.10	.41
2020	.09	.15	.16	.13	.53
2021	.19	.20	***.18***	***.13***	***.70***
2022	***.20***	***.20***	***.20***	***.15***	***.75***

Calendar	QUARTERLY DIVIDENDS PAID [B]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.051	.051	.051	.051	.204
2018	.062	.062	.062	.062	.248
2019	.070	.070	.070	.070	.280
2020	.080	.053	.053	.053	.239
2021	.080	.080	.080		

BUSINESS: Rollins, Inc. owns and operates Orkin LLC Exterminating, one of the world's largest pest- and termite-control service providers. Has over 500 locations (including franchises) in the U.S., Canada, Europe, Latin America, the Caribbean, the Middle East, and Asia. Commercial and residential pest contol account for 81% of revenues, and the balance is mainly from the termite business. Acquired HomeTeam Pest Defense, 4/08; Crane Pest Control, 12/08; two acquisitions in Australia in 2014. Has approx. 15,600 employ. Rollins family & other dirs. own 51.5% and less than 1.0%, resp., of stock (3/21 proxy). Chairman & CEO: Gary W. Rollins. Inc.: DE. Address: 2170 Piedmont Rd., N.E., Atlanta, GA 30324. Telephone: 404-888-2000. Internet: www.rollins.com.

Rollins registered strong second-quarter results. The top and bottom lines increased more than 15% and 33% year over year, to about $638 million and $0.20, respectively. The company experienced double-digit revenue growth across residential, commercial, and termite business lines, thanks to improving demand and pricing. Management also divested most of the Clark Pest Control of Stockton properties acquired during 2019.

The residential pest control operations are expected to stay healthy in the near term. This line accounted for over 45% of total revenues and gained about 14% year over year. Rollins enjoyed strong requests from residential customers, as many people worked from home, and scheduling appointments was easy. However, the company will probably experience some softness in the termite business during the winter season.

Rollins' commercial business will likely continue to recover in the coming months. Commercial pest control generates about 33% of total revenues and increased nearly 17% over the year-ago period. This line benefited from COVID-19-related restrictions being eased and several of Rollins' clients returning to operations. We think the demand for its sanitation offering, Vital Clean, will likely pick up as offices reopen in the coming months. This service is expected to remain popular as part of routine cleaning, even in a post-pandemic world. Rollins will probably attract new commercial clients because the government continues to promote growth-friendly economic policies. In all, we have added $0.05 each to our previous 2021 and 2022 share-earnings estimates, bringing our revised share-net calls to $0.70 and $0.75.

Long-term business prospects seem encouraging. Rollins will likely continue with its acquisition activities in the coming months. Also, the company has been investing in technology to optimize routes and save costs. Therefore, management will probably channel these savings into introducing new decontamination services for residential customers.

Good quality shares of Rollins have limited long-term capital appreciation potential.

Emma Jalees *August 20, 2021*

Company's Financial Strength	A
Stock's Price Stability	90
Price Growth Persistence	90
Earnings Predictability	85

(A) Dil. shs. Excl. nonrec. gains: '05, 1¢; '09, 2¢. 2017 excl. one-time tax impact: 5¢. Egs may not sum due to rdg. and/or change in shs. out. Next egs. rpt. due mid-October.

(B) Div'd paid in mid-March, June, September, and December. Excl. special div'd: $0.08 paid 12/12, $0.06 paid 12/13, $0.07 paid 12/14, $0.10 paid 10/17, $0.14 paid 11/18, $0.05 paid 12/19, & $0.13 paid 12/20 ■ Div'd reinvest. plan available.

(C) Incl. intang. In '20: $765.48 mill., $1.56/sh.

(D) In mill., adj. for stock splits.

SELECTIVE INSUR. NDQ-SIGI

RECENT PRICE **84.83** | P/E RATIO **11.6** (Trailing: 13.2 / Median: 15.0) | RELATIVE P/E RATIO **0.62** | DIV'D YLD **1.2%** | **VALUE LINE**

TIMELINESS 2 Raised 8/13/21
SAFETY 3 New 7/27/90
TECHNICAL 4 Lowered 8/27/21
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$58-$123	$91 (5%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	125	(+45%)	*11%*
Low	85	(Nil)	*2%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	91	103	97
to Sell	114	113	126
Hld's(000)	47307	47460	47553

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
High:	18.9	19.0	20.3	28.3	27.7	37.9	44.0	62.4	67.2	81.4	70.9	86.3						
Low:	14.1	12.1	16.2	19.5	21.4	25.5	29.3	38.5	53.6	58.1	37.1	62.8						

LEGENDS
13.0 x Earnings p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2024 | 2025 | 2026

% TOT. RETURN 7/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	52.0	55.5
3 yr.	41.3	48.6
5 yr.	121.8	95.5

Percent shares traded: 12 / 8 / 4

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
	24.94	26.18	27.94	28.28	26.88	26.39	26.45	28.72	31.04	33.93	34.69	37.57	39.17	41.33	43.68	44.77	*49.35*	*51.65*	P/C Prem Earned per sh	*53.85*
	2.39	2.74	3.21	2.48	2.23	2.71	2.71	2.39	2.41	2.54	2.12	2.29	2.77	3.31	3.74	3.79	*5.15*	*5.25*	Investment Inc per sh	*5.60*
	1.21	.97	.25	d.26	d.04	d.44	d1.94	d1.14	.61	1.29	2.64	2.74	2.72	2.19	2.84	1.98	*3.50*	*4.00*	Underwriting Inc per sh	*4.75*
	2.24	2.30	2.22	1.43	1.39	1.35	.34	.59	1.65	2.17	2.70	2.75	3.11	3.66	4.40	4.15	*7.25*	*7.35*	Earnings per sh [A]	*8.00*
	.40	.44	.49	.52	.52	.52	.52	.52	.52	.53	.57	.61	.66	.74	.83	.94	*1.03*	*1.14*	Div'ds Decl'd per sh [B■]	*1.48*
	17.26	18.81	19.81	16.84	18.83	19.96	20.39	19.77	20.63	23.36	24.37	26.77	29.28	30.40	36.91	42.38	*48.35*	*52.50*	Book Value per sh	*58.45*
	56.86	57.27	54.31	52.88	53.24	53.68	54.41	55.16	55.92	54.59	57.36	57.21	58.50	58.95	59.46	59.91	*60.00*	*60.00*	Common Shs Outst'g [C]	*65.00*
	142%	144%	122%	133%	80%	81%	80%	91%	117%	103%	124%	141%	172%	198%	190%	134%	*Bold figures are Value Line estimates*		Price to Book Value	*178%*
	10.9	11.8	10.9	15.7	10.8	12.0	48.1	30.5	14.6	11.1	11.2	13.5	16.2	16.4	15.9	13.7			Avg Ann'l P/E Ratio	*13.0*
	.58	.64	.58	.94	.72	.76	3.02	1.94	.82	.58	.56	.71	.81	.89	.85	.71			Relative P/E Ratio	*.70*
	1.6%	1.6%	2.0%	2.3%	3.5%	3.2%	3.2%	2.9%	2.2%	2.2%	1.9%	1.6%	1.3%	1.2%	1.2%	1.7%			Avg Ann'l Div'd Yield	*1.4%*
	1439.3	1584.1	1736.1	1852.6	1989.9	2149.6	2291.0	2436.2	2597.2	2681.8	*2960*	*3100*	P/C Premiums Earned	*3500*
	74.7%	70.8%	64.6%	62.5%	57.7%	57.4%	58.7%	61.5%	59.7%	61.0%	*59.5%*	*59.0%*	Loss to Prem Earned	*58.0%*
	32.6%	33.2%	33.4%	33.7%	34.7%	35.5%	34.4%	33.2%	13.1%	13.7%	*13.0%*	*13.0%*	Expense to Prem Writ	*13.0%*
	-7.3%	-4.0%	2.0%	3.8%	7.6%	7.0%	6.9%	5.3%	27.1%	25.3%	*27.5%*	*28.0%*	Underwriting Margin	*29.0%*
	- -	- -	29.6%	27.0%	28.4%	28.1%	27.7%	18.0%	18.9%	18.7%	*19.0%*	*19.0%*	Income Tax Rate	*19.0%*
	19.1	32.1	86.7	124.5	157.1	161.7	184.9	218.6	264.4	249.7	*435*	*445*	Net Profit ($mill)	*520*
	3.8%	3.2%	3.1%	3.0%	2.5%	2.5%	2.9%	3.5%	3.5%	3.2%	*3.6%*	*3.7%*	Inv Inc/Total Inv	*3.8%*
	5736	6794	6270	6582	6904	7356	7686	7953	8797	9688	*10500*	*11500*	Total Assets ($mill)	*14000*
	1109.2	1090.6	1153.9	1275.6	1398.0	1531.4	1713.0	1791.8	2194.9	2738.9	*2900*	*3150*	Shr. Equity ($mill)	*3800*
	1.7%	2.9%	7.5%	9.8%	11.2%	10.6%	10.8%	12.2%	12.0%	9.1%	*15.0%*	*14.0%*	Return on Shr. Equity	*13.5%*
	NMF	.5%	5.1%	7.5%	9.0%	8.4%	8.6%	9.8%	9.9%	7.7%	*13.0%*	*12.0%*	Retained to Com Eq	*11.0%*
	NMF	84%	32%	23%	20%	21%	20%	19%	18%	22%	*14%*	*15%*	All Div'ds to Net Prof	*19%*

CAPITAL STRUCTURE as of 6/30/21
Total Debt $550.9 mill. **Due in 5 Yrs** $550.9 mill.
LT Debt $550.9 mill. **LT Interest** $32.0 mill.

(16% of Cap'l)

Leases, Uncapitalized $8.4 million.
Pension Assets-12/20 $433 mill. **Oblig.** $425 mill.

Pfd Stock None
Common Stock 60,107,525 shs.
as of 7/16/21
MARKET CAP: $5.1 billion (Large Cap)

FINANCIAL POSITION ($MILL.)	2019	2020	6/30/21
Bonds	6116.4	6472.7	6653.4
Stocks	72.9	310.4	348.3
Mortgages	- -	- -	- -
Other	2607.9	2904.8	3166.2
Total Assets	8797.2	9687.9	10167.9
Unearned Prems	1523.2	1618.3	1791.3
Reserves	4067.2	4260.4	4437.3
Other	1011.8	1070.3	1047.9
Total Liab.	6602.2	6949.0	7276.5

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Premium Inc	5.0%	5.5%	*3.5%*
Invest Income	4.0%	9.0%	*7.5%*
Earnings	11.5%	13.5%	*12.0%*
Dividends	5.0%	9.0%	*10.0%*
Book Value	7.0%	10.0%	*8.0%*

Calendar	NET PREM. EARNED ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	591.8	604.8	614.3	625.3	2436.2
2019	632.6	642.6	653.6	668.4	2597.2
2020	651.7	630.7	694.5	704.9	2681.8
2021	725.0	740.5	*745*	*749.5*	*2960*
2022	*760*	*775*	*780*	*785*	*3100*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.46	1.01	.99	1.20	3.66
2019	.90	1.16	.97	1.37	4.40
2020	.84	.40	1.06	1.84	4.15
2021	1.70	1.85	*1.70*	*2.00*	*7.25*
2022	*1.75*	*1.85*	*1.70*	*2.05*	*7.35*

Calendar	QUARTERLY DIVIDENDS PAID [B■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.16	.16	.16	.18	.66
2018	.18	.18	.18	.20	.74
2019	.20	.20	.20	.23	.83
2020	.23	.23	.23	.25	.94
2021	.25	.25	.25		

BUSINESS: Selective Insurance Group, Inc. is a holding company for five property/casualty insurance companies. (Main subsidiary: Selective Insurance Company of America.) Markets products primarily in the East and Midwest. New Jersey accounted for 18% of premiums written in '20. Mix of 2020 premiums written: personal lines, 20%; commercial lines, 80%. Commercial premiums by industry (as percentage of total): automobile, 26%; general liability, 32%; workers' compensation, 17%; other, 25%. Has about 2,400 employees. Officers/directors own 2.0% of common stock; BlackRock, 11.2% (4/21 Proxy). Chairman, Pres. & CEO: John J. Marchioni. Inc.: NJ Address: 40 Wantage Ave., Branchville, NJ 07890. Telephone: 973-948-3000. Internet: www.selective.com.

Selective Insurance Group has been kicking it into a higher gear of late. More specifically, a jump in net written premiums, along with stable retention ratios, has bolstered the top line. Meantime, a combination of elevated alternative investment income and favorable prior-year reserve development has helped lift profits. Even after adjusting for policy credits in the personal and commercial auto lines, the company has been able to take advantage of rate hikes in the neighborhood of 5%. On the underwriting front, it appears more-normalized catastrophe loss trends and a reduced combined ratio have supported wider margins. Therefore, we have decided to increase our 2021 share-net estimate by $1.95, to $7.25.

We think the P&C insurance provider will tack a dime onto its bottom line next year, reaching $7.35 once all of the dust has settled. In our view, the company will likely witness just a slight uptick in investment income for 2022, due to the ill effects of low interest rates on its fixed-income portfolio. Elsewhere, we do not envision a major dropoff for weather-related loss activity or policy expenses, meaning the combined ratio will probably hold fairly steady over the next 12-18 months. Nevertheless, the insurer should be able to benefit from decent price increases and more-lucrative coverage terms & conditions. In terms of risk, Selective's updated technology suite ought to enable it to further pare its overall risk exposure, while identifying coverage shortfalls and wider-margin business opportunities.

It seems the threat of inflationary pressure has popped up on management's radar screen. To wit, leadership has stated that current inflationary pressures are being offset by continued lower-than-expected loss frequencies for short-tail policies. Thus, loss trend models might need to be revamped if inflation becomes a larger concern, since a spike in catastrophe claims could be exacerbated by a surge in demand for building materials (putting greater stress on supply chains and labor shortages).

This timely issue offers subpar long-term appreciation potential. SIGI's dividend yield is unimpressive. Patient investors will want to hold off here, for now.

Kenneth DeFranco, Jr. *September 3, 2021*

(A) Diluted egs. Excludes cap'l gains/losses beginning in 2005: '05, 9¢. Excl. loss from discontinued ops.: '08, 1¢; '09, 15¢; '10, 7¢; '11, 1¢. EPS may not sum due to rounding. Next earnings report due late October. **(B)** Dividends historically paid in early March, June, September, December. ■ Div'd reinvestment plan available. **(C)** In mill., adj. for stock split.

Company's Financial Strength	B+
Stock's Price Stability	85
Price Growth Persistence	95
Earnings Predictability	80

SIRIUS XM HOLDINGS NDQ-SIRI

RECENT PRICE **6.34** | P/E RATIO **21.1** (Trailing:NMF Median: 36.0) | RELATIVE P/E RATIO **1.11** | DIV'D YLD **0.9%** | **VALUE LINE**

TIMELINESS 3 Lowered 12/25/20
SAFETY 3 Raised 1/29/21
TECHNICAL 3 Raised 7/30/21
BETA .95 (1.00 = Market)

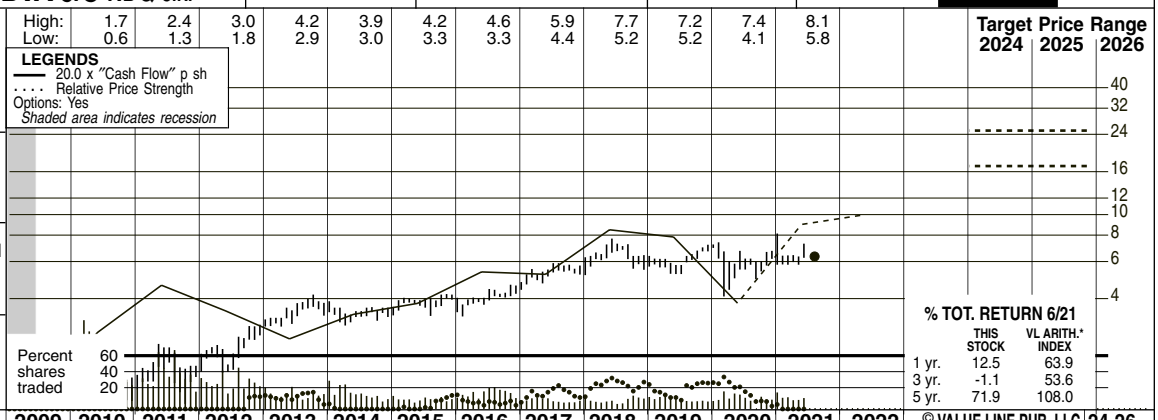
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$5-$11 $8 (25%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	25	(+295%)	*41%*
Low	17	(+170%)	*29%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	257	284	236
to Sell	277	247	329
Hld's(000)	668021	626377	573524



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
.18	.44	.63	.46	.64	.72	.80	.65	.62	.74	.89	1.06	1.20	1.33	1.77	1.93	*2.10*	*2.20*	Revenues per sh	*2.55*
d.56	d.70	d.31	d.09	.04	.11	.19	.14	.10	.13	.15	.21	.21	.34	.31	.15	*.45*	*.50*	"Cash Flow" per sh	*1.00*
d.65	d.79	d.39	d.25	d.10	.03	.07	.07	.06	.08	.09	.15	.14	.26	.20	.03	*.30*	*.35*	Earnings per sh A	*.85*
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	.01	.04	.05	.05	.06	*.06*	*.08*	Div'ds Decl'd per sh D	*.15*
.04	.07	.04	.04	.06	.08	.04	.02	.03	.02	.03	.04	.06	.08	.08	.08	*.10*	*.10*	Cap'l Spending per sh	*.10*
.24	d.27	d.54	d.01	.00	.05	.19	.77	.45	.23	d.03	d.17	d.34	d.42	d.17	d.55	*d.65*	*d.30*	Book Value per sh B	*.55*
1346.2	1434.6	1471.1	3651.7	3882.7	3933.2	3753.2	5262.4	6096.2	5638.7	5147.6	4740.9	4527.7	4345.6	4412.0	4173.0	*4000.0*	*3900.0*	Common Shs Outst'g C	*3800.0*
- -	- -	- -	- -	- -	35.9	26.4	33.4	58.0	42.9	43.0	27.0	37.5	24.7	30.7	NMF	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*25.0*
- -	- -	- -	- -	- -	2.28	1.66	2.13	3.26	2.26	2.17	1.42	1.89	1.33	1.64	NMF			Relative P/E Ratio	*1.40*
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	.2%	.8%	.7%	.8%	.9%			Avg Ann'l Div'd Yield	*.7%*
3014.5	3402.0	3799.1	4181.1	4570.1	5017.2	5425.1	5770.7	7794.0	8040.0	*8350*	*8600*	Revenues ($mill)	*9675*
31.3%	33.5%	42.6%	45.0%	31.7%	33.9%	35.7%	35.1%	27.1%	17.0%	*30.0%*	*32.0%*	Operating Margin	*50.0%*
267.9	266.3	253.3	266.4	272.2	269.0	298.6	300.7	468.0	506.0	*515*	*525*	Depreciation ($mill)	*600*
427.0	470.9	377.2	493.2	509.7	745.9	647.9	1175.9	914.0	131.0	*1250*	*1400*	Net Profit ($mill)	*3230*
3.2%	.8%	40.8%	40.6%	42.9%	31.7%	48.8%	17.2%	23.6%	69.5%	*30.0%*	*22.0%*	Income Tax Rate	*22.0%*
14.2%	13.8%	9.9%	11.8%	11.2%	14.9%	11.9%	20.4%	11.7%	1.6%	*15.0%*	*16.3%*	Net Profit Margin	*33.4%*
d970.6	d486.4	d1320	d764.0	d1935	d2026	d2351	d2325	d2290	d2200	*d2820*	*d2550*	Working Cap'l ($mill)	*d850*
3012.4	2431.0	3093.8	4493.9	5443.6	5842.8	6741.2	6884.5	7842.0	8499.0	*8800*	*8500*	Long-Term Debt ($mill)	*8000*
704.1	4039.6	2745.7	1309.8	d166.5	d792.0	d1524	d1817	d736.0	d2285	*d2625*	*d1200*	Shr. Equity ($mill)	*2000*
15.6%	8.0%	8.2%	10.8%	12.5%	18.0%	15.7%	26.7%	15.6%	5.3%	*16.0%*	*19.0%*	Return on Total Cap'l	*32.5%*
60.6%	11.7%	13.7%	37.7%	- -	- -	- -	- -	37.7%	- -	*NMF*	*NMF*	Return on Shr. Equity	*NMF*
60.6%	11.7%	13.7%	37.7%	- -	- -	- -	- -	37.7%	- -	*NMF*	*NMF*	Retained to Com Eq	*NMF*
- -	- -	- -	- -	- -	6%	29%	17%	25%	NMF	*19%*	*22%*	All Div'ds to Net Prof	*18%*

CAPITAL STRUCTURE as of 3/31/21
Total Debt $8,879 mill. **Due in 5 Yrs** $3,350 mill.
LT Debt $8,878 mill. **LT Interest** $360.0 mill.
(Tot. Interest Covered: 2.1x)
(NMF of Total Cap'l)
Leases, Uncapitalized Annual rentals $71.0 mill.

No Defined Benefit Pension Plan

Pfd Stock None
Common Stock 4,139,978,947 shares
as of 1/29/21

MARKET CAP: $26.2 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	3/31/21
Cash Assets	106	71	59
Receivables	670	559	611
Inventory (FIFO)	11	10	8
Other	216	327	227
Current Assets	1003	967	905
Accts Payable	1151	1223	1057
Debt Due	2	1	1
Other	2140	1943	1792
Current Liab.	3293	3167	2850

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	10.5%	17.5%	*7.5%*
"Cash Flow"	31.5%	15.5%	*24.5%*
Earnings	- -	16.5%	*31.5%*
Dividends	- -	- -	*20.0%*
Book Value	- -	- -	*NMF*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1375.1	1432.3	1467.4	1495.9	5770.7
2019	1744.0	1977.0	2011.0	2062.0	7794.0
2020	1952.0	1874.0	2025.0	2189	8040
2021	2058	*2025*	*2050*	*2217*	*8350*
2022	*2100*	*2120*	*2150*	*2230*	*8600*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.06	.06	.07	.06	.26
2019	.03	.06	.05	.05	.20
2020	.07	.05	.06	d.16	.03
2021	.07	*.06*	*.07*	*.10*	*.30*
2022	*.10*	*.06*	*.07*	*.12*	*.35*

Calendar	QUARTERLY DIVIDENDS PAID D Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.01	.01	.01	.011	.041
2018	.011	.011	.011	.012	.045
2019	.012	.012	.012	.013	.049
2020	.013	.013	.015	.015	.056
2021	.015	.015			

BUSINESS: Sirius XM Holdings, Inc. broadcasts a wide variety of programming (music, sports, talk, news, comedy, etc.) in the U.S. through two audio entertainment systems: SiriusXM and Pandora. As of 12/31/20, SiriusXM (and 360L) had about 34.7 million subscribers and Pandora had 6.3 mill. subscribers. It offers programming through satellite radio, streaming media through mobile, web, and connected devices. Revenues are supported by subscriptions and ad revenues. It has 5,726 employees. Officers/directors own less than 1% of stock, Liberty Media Corp., 77.0% (4/21 proxy). Inc.: DE. Chairman: Gregory B. Maffei. CEO: Jennifer Witz. Address: 1221 Avenue of the Americas, 35th Floor New York, NY 10020. Tel.: 212-584-5100. Internet: www.siriusxm.com.

Sirius XM Holdings ought to post solid gains this year. The satellite radio company got off to a relatively good start in the March period. Sirius Self-Pay Net Subscriber Additions increased 83% year over year during the interim. The company has benefited from the reopening of the economy, better monetization of its content, and the rebounding ad market. In fact, ad revenues recovered 24% during the March period, and total sales were up 5%. Profits slipped slightly from the year-ago period, to a nickel a share. (Note: Excluding impairments related to the failure of the company's SXM-7 satellite, the surrender of office space, and a benefit from a tax audit settlement, the bottom line held steady at $0.07 a share.) Looking ahead, share net should bounce back nicely this year. Contributions from recent acquisitions, and subscriber growth ought to help sales climb between 3% and 5% for 2021.

Next year should shape up nicely, as well. The top line will probably advance 3% in 2022. Too, Sirius has been using a lot of its cash to lower its stock count, which ought to boost per-share comparisons moving forward. Therefore, we look for share profits to expand between 10% and 15%, next year.

The company is bolstering its operations. In May, it launched a consolidated advertising sales organization named SXM Media. We imagine the segment will better leverage its audio ad technology platforms AdsWizz and SimpleCast, with podcast ad network Midroll, and will better serve the SiriusXM, Pandora, Stitcher, and SoundCloud platforms. What's more, recent acquisitions have been accretive to its results, and strategic partnerships should pay off moving forward. Too, Sirius will probably invest heavily in its content and technological improvements.

Debt maturities have been pushed out. In June, the company issued $2.0 billion 4.0% senior notes due 2028. It plans to use the bulk of the proceeds to redeem borrowings coming due soon, namely the 3.875% notes due in 2022.

These shares offer robust capital appreciation potential over the coming 3 to 5 years. For now, however, SIRI is ranked to perform in line with the broader market averages.

Orly Seidman *July 30, 2021*

(A) Fully diluted earnings. Excludes nonrecurring gains/(losses): '15, $0.01, '12, $0.44; '10, ($0.02); '09, ($0.05); '08, ($2.20); '05, ($0.03). Next earnings report due early Aug.
(B) Includes intangibles. In 2020, $6.462 billion, or $1.55 per share.
(C) In millions.
(D) Excl. special dividend of $0.05, paid 12/28/12. Quarterly dividend instituted on 11/1/16 and historically paid in late February, May, August, and November.

Company's Financial Strength	C++
Stock's Price Stability	85
Price Growth Persistence	85
Earnings Predictability	45

SYNOPSYS, INC. NDQ-SNPS

RECENT PRICE **283.89** | P/E RATIO **42.2** (Trailing: 43.4 Median: 18.0) | RELATIVE P/E RATIO **2.18** | DIV'D YLD **Nil** | **VALUE LINE**

TIMELINESS 3 Lowered 6/11/21
SAFETY 1 Raised 8/17/12
TECHNICAL 4 Lowered 6/25/21
BETA .95 (1.00 = Market)

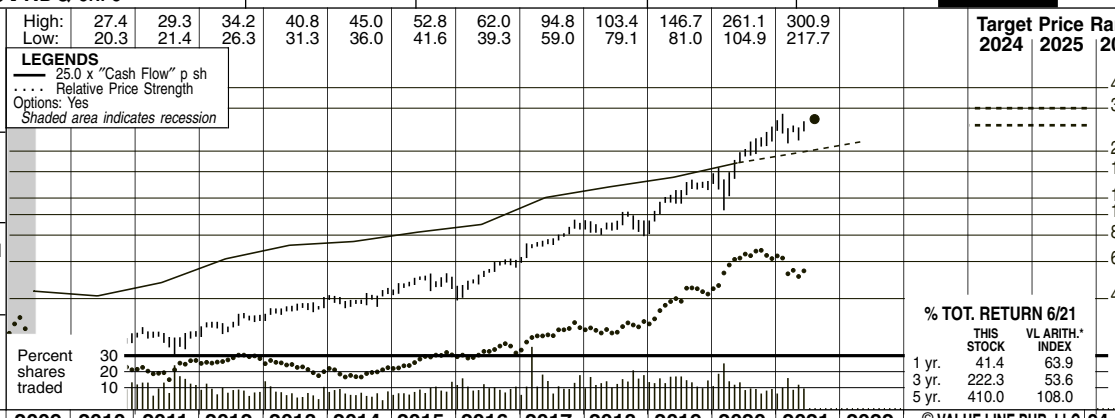
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$193-$422 $308 (10%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	320	(+15%)	*3%*
Low	265	(-5%)	*-1%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	300	347	347
to Sell	283	295	330
Hld's(000)	133715	132638	132308



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
6.80	7.79	8.28	9.43	9.26	9.30	10.72	11.64	12.73	13.19	14.43	16.00	18.11	20.91	22.36	24.15	***26.85***	***29.45***	Sales per sh [A]	***37.00***
.80	.97	1.44	1.78	1.74	1.65	1.91	2.47	2.86	2.99	3.31	3.59	4.82	5.42	6.01	7.04	***7.90***	***8.95***	"Cash Flow" per sh	***11.45***
.39	.54	1.04	1.35	1.37	1.26	1.42	2.10	2.45	2.53	2.77	3.02	3.42	3.91	4.56	5.55	***6.50***	***7.45***	Earnings per sh [A B]	***9.75***
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	***Nil***	***Nil***	Div'ds Decl'd per sh	***.80***
.30	.34	.31	.27	.27	.26	.40	.34	.42	.66	.56	.44	.47	.66	1.32	1.01	***.70***	***1.05***	Cap'l Spending per sh	***1.40***
8.35	8.27	9.81	10.78	12.55	14.14	14.66	16.58	18.09	19.60	20.16	21.10	21.77	23.31	27.16	32.15	***33.55***	***35.05***	Book Value per sh [D]	***39.85***
145.90	140.57	146.37	141.79	146.95	148.48	143.31	150.90	154.17	155.97	155.44	151.45	150.45	149.27	150.33	152.62	***152.00***	***151.00***	Common Shs Outst'g [C]	***148.00***
46.0	37.7	25.3	17.1	14.4	17.9	18.4	14.2	14.3	15.4	16.8	16.8	21.3	23.0	25.1	30.5	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***30.0***
2.45	2.04	1.34	1.03	.96	1.14	1.15	.90	.80	.81	.85	.88	1.07	1.24	1.34	1.58			Relative P/E Ratio	***1.65***
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -			Avg Ann'l Div'd Yield	***.3%***
1535.6	1756.0	1962.2	2057.5	2242.2	2422.5	2724.9	3121.1	3360.7	3685.3	***4080***	***4450***	Sales ($mill) [A]	***5475***
22.2%	23.8%	25.6%	25.3%	26.3%	26.1%	26.3%	28.9%	30.3%	33.2%	***34.0%***	***35.5%***	Operating Margin	***36.5%***
59.1	57.0	59.9	66.7	75.8	77.4	189.4	209.2	201.7	210.0	***210***	***220***	Depreciation ($mill)	***250***
213.9	315.5	381.4	398.9	438.4	466.8	536.1	600.0	702.5	864.6	***990***	***1130***	Net Profit ($mill)	***1445***
26.2%	24.4%	20.7%	14.5%	17.2%	19.0%	19.0%	13.0%	16.0%	16.0%	***16.0%***	***16.0%***	Income Tax Rate	***16.0%***
13.9%	18.0%	19.4%	19.4%	19.6%	19.3%	19.7%	19.2%	20.9%	23.5%	***24.3%***	***25.4%***	Net Profit Margin	***26.4%***
329.3	d111.9	225.1	117.9	d14.6	1.9	68.5	d558.6	d13.6	409.3	***375***	***435***	Working Cap'l ($mill)	***660***
- -	105.0	75.0	45.0	- -	- -	134.1	125.5	120.1	100.8	***50.0***	***100***	Long-Term Debt ($mill)	***150***
2101.3	2501.7	2788.3	3056.2	3134.0	3195.1	3275.6	3479.2	4083.0	4907.4	***5100***	***5290***	Shr. Equity ($mill) [D]	***5900***
10.2%	12.1%	13.4%	12.9%	14.0%	14.6%	15.8%	16.7%	16.8%	17.3%	***19.0%***	***21.0%***	Return on Total Cap'l	***24.0%***
10.2%	12.6%	13.7%	13.1%	14.0%	14.6%	16.4%	17.2%	17.2%	17.6%	***19.5%***	***21.5%***	Return on Shr. Equity	***24.5%***
10.2%	12.6%	13.7%	13.1%	14.0%	14.6%	16.4%	17.2%	17.2%	17.6%	***19.5%***	***21.5%***	Retained to Com Eq	***22.5%***
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	***Nil***	***Nil***	All Div'ds to Net Prof	***8%***

CAPITAL STRUCTURE as of 4/30/21
Total Debt $115.5 mill. **Due in 5 Yrs** $100.0 mill.
LT Debt $25.6 mill. **LT Interest** .7 mill. (1% of Cap'l)

Leases, Uncapitalized Annual rentals $52.4 mill.
No Defined Benefit Pension Plan

Common Stock 152,554,000 shs.

MARKET CAP: $43.3 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	4/30/21
Cash Assets	728.6	1235.7	1457.9
Receivables	553.9	780.7	612.3
Inventory (Avg Cst)	- -	- -	- -
Other	456.4	532.8	619.6
Current Assets	1738.9	2549.2	2689.8
Accts Payable	506.5	623.7	480.8
Debt Due	17.6	27.1	89.9
Other	1228.4	1489.1	1685.0
Current Liab.	1752.5	2139.9	2255.7

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	9.0%	11.0%	*8.5%*
"Cash Flow"	13.5%	15.0%	*11.0%*
Earnings	13.5%	12.5%	*13.0%*
Dividends	- -	- -	*Nil*
Book Value	8.0%	7.5%	*6.5%*

Fiscal Year Ends	QUARTERLY SALES ($mill.) [A] Jan.Per	Apr.Per	July Per	Oct.Per	Full Fiscal Year
2018	769.4	776.9	779.7	795.1	3121.1
2019	820.4	836.2	853.0	851.1	3360.7
2020	834.4	861.3	964.1	1025.5	3685.3
2021	970.3	1024.3	***1050***	***1035.4***	***4080***
2022	***1050***	***1105***	***1125***	***1170***	***4450***

Fiscal Year Ends	EARNINGS PER SHARE [A B] Jan.Per	Apr.Per	July Per	Oct.Per	Full Fiscal Year
2018	1.10	1.08	.95	.78	3.91
2019	1.08	1.16	1.18	1.15	4.56
2020	1.01	1.22	1.74	1.58	5.55
2021	1.52	1.70	***1.80***	***1.48***	***6.50***
2022	***1.75***	***1.85***	***1.90***	***1.95***	***7.45***

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017					
2018	NO CASH DIVIDENDS BEING PAID				
2019					
2020					
2021					

BUSINESS: Synopsys, Inc. provides software, intellectual property (IP), and services used to design integrated circuits (ICs) and electronic systems. It supplies the electronic design automation (EDA) software that engineers use to design and test ICs, aka chips. IP products are pre-designed circuits used as components of larger chip designs. Also provides software and hardware used to develop electronic systems, and technical support. 2020 Backlog, $4.3 bill.; foreign sales, 52%. Employs 15,036. Officers and directors own 1.6% of common stock; Vanguard Group, 11.1%; BlackRock, 8.3% (2/21 Proxy). Chmn./co-CEO: Aart De Geus; co-CEO: Chi-Foon Chan. Inc.: DE. Addr.: 690 E. Middlefield Road, Mountain View, CA 94043. Telephone: 650-584-5000. Internet: www.synopsys.com.

Synopsys is firing on all cylinders. The Mountain View, California-based provider of chip design software continues to benefit from strong global demand for semiconductors. The company's tools have become a must-have for chipmakers that want to create the most advanced circuit boards, typically those used in smartphones, data centers, and increasingly the automotive industry. During the first six months of fiscal 2021 (years end in October), share net and revenue increased 44% and 18%, respectively, as customers flooded Synopsys with orders for IP products and electronic design tools. The level of demand also appears to be sustainable—and not just pandemic-related—thanks to what we view as a permanent shift in the use of microprocessors in everything from computers and smartphones to home appliances and wearable health monitors.

The company hiked its guidance for fiscal 2021. Revenue is now expected to be between $4.035 billion and $4.085 billion, up from $4.000 billion-$4.050 billion previously. The revised outlook represents year-over-year growth of 9%-11%. Synopsys also boosted its EPS forecast range to $6.38-$6.45 (previously $6.23-$6.30) and its operating cash flow estimate to $1.275 billion (previously $1.25 billion).

Leadership has remained active on the acquisition front. During the last three months, Synopsys completed two deals. In May, it purchased MorethanIP for an undisclosed sum, bolstering its presence in the high-speed Ethernet solutions market. Then in June, the company announced it was acquiring Code Dx, a provider of software tools that automate and accelerate the discovery of product vulnerabilities. Both transactions fit with management's style of doing smaller, bolt-on deals that can augment a particular field Synopsys views as promising. Since 2015, the company has inked nearly 30 agreements, the largest being a $550 million transaction for Black Duck Software.

These shares are ranked 3 (Average) for year-ahead relative price performance, having slipped a couple of notches on our Timeliness scale since May. Long-term investors won't find much to like here either, as the equity currently offers lackluster 3- to 5-year appeal.

Daniel Henigson, CFA *August 6, 2021*

(A) Fiscal year ends October 31st. **(B)** Diluted earnings exclude nonrecurring gains/(losses): '05, (50¢); '06, (37¢); '07, (17¢); '08, (6¢); '09, (22¢); '10, 30¢; '11, 5¢; '12, (89¢); '13, (86¢); '14, (89¢); '15, (39¢); '16, (d25¢); '17, ($2.54); '18, ($1.09); '19, ($1.11); '20, ($1.28). Qlty. figures may not sum due to rounding. Next earnings report due mid-August. **(C)** In millions. **(D)** Includes intangibles. In 2020: $3,619.4 mill, or $23.72/sh.

Company's Financial Strength	A+
Stock's Price Stability	85
Price Growth Persistence	90
Earnings Predictability	100

TRIMAS CORP. NDQ-TRS

RECENT PRICE **30.01** | P/E RATIO **16.2** (Trailing: 18.3 Median: 16.0) | RELATIVE P/E RATIO **0.79** | DIV'D YLD **Nil** | **VALUE LINE**

TIMELINESS 5 Lowered 6/4/21
SAFETY 3 New 4/18/14
TECHNICAL 1 Raised 7/9/21
BETA .85 (1.00 = Market)

18-Month Target Price Range

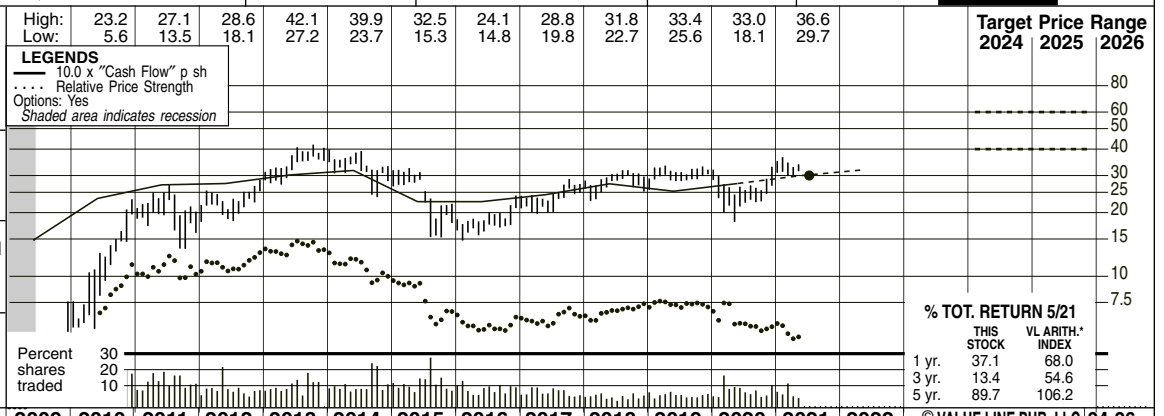
Low-High	Midpoint (% to Mid)
$24-$53	$39 (30%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	60	(+100%)	*19%*
Low	40	(+35%)	*8%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	45	67	70
to Sell	76	74	74
Hld's(000)	41979	42247	42283



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
- -	- -	31.98	30.38	23.71	27.67	31.32	32.33	30.99	33.11	19.06	17.44	17.88	19.27	16.24	17.83	*20.00*	*22.00*	Sales per sh	*28.20*
- -	- -	d2.77	d2.63	1.48	2.34	2.71	2.75	3.02	3.17	2.25	2.25	2.43	2.75	2.53	2.75	*3.05*	*3.20*	"Cash Flow" per sh	*4.50*
- -	- -	d4.69	d3.96	.18	1.24	1.53	1.69	2.06	1.92	1.29	1.26	1.40	1.75	1.45	1.57	*1.85*	*2.00*	Earnings per sh [A]	*2.90*
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	Div'ds Decl'd per sh	*.48*
- -	- -	1.94	.87	.41	.64	.94	1.17	.88	.76	.63	.69	.80	.55	.67	.94	*1.05*	*1.05*	Cap'l Spending per sh	*1.15*
- -	- -	6.24	1.63	1.83	3.30	5.02	7.71	12.21	13.04	12.07	10.98	11.90	13.63	15.65	13.53	*13.15*	*14.30*	Book Value per sh [B]	*20.25*
- -	- -	33.41	33.62	33.90	34.07	34.61	39.38	45.00	45.28	45.32	45.52	45.72	45.53	44.56	43.18	*43.00*	*42.00*	Common Shs Outst'g [C]	*39.00*
- -	- -	- -	- -	19.1	9.6	13.1	13.3	16.8	17.3	15.0	14.5	16.8	16.1	21.0	16.3	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*17.0*
- -	- -	- -	- -	1.27	.61	.82	.85	.94	.91	.76	.76	.84	.87	1.12	.85			Relative P/E Ratio	*.95*
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -			Avg Ann'l Div'd Yield	*1.0%*
1084.0	1272.9	1394.9	1499.1	864.0	794.0	817.7	877.1	723.5	770.0	*860*	*925*	Sales ($mill)	*1100*
15.8%	13.5%	13.2%	14.0%	16.8%	18.0%	20.9%	18.3%	19.7%	19.5%	*19.5%*	*19.0%*	Operating Margin	*20.5%*
40.4	44.3	50.6	56.5	43.5	44.9	46.9	44.0	46.5	49.8	*50.0*	*50.0*	Depreciation ($mill)	*60.0*
53.4	64.1	85.1	87.1	58.7	57.7	64.4	81.0	66.2	68.9	*80.5*	*85.0*	Net Profit ($mill)	*115*
36.2%	25.1%	18.8%	33.0%	30.0%	31.1%	40.5%	19.0%	20.5%	19.9%	*23.0%*	*23.0%*	Income Tax Rate	*23.0%*
4.9%	5.0%	6.1%	5.8%	6.8%	7.3%	7.9%	9.2%	9.1%	8.9%	*9.4%*	*9.2%*	Net Profit Margin	*10.5%*
207.3	190.6	253.5	248.7	173.8	175.5	189.4	270.1	314.2	214.6	*205*	*195*	Working Cap'l ($mill)	*240*
462.6	408.1	295.5	615.5	405.8	360.8	303.1	293.6	294.7	346.3	*400*	*350*	Long-Term Debt ($mill)	*320*
173.8	303.6	549.4	590.6	547.2	499.7	544.0	620.5	697.5	584.3	*565*	*600*	Shr. Equity ($mill)	*790*
11.7%	12.1%	11.2%	7.8%	6.9%	7.5%	8.5%	9.6%	7.4%	8.2%	*9.0%*	*9.5%*	Return on Total Cap'l	*11.0%*
30.7%	21.1%	15.5%	14.7%	10.7%	11.6%	11.8%	13.1%	9.5%	11.8%	*14.0%*	*14.5%*	Return on Shr. Equity	*14.5%*
30.7%	21.1%	15.5%	14.7%	10.7%	11.6%	11.8%	13.1%	9.5%	11.8%	*14.0%*	*14.5%*	Retained to Com Eq	*12.5%*
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	All Div'ds to Net Prof	*15%*

CAPITAL STRUCTURE as of 3/31/21
Total Debt $690.2 mill. **Due in 5 Yrs** $300.0 mill.
LT Debt $390.2 mill. **LT Interest** $15.0 mill.

(Total int. coverage: 6.9x) (40% of Cap'l)

Leases, Uncapitalized Annual rentals $8.1 mill.
Pension Assets-12/20 $36.1 mill.
Oblig. $40.8 mill.

Pfd Stock None
Common Stock 43,163,620 shares
as of 4/22/21
MARKET CAP: $1.3 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2019	2020	3/31/21
Cash Assets	172.5	74.0	421.1
Receivables	108.9	113.4	128.0
Inventory (FIFO)	132.7	149.4	151.8
Other	19.9	15.0	18.0
Current Assets	434.0	351.8	718.9
Accts Payable	72.7	69.9	76.7
Debt Due	- -	- -	300.0
Other	47.1	67.3	63.8
Current Liab.	119.8	137.2	440.5

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	-4.0%	-8.5%	*8.0%*
"Cash Flow"	21.0%	-1.0%	*9.0%*
Earnings	- -	-2.0%	*10.5%*
Dividends	- -	- -	*NMF*
Book Value	20.5%	3.0%	*6.0%*

Calendar	QUARTERLY SALES ($ mill.)[A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	217.1	224.9	223.8	211.3	877.1
2019	173.4	190.8	188.4	170.9	723.5
2020	182.8	199.5	199.5	188.2	770.0
2021	206.7	*220*	*220*	*213.3*	*860*
2022	*210*	*235*	*245*	*235*	*925*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.41	.48	.48	.38	1.75
2019	.36	.43	.36	.31	1.45
2020	.34	.43	.43	.38	1.57
2021	.40	*.55*	*.50*	*.40*	*1.85*
2022	*.45*	*.55*	*.55*	*.45*	*2.00*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017					
2018	NO CASH DIVIDENDS BEING PAID				
2019					
2020					
2021					

BUSINESS: TriMas Corporation is a global designer, manufacturer and distributor of engineered products for commercial, industrial, and consumer markets. The company operates through three reportable segments: Packaging (63% of '20 sales), Aerospace (22%), and Specialty Products (15%). In June of 2015, it spun off Cequent Asia Pacific and Cequent Americas segments. Has about 3,500 employees. Officers and directors own 0.8% of common shares; Vanguard, 8.8%; Champlain Investment Partners, 7.7%; Wellington Management, 7.4% (4/21 proxy). Chief Executive Officer & President: Thomas Amato. Incorporated: Delaware. Address: 39400 Woodward Avenue, Suite 130, Bloomfield Hills, Michigan 48304. Telephone: (248) 631-5450. Internet: www.trimascorp.com.

TriMas is dealing with conflicting market fundamentals. The pandemic had the effect of propping up sales within the Packaging segment (which produces closures, caps, and dispensers), thanks to the heightened need for cleaning and sanitization products. Meanwhile, COVID-19 stunted sales of fasteners in the Aerospace arena, as air travel diminished and business jet production was taken off line. Specialty Products (SP) also hit a snag, since lower oil & gas market activity hurt high-pressure steel cylinder sales.

The company has continued to post decent results despite uneven demand. First-quarter sales were up 13% year over year, to $207 million. Growth was, as expected, thanks to the Packaging segment (+32%). And, due to prior cost cutting, SP operating profitability took a faster-than-expected positive turn, even though segment sales were off by double digits. That helped earnings increase 15% from the previous year, to $0.40 a share.

Though there are still lingering effects of the pandemic, we see things changing a bit in the coming quarters. On the plus side, travel is starting to come back thanks to vaccine progress and the easing of COVID-19 restrictions. Eventually, that should translate into an aircraft production recovery. And oil prices have already surged higher, which tends to spur activity in the industry, a positive for SP sales. On the other hand, growth from the Packaging division will probably start to slow over the balance of 2021, relative to very strong 2020 comparisons, as pandemic-era tailwinds likely start to fade. On balance, these factors should be a moderate net positive for TriMas.

Guidance was fairly upbeat. Management called for second-quarter sales of $205 million-$223 million, and earnings expanding to $0.50-$0.57 per share. Those ranges assume a degree of year-over-year revenue growth from all three segments. We are adding $0.20 to our full-year 2021 bottom-line estimate, which now stands at $1.85 a share.

These shares are now untimely. TRS holds more appeal for long-term investors, based on our projections for increasing scale in the larger, higher-margin Packaging segment.

Jeffrey Hirt *July 9, 2021*

(A) Diluted earnings. Excludes nonrecurring gains (losses): '07, (90¢); '08, (11¢); '09, 19¢; '11, (7¢); '12, (80¢); '13, (25¢); '14, (46¢); '15, (29¢); '16, ($2.14); '17, (73¢); '18, 5¢; '19, (9¢); '20, ($3.40); '21, (10¢). May not sum due to rounding. Next earnings report due late July.
(B) Includes intangibles. At 12/31/20: $510.2 million, $11.81/sh.
(C) In millions.

Company's Financial Strength	B+
Stock's Price Stability	80
Price Growth Persistence	75
Earnings Predictability	80

TETRA TECH, INC. NDQ-TTEK

RECENT PRICE **135.88** | P/E RATIO **34.8** (Trailing: 37.2 / Median: 18.0) | RELATIVE P/E RATIO **1.82** | DIV'D YLD **0.6%** | VALUE LINE **414**

TIMELINESS 3 Lowered 6/11/21
SAFETY 3 New 12/18/98
TECHNICAL 4 Lowered 8/6/21
BETA .95 (1.00 = Market)

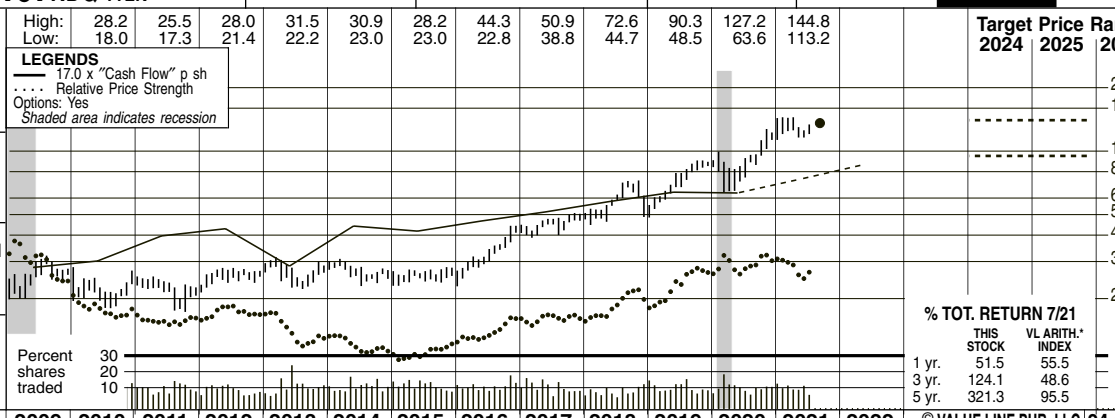
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$87-$183 $135 (0%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	140	(+5%)	2%
Low	95	(-30%)	-7%

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	126	161	149
to Sell	169	181	203
Hld's(000)	44704	45729	46258



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
15.76	16.62	17.35	20.80	22.63	23.65	28.68	31.68	31.57	29.72	28.94	33.82	36.40	39.76	43.79	43.66	*47.75*	*51.90*	Revenues per sh [A C]	*68.40*
.41	.88	1.03	1.33	1.66	1.78	2.33	2.53	1.68	2.60	2.46	2.74	3.03	3.40	3.76	3.73	*4.45*	*5.05*	"Cash Flow" per sh	*7.85*
.12	.66	.79	1.02	1.22	1.23	1.43	1.63	.70	1.66	1.66	1.88	2.14	2.64	3.17	3.26	*3.75*	*4.00*	Earnings per sh [A B]	*6.50*
- -	- -	- -	- -	- -	- -	- -	- -	- -	.14	.30	.34	.38	.44	.54	.64	*.77*	*.85*	Div'ds Decl'd per sh [E]	*1.10*
.17	.20	.23	.30	.32	.35	.30	.39	.43	.31	.41	.21	.17	.18	.30	.23	*.30*	*.35*	Cap'l Spending per sh	*.40*
5.34	6.15	7.12	8.54	10.55	12.11	13.68	15.96	15.56	16.17	14.42	15.24	16.62	17.47	18.13	19.28	*20.35*	*22.00*	Book Value per sh	*29.85*
57.05	57.68	58.39	59.88	61.26	61.76	62.50	63.84	64.13	62.59	59.38	57.04	55.87	55.35	54.57	53.80	*53.00*	*52.00*	Common Shs Outst'g [D]	*47.50*
NMF	25.9	24.5	22.1	19.7	18.6	15.9	15.0	37.7	16.5	15.4	15.6	19.9	20.6	21.0	25.9	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*18.0*
NMF	1.40	1.30	1.33	1.31	1.18	1.00	.95	2.12	.87	.78	.82	1.00	1.11	1.12	1.33			Relative P/E Ratio	*1.00*
- -	- -	- -	- -	- -	- -	- -	- -	- -	.5%	1.2%	1.2%	.9%	.8%	.8%	.8%			Avg Ann'l Div'd Yield	*.9%*
1792.3	2022.2	2024.8	1859.9	1718.7	1929.2	2034.0	2200.7	2389.6	2348.6	*2530*	*2700*	Revenues ($mill) [A C]	*3250*
11.3%	10.1%	6.4%	8.0%	11.7%	11.5%	11.5%	12.0%	10.9%	11.3%	*12.8%*	*13.5%*	Operating Margin	*15.5%*
55.7	56.9	62.6	54.5	44.2	45.6	45.8	38.6	28.8	24.6	*40.0*	*55.0*	Depreciation ($mill)	*65.0*
90.0	104.4	45.0	108.3	101.8	110.9	123.6	149.3	176.5	176.0	*200*	*210*	Net Profit ($mill)	*310*
33.8%	34.9%	34.0%	24.7%	31.9%	32.6%	30.3%	27.2%	19.1%	23.5%	*26.0%*	*25.0%*	Income Tax Rate	*25.0%*
5.0%	5.2%	2.2%	5.8%	5.9%	5.7%	6.1%	6.8%	7.4%	7.5%	*7.8%*	*7.7%*	Net Profit Margin	*9.5%*
307.4	355.5	388.5	394.7	373.4	454.3	504.3	432.3	309.8	206.3	*225*	*240*	Working Cap'l ($mill)	*310*
144.9	81.0	203.4	192.8	181.0	331.5	341.3	264.7	263.9	242.4	*265*	*280*	Long-Term Debt ($mill)	*265*
854.7	1019.0	997.8	1012.1	856.3	869.3	928.5	967.0	989.3	1037.3	*1080*	*1145*	Shr. Equity ($mill)	*1420*
9.3%	9.8%	4.1%	9.4%	10.2%	9.7%	10.2%	12.8%	14.7%	14.3%	*15.5%*	*15.5%*	Return on Total Cap'l	*19.5%*
10.5%	10.2%	4.5%	10.7%	11.9%	12.8%	13.3%	15.4%	17.8%	17.0%	*18.5%*	*18.0%*	Return on Shr. Equity	*22.0%*
10.5%	10.2%	4.5%	9.8%	9.8%	10.5%	11.0%	12.9%	14.8%	13.6%	*14.5%*	*14.5%*	Retained to Com Eq	*18.0%*
- -	- -	- -	8%	18%	18%	18%	16%	17%	20%	*21%*	*21%*	All Div'ds to Net Prof	*17%*

CAPITAL STRUCTURE as of 6/27/21
Total Debt $250.3 mill. **Due in 5 Yrs** $250.3 mill.
LT Debt $234.0 mill. **LT Interest** $12.0 mill.
(Total int. earned 19.2x) (17% of Cap'l)

Leases, Uncapitalized Annual rentals $75.1 mill.

Pension Assets-9/20: $35.1 mill.
Oblig $35.0 mill.

Common Stock 54,071,184 shs.
as of 7/19/21

MARKET CAP: $7.3 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/27/21
Cash Assets	120.7	157.5	234.3
Receivables	768.8	649.1	664.4
Other	190.3	193.2	207.7
Current Assets	1079.8	999.8	1106.4
Accts Payable	206.6	111.8	132.6
Debt Due	12.6	49.3	16.3
Other	550.8	632.4	662.4
Current Liab.	770.0	793.5	811.3

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	6.5%	7.0%	*8.5%*
"Cash Flow"	8.5%	10.0%	*13.5%*
Earnings	10.0%	17.5%	*13.5%*
Dividends	- -	30.0%	*12.5%*
Book Value	6.0%	3.5%	*8.5%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A C] Dec.Per.	Mar.Per.	Jun.Per.	Sep.Per.	Full Fiscal Year
2018	544.8	532.8	570.4	552.7	2200.7
2019	553.3	585.4	623.2	627.7	2389.6
2020	614.0	584.5	560.3	589.8	2348.6
2021	605.2	599.8	638.0	*687.0*	*2530*
2022	*640*	*670*	*675*	*715*	*2700*

Fiscal Year Ends	EARNINGS PER SHARE [A B] Dec.Per.	Mar.Per.	Jun.Per.	Sep.Per.	Full Fiscal Year
2018	.65	.54	.71	.75	2.64
2019	.70	.70	.89	.88	3.17
2020	.84	.73	.78	.91	3.26
2021	.96	.83	.95	*1.01*	*3.75*
2022	*1.05*	*.90*	*.95*	*1.10*	*4.00*

Calendar	QUARTERLY DIVIDENDS PAID[E] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.09	.10	.10	.10	.39
2018	.10	.12	.12	.12	.46
2019	.12	.15	.15	.15	.57
2020	.15	.17	.17	.17	.66
2021	.17	.20			

BUSINESS: Tetra Tech, Inc. is an international provider of engineering and management consulting services to public agencies and private corporations. The company operates in the water, environment, infrastructure, resource management, energy, and global development arenas. Revenue breakdown for 2020: federal government, 33%; U.S. commercial, 22%; International, 30%; State & Local Government, 15%. Employees: About 20,000. Officers & directors own 1.7% of common stock; BlackRock, Inc., 12.4%; Vanguard Group, 10.0%; (1/21 proxy). Chairman, CEO, and President: Dan Batrack. Incorporated: Delaware. Address: 3475 East Foothill Boulevard, Pasadena, California 91107. Telephone: 626-351-4664. Internet: www.tetratech.com.

Tetra Tech recorded improved fiscal third-quarter results (quarter ended June 27th). Revenues expanded 14% year over year to $638 million, aided by higher demand for the company's services. State and local revenues increased 31% due to more municipal water and disaster response projects while strengthening international operations helped the top line. Margins expanded during the quarter, thanks to data analytics and design services sales, while the company benefited from some economies of scale. These factors allowed earnings to reach $0.95 per share during the quarter. The company remains on track for a solid performance in the final quarter of fiscal 2021, as it will likely convert a portion of its $3.25 billion in projects backlog. It should also gain from higher demand from governments as te health crisis abates. Overall, these factors ought to enable earnings to rise to $1.01 per share in the period.

The long-term outlook is strong here. The company ought to gain from further conversion of its backlog, while U.S. federal and municipal agencies will likely sign other contracts in the coming quarters. The U.S. Army Corps of Engineers has increased its business with Tetra, while other federal clients, including the Department of Transportation, will probably sign new deals. Should the infrastructure bill before Congress be signed by the President, the amount of work could have further upside. Tetra also recently purchased Hoare Lea, which will bolster its business that focuses on reducing the carbon footprint of buildings. A higher top line will likely improve gross margins as more projects utilize the company's high-end offerings. Meanwhile, administrative costs will probably expand at a slower pace. This will likely allow earnings to rise to $4.00 per share in 2022 and $6.50 per share by 2024-2026.

Shares of Tetra Tech are neutrally ranked for Timeliness. The stock is trading near the high end of our 3- to 5-year Target Price Range, leaving little upside for new investors. The dividend yield is below average. Though the prospects for earnings growth are solid, these appear priced into the stock. Interested investors should wait for a dip in price.

John E. Seibert III *August 20, 2021*

(A) Fisc. year ends around Sept. 30th. **(B)** Dil. egs. Excl. extra. and nonrec. gains/(losses): '05, ($1.87); '06 (3¢); '09, 21¢; '10, 1¢; '15, ($1.01); '16, (26¢); '17, 9¢; '18, (22¢); '19, (33¢); '20, (10¢). Results may not sum due to rounding. Next egs. report due early November. **(C)** Reported rev's. net of sub. costs. Rev's. from 2005 on excl. wireless comm's. unit. Revenue before 2006 do not reflect the elimination of inter-segment revenue. **(D)** In mill. **(E)** Div. initiated June 2014. Paid by early March. June, Sept., and mid-Dec.

Company's Financial Strength	B++
Stock's Price Stability	80
Price Growth Persistence	60
Earnings Predictability	95

WATERS CORP. NYSE-WAT

RECENT PRICE **388.85** | P/E RATIO **36.6** (Trailing: 39.4 Median: 22.0) | RELATIVE P/E RATIO **1.91** | DIV'D YLD **Nil** | **VALUE LINE**

TIMELINESS 3 Lowered 7/2/21
SAFETY 2 Raised 5/27/11
TECHNICAL 4 Lowered 7/23/21
BETA .95 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$260-$484 $372 (-5%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	425	(+10%)	*2%*
Low	315	(-20%)	*-5%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	209	248	257
to Sell	254	239	255
Hld's(000)	55190	54954	53938

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
11.00	12.63	14.59	16.09	15.92	17.89	20.38	20.62	22.45	23.93	25.07	27.09	29.10	33.10	38.45	37.96	*44.00*	*45.45*	Sales per sh	*50.00*
2.61	2.77	3.18	4.00	4.04	4.84	5.50	5.58	5.76	5.75	6.31	7.16	8.38	9.34	10.32	9.47	*12.40*	*12.90*	"Cash Flow" per sh	*17.60*
1.99	2.25	2.62	3.25	3.34	4.06	4.69	5.19	5.20	5.07	5.65	6.41	7.49	8.05	8.69	8.36	*10.60*	*11.05*	Earnings per sh [A]	*15.80*
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	*Nil*	*Nil*	Div'ds Decl'd per sh	*Nil*
.48	.51	.60	.71	1.00	.68	.94	1.17	1.40	1.10	1.23	1.19	1.08	1.31	2.62	2.77	*1.60*	*1.65*	Cap'l Spending per sh	*2.00*
2.69	3.57	5.80	6.75	9.02	11.64	13.50	16.42	20.79	22.79	25.27	28.77	28.16	21.44	d3.46	3.73	*14.25*	*18.90*	Book Value per sh [B]	*63.90*
105.34	101.37	100.98	97.89	94.12	91.85	90.83	89.39	84.82	83.15	81.47	80.02	79.34	73.12	62.59	62.31	*62.50*	*62.50*	Common Shs Outst'g [C]	*62.50*
21.1	19.6	24.3	17.7	14.4	16.7	17.9	16.0	18.8	21.1	22.3	21.7	23.2	24.4	25.4	25.0	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*23.5*
1.12	1.06	1.29	1.07	.96	1.06	1.12	1.02	1.06	1.11	1.12	1.14	1.17	1.32	1.35	1.28			Relative P/E Ratio	*1.30*
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			Avg Ann'l Div'd Yield	*Nil*
1851.2	1843.6	1904.2	1989.3	2042.3	2167.4	2309.1	2419.9	2406.6	2365.4	*2750*	*2840*	Sales ($mill)	*3125*
32.7%	30.9%	29.7%	28.9%	30.7%	31.2%	34.0%	33.0%	31.7%	30.5%	*37.0%*	*38.0%*	Operating Margin	*37.5%*
66.4	37.4	38.2	46.4	45.3	51.7	61.5	58.0	53.8	68.7	*115*	*120*	Depreciation ($mill)	*135*
433.0	461.4	450.0	431.6	469.1	521.5	603.7	625.2	592.2	521.6	*660*	*685*	Net Profit ($mill)	*965*
15.0%	5.4%	8.2%	12.0%	13.4%	13.1%	11.8%	14.5%	12.7%	14.6%	*14.5%*	*14.5%*	Income Tax Rate	*14.5%*
23.4%	25.0%	23.6%	21.7%	23.0%	24.1%	26.1%	25.8%	24.6%	22.1%	*24.0%*	*24.1%*	Net Profit Margin	*31.8%*
1340.2	1753.5	2068.8	2272.1	2649.4	3115.2	3663.9	2214.3	721.2	596.0	*705*	*735*	Working Cap'l ($mill)	*735*
700.0	1045.0	1190.0	1240.0	1493.0	1702.0	1897.5	1148.2	1580.8	1206.5	*1555*	*1555*	Long-Term Debt ($mill)	*1405*
1226.6	1467.4	1763.2	1894.7	2058.9	2301.9	2233.8	1567.3	d216.3	232.1	*890*	*1180*	Shr. Equity ($mill)	*3995*
22.9%	18.6%	15.7%	14.2%	13.7%	13.6%	14.9%	23.9%	45.2%	38.0%	*36.5%*	*25.0%*	Return on Total Cap'l	*18.0%*
35.3%	31.4%	25.5%	22.8%	22.8%	22.7%	27.0%	39.9%	39.9%	NMF	*74.0%*	*58.0%*	Return on Shr. Equity	*24.0%*
35.3%	31.4%	25.5%	22.8%	22.8%	22.7%	27.0%	39.9%	39.9%	NMF	*74.0%*	*58.0%*	Retained to Com Eq	*24.0%*
--	--	--	--	--	--	--	--	--	--	*Nil*	*Nil*	All Div'ds to Net Prof	*Nil*

CAPITAL STRUCTURE as of 3/31/21
Total Debt $1703.1 mill. **Due in 5 Yrs** $250.0 mill.
LT Debt $1601.1 mill **LT Interest** $49.7 mill.
(Total interest coverage: 16.6x) (87% of Capital)
Leases, Uncapitalized Annual rentals $29.6 mill.
Pension Assets-12/20 $110.1 mill.
Oblig. $145.0 mill.

Preferred Stock None

Common Stock 62,700,498 shs.
as of 4/4/21

MARKET CAP: $24.4 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	3/31/21
Cash Assets	337.1	443.1	809.8
Receivables	587.7	573.3	550.7
Inventory	320.6	304.3	328.0
Other	67.1	80.3	79.5
Current Assets	1312.5	1401.0	1768.0
Accts Payable	49.0	72.2	81.5
Debt Due	100.4	150.0	100.2
Other	441.9	582.8	603.5
Current Liab.	591.3	805.0	785.2

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	8.0%	9.0%	*4.5%*
"Cash Flow"	8.5%	10.5%	*5.5%*
Earnings	9.0%	9.5%	*6.0%*
Dividends	--	--	*Nil*
Book Value	-2.5%	-20.5%	*7.5%*

Calendar	QUARTERLY SALES ($ mill.) Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Year
2018	530.7	596.2	578.0	715.0	2419.9
2019	513.9	599.2	577.3	716.2	2406.6
2020	464.9	520.0	593.8	786.7	2365.4
2021	608.5	681.6	*640*	*819.9*	*2750*
2022	*620*	*675*	*730*	*815*	*2840*

Calendar	EARNINGS PER SHARE [A] Mar.Per	Jun.Per	Sep.Per	Dec.Per	Full Year
2018	1.59	1.95	1.92	2.59	8.05
2019	1.51	2.08	2.07	3.12	8.69
2020	.86	1.98	2.03	3.49	8.36
2021	2.37	2.69	*2.30*	*3.24*	*10.60*
2022	*2.40*	*2.40*	*2.60*	*3.65*	*11.05*

Calendar	QUARTERLY DIVIDENDS PAID Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017					
2018	NO CASH DIVIDENDS BEING PAID				
2019					
2020					
2021					

BUSINESS: Waters Corp. manufactures, distributes, and services high-performance and ultra-performance liquid chromatography (HPLC and UPLC) and mass spectrometry systems, chemistry consumables, and related products through its Waters division (90% of '20 sales) and thermal analysis, rheometry, and calorimetry instruments through its TA division (10%). HPLC and UPLC are used to identify and analyze the components of a variety of chemicals and materials. Acquired Thar Instruments 2/09. Vanguard, 10.7% of common stock; MFS Co. 6.4%; BlackRock, 7.6%; Off. & dir., 1.1% (4/21 proxy). Chairman: Flemming Ornskov, MD; President & CEO: Udit Batra, Ph.D. Inc.: DE. Address: 34 Maple Street, Milford, MA 01757. Tel: 508-482-2314. Internet: www.waters.com.

Waters reported strong second-quarter results. Net sales increased 31.1%, to $681.6 million and were well above our estimate of $625 million. Net income of $167.3 million was up 36.1% year to year, supporting diluted earnings per share of $2.69, well above our call of $2.25 per diluted share and the previous-year results. Performance was even better than the first quarter, when all regions displayed double-digit growth. Growth in China was 68%, while growth elsewhere was 29%. Sales in Asia increased 29.7% to $269.9 million, or 40% of total revenues, even as this metric in the Americas increased a more modest 28.7%, to $224.9 million (33% of the total). Sales in Europe of $186.8 million (27%) were up by 36.4%. The pharmaceutical market was especially strong, generating a sales increase of 34.0%, to $416.7 million, or 68% of the total. Reflecting demand deferred by the pandemic and new product introductions, sales of Waters' instruments increased 43.1%, to $314.5 million, while consumables were up 17.4% to $224.9 million. **CEO Dr. Udit Batra has effected a turn around of the company, since his appointment a year ago.** Although Waters had leading and innovative products, it was underperforming peers and losing some market share. Dr. Batra has inspired management to execute on its innovation, initiating replacement of older tools in its large installed base of both liquid chromatography and mass spectrometry systems. The Waters segment, which offers both tools, increased sales in the second quarter 30.4%, to $607.3 million (89% of the total). He has also led a revamp of the company's website in an effort to increase its e-commerce business from the 20% level to the industry norm of 50%. His success is evident in the company's strong performance. To reflect this, we have increased our share-net estimates for 2021 and 2022 by $0.15 and $0.50, respectively, to $10.60 and $11.05. Our sales estimates, in turn, are $2.75 billion, and $2.84 billion.

Ranked 3 (Average) for Timeliness, Waters shares have below average 3- to 5-year appreciation potential. Still, given the pace of changes under way, improved performance will likely continue.

Glenn Pierr Johnson *August 13, 2021*

(A) Diluted earnings. Excludes non-recurring gains (losses): '04, ($0.10); '05, ($0.25); '06, ($0.12); '08 ($0.04); '18 ($0.40). Figures may not sum due to rounding. Next earnings report due late October.
(B) Includes intangibles. In 2020: $703.0 mill., $11.28/sh.
(C) In millions.

Company's Financial Strength	A
Stock's Price Stability	90
Price Growth Persistence	80
Earnings Predictability	100

ENCORE WIRE CORP. NYSE-WIRE

RECENT PRICE **85.15** | P/E RATIO **5.5** (Trailing: 6.5 Median: 17.0) | RELATIVE P/E RATIO **0.30** | DIV'D YLD **0.1%** | **VALUE LINE**

TIMELINESS 3 Lowered 12/18/20
SAFETY 3 New 6/26/20
TECHNICAL 3 Raised 9/17/21
BETA .95 (1.00 = Market)

18-Month Target Price Range

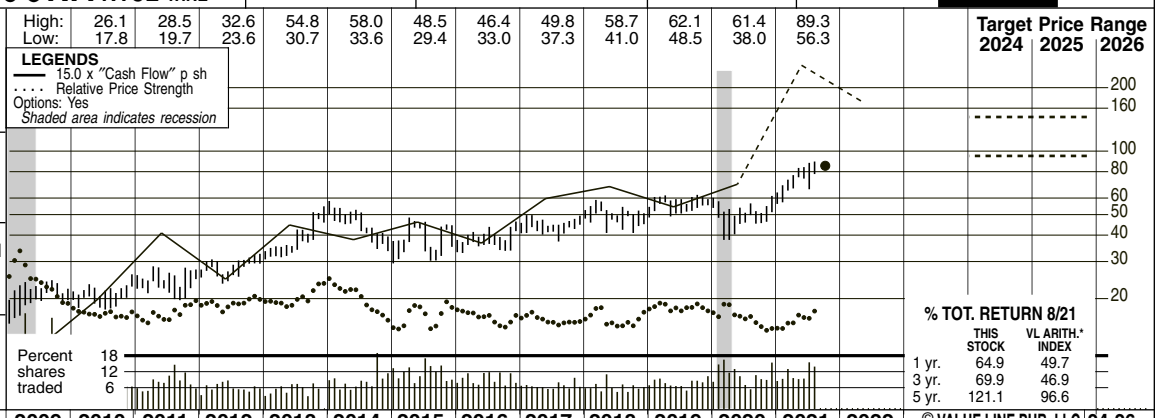
Low-High	Midpoint (% to Mid)
$60-$120	$90 (5%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	145	(+70%)	*14%*
Low	95	(+10%)	*3%*

Institutional Decisions

	4Q2020	1Q2021	2Q2021
to Buy	85	75	79
to Sell	90	85	90
Hld's(000)	18420	18366	18280



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
29.23	53.67	45.35	47.01	28.05	39.21	50.39	51.90	55.96	56.32	49.19	45.37	55.89	61.72	60.97	62.12	*112.20*	*111.10*	Sales per sh	*130.00*
2.40	5.48	1.71	2.34	.75	1.32	2.73	1.65	2.98	2.54	3.08	2.44	3.97	4.53	3.63	4.65	*17.00*	*11.20*	"Cash Flow" per sh	*9.60*
2.13	4.86	1.30	1.70	.16	.73	2.14	.91	2.26	1.78	2.29	1.63	3.21	3.74	2.77	3.68	*16.00*	*10.00*	Earnings per sh A	*8.00*
- -	- -	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	*.08*	*.08*	Div'ds Decl'd per sh	*.12*
.66	.96	1.09	.78	.99	.94	1.07	1.95	2.15	2.14	2.11	2.19	1.04	1.25	2.51	4.19	*5.35*	*7.90*	Cap'l Spending per sh	*2.95*
8.12	14.05	13.59	16.94	16.97	17.55	19.54	19.85	22.06	23.80	26.04	27.64	30.79	34.51	37.26	40.75	*56.15*	*64.80*	Book Value per sh B	*84.80*
25.94	23.28	26.12	23.00	23.16	23.22	23.43	20.66	20.70	20.72	20.69	20.74	20.83	20.88	20.91	20.56	*20.50*	*20.25*	Common Shs Outst'g C	*20.00*
6.9	6.7	18.9	11.0	NMF	28.6	11.1	31.2	17.1	25.4	16.8	23.4	13.7	13.4	20.2	13.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*15.0*
.37	.36	1.00	.66	NMF	1.82	.70	1.99	.96	1.34	.85	1.23	.69	.72	1.08	.71			Relative P/E Ratio	*.85*
- -	- -	.3%	.4%	.4%	.4%	.3%	.3%	.2%	.2%	.2%	.2%	.2%	.2%	.1%	.2%			Avg Ann'l Div'd Yield	*.1%*
1180.5	1072.3	1158.3	1167.0	1017.6	940.8	1164.3	1288.7	1275.0	1276.9	*2300*	*2250*	Sales ($mill)	*2600*
7.6%	4.1%	7.4%	6.1%	8.7%	7.2%	8.2%	9.0%	7.0%	9.2%	*19.2%*	*12.5%*	Operating Margin	*8.7%*
13.7	14.3	14.8	15.5	16.1	16.8	15.7	16.5	17.7	19.5	*21.0*	*24.0*	Depreciation ($mill)	*32.0*
50.1	19.8	46.9	37.1	47.6	33.8	67.0	78.2	58.1	76.1	*330*	*200*	Net Profit ($mill)	*160*
34.2%	32.6%	33.6%	33.9%	34.2%	33.4%	16.1%	23.1%	23.2%	23.0%	*23.0%*	*23.0%*	Income Tax Rate	*23.0%*
4.2%	1.8%	4.1%	3.2%	4.7%	3.6%	5.8%	6.1%	4.6%	6.0%	*14.3%*	*9.0%*	Net Profit Margin	*6.2%*
334.5	261.5	282.2	286.0	307.5	325.5	375.4	445.6	473.9	461.5	*900*	*800*	Working Cap'l ($mill)	*970*
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	*Nil*	*Nil*	Long-Term Debt ($mill)	*Nil*
457.7	410.2	456.6	493.2	538.6	573.1	641.3	720.5	779.1	837.7	*1150*	*1300*	Shr. Equity ($mill)	*1700*
11.0%	4.8%	10.3%	7.5%	8.8%	5.9%	10.5%	10.8%	7.5%	9.1%	*28.5%*	*15.5%*	Return on Total Cap'l	*9.5%*
11.0%	4.8%	10.3%	7.5%	8.8%	5.9%	10.5%	10.8%	7.5%	9.1%	*28.5%*	*15.5%*	Return on Shr. Equity	*9.5%*
10.5%	4.4%	9.9%	7.2%	8.5%	5.6%	10.2%	10.6%	7.2%	8.9%	*28.5%*	*15.5%*	Retained to Com Eq	*9.5%*
4%	9%	4%	4%	3%	5%	2%	2%	3%	2%	*2%*	*1%*	All Div'ds to Net Prof	*2%*

CAPITAL STRUCTURE as of 6/30/21
Total Debt None
ST Debt None

Leases, Uncapitalized: None

No Defined Benefit Pension Plan
Pfd Stock None
Common Stock 20,649,395 shs.
as of 7/28/21

MARKET CAP: $1.7 billion (Mid-Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	231.0	183.1	157.9
Receivables	223.1	275.8	574.2
Inventory (FIFO)	89.7	92.3	87.9
Other	5.5	3.9	3.3
Current Assets	549.2	555.1	823.3
Accts Payable	40.5	56.7	77.5
Debt Due	- -	- -	- -
Other	34.8	36.9	100.6
Current Liab.	75.3	93.6	178.1

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	5.0%	2.5%	*13.5%*
"Cash Flow"	11.5%	8.5%	*14.5%*
Earnings	14.5%	10.0%	*15.5%*
Dividends	- -	- -	- -
Book Value	8.0%	9.5%	*14.5%*

Calendar	QUARTERLY SALES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	291.5	336.8	340.7	319.7	1288.7
2019	314.7	336.9	321.2	302.2	1275.0
2020	302.8	253.6	339.7	380.8	1276.9
2021	444.1	744.4	*580*	*531.5*	*2300*
2022	*525*	*650*	*575*	*500*	*2250*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.55	.86	1.13	1.20	3.74
2019	.64	.85	.78	.50	2.77
2020	.89	.60	1.02	1.17	3.68
2021	1.99	8.82	*3.00*	*2.19*	*16.00*
2022	*1.50*	*5.00*	*2.00*	*1.50*	*10.00*

Calendar	QUARTERLY DIVIDENDS PAID C Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.02	.02	.02	.02	.08
2018	.02	.02	.02	.02	.08
2019	.02	.02	.02	.02	.08
2020	.02	.02	.02	.02	.08
2021	.02	.02	.02		

BUSINESS: Encore Wire Corp. manufactures copper electrical building wire and cable products. The company's products include: NM-B cable, the non-metallic sheathed cable used as interior wiring in homes, apartments, and manufactured housing; UF-B cable, the underground feeder cable used to conduct power underground to outside lighting remote from buildings; and THWN-2 cables, which are used as feeder, circuit, and branch wiring in commercial buildings. Has 1,289 employees as of 12/20. Officers & Dir.'s own 3.4% of stock; BlackRock 15.4%; Vanguard 9.9%; Dimensional Fund Adv. 7.8% (as of 4/21 proxy). Inc: DE. Chairman, Pres. and CEO: Daniel Jones. Addr.: 1329 Millwood Road, McKinney, TX 75069. Tel.: (972) 562-9473. Internet: www.encorewire.com.

Encore Wire earned more in its June quarter than in any entire year in its history. Second-quarter sales increased by $300 million sequentially, and earnings per share of $8.82 obliterated our $1.50-per-share-estimate, which was more or less in line with the Wall Street consensus. The quarter did not contain any unique income contributions, or one-time tax events. Rather, the upside was mostly due to the recent expansion of its lone operating facility. The additional production ramped up quickly, helping copper unit volumes to rise 15% sequentially.

Price increases are offsetting higher input costs. Copper costs per pound climbed 74% in the quarter, but selling prices per pound jumped 234%. As a result, gross margins ballooned to 37.3% during the June period. This figure is usually in the mid to high teens. Going forward, we think product spreads will narrow, but Encore's ability to execute during the pandemic likely helped bolster its reputation with national distributors. High order fill rates should help it maintain its market-leading position.

Capital expenditures will rise. A debt free balance sheet and sudden cash flow wave will allow the second phase of its expansion to be accelerated. About $310 million will be spent over this year and next.

We've raised our share-net estimates for this year and next by $10.15 and $5.00, respectively. Our confidence in our new projections hinges mostly on sustained construction activity.

Investors that believe the construction boom will run longer than current consensus should consider this stock. Record production volumes in the June interim, hot construction markets, and a volatile copper market have caused observers to suddenly question what WIRE's peak- and mid-cycle earnings are. We have raised our long-term earnings forecast to $8 per share from $6 per share, but assigning a multiple is tricky. For instance, in 2006, the last time the construction market was this torrid, WIRE's relative P/E multiple shriveled to .36. Obviously, the company has larger capacity and is more efficient, but its success hinges on the health of domestic construction markets.

Charles Moran CFA *September 24, 2021*

(A) Diluted earnings per share. **(B)** Next earnings report due in late October.
(C) Dividends historically paid in January, April, July, October.

Company's Financial Strength	A
Stock's Price Stability	75
Price Growth Persistence	60
Earnings Predictability	50

WEST PHARM. NYSE-WST

RECENT PRICE 415.23 | P/E RATIO NMF (Trailing: NMF Median: 35.0) | RELATIVE P/E RATIO NMF | DIV'D YLD 0.2% | VALUE LINE

TIMELINESS 4 Lowered 5/28/21
SAFETY 2 Raised 11/22/13
TECHNICAL 5 Lowered 7/9/21
BETA .80 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$266-$567 $417 (0%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	435	(+5%)	2%
Low	320	(-25%)	-6%

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	289	306	291
to Sell	256	252	271
Hld's(000)	67658	68120	67943

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
High:	22.4	24.0	28.0	50.6	55.3	64.6	86.5	103.4	125.1	152.1	305.0	416.7						
Low:	16.4	17.8	18.7	27.3	39.1	48.7	53.9	78.0	82.7	93.1	124.5	253.9						
Sales per sh	11.98	13.88	15.79	16.07	16.00	16.59	17.69	19.02	19.44	19.91	19.36	20.64	21.64	23.18	24.83	29.01	*37.55*	*37.65*
"Cash Flow" per sh	1.58	1.79	2.15	2.18	2.13	2.19	2.34	2.61	2.81	2.97	2.51	3.17	3.32	4.20	4.66	6.15	*9.65*	*9.25*
Earnings per sh [A]	.70	.97	1.19	1.19	1.06	1.05	1.17	1.38	1.57	1.75	1.30	1.91	1.99	2.74	3.21	4.57	*8.00*	*7.50*
Div'ds Decl'd per sh [B]■	.23	.25	.27	.29	.31	.33	.35	.37	.39	.41	.46	.50	.54	.58	.62	.66	*.70*	*.84*
Cap'l Spending per sh	.93	1.37	2.00	2.12	1.59	1.07	1.42	1.97	2.16	1.68	1.82	2.33	1.77	1.41	1.71	2.36	*3.25*	*2.00*
Book Value per sh [C]	5.71	6.30	7.51	7.45	8.77	9.39	9.72	10.94	12.88	13.40	14.16	15.29	17.32	18.84	21.23	25.06	*32.45*	*34.25*
Common Shs Outst'g [D]	58.43	65.80	64.60	65.40	66.00	66.60	67.40	66.60	70.40	71.40	72.30	73.10	73.90	74.10	74.10	74.00	*74.00*	*73.00*
Avg Ann'l P/E Ratio	19.0	19.6	18.8	18.0	17.1	18.1	17.8	17.2	23.7	26.1	43.8	38.1	45.6	37.0	39.5	49.1		
Relative P/E Ratio	1.01	1.06	1.00	1.08	1.14	1.15	1.12	1.09	1.33	1.37	2.21	2.00	2.29	2.00	2.10	2.52		
Avg Ann'l Div'd Yield	1.7%	1.3%	1.2%	1.4%	1.7%	1.7%	1.7%	1.6%	1.0%	.9%	.8%	.7%	.6%	.6%	.5%	.3%		
Sales ($mill)	1192.3	1266.4	1368.4	1421.4	1399.8	1509.1	1599.1	1717.4	1839.9	2146.9	*2780*	*2750*						
Operating Margin	16.2%	16.8%	18.1%	18.8%	19.6%	20.7%	20.3%	20.2%	21.7%	24.0%	*29.5%*	*28.5%*						
Depreciation ($mill)	75.7	76.9	85.2	84.8	86.1	88.1	94.3	104.4	103.4	109.1	*115*	*125*						
Net Profit ($mill)	82.0	97.1	112.3	127.1	95.6	143.6	150.7	206.9	241.7	346.2	*600*	*550*						
Income Tax Rate	24.8%	27.3%	27.3%	27.9%	22.7%	28.7%	36.4%	17.2%	20.2%	18.1%	*16.0%*	*17.5%*						
Net Profit Margin	6.9%	7.7%	8.2%	8.9%	6.8%	9.5%	9.4%	12.0%	13.1%	16.1%	*21.6%*	*20.0%*						
Working Cap'l ($mill)	228.8	295.5	413.8	406.8	359.4	400.9	464.0	610.7	717.1	870.3	*1250*	*1250*						
Long-Term Debt ($mill)	299.3	378.8	371.3	309.5	228.9	226.2	197.0	196.0	255.0	252.9	*250*	*250*						
Shr. Equity ($mill)	654.9	728.9	906.4	956.9	1023.9	1117.5	1279.9	1396.3	1573.2	1854.5	*2400*	*2500*						
Return on Total Cap'l	9.5%	9.5%	9.5%	10.7%	8.1%	11.0%	10.5%	13.3%	13.5%	16.6%	*23.0%*	*20.0%*						
Return on Shr. Equity	12.5%	13.3%	12.4%	13.3%	9.3%	12.9%	11.8%	14.8%	15.4%	18.7%	*25.0%*	*22.0%*						
Retained to Com Eq	9.0%	9.9%	9.4%	10.2%	6.2%	9.6%	8.7%	11.8%	12.5%	16.1%	*23.0%*	*20.0%*						
All Div'ds to Net Prof	28%	26%	24%	23%	34%	25%	26%	20%	19%	14%	*9%*	*11%*						

Bold figures are Value Line estimates

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Sales per sh			*48.55*
"Cash Flow" per sh			*10.95*
Earnings per sh [A]			*8.75*
Div'ds Decl'd per sh [B]■			*1.35*
Cap'l Spending per sh			*2.85*
Book Value per sh [C]			*44.30*
Common Shs Outst'g [D]			*70.00*
Avg Ann'l P/E Ratio			*43.0*
Relative P/E Ratio			*2.40*
Avg Ann'l Div'd Yield			*.4%*
Sales ($mill)			*3400*
Operating Margin			*28.5%*
Depreciation ($mill)			*150*
Net Profit ($mill)			*615*
Income Tax Rate			*25.0%*
Net Profit Margin			*18.1%*
Working Cap'l ($mill)			*1200*
Long-Term Debt ($mill)			*200*
Shr. Equity ($mill)			*3100*
Return on Total Cap'l			*18.0%*
Return on Shr. Equity			*20.0%*
Retained to Com Eq			*17.0%*
All Div'ds to Net Prof			*16%*

CAPITAL STRUCTURE as of 3/31/21
Total Debt $254.6 mill. **Due in 5 Yrs** $182.7 mill.
LT Debt $252.3 mill. **LT Interest** $7.5 mill.
(12% of Cap'l)

Leases, Uncapitalized Annual rentals $12.4 mill.

Pension Assets-12/20 $258.1 mill.
Oblig. $298.9 mill.

Pfd Stock None
Common Stock 73,823,701 shares as of 4/16/21
MARKET CAP: $30.7 billion (Large Cap)

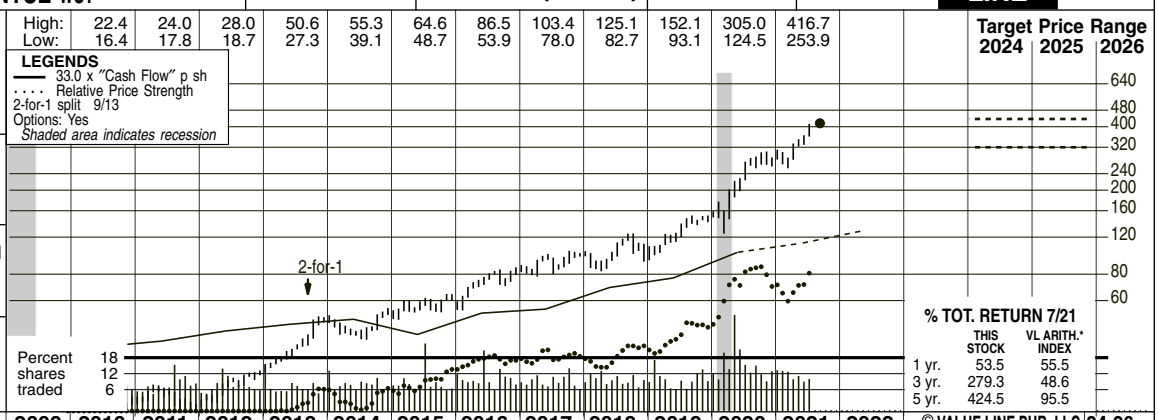
CURRENT POSITION ($MILL.)	2019	2020	3/31/21
Cash Assets	439.1	615.5	483.7
Receivables	319.3	385.3	465.7
Inventory (LIFO)	235.7	321.3	310.2
Other	64.6	51.6	67.4
Current Assets	1058.7	1373.7	1327.0
Accts Payable	156.8	213.1	204.3
Debt Due	2.3	2.3	2.3
Other	182.5	265.1	276.2
Current Liab.	341.6	503.4	482.8

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Sales	4.5%	5.5%	*11.0%*
"Cash Flow"	8.5%	12.5%	*14.0%*
Earnings	12.5%	18.0%	*17.0%*
Dividends	7.0%	8.0%	*12.0%*
Book Value	10.0%	10.0%	*12.0%*

Calendar	QUARTERLY SALES ($ mill.) Mar.Per	Jun.Per	Sep.Per	Dec.31	Full Year
2018	415.7	447.5	431.7	422.5	1717.4
2019	443.5	469.7	456.1	470.6	1839.9
2020	491.5	527.2	548.0	580.2	2146.9
2021	670.7	723.6	*700*	*685.7*	*2780*
2022	*725*	*700*	*675*	*650*	*2750*

Calendar	EARNINGS PER SHARE [A] Mar.Per	Jun.Per	Sep.Per	Dec.31	Full Year
2018	.58	.75	.73	.69	2.74
2019	.73	.88	.75	.84	3.21
2020	.99	1.21	1.09	1.29	4.57
2021	1.99	2.47	*1.80*	*1.74*	*8.00*
2022	*2.15*	*2.00*	*1.75*	*1.60*	*7.50*

Calendar	QUARTERLY DIVIDENDS PAID [B]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.13	.13	.13	.14	.53
2018	.14	.14	.14	.15	.57
2019	.15	.15	.15	.16	.61
2020	.16	.16	.16	.17	.65
2021	.17	.17	.17		



BUSINESS: West Pharmaceutical Services manufactures systems and component parts (stoppers, seals, syringe components) used in the delivery of injectible drugs. Also supplies packaging and delivery system components to food processors and makers of personal care products. Its West Monarch Analytical Labs division provides testing services that help drug companies meet closure/packaging regulatory guidelines. Foreign sales: 55.6% of '20 total; R&D: 2.1%. Has about 9,200 employees. Officers & directors own less than 1.0% of common; Vanguard, 11.2%; BlackRock, 9.9%; T. Rowe Price, 6.2% (3/21 Proxy). President & CEO: Eric M. Green. Inc.: PA. Address: 530 Herman O. West Drive, Exton, PA 19341. Telephone: 610-594-2900. Internet: www.westpharma.com.

The story remained a similar one for West Pharmaceutical Services in the second quarter. It continued to benefit from the favorable backdrop created by the COVID-19 pandemic, and once again crushed top- and bottom-line expectations, posting record results on both lines. Specifically, it reported sales nearing $725 million, up 37% from a strong year-earlier comparison and more than $50 million above our estimate. The Proprietary Products segment remained the best performer, inking a 47% sales gain. Earnings per share, meanwhile, more than doubled to $2.47, easily surpassing the Wall Street consensus. For perspective, we were modeling for EPS of $1.50, anticipating a slowdown from the growth enjoyed throughout 2020 and in the March quarter. The bottom line seemed to get a boost from an uptick in demand for high-value products (HVPs), which tend to carry higher margins. In this vein, the EBITDA margin was up more than 750 basis points year over year.

We have considerably raised our full-year estimates. Following the aforementioned beats, management upped its guidance on nearly all fronts. It now expects sales to come in between $2.760 billion and $2.785 billion, up $130 million at both ends of its previous forecast. It also sees EPS ranging from $7.99 to $8.14, up nearly $1.05 at both sides. While we still suspect that growth will temper in the back half of the year against stiff comparisons and a more normalized operating environment, we've upped our assumptions to model for better demand and ongoing expansion of HVPs. In all, we look for EPS of $8.00 for all of 2021, representing nearly 50% growth in the back half.

Earnings may well pull back next year. We expect more-normalized operating conditions and see margins coming under some pressure as management noted that it is making investments into HVP capacity. Still, we anticipate that EPS will come in at $7.50 a share in 2022.

We advise would-be investors to be careful here. The shares have continued to find investor support, but appear to be overvalued and offer uninspiring 3- to 5-year price appreciation potential. In the interim, they are a untimely.

Andre J. Costanza *August 13, 2021*

(A) Diluted earnings. Excl. nonrec. gains/(losses): '05, (6¢); '07, (16¢); '08, 6¢; '09, 01¢; and '10, (11¢); GAAP as of 2015. May not add due to rounding. Next earnings report due late August. **(B)** Dividends historically paid early Feb, May, Aug., and Nov. ■ Dividend reinvestment plan available. **(C)** Incl. intangibles. On 12/31/20: $141.6 mill., $1.91/share. **(D)** In millions, adjusted for split.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	100
Earnings Predictability	60

ATMOS ENERGY CORP. NYSE-ATO

RECENT PRICE **101.07** | P/E RATIO **19.4** (Trailing: 19.0 Median: 19.0) | RELATIVE P/E RATIO **1.01** | DIV'D YLD **2.7%** | **VALUE LINE**

TIMELINESS 4 Lowered 8/20/21
SAFETY 1 Raised 6/6/14
TECHNICAL 3 Raised 8/27/21
BETA .80 (1.00 = Market)

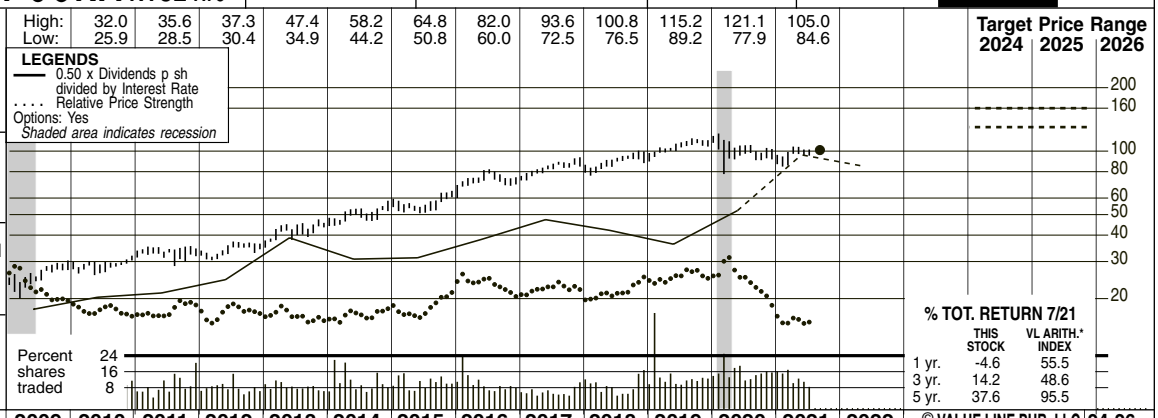
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$75-$160 $118 (15%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	160	(+60%)	*14%*
Low	130	(+30%)	*9%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	256	280	256
to Sell	231	228	258
Hld's(000)	108898	107949	107920



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
61.75	75.27	66.03	79.52	53.69	53.12	48.15	38.10	42.88	49.22	40.82	32.23	26.01	28.00	24.32	22.41	*24.60*	*25.05*	Revenues per sh [A]	*35.50*
3.90	4.26	4.14	4.19	4.29	4.64	4.72	4.76	5.14	5.42	5.81	6.19	6.62	7.24	7.57	8.03	*8.55*	*9.10*	"Cash Flow" per sh	*10.25*
1.72	2.00	1.94	2.00	1.97	2.16	2.26	2.10	2.50	2.96	3.09	3.38	3.60	4.00	4.35	4.72	*5.10*	*5.45*	Earnings per sh [AB]	*6.50*
1.24	1.26	1.28	1.30	1.32	1.34	1.36	1.38	1.40	1.48	1.56	1.68	1.80	1.94	2.10	2.30	*2.50*	*2.70*	Div'ds Decl'd per sh [C]■	*3.30*
4.14	5.20	4.39	5.20	5.51	6.02	6.90	8.12	9.32	8.32	9.61	10.46	10.72	13.19	14.19	15.38	*15.80*	*15.75*	Cap'l Spending per sh	*15.15*
19.90	20.16	22.01	22.60	23.52	24.16	24.98	26.14	28.47	30.74	31.48	33.32	36.74	42.87	48.18	53.95	*60.20*	*68.25*	Book Value per sh	*87.85*
80.54	81.74	89.33	90.81	92.55	90.16	90.30	90.24	90.64	100.39	101.48	103.93	106.10	111.27	119.34	125.88	*133.00*	*137.00*	Common Shs Outst'g [D]	*155.00*
16.1	13.5	15.9	13.6	12.5	13.2	14.4	15.9	15.9	16.1	17.5	20.8	22.0	21.7	23.2	22.3	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*22.5*
.86	.73	.84	.82	.83	.84	.90	1.01	.89	.85	.88	1.09	1.11	1.17	1.24	1.13			Relative P/E Ratio	*1.25*
4.5%	4.7%	4.2%	4.8%	5.3%	4.7%	4.2%	4.1%	3.5%	3.1%	2.9%	2.4%	2.3%	2.2%	2.1%	2.2%			Avg Ann'l Div'd Yield	*2.3%*
4347.6	3438.5	3886.3	4940.9	4142.1	3349.9	2759.7	3115.5	2901.8	2821.1	*3275*	*3430*	Revenues ($mill) [A]	*5500*
199.3	192.2	230.7	289.8	315.1	350.1	382.7	444.3	511.4	580.5	*665*	*735*	Net Profit ($mill)	*1000*
36.4%	33.8%	38.2%	39.2%	38.3%	36.4%	36.6%	27.0%	21.4%	19.5%	*19.0%*	*20.0%*	Income Tax Rate	*25.0%*
4.6%	5.6%	5.9%	5.9%	7.6%	10.5%	13.9%	14.3%	17.6%	20.6%	*20.3%*	*21.4%*	Net Profit Margin	*18.2%*
49.4%	45.3%	48.8%	44.3%	43.5%	38.7%	44.0%	34.3%	38.0%	40.0%	*48.0%*	*45.0%*	Long-Term Debt Ratio	*40.0%*
50.6%	54.7%	51.2%	55.7%	56.5%	61.3%	56.0%	65.7%	62.0%	60.0%	*52.0%*	*55.0%*	Common Equity Ratio	*60.0%*
4461.5	4315.5	5036.1	5542.2	5650.2	5651.8	6965.7	7263.6	9279.7	11323	*15400*	*17000*	Total Capital ($mill)	*22700*
5147.9	5475.6	6030.7	6725.9	7430.6	8280.5	9259.2	10371	11788	13355	*14700*	*15850*	Net Plant ($mill)	*19100*
6.1%	6.1%	5.9%	6.4%	6.6%	7.2%	6.4%	6.9%	6.1%	5.5%	*6.0%*	*5.5%*	Return on Total Cap'l	*5.5%*
8.8%	8.1%	8.9%	9.4%	9.9%	10.1%	9.8%	9.3%	8.9%	8.6%	*8.5%*	*8.0%*	Return on Shr. Equity	*7.5%*
8.8%	8.1%	8.9%	9.4%	9.9%	10.1%	9.8%	9.3%	8.9%	8.6%	*8.5%*	*8.0%*	Return on Com Equity	*7.5%*
3.3%	2.8%	4.0%	4.7%	4.9%	5.1%	4.9%	4.8%	4.6%	4.4%	*4.0%*	*4.0%*	Retained to Com Eq	*3.5%*
62%	65%	56%	50%	51%	50%	50%	48%	48%	49%	*50%*	*50%*	All Div'ds to Net Prof	*51%*

CAPITAL STRUCTURE as of 6/30/21
Total Debt $7328.9 mill. **Due in 5 Yrs** $410.0 mill.
LT Debt $7128.5 mill. **LT Interest** $370.0 mill.
(LT interest earned: 9.5x; total interest coverage: 9.5x)
Leases, Uncapitalized Annual rentals $20.4 mill.

Pfd Stock None

Pension Assets-9/20 $528.9 mill.
Oblig. $604.2 mill.
Common Stock 130,790,813 shs.
as of 7/30/21

MARKET CAP: $13.2 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	24.5	20.8	524.6
Other	433.5	450.5	590.8
Current Assets	458.0	471.3	1115.4
Accts Payable	265.0	235.8	280.4
Debt Due	464.9	.2	200.4
Other	479.5	546.4	581.7
Current Liab.	1209.4	782.4	1062.5
Fix. Chg. Cov.	990%	1306%	1315%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	-8.5%	-11.0%	*6.0%*
"Cash Flow"	5.5%	7.0%	*5.0%*
Earnings	8.0%	9.0%	*7.0%*
Dividends	5.0%	7.5%	*7.5%*
Book Value	7.5%	10.0%	*10.5%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2018	889.2	1219.4	562.2	444.7	3115.5
2019	877.8	1094.6	485.7	443.7	2901.8
2020	875.6	977.6	493.0	474.9	2821.1
2021	914.5	1319.1	605.6	*435.8*	*3275*
2022	*960*	*1405*	*580*	*485*	*3430*

Fiscal Year Ends	EARNINGS PER SHARE [A B E] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2018	1.40	1.57	.64	.41	4.00
2019	1.38	1.82	.68	.49	4.35
2020	1.47	1.95	.79	.53	4.72
2021	1.71	2.30	.78	*.31*	*5.10*
2022	*1.84*	*2.29*	*.82*	*.50*	*5.45*

Cal-endar	QUARTERLY DIVIDENDS PAID [C]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.45	.45	.45	.485	1.84
2018	.485	.485	.485	.525	1.98
2019	.525	.525	.525	.575	2.15
2020	.575	.575	.575	.625	2.35
2021	.625	.625	.625		

BUSINESS: Atmos Energy Corporation is engaged primarily in the distribution and sale of natural gas to over three million customers through six regulated natural gas utility operations: Louisiana Division, West Texas Division, Mid-Tex Division, Mississippi Division, Colorado-Kansas Division, and Kentucky/Mid-States Division. Gas sales breakdown for fiscal 2020: 68.6%, residential; 26.2%, commercial; 3.6%, industrial; and 1.6% other. The company sold Atmos Energy Marketing, 1/17. Officers and directors own approximately 1.2% of common stock (12/20 Proxy). President and Chief Executive Officer: Kevin Akers. Incorporated: Texas. Address: Three Lincoln Centre, Suite 1800, 5430 LBJ Freeway, Dallas, Texas 75240. Telephone: 972-934-9227. Internet: www.atmosenergy.com.

Atmos Energy appears to be en route to a solid fiscal 2021 (ends September 30th). Through the first nine months, share net of $4.79 was about 14% above the year-ago figure of $4.21. That was made possible partly by the natural gas distribution division, which benefited from higher rates, mainly in the Mid-Tex, Mississippi, Louisiana, and West Texas units. Customer growth, primarily in the Mid-Tex unit, also helped. Elsewhere, results of the pipeline and storage business received a boost from GRIP filings approved in May, 2020 and May, 2021. Though uncertainties surrounding the coronavirus persist, we expect full-year earnings to rise around 8%, to $5.10 a share, versus fiscal 2020's $4.72 tally. Concerning next year, share net stands to increase at a similar percentage rate, to $5.45, as operating margins expand further.

There's sufficient liquidity to meet various obligations for some time. When June ended, cash and equivalents were $524.6 million. Too, long-term debt was manageable, at 48% of total capital, and short-term commitments did not seem to be a major hurdle. What's more, $4 billion in common stock and/or debt securities remained available for issuance (out of $5 billion) under a shelf registration statement that expires in June, 2024. Lastly, Atmos can tap into four revolving credit facilities totaling $2.5 billion plus a $1.5 billion commercial paper program.

Business prospects out to mid-decade look encouraging. The company ranks as one of the country's biggest natural gas-only distributors, with more than three million customers across several states, including Texas, Louisiana, and Mississippi. Furthermore, we believe the pipeline and storage unit has promising overall growth opportunities, given that it operates in one of the most-active drilling regions in the world. Healthy corporate finances are another plus. So, in Atmos' current configuration, annual bottom-line advances may be between 6% and 8% over the 2024-2026 horizon.

These shares, though untimely, possess decent, risk-adjusted total return potential. Long-term capital gains possibilities are worthwhile. Dividend growth prospects appear promising, as well.

Frederick L. Harris, III *August 27, 2021*

(A) Fiscal year ends Sept. 30th. **(B)** Diluted shrs. Excl. nonrec. gains (loss): '10, 5¢; '11, (1¢); '18, $1.43; '20, 17¢. Excludes discontinued operations: '11, 10¢; '12, 27¢; '13, 14¢; '17, 13¢. Next egs. rpt. due early Nov. **(C)** Dividends historically paid in early March, June, Sept., and Dec. ■ Div. reinvestment plan. Direct stock purchase plan avail. **(D)** In millions. **(E)** Qtrs may not add due to change in shrs outstanding.

Company's Financial Strength	A+
Stock's Price Stability	95
Price Growth Persistence	80
Earnings Predictability	100

NEW JERSEY RES. NYSE-NJR

RECENT PRICE **37.88** | P/E RATIO **16.3** (Trailing: 14.3 Median: 17.0) | RELATIVE P/E RATIO **0.85** | DIV'D YLD **3.5%** | **VALUE LINE**

TIMELINESS 4 Lowered 8/20/21
SAFETY 2 Lowered 4/17/20
TECHNICAL 2 Lowered 8/13/21
BETA 1.00 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$16-$51	$34 (-10%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	50	(+30%)	*10%*
Low	35	(-10%)	*2%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	129	132	105
to Sell	105	118	139
Hld's(000)	69155	71013	68468

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
High:	22.0	25.2	25.1	23.8	32.1	34.1	38.9	45.4	51.8	51.2	44.7	44.4						
Low:	16.7	19.8	19.3	19.5	21.9	26.8	30.5	33.7	35.6	40.3	21.1	33.3						

LEGENDS
0.40 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
3-for-2 split 3/08
2-for-1 split 3/15
Options: Yes
Shaded area indicates recession

2-for-1

Target Price Range 2024 | 2025 | 2026

80 60 50 40 30 25 20 15 10 7.5

Percent shares traded 30 20 10

% TOT. RETURN 7/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	28.7	55.5
3 yr.	-8.3	48.6
5 yr.	20.2	95.5

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	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022		24-26
	38.10	39.81	36.31	45.37	31.17	32.05	36.30	27.08	38.38	44.40	32.09	21.90	26.28	33.24	29.01	20.39	*20.90*	*26.55*	Revenues per sh [A]	*28.40*
	1.31	1.37	1.22	1.81	1.58	1.63	1.70	1.86	1.93	2.73	2.52	2.46	2.68	3.72	2.99	3.30	*3.50*	*3.75*	"Cash Flow" per sh	*4.00*
	.88	.93	.78	1.35	1.20	1.23	1.29	1.36	1.37	2.08	1.78	1.61	1.73	2.72	1.96	2.07	*2.20*	*2.40*	Earnings per sh [B]	*2.55*
	.45	.48	.51	.56	.62	.68	.72	.77	.81	.86	.93	.98	1.04	1.11	1.19	1.27	*1.34*	*1.42*	Div'ds Decl'd per sh [C]■	*1.65*
	.64	.64	.73	.86	.90	1.05	1.13	1.26	1.33	1.52	3.76	4.15	3.80	4.39	5.83	4.65	*4.10*	*4.10*	Cap'l Spending per sh	*4.00*
	5.30	7.50	7.75	8.64	8.29	8.81	9.36	9.80	10.65	11.48	12.99	13.58	14.33	16.18	17.37	19.26	*20.35*	*21.55*	Book Value per sh [D]	*24.65*
	82.64	82.88	83.22	84.12	83.17	82.35	82.89	83.05	83.32	84.20	85.19	85.88	86.32	87.69	89.34	95.80	*97.00*	*98.00*	Common Shs Outst'g [E]	*100.00*
	16.8	16.1	21.6	12.3	14.9	15.0	16.8	16.8	16.0	11.7	16.6	21.3	22.4	15.6	24.3	17.7	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*17.0*
	.89	.87	1.15	.74	.99	.95	1.05	1.07	.90	.62	.84	1.12	1.13	.84	1.29	.91			Relative P/E Ratio	*.95*
	3.1%	3.2%	3.0%	3.3%	3.5%	3.7%	3.3%	3.4%	3.7%	3.5%	3.1%	2.9%	2.7%	2.6%	2.5%	3.5%			Avg Ann'l Div'd Yield	*3.7%*
	3009.2	2248.9	3198.1	3738.1	2734.0	1880.9	2268.6	2915.1	2592.0	1953.7	*2025*	*2600*	Revenues ($mill) [A]	*2840*
	106.5	112.4	113.7	176.9	153.7	138.1	149.4	240.5	175.0	196.2	*215*	*235*	Net Profit ($mill)	*260*
	30.2%	7.1%	25.4%	30.2%	26.3%	15.5%	17.2%	--	NMF	5.0%	*5.0%*	*5.0%*	Income Tax Rate	*5.0%*
	3.5%	5.0%	3.6%	4.7%	5.6%	7.3%	6.6%	8.2%	6.7%	10.0%	*10.6%*	*9.1%*	Net Profit Margin	*9.1%*
	35.5%	39.2%	36.6%	38.2%	43.2%	47.7%	44.6%	45.4%	49.8%	55.1%	*54.0%*	*54.0%*	Long-Term Debt Ratio	*53.0%*
	64.5%	60.8%	63.4%	61.8%	56.8%	52.3%	55.4%	54.6%	50.2%	44.9%	*46.0%*	*46.0%*	Common Equity Ratio	*47.0%*
	1203.1	1339.0	1400.3	1564.4	1950.6	2230.1	2233.7	2599.6	3088.9	4104.2	*4275*	*4610*	Total Capital ($mill)	*5265*
	1295.9	1484.9	1643.1	1884.1	2128.3	2407.7	2609.7	2651.0	3041.2	3983.0	*4065*	*4145*	Net Plant ($mill)	*4400*
	9.7%	9.2%	9.0%	12.1%	8.6%	6.9%	7.7%	10.1%	6.4%	5.6%	*6.0%*	*6.0%*	Return on Total Cap'l	*6.0%*
	13.7%	13.8%	12.8%	18.3%	13.9%	11.8%	12.1%	16.9%	11.3%	10.6%	*11.0%*	*11.0%*	Return on Shr. Equity	*10.5%*
	13.7%	13.8%	12.8%	18.3%	13.9%	11.8%	12.1%	16.9%	11.3%	10.6%	*11.0%*	*11.0%*	Return on Com Equity	*10.5%*
	6.2%	6.2%	5.2%	11.0%	7.0%	4.8%	5.0%	10.2%	4.6%	4.3%	*4.5%*	*4.5%*	Retained to Com Eq	*3.5%*
	55%	55%	59%	40%	50%	60%	59%	40%	59%	60%	*61%*	*59%*	All Div'ds to Net Prof	*64%*

CAPITAL STRUCTURE as of 6/30/21
Total Debt $2420.9 mill. **Due in 5 Yrs** $420.5 mill.
LT Debt $2221.6 mill. **LT Interest** $47.1 mill.
Incl. $54.9 mill. capitalized leases.
(LT interest earned: 5.0x; total interest coverage: 5.0x)
Pension Assets-9/20 $404.4 mill.
Oblig. $643.0 mill.
Pfd Stock None

Common Stock 96,433,901 shs.
as of 8/2/21
MARKET CAP: $3.7 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	2.7	117.0	4.7
Other	508.9	505.3	513.6
Current Assets	511.6	622.3	518.3
Accts Payable	295.9	270.1	310.8
Debt Due	46.9	152.6	199.3
Other	103.6	111.0	103.5
Current Liab.	446.4	533.7	613.6
Fix. Chg. Cov.	545%	545%	550%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	-2.5%	-6.5%	*.5%*
"Cash Flow"	7.0%	7.0%	*3.0%*
Earnings	6.0%	5.5%	*2.0%*
Dividends	7.0%	6.5%	*5.5%*
Book Value	7.5%	8.5%	*6.0%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.) [A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2018	705.3	1019.1	543.4	647.3	2915.1
2019	811.8	866.2	434.9	479.1	2592.0
2020	615.0	639.6	299.0	400.1	1953.7
2021	454.3	802.2	367.6	***400.9***	***2025***
2022	***600***	***945***	***505***	***550***	***2600***

Fiscal Year Ends	EARNINGS PER SHARE [A B] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2018	1.53	1.61	d.09	d.33	2.72
2019	.61	1.27	d.20	.29	1.96
2020	.44	1.12	d.06	.57	2.07
2021	.46	1.77	d.15	***.12***	***2.20***
2022	***.50***	***1.85***	***d.13***	***.18***	***2.40***

Calendar	QUARTERLY DIVIDENDS PAID [C]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.255	.255	.255	.273	1.04
2018	.273	.273	.273	.2925	1.11
2019	.2925	.2925	.2925	.3125	1.19
2020	.3125	.3125	.3125	.3325	1.27
2021	.3325	.3325	.3325		

BUSINESS: New Jersey Resources Corp. is a holding company providing retail/wholesale energy svcs. to customers in NJ, and in states from the Gulf Coast to New England, and Canada. New Jersey Natural Gas had 558,000 cust. at 9/30/20. Fiscal 2020 volume: 215 bill. cu. ft. (14% interruptible, 21% res., 10% commercial & elec. utility, 55% capacity release programs). N.J. Natural Energy subsidiary provides unregulated retail/wholesale natural gas and related energy svcs. 2020 dep. rate: 2.8%. Has 1,156 empls. Off./dir. own 1.3% of common; BlackRock, 14.3%; Vanguard, 10.6% (12/20 Proxy). CEO, President & Director: Steven D. Westhoven. Incorporated: New Jersey. Address: 1415 Wyckoff Road, Wall, NJ 07719. Telephone: 732-938-1480. Web: www.njresources.com.

Since our May review, shares of New Jersey Resources have corrected moderately. In fact, over that time frame, the stock's price has receded approximately 9.5%. This likely reflects the challenging operating environment that has persisted for some time.

The company recently posted somewhat mixed June-period financial results. For the second quarter, revenues increased nearly 23%, to $367.6 million, thanks to a more-than-40% rise in nonutility volumes, partially offset by a low single-digit decline in regulated utility volumes. On the profitability front, total operating expenses increased 180 basis points as a function of the top line. After accounting for a sizable increase in interest expense and taxes, NJR's bottom line loss fell 2.5 times deeper into the red, to a deficit of $0.15. That said, this was still markedly better than our estimate for a loss of $0.20.

As a result, we have added a nickel to our 2021 share-net estimate, bringing that figure to $2.20. Our revised figure would represent an annual earnings advance of nearly 6.5%. This ought to be supported by an estimated top-line increase of about 3.5%, to roughly $2.1 billion. A primary driver this year will likely be the incremental contributions from the nonutility operations, particularly the Energy Services arm, which has been performing quite well, of late. Meanwhile, the New Jersey Natural Gas regulated utility business added 5,448 new customers over the first nine months of this fiscal year. However, that unit has been experiencing an uptick in bad-debt accounts, likely stemming from the COVID-19 pandemic and the loss of associated jobs. Elsewhere, other developments like the Southern Reliability Link project, which is anticipated to go into service this month, and a pending base-rate increase of about $165 million at the NJNG division should also be nicely additive.

These untimely shares appear richly valued at this time. NJR's stock price already reflects the bulk of the earnings growth potential we project for the pull to 2024-2026. Alternatively, the equity does offer attractive dividend growth potential and an above-average yield.

Bryan J. Fong *August 27, 2021*

(A) Fiscal year ends Sept. 30th.
(B) Diluted earnings. Qtly. revenues and egs. may not sum to total due to rounding and change in shares outstanding. Next earnings report due early Nov.
(C) Dividends historically paid in early Jan., April, July, and October. ■ Dividend reinvestment plan available.
(D) Includes regulatory assets in 2020: $527.5 million, $5.51/share.
(E) In millions, adjusted for splits.

Company's Financial Strength	A+
Stock's Price Stability	80
Price Growth Persistence	55
Earnings Predictability	55

N.W. NATURAL NYSE-NWN

RECENT PRICE **53.04** | P/E RATIO **20.2** (Trailing: 18.9 Median: 24.0) | RELATIVE P/E RATIO **1.06** | DIV'D YLD **3.6%** | **VALUE LINE**

TIMELINESS 4 Lowered 6/11/21
SAFETY 3 Lowered 3/19/21
TECHNICAL 5 Lowered 8/13/21
BETA .85 (1.00 = Market)

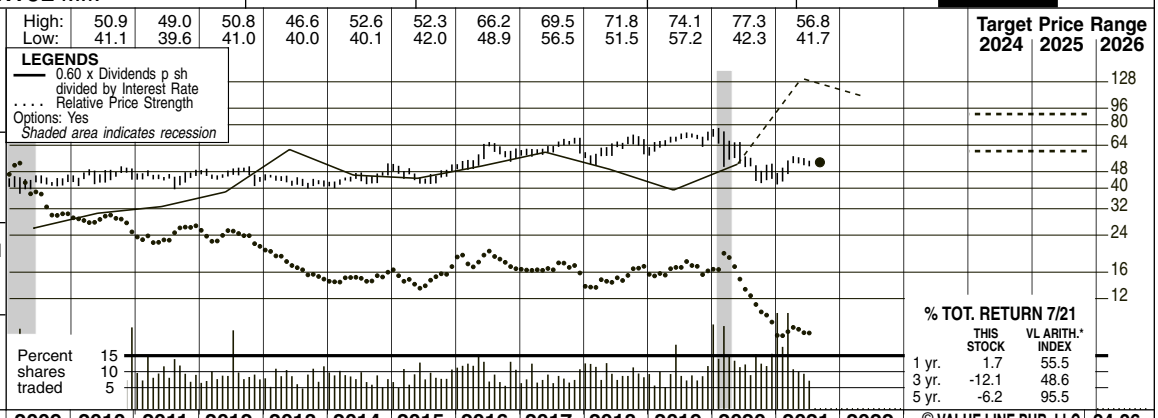
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$26-$67 $47 (-10%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	90	(+70%)	*17%*
Low	60	(+15%)	*7%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	92	99	103
to Sell	94	85	89
Hld's(000)	21896	22201	21451



% TOT. RETURN 7/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	1.7	55.5
3 yr.	-12.1	48.6
5 yr.	-6.2	95.5

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
33.01	37.20	39.13	39.16	38.17	30.56	31.72	27.14	28.02	27.64	26.39	23.61	26.52	24.45	24.49	25.29	*26.75*	*27.75*	Revenues per sh	*31.10*
4.34	4.76	5.41	5.31	5.20	5.18	5.00	4.94	5.04	5.05	4.91	4.93	1.04	5.28	5.15	5.69	*5.85*	*6.10*	"Cash Flow" per sh	*6.85*
2.11	2.35	2.76	2.57	2.83	2.73	2.39	2.22	2.24	2.16	1.96	2.12	d1.94	2.33	2.19	2.30	*2.60*	*2.70*	Earnings per sh [A]	*3.10*
1.32	1.39	1.44	1.52	1.60	1.68	1.75	1.79	1.83	1.85	1.86	1.87	1.88	1.89	1.90	1.91	*1.92*	*1.93*	Div'ds Decl'd per sh [B]■	*1.96*
3.48	3.56	4.48	3.92	5.09	9.35	3.76	4.91	5.13	4.40	4.37	4.87	7.43	7.43	7.95	9.18	*8.40*	*8.70*	Cap'l Spending per sh	*9.40*
21.28	22.01	22.52	23.71	24.88	26.08	26.70	27.23	27.77	28.12	28.47	29.71	25.85	26.41	28.42	29.05	*33.85*	*37.10*	Book Value per sh [D]	*45.30*
27.58	27.24	26.41	26.50	26.53	26.58	26.76	26.92	27.08	27.28	27.43	28.63	28.74	28.88	30.47	30.59	*31.00*	*31.00*	Common Shs Outst'g [C]	*32.00*
17.0	15.9	16.7	18.1	15.2	17.0	19.0	21.1	19.4	20.7	23.7	26.9	- -	26.6	30.9	25.0	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*24.0*
.91	.86	.89	1.09	1.01	1.08	1.19	1.34	1.09	1.09	1.19	1.41	- -	1.44	1.65	1.30			Relative P/E Ratio	*1.35*
3.7%	3.7%	3.1%	3.3%	3.7%	3.6%	3.9%	3.8%	4.2%	4.1%	4.0%	3.3%	3.0%	3.0%	2.8%	3.3%			Avg Ann'l Div'd Yield	*2.6%*
848.8	730.6	758.5	754.0	723.8	676.0	762.2	706.1	746.4	773.7	*830*	*860*	Revenues ($mill)	*995*
63.9	59.9	60.5	58.7	53.7	58.9	d55.6	67.3	65.3	70.3	*80.0*	*85.0*	Net Profit ($mill)	*100*
40.4%	42.4%	40.8%	41.5%	40.0%	40.9%	- -	26.4%	16.2%	23.1%	*21.0%*	*21.0%*	Income Tax Rate	*21.0%*
7.5%	8.2%	8.0%	7.8%	7.4%	8.7%	NMF	9.5%	8.8%	9.1%	*9.6%*	*9.9%*	Net Profit Margin	*10.1%*
47.3%	48.5%	47.6%	44.8%	42.5%	44.4%	47.9%	48.1%	48.2%	49.2%	*49.0%*	*46.5%*	Long-Term Debt Ratio	*43.0%*
52.7%	51.5%	52.4%	55.2%	57.5%	55.6%	52.1%	51.9%	51.8%	50.8%	*51.0%*	*53.5%*	Common Equity Ratio	*57.0%*
1356.2	1424.7	1433.6	1389.0	1357.7	1529.8	1426.0	1468.9	1672.0	1748.8	*2050*	*2150*	Total Capital ($mill)	*2550*
1893.9	1973.6	2062.9	2121.6	2182.7	2260.9	2255.0	2421.4	2438.9	2654.8	*2640*	*2750*	Net Plant ($mill)	*3105*
6.2%	5.7%	5.8%	5.8%	5.5%	5.1%	NMF	5.8%	5.2%	5.2%	*4.0%*	*4.0%*	Return on Total Cap'l	*4.0%*
8.9%	8.2%	8.1%	7.6%	6.9%	6.9%	NMF	8.8%	7.5%	7.9%	*7.5%*	*7.5%*	Return on Shr. Equity	*7.0%*
8.9%	8.2%	8.1%	7.6%	6.9%	6.9%	NMF	8.8%	7.5%	7.9%	*7.5%*	*7.5%*	Return on Com Equity	*7.0%*
2.4%	1.6%	1.5%	1.1%	.6%	.9%	NMF	2.1%	1.4%	1.7%	*2.0%*	*2.0%*	Retained to Com Eq	*2.5%*
73%	80%	81%	85%	92%	87%	NMF	76%	82%	79%	*74%*	*72%*	All Div'ds to Net Prof	*63%*

CAPITAL STRUCTURE as of 6/30/21
Total Debt $1215.8 mill. **Due in 5 Yrs** $360.2 mill.
LT Debt $915.5 mill. **LT Interest** $43.1 mill.

(Total interest coverage: 3.1x)

Pension Assets-12/20 $373.9 mill.
Oblig. $595.2 mill.

Pfd Stock None

Common Stock 30,670,722 shares
as of 7/23/21

MARKET CAP $1.6 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	9.6	30.2	20.1
Other	284.1	293.0	253.7
Current Assets	293.7	323.2	273.8
Accts Payable	113.4	97.9	97.9
Debt Due	224.2	399.9	330.3
Other	144.6	129.3	144.3
Current Liab.	482.2	627.1	572.5
Fix. Chg. Cov.	336%	335%	312%

ANNUAL RATES (of change (per sh))	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	-3.5%	-2.0%	*4.0%*
"Cash Flow"	.5%	1.5%	*4.0%*
Earnings	-1.5%	1.5%	*5.5%*
Dividends	1.5%	.5%	*.5%*
Book Value	1.0%	- -	*8.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	264.7	124.6	91.2	226.7	706.1
2019	285.4	123.4	90.3	247.3	746.4
2020	285.2	135.0	93.3	260.2	773.7
2021	315.9	148.9	*110*	*255.2*	*830*
2022	*320*	*150*	*120*	*270*	*860*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1.46	d.01	d.39	1.27	2.33
2019	1.50	.07	d.61	1.26	2.19
2020	1.58	d.17	d.61	1.50	2.30
2021	1.94	d.02	*d.60*	*1.28*	*2.60*
2022	*1.96*	*.01*	*d.57*	*1.30*	*2.70*

Calendar	QUARTERLY DIVIDENDS PAID [B] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.47	.47	.47	.4725	1.88
2018	.4725	.4725	.4725	.475	1.89
2019	.475	.475	.475	.4775	1.90
2020	.4775	.4775	.4775	.48	1.91
2021	.48	.48	.48		

BUSINESS: Northwest Natural Holding Co. distributes natural gas to 1000 communities, 775,000 customers, in Oregon (89% of customers) and in southwest Washington state. Principal cities served: Portland and Eugene, OR; Vancouver, WA. Service area population: 3.7 mill. (77% in OR). Company buys gas supply from Canadian and U.S. producers; has transportation rights on Northwest Pipeline system. Owns local underground storage. Rev. breakdown: residential, 37%; commercial, 22%; industrial, gas transportation, 41%. Employs 1,167. BlackRock Inc. owns 16.4% of shares; State Street, 15.4%; Off./Dir., 1.03% (4/21 proxy). CEO: David H. Anderson. Inc.: Oregon. Address: 220 NW 2nd Ave., Portland, OR 97209. Tel.: 503-226-4211. Internet: www.nwnatural.com.

Northwest Natural Holding recently posted better-than-expected June-quarter financial results. To that point, revenues increased 10.3%, to $148.9 million thanks to new rates in Oregon, additional customer accounts, and reduced economic headwinds from the COVID-19 pandemic. On the profitability front, total expenses declined 190 basis points, as a percentage of the top line. After accounting for a drop in interest expenses as well, NWN's share deficit was reduced by nearly 90%, to $0.02. This was markedly above our call for a loss of $0.10.

As a result, we have raised our earnings outlook for 2021 and 2022 by a nickel each, to $2.60 and $2.70, respectively. In the current year, our revised figure would represent a share-net increase of approximately 13%. This ought to be supported by a nearly 7.5% rise in revenues, to $830 million. The company has been quite successful at adding new customer meters despite the challenging operating environment. This is evident in the Natural Gas Distribution business gaining 12,000 new accounts over the past year. Additional benefits stemmed from an increase in its base rate in Oregon that went into effect last November. Elsewhere, the NW Natural Water Company continues to grow through the acquisition of water and waster water utilities. Those efforts are helping to expand that unit's geographic footprint while providing clean and reliable service to its customers.

The balance sheet is in good shape. Although cash reserves fell 33% so far this year, that financial cushion still sits at about $20 million. Meanwhile, the long-term debt load receded a bit and sits at about 50% of total capital, which is on the lower end for this industry.

Since our May review, these shares have fallen one notch in Timeliness. At this point, our Ranking System suggests NWN stock will lag the broader market averages in the coming year. However, a near term correction may provide an attractive opportunity for income-seeking accounts. The stock does offer an above-average dividend yield. At the same time, the equity is also positioned for worthwhile recovery potential over the coming 3- to 5-year time frame.

Bryan J. Fong *August 27, 2021*

(A) Diluted earnings per share. Excludes nonrecurring items: '06, ($0.06); '08, ($0.03); '09, $0.06; May not sum due to rounding. Next earnings report due in early Nov.
(B) Dividends historically paid in mid-February, May, August, and November.
■ Dividend reinvestment plan available.
(C) In millions.
(D) Includes intangibles. In 2020: $69.2 million, $2.26/share.

Company's Financial Strength	A
Stock's Price Stability	85
Price Growth Persistence	35
Earnings Predictability	5

ONE GAS, INC. NYSE-OGS

RECENT PRICE **72.94** | P/E RATIO **18.7** (Trailing: 19.0 Median: NMF) | RELATIVE P/E RATIO **0.98** | DIV'D YLD **3.3%** | **VALUE LINE**

TIMELINESS 4 Lowered 6/11/21
SAFETY 2 New 6/2/17
TECHNICAL 4 Raised 7/23/21
BETA .80 (1.00 = Market)

18-Month Target Price Range

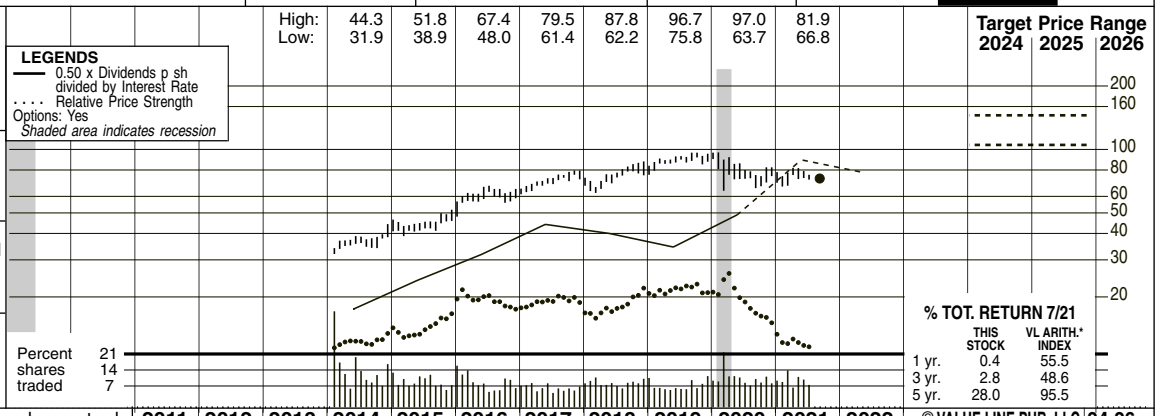
Low-High	Midpoint (% to Mid)
$57-$116	$87 (20%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	145	(+100%)	*21%*
Low	105	(+45%)	*12%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	130	123	127
to Sell	151	163	144
Hld's(000)	42057	42726	42395



The shares of ONE Gas, Inc. began trading "regular-way" on the New York Stock Exchange on February 3, 2014. That happened as a result of the separation of ONEOK's natural gas distribution operation. Regarding the details of the spinoff, on January 31, 2014, ONEOK distributed one share of OGS common stock for every four shares of ONEOK common stock held by ONEOK shareholders of record as of the close of business on January 21. It should be mentioned that ONEOK did not retain any ownership interest in the new company.

CAPITAL STRUCTURE as of 6/30/21
Total Debt $4082.8 mill. **Due in 5 Yrs** $1020.0 mill.
LT Debt $4082.8 mill. **LT Interest** $150.0 mill.
(LT interest earned: 4.8x; total interest coverage: 4.8x)
Leases, Uncapitalized Annual rentals $7.9 mill.
Pfd Stock None
Pension Assets-12/20 $987.6 mill.
Oblig. $1077.6 mill.
Common Stock 53,500,783 shs.
as of 7/26/21
MARKET CAP: $3.9 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	17.9	8.0	209.1
Other	488.3	531.9	394.6
Current Assets	506.2	539.9	603.7
Accts Payable	120.5	152.3	158.4
Debt Due	516.5	418.2	- -
Other	235.7	226.6	210.9
Current Liab.	872.7	797.1	369.3
Fix. Chg. Cov.	567%	587%	595%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	- -	-1.0%	*6.0%*
"Cash Flow"	- -	8.0%	*6.0%*
Earnings	- -	10.0%	*6.5%*
Dividends	- -	14.5%	*7.0%*
Book Value	- -	3.0%	*10.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	638.5	292.5	238.3	464.4	1633.7
2019	661.0	290.6	248.6	452.5	1652.7
2020	528.2	273.3	244.6	484.2	1530.3
2021	625.3	315.6	***257***	***477.1***	***1675***
2022	***650***	***355***	***300***	***505***	***1810***

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1.72	.39	.31	.83	3.25
2019	1.76	.46	.33	.96	3.51
2020	1.72	.48	.39	1.09	3.68
2021	1.79	.56	***.42***	***1.08***	***3.85***
2022	***1.85***	***.60***	***.47***	***1.13***	***4.05***

Calendar	QUARTERLY DIVIDENDS PAID [B] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.42	.42	.42	.42	1.68
2018	.46	.46	.46	.46	1.84
2019	.50	.50	.50	.50	2.00
2020	.54	.54	.54	.54	2.16
2021	.58	.58	.58		

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
	- -	- -	- -	34.92	29.62	27.30	29.43	31.08	31.32	28.78	***31.30***	***33.85***	Revenues per sh	***43.00***
	- -	- -	- -	4.52	4.82	5.43	5.96	6.32	6.96	7.36	***7.75***	***8.20***	"Cash Flow" per sh	***9.75***
	- -	- -	- -	2.07	2.24	2.65	3.02	3.25	3.51	3.68	***3.85***	***4.05***	Earnings per sh [A]	***5.00***
	- -	- -	- -	.84	1.20	1.40	1.68	1.84	2.00	2.16	***2.32***	***2.48***	Div'ds Decl'd per sh [B]■	***2.95***
	- -	- -	- -	5.70	5.63	5.91	6.81	7.50	7.91	8.87	***9.00***	***9.20***	Cap'l Spending per sh	***9.75***
	- -	- -	- -	34.45	35.24	36.12	37.47	38.86	40.35	42.01	***44.40***	***48.45***	Book Value per sh	***74.40***
	- -	- -	- -	52.08	52.26	52.28	52.31	52.57	52.77	53.17	***53.50***	***53.50***	Common Shs Outst'g [C]	***57.00***
	- -	- -	- -	17.8	19.8	22.7	23.5	23.1	25.3	21.7	*Bold figures are*		Avg Ann'l P/E Ratio	***25.0***
	- -	- -	- -	.94	1.00	1.19	1.18	1.25	1.35	1.11	*Value Line*		Relative P/E Ratio	***1.40***
	- -	- -	- -	2.3%	2.7%	2.3%	2.4%	2.5%	2.3%	2.7%	*estimates*		Avg Ann'l Div'd Yield	***2.4%***
	- -	- -	- -	1818.9	1547.7	1427.2	1539.6	1633.7	1652.7	1530.3	***1675***	***1810***	Revenues ($mill)	***2450***
	- -	- -	- -	109.8	119.0	140.1	159.9	172.2	186.7	196.4	***205***	***215***	Net Profit ($mill)	***285***
	- -	- -	- -	38.4%	38.0%	37.8%	36.4%	23.7%	18.7%	17.5%	***17.0%***	***17.5%***	Income Tax Rate	***22.0%***
	- -	- -	- -	6.0%	7.7%	9.8%	10.4%	10.5%	11.3%	12.8%	***12.2%***	***11.9%***	Net Profit Margin	***11.6%***
	- -	- -	- -	40.1%	39.5%	38.7%	37.8%	38.6%	37.7%	41.5%	***64.0%***	***62.0%***	Long-Term Debt Ratio	***47.0%***
	- -	- -	- -	59.9%	60.5%	61.3%	62.2%	61.4%	62.3%	58.5%	***36.0%***	***38.0%***	Common Equity Ratio	***53.0%***
	- -	- -	- -	2995.3	3042.9	3080.7	3153.5	3328.1	3415.5	3815.7	***6600***	***6820***	Total Capital ($mill)	***8000***
	- -	- -	- -	3293.7	3511.9	3731.6	4007.6	4283.7	4565.2	4867.1	***5150***	***5380***	Net Plant ($mill)	***6000***
	- -	- -	- -	4.4%	4.7%	5.2%	5.8%	5.9%	6.4%	6.0%	***5.0%***	***5.0%***	Return on Total Cap'l	***5.0%***
	- -	- -	- -	6.1%	6.5%	7.4%	8.2%	8.4%	8.8%	8.8%	***8.5%***	***8.5%***	Return on Shr. Equity	***6.5%***
	- -	- -	- -	6.1%	6.5%	7.4%	8.2%	8.4%	8.8%	8.8%	***8.5%***	***8.5%***	Return on Com Equity	***6.5%***
	- -	- -	- -	3.7%	3.1%	3.5%	3.7%	3.7%	3.8%	3.7%	***3.5%***	***3.0%***	Retained to Com Eq	***3.0%***
	- -	- -	- -	40%	53%	52%	55%	56%	56%	58%	***61%***	***62%***	All Div'ds to Net Prof	***59%***

BUSINESS: ONE Gas, Inc. provides natural gas distribution services to more than two million customers. There are three divisions: Oklahoma Natural Gas, Kansas Gas Service, and Texas Gas Service. The company purchased 153 Bcf of natural gas supply in 2020, compared to 174 Bcf in 2019. Total volumes delivered by customer (fiscal 2020): transportation, 58.3%; residential, 31.7%; commercial & industrial, 9.4%; other, .6%. ONE Gas has around 3,600 employees. BlackRock owns 11.9% of common stock; The Vanguard Group, 9.7%; American Century Investment, 7.6%; officers and directors, 1.9% (4/21 Proxy). CEO: Robert S. McAnnally. Incorporated: Oklahoma. Address: 15 East Fifth Street, Tulsa, Oklahoma 74103. Tel.: 918-947-7000. Internet: www.onegas.com.

Profits for ONE Gas have been decent so far this year. In fact, through the first half, share net of $2.35 was 7% higher than the 2020 tally of $2.20. That stemmed partly from benefits from new rates, primarily in Texas and Oklahoma. Another plus was an expanded customer base in Oklahoma and Texas. The effective income tax rate was lower, too. Although the company is not out of the woods yet as far as COVID-19 goes, it seems that full-year earnings will advance almost 5%, to $3.85 a share, relative to the 2020 figure of $3.68. Assuming additional expansion of operating margins in 2022, share net stands to increase at a similar percentage rate, to $4.05.

There's a new CEO. Pierce H. Norton II stepped down in late June to become the head of ONEOK Inc. (ONE Gas was spun off from that company in early 2014 via the distribution of OGS common stock to ONEOK shareholders.) His successor, Robert S. McAnnally, has held some important positions since coming on board six years ago, the latest one being chief operating officer. So, we believe ONE Gas is in capable hands.

Prospects out to mid-decade appear promising. The company remains the top natural gas distributor (as measured by customer count) in both Oklahoma and Kansas, and holds the number-three spot in Texas. Furthermore, we think those markets have decent growth possibilities and are located in one of the most active drilling regions in the United States. Too, ONE Gas seems capable of meeting its working capital requirements, capital expenditures, and other obligations for a while.

There are risks to consider, however. The company's lack of geographic diversification leaves it somewhat more vulnerable to regional economic downturns and regulations. Also, there's competition from other energy suppliers, including electric companies and propane dealers. Finally, pipeline ruptures, leaks, and other unfortunate occurrences can take a big bite out of profits if not adequately covered by insurance.

The stock, though untimely, may appeal to total return-minded investors with a long-term stance.

Frederick L. Harris, III *August 27, 2021*

(A) Diluted EPS. Excludes nonrecurring gain: 2017, $0.06. Next earnings report due early Nov. Quarterly EPS for 2018 don't add up due to rounding.

(B) Dividends historically paid in early March, June, Sept., and Dec. ■ Dividend reinvestment plan. Direct stock purchase plan.
(C) In millions.

Company's Financial Strength	B++
Stock's Price Stability	95
Price Growth Persistence	70
Earnings Predictability	100

SOUTH JERSEY INDS. NYSE-SJI

RECENT PRICE **25.32** | P/E RATIO **14.8** (Trailing: 26.7 Median: 19.0) | RELATIVE P/E RATIO **0.77** | DIV'D YLD **5.1%** | **VALUE LINE**

TIMELINESS 5 Lowered 5/28/21
SAFETY 3 Lowered 8/28/20
TECHNICAL 2 Raised 7/23/21
BETA 1.05 (1.00 = Market)

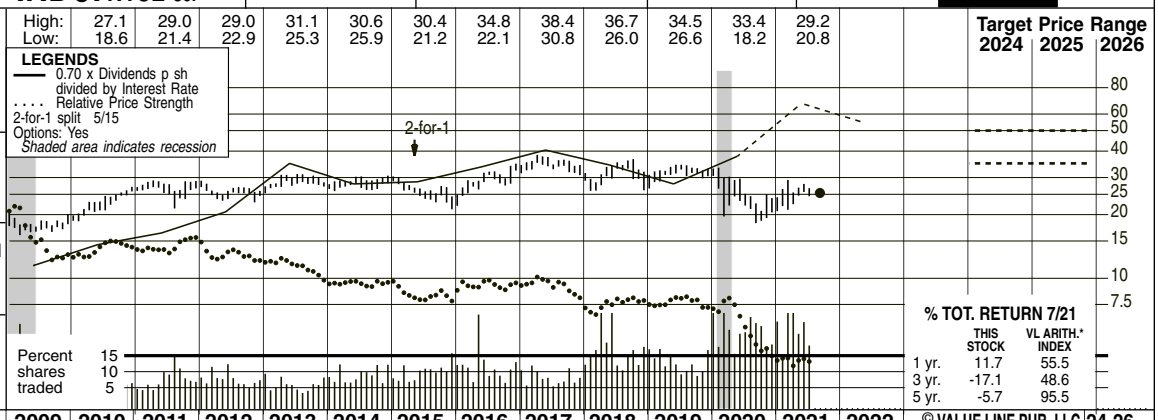
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$10-$36 $23 (-10%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	50	(+95%)	*22%*
Low	35	(+40%)	*13%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	132	110	141
to Sell	64	91	89
Hld's(000)	85672	110377	102245



Target Price Range 2024 | 2025 | 2026
80 60 50 40 30 25 20 15 10 7.5

% TOT. RETURN 7/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	11.7	55.5
3 yr.	-17.1	48.6
5 yr.	-5.7	95.5

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
15.89	15.88	16.15	16.18	14.19	15.48	13.71	11.16	11.18	12.98	13.52	13.04	15.63	19.20	17.63	15.32	*16.05*	*16.95*	Revenues per sh	*20.85*
1.25	1.75	1.60	1.74	1.86	2.10	2.23	2.34	2.48	2.67	2.42	2.67	2.79	2.91	2.56	3.32	*2.70*	*3.00*	"Cash Flow" per sh	*4.15*
.86	1.23	1.05	1.14	1.19	1.35	1.45	1.52	1.52	1.57	1.44	1.34	1.23	1.38	1.12	1.68	*1.65*	*1.85*	Earnings per sh [A]	*2.70*
.43	.46	.51	.56	.61	.68	.75	.83	.90	.96	1.02	1.06	1.10	1.13	1.16	1.19	*1.25*	*1.32*	Div'ds Decl'd per sh [B] ■	*1.50*
1.60	1.26	.94	1.04	1.83	2.79	3.20	4.01	4.84	5.01	4.87	3.50	3.43	3.99	5.46	4.84	*4.90*	*5.65*	Cap'l Spending per sh	*7.50*
6.75	7.55	8.12	8.67	9.12	9.54	10.33	11.63	12.64	13.65	14.62	16.22	14.99	14.82	15.41	16.51	*16.75*	*17.40*	Book Value per sh [C]	*20.85*
57.96	58.65	59.22	59.46	59.59	59.75	60.43	63.31	65.43	68.33	70.97	79.48	79.55	85.51	92.39	100.59	*112.00*	*115.00*	Common Shs Outst'g [D]	*120.00*
16.6	11.9	17.2	15.9	15.0	16.8	18.4	16.9	18.9	18.0	17.9	21.7	27.9	22.6	28.3	14.9	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*16.0*
.88	.64	.91	.96	1.00	1.07	1.15	1.08	1.06	.95	.90	1.14	1.40	1.22	1.51	.77			Relative P/E Ratio	*.90*
3.0%	3.2%	2.8%	3.1%	3.4%	3.0%	2.8%	3.2%	3.1%	3.4%	3.9%	3.6%	3.2%	3.6%	3.7%	4.8%			Avg Ann'l Div'd Yield	*3.5%*
828.6	706.3	731.4	887.0	959.6	1036.5	1243.1	1641.3	1628.6	1541.4	*1800*	*1950*	Revenues ($mill)	*2500*
87.0	93.3	97.1	104.0	99.0	102.8	98.1	116.2	103.0	163.0	*180*	*205*	Net Profit ($mill)	*320*
22.4%	10.8%	--	--	5.9%	42.0%	--	--	--	9.9%	*22.0%*	*21.0%*	Income Tax Rate	*21.0%*
10.5%	13.2%	13.3%	11.7%	10.3%	9.9%	7.9%	7.1%	6.3%	10.6%	*10.0%*	*10.5%*	Net Profit Margin	*12.8%*
40.5%	45.0%	45.1%	48.0%	49.2%	38.5%	48.5%	62.4%	59.2%	62.6%	*63.5%*	*63.5%*	Long-Term Debt Ratio	*61.5%*
59.5%	55.0%	54.9%	52.0%	50.8%	61.5%	51.5%	37.6%	40.8%	37.4%	*36.5%*	*36.5%*	Common Equity Ratio	*38.5%*
1048.3	1337.6	1507.4	1791.9	2043.9	2097.2	2315.4	3373.9	3493.9	4437.3	*5125*	*5450*	Total Capital ($mill)	*6500*
1352.4	1578.0	1859.1	2134.1	2448.1	2623.8	2700.2	3653.5	4073.5	4464.2	*4800*	*5150*	Net Plant ($mill)	*5800*
8.9%	7.4%	6.8%	6.4%	5.4%	5.4%	5.1%	4.4%	4.0%	4.8%	*4.5%*	*4.5%*	Return on Total Cap'l	*6.0%*
13.9%	12.7%	11.7%	11.2%	9.5%	8.0%	8.2%	9.2%	7.2%	9.8%	*9.5%*	*10.5%*	Return on Shr. Equity	*13.0%*
13.9%	12.7%	11.7%	11.2%	9.5%	8.0%	8.2%	9.2%	7.2%	9.8%	*9.5%*	*10.5%*	Return on Com Equity	*13.0%*
6.7%	5.8%	4.8%	4.3%	2.8%	1.6%	.9%	1.7%	NMF	2.9%	*2.0%*	*2.5%*	Retained to Com Eq	*5.5%*
52%	55%	59%	61%	71%	80%	89%	82%	104%	70%	*78%*	*74%*	All Div'ds to Net Prof	*56%*

CAPITAL STRUCTURE as of 6/30/21
Total Debt $3293.1 mill. **Due in 5 Yrs** $380.1 mill.
LT Debt $3177.4 mill. **LT Interest** $100 mill.

Leases, Uncapitalized Annual rentals $1.2 mill.
Pension Assets-12/20 $331 mill.
Oblig. $481.8 mill.

Pfd Stock None

Common Stock 112,447,099 shs.
as of 8/1/21

MARKET CAP: $2.8 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	6.4	34.0	87.9
Other	646.1	472.8	439.1
Current Assets	652.5	506.8	527.0
Accts Payable	232.2	256.6	226.1
Debt Due	1316.6	739.2	115.7
Other	183.1	167.8	247.8
Current Liab.	1731.9	1163.6	589.6
Fix. Chg. Cov.	176%	238%	254%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	1.5%	6.5%	*3.0%*
"Cash Flow"	4.5%	3.0%	*6.0%*
Earnings	1.5%	-1.5%	*11.5%*
Dividends	6.5%	4.0%	*4.5%*
Book Value	5.5%	2.5%	*5.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	521.9	227.3	302.5	589.6	1641.3
2019	637.3	266.9	261.2	463.2	1628.6
2020	534.1	260.0	261.5	485.8	1541.4
2021	674.3	311.8	*295*	*518.9*	*1800*
2022	*650*	*335*	*330*	*635*	*1950*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1.19	.07	d.27	.39	1.38
2019	1.09	d.13	d.30	.46	1.12
2020	1.15	d.01	d.06	.62	1.68
2021	1.26	.02	*d.15*	*.52*	*1.65*
2022	*1.32*	*.02*	*d.07*	*.58*	*1.85*

Calendar	QUARTERLY DIVIDENDS PAID [B]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	--	.273	.273	.553	1.10
2018	--	.280	.280	.567	1.13
2019	--	.287	.287	.582	1.16
2020	--	.295	.295	.598	1.19
2021	--	.303	.303		

BUSINESS: South Jersey Industries, Inc. is a holding company. The company distributes natural gas in New Jersey and Maryland. South Jersey Gas rev. mix '20: residential, 48%; commercial, 23%; cogen. and electric gen., 9%; industrial, 20%. Acq. Elizabethtown Gas and Elkton Gas, 7/18. Nonutil. oper. incl. South Jersey Energy, South Jersey Resources Group, South Jersey Exploration, Marina Energy, South Jersey Energy Service Plus, and SJI Midstream. Has about 1,130 empl. Off./dir. own less than 1% of common; BlackRock, 14.4%; State Street Corporation, 13.9%; The Vanguard Group, 10.8% (3/21 proxy). Pres. & CEO: Michael J. Renna. Chairman: Joseph M. Rigby. Inc.: NJ. Addr.: 1 South Jersey Plaza, Folsom, NJ 08037. Tel.: 609-561-9000. Web: www.sjindustries.com.

Shares of South Jersey Industries have traded in a fairly narrow range in recent months. The company reported solid results for the June quarter. The top line increased roughly 20%, on a year-over-year basis. Adjusted earnings per share of $0.02 marked a nice improvement over the prior-year deficit of $0.01. Utility South Jersey Gas benefited from continued growth in the customer base as well as infrastructure modernization programs. An increase in adjusted earnings here was partly offset by losses incurred at Elizabethtown Gas, owing to greater operating and depreciation expenses. Meanwhile, the Energy Management business has capitalized on improved asset optimization opportunities and additional fuel management contracts. Elsewhere, fuel cell and solar investments have paid off at the Energy Production segment. On a GAAP basis, South Jersey reported a share deficit of $0.87 for the recent interim. This was mostly due to an impairment charge of $87.4 million ($0.79 per share) related to the company's investment in the Penn East Pipeline.

Long-term prospects appear to be relatively favorable here. The company's utility business ought to further benefit from healthy customer growth, rate relief, and infrastructure modernization programs that allow it to enhance the reliability of its systems and earn an authorized return on these investments. Demand for natural gas should continue to rise within the company's service territories. We anticipate good performance on the nonutility side, as well. This should be driven by solid results at the Energy Management's Wholesale Services line. Measures by the company to control operating expenses will likely support profitability, too.

This stock is ranked to underperform the broader market averages for the coming six to 12 months. Looking further out, we anticipate solid growth in earnings per share for the company over the pull to mid-decade. From the recent quotation, this stock offers attractive long-term total return potential. This is supported by a generous dividend yield. All told, patient, income-seeking subscribers may want to take a closer look.

Michael Napoli, CFA *August 27, 2021*

(A) Based on economic egs. from 2007. GAAP EPS: '10, $1.11; '11, $1.49; '12, $1.49; '13, $1.28; '14, $1.46; '15, $1.52; '16, $1.56; '17, ($0.04); '18, $0.21; '19, $0.84; '20, $1.62. Excl. nonrecur. gain (loss): '10, ($0.24); '11, $0.04; '12, ($0.03); '13, ($0.24); '14, ($0.11); '15, $0.08; '16, $0.22; '17, ($1.27); '18, ($1.17); '19, ($0.28); '20, ($0.06). Next egs. rpt. due early November. **(B)** Div'ds paid early April, July, Oct., and late Dec. ■ Div. reinvest. plan avail. **(C)** Incl. reg. assets. In 2020: $674.0 mill., $6.70 per shr. **(D)** In mill., adj. for split.

Company's Financial Strength	B++
Stock's Price Stability	60
Price Growth Persistence	20
Earnings Predictability	65

SOUTHWEST GAS NYSE-SWX

RECENT PRICE **72.17** | P/E RATIO **16.9** (Trailing: 15.7 Median: 19.0) | RELATIVE P/E RATIO **0.88** | DIV'D YLD **3.4%** | **VALUE LINE**

TIMELINESS 4 Lowered 8/6/21
SAFETY 3 Lowered 1/4/91
TECHNICAL 5 Lowered 7/16/21
BETA .95 (1.00 = Market)

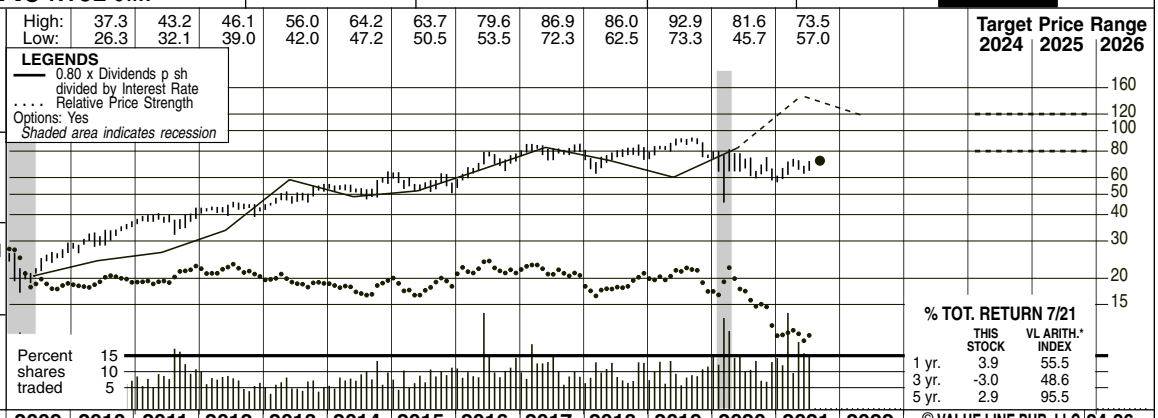
18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$31-$88 $60 (-20%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	120	(+65%)	*16%*
Low	80	(+10%)	*6%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	116	140	144
to Sell	137	123	132
Hld's(000)	46991	48058	48499



2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
43.59	48.47	50.28	48.53	42.00	40.18	41.07	41.77	42.08	45.61	52.00	51.82	53.00	54.31	56.72	57.68	***59.00***	***62.30***	Revenues per sh	***69.25***
5.20	5.97	6.21	5.76	6.16	6.46	6.81	7.73	8.24	8.47	8.62	9.29	8.83	8.14	9.40	9.87	***10.40***	***10.90***	"Cash Flow" per sh	***13.75***
1.25	1.98	1.95	1.39	1.94	2.27	2.43	2.86	3.11	3.01	2.92	3.18	3.62	3.68	3.94	4.14	***4.35***	***4.55***	Earnings per sh [A]	***6.25***
.82	.82	.86	.90	.95	1.00	1.06	1.18	1.32	1.46	1.62	1.80	1.98	2.08	2.18	2.28	***2.38***	***2.48***	Div'ds Decl'd per sh [B■†]	***2.80***
7.49	8.27	7.96	6.79	4.81	4.73	8.29	8.57	7.86	8.53	10.30	11.15	12.97	14.44	17.06	14.43	***11.85***	***14.75***	Cap'l Spending per sh	***22.30***
19.10	21.58	22.98	23.49	24.44	25.62	26.66	28.35	30.47	31.95	33.61	35.03	37.74	42.47	45.56	46.77	***49.15***	***52.05***	Book Value per sh	***66.90***
39.33	41.77	42.81	44.19	45.09	45.56	45.96	46.15	46.36	46.52	47.38	47.48	48.09	53.03	55.01	57.19	***59.00***	***61.00***	Common Shs Outst'g [C]	***65.00***
20.6	15.9	17.3	20.3	12.2	14.0	15.7	15.0	15.8	17.9	19.4	21.6	22.2	20.6	21.3	16.8	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	***16.0***
1.10	.86	.92	1.22	.81	.89	.98	.95	.89	.94	.98	1.13	1.12	1.11	1.13	.87			Relative P/E Ratio	***.90***
3.2%	2.6%	2.6%	3.2%	4.0%	3.2%	2.8%	2.8%	2.7%	2.7%	2.9%	2.6%	2.5%	2.7%	2.6%	3.3%			Avg Ann'l Div'd Yield	***2.8%***
1887.2	1927.8	1950.8	2121.7	2463.6	2460.5	2548.8	2880.0	3119.9	3298.9	***3480***	***3800***	Revenues ($mill)	***4500***
112.3	133.3	145.3	141.1	138.3	152.0	173.8	182.3	213.9	232.3	***255***	***275***	Net Profit ($mill)	***395***
36.2%	36.2%	35.0%	35.7%	36.4%	33.9%	32.8%	25.3%	20.5%	21.6%	***21.0%***	***21.0%***	Income Tax Rate	***21.0%***
6.0%	6.9%	7.4%	6.7%	5.6%	6.2%	6.8%	6.3%	6.9%	7.0%	***7.3%***	***7.2%***	Net Profit Margin	***8.8%***
43.2%	49.2%	49.4%	52.4%	49.3%	48.2%	49.8%	48.3%	47.9%	50.5%	***54.5%***	***54.0%***	Long-Term Debt Ratio	***49.0%***
56.8%	50.8%	50.6%	47.6%	50.7%	51.8%	50.2%	51.7%	52.1%	49.5%	***45.5%***	***46.0%***	Common Equity Ratio	***51.0%***
2155.9	2576.9	2793.7	3123.9	3143.5	3213.5	3613.3	4359.3	4806.4	5407.2	***6400***	***6875***	Total Capital ($mill)	***8550***
3218.9	3343.8	3486.1	3658.4	3891.1	4132.0	4523.7	5093.2	5685.2	6176.1	***6800***	***7200***	Net Plant ($mill)	***8400***
6.4%	6.4%	6.3%	5.7%	5.5%	5.8%	5.8%	5.2%	5.4%	5.3%	***5.0%***	***5.0%***	Return on Total Cap'l	***5.5%***
9.2%	10.2%	10.3%	9.5%	8.7%	9.1%	9.6%	8.1%	8.5%	8.7%	***9.0%***	***8.5%***	Return on Shr. Equity	***9.0%***
9.2%	10.2%	10.3%	9.5%	8.7%	9.1%	9.6%	8.1%	8.5%	8.7%	***9.0%***	***8.5%***	Return on Com Equity	***9.0%***
5.3%	6.1%	6.1%	5.0%	4.0%	4.1%	4.5%	3.6%	3.9%	4.0%	***4.0%***	***4.0%***	Retained to Com Eq	***5.0%***
43%	40%	41%	47%	54%	55%	53%	55%	54%	54%	***55%***	***55%***	All Div'ds to Net Prof	***46%***

CAPITAL STRUCTURE as of 6/30/21
Total Debt $3116.2 mill. **Due in 5 Yrs** $750.9 mill.
LT Debt $2478.8 mill. **LT Interest** $100.0 mill.
(Total interest coverage: 4.2x) (45% of Cap'l)
Leases, Uncapitalized Annual rentals $13.9 mill.
Pension Assets-12/20 $1238.7 mill.
Oblig. $1581.4 mill.

Pfd Stock None

Common Stock 59,093,403 shs.
as of 7/30/21

MARKET CAP: $4.3 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	49.5	83.4	47.6
Other	810.4	787.6	959.2
Current Assets	859.9	871.0	1006.8
Accts Payable	238.9	231.3	182.3
Debt Due	374.5	147.4	637.4
Other	466.5	533.3	452.7
Current Liab.	1079.9	912.0	1272.4
Fix. Chg. Cov.	340%	379%	513%

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	2.5%	4.0%	*3.5%*
"Cash Flow"	4.0%	1.5%	*7.0%*
Earnings	7.5%	5.5%	*8.0%*
Dividends	8.5%	8.0%	*4.5%*
Book Value	6.0%	7.0%	*7.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	754.3	670.9	668.1	786.7	2880.0
2019	833.6	713.0	725.2	848.1	3119.9
2020	836.3	757.2	791.2	914.2	3298.9
2021	885.9	821.4	***835***	***937.7***	***3480***
2022	***950***	***900***	***925***	***1025***	***3800***

Calendar	EARNINGS PER SHARE [A D] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1.63	.44	.25	1.36	3.68
2019	1.77	.41	.10	1.67	3.94
2020	1.31	.68	.32	1.82	4.14
2021	2.03	.43	***.20***	***1.69***	***4.35***
2022	***1.95***	***.55***	***.27***	***1.78***	***4.55***

Calendar	QUARTERLY DIVIDENDS PAID [B■†] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.450	.495	.495	.495	1.94
2018	.495	.520	.520	.520	2.06
2019	.520	.545	.545	.545	2.16
2020	.545	.570	.570	.570	2.26
2021	.570	.595			

BUSINESS: Southwest Gas Holdings, Inc. is the parent holding company of Southwest Gas and Centuri Group. Southwest Gas is a regulated gas distributor serving 2.1 million customers in Arizona, Nevada, and California. Centuri provides construction services. 2020 margin mix: residential and small commercial, 85%; large commercial and industrial, 3%; transportation, 12%. Total throughput: 2.2 billion therms. Has 11,149 employees. Off. & dir. own .8% of common; BlackRock, Inc., 12.3%; The Vanguard Group, Inc., 9.8%; Lazard Asset Management LLC, 9.4% (3/21 Proxy). Chairman: Michael J. Melarkey. Pres. & CEO: John P. Hester. Inc.: DE. Addr.: 8360 S. Durango Drive, P.O. Box 98510 Las Vegas, Nevada 89193. Tel.: 702-876-7237. Web: www.swgas.com.

Southwest Gas reported mixed results for the second quarter. The company posted revenue of $821.4 million, an advance of roughly 8% on a year-over-year basis. Southwest's utility operations benefited from rate relief and growth in the customer base. Elsewhere, Centuri experienced greater demand for gas infrastructure services. However, operating expenses also rose significantly, largely owing to an increase in the cost of completing gas infrastructure work. All told, share net of $0.43 was no match for the prior-year tally.

The company's infrastructure services provider, Centuri, has agreed to acquire Riggs Distler for $855 million in cash. This purchase will be funded by new debt. The transaction, which is scheduled to be completed in the current quarter, is expected to be accretive to the company's earnings in the first full year. This move will broaden Centuri's electric services platform to include 5G telecom and renewables services. It will expand the company's operating footprint into new markets in the Northeast and Mid-Atlantic region. This will also enhance Centuri's utility service offerings for its existing customers.

We anticipate solid results here in the coming years. The company's utility business ought to further benefit from rate relief and expansion in the customer base. Infrastructure investments should also bear fruit. Meantime, Centuri will probably continue to experience growing demand. This operation has a robust client base, and should further benefit from the need of utilities to replace aging infrastructure. A measure of cost control would also help.

This stock is ranked to trail the broader market for the coming six to 12 months. Looking further out, we anticipate solid growth in earnings for the company out to mid-decade. From the recent quotation, this equity offers healthy long-term total return potential. This is helped by a respectable dividend yield. The payout should continue to rise going forward. Also, Southwest Gas earns good marks for Financial Strength, Price Stability, and Earnings Predictability. Conservative accounts with a long time horizon may want to take a closer look.

Michael Napoli, CFA *August 27, 2021*

(A) Diluted earnings. Excl. nonrec. gains (losses): '05, (11¢); '06, 7¢. Next egs. report due early November. **(B)** Dividends historically paid early March, June, September, and December. ■† Div'd reinvestment and stock purchase plan avail. **(C)** In millions. **(D)** Totals may not sum due to rounding.

Company's Financial Strength	A
Stock's Price Stability	80
Price Growth Persistence	65
Earnings Predictability	95

SPIRE INC. NYSE-SR

RECENT PRICE **72.28** | P/E RATIO **17.9** (Trailing: 15.1 Median: 19.0) | RELATIVE P/E RATIO **0.94** | DIV'D YLD **3.7%** | **VALUE LINE**

TIMELINESS 4 Lowered 8/20/21
SAFETY 2 Raised 6/20/03
TECHNICAL 3 Lowered 7/2/21
BETA .85 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$37-$92	$65 (-10%)

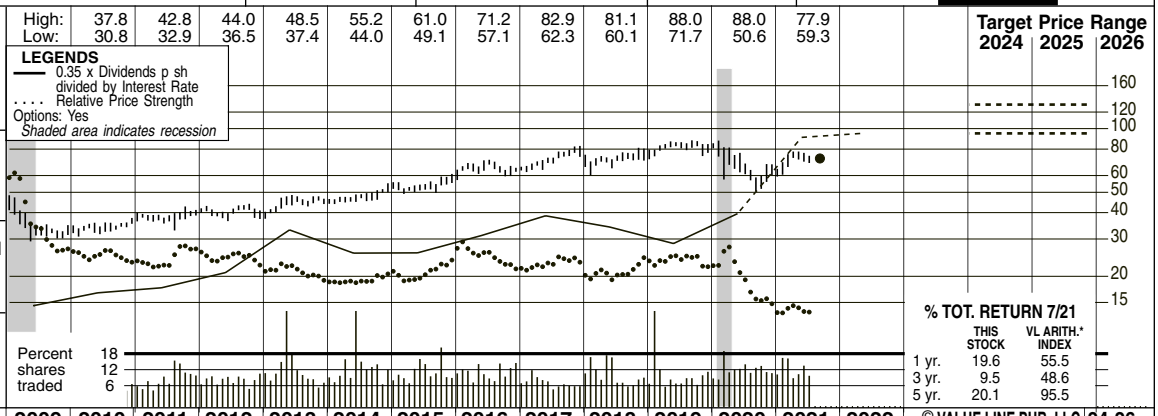
2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	130	(+80%)	*18%*
Low	95	(+30%)	*10%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	145	131	124
to Sell	121	148	139
Hld's(000)	40642	41028	42475

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
High:	37.8	42.8	44.0	48.5	55.2	61.0	71.2	82.9	81.1	88.0	80.0	77.9						
Low:	30.8	32.9	36.5	37.4	44.0	49.1	57.1	62.3	60.1	71.7	50.6	59.3						



% TOT. RETURN 7/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	19.6	55.5
3 yr.	9.5	48.6
5 yr.	20.1	95.5

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	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
Revenues per sh [A]	75.43	93.51	93.40	100.44	85.49	77.83	71.48	49.90	31.10	37.68	45.59	33.68	36.07	38.78	38.30	35.96	*42.30*	*37.75*	*58.20*
"Cash Flow" per sh	2.98	3.81	3.87	4.22	4.56	4.11	4.62	4.58	3.12	3.87	6.15	6.16	6.54	7.55	7.12	5.25	*8.75*	*8.10*	*10.50*
Earnings per sh [A B]	1.90	2.37	2.31	2.64	2.92	2.43	2.86	2.79	2.02	2.35	3.16	3.24	3.43	4.33	3.52	1.44	*4.70*	*4.00*	*5.50*
Div'ds Decl'd per sh [C■]	1.37	1.40	1.45	1.49	1.53	1.57	1.61	1.66	1.70	1.76	1.84	1.96	2.10	2.25	2.37	2.49	*2.60*	*2.72*	*3.10*
Cap'l Spending per sh	2.84	2.97	2.72	2.57	2.36	2.56	3.02	4.83	4.00	3.96	6.68	6.42	9.08	9.86	16.15	12.37	*11.35*	*10.95*	*11.45*
Book Value per sh [D]	17.31	18.85	19.79	22.12	23.32	24.02	25.56	26.67	32.00	34.93	36.30	38.73	41.26	44.51	45.14	44.19	*47.95*	*50.90*	*70.60*
Common Shs Outst'g [E]	21.17	21.36	21.65	21.99	22.17	22.29	22.43	22.55	32.70	43.18	43.36	45.65	48.26	50.67	50.97	51.60	*52.00*	*53.00*	*55.00*
Avg Ann'l P/E Ratio	16.2	13.6	14.2	14.3	13.4	13.7	13.0	14.5	21.3	19.8	16.5	19.6	19.8	16.7	22.8	NMF	*Bold figures are Value Line estimates*		*20.5*
Relative P/E Ratio	.86	.73	.75	.86	.89	.87	.82	.92	1.20	1.04	.83	1.03	1.00	.90	1.21	NMF			*1.15*
Avg Ann'l Div'd Yield	4.4%	4.3%	4.4%	3.9%	3.9%	4.7%	4.3%	4.1%	4.0%	3.8%	3.5%	3.1%	3.1%	3.1%	3.0%	3.4%			*2.8%*
Revenues ($mill) [A]	1603.3	1125.5	1017.0	1627.2	1976.4	1537.3	1740.7	1965.0	1952.4	1855.4	*2200*	*2000*	*3200*						
Net Profit ($mill)	63.8	62.6	52.8	84.6	136.9	144.2	161.6	214.2	184.6	88.6	*245*	*210*	*300*						
Income Tax Rate	31.4%	29.6%	25.0%	27.6%	31.2%	32.5%	32.4%	32.4%	15.7%	12.3%	*20.0%*	*21.0%*	*23.5%*						
Net Profit Margin	4.0%	5.6%	5.2%	5.2%	6.9%	9.4%	9.3%	10.9%	9.5%	4.8%	*11.1%*	*10.5%*	*9.4%*						
Long-Term Debt Ratio	38.9%	36.1%	46.6%	55.1%	53.0%	50.9%	50.0%	45.7%	45.0%	49.0%	*52.0%*	*51.0%*	*45.0%*						
Common Equity Ratio	61.1%	63.9%	53.4%	44.9%	47.0%	49.1%	50.0%	54.3%	55.0%	51.0%	*48.0%*	*49.0%*	*55.0%*						
Total Capital ($mill)	937.7	941.0	1959.0	3359.4	3345.1	3601.9	3986.3	4155.5	4625.6	4946.0	*5700*	*6000*	*7500*						
Net Plant ($mill)	928.7	1019.3	1776.6	2759.7	2941.2	3300.9	3665.2	3970.5	4352.0	4680.1	*5050*	*5350*	*6800*						
Return on Total Cap'l	8.1%	7.9%	3.3%	3.1%	5.1%	4.9%	5.0%	6.3%	5.1%	2.9%	*6.0%*	*5.0%*	*5.5%*						
Return on Shr. Equity	11.1%	10.4%	5.0%	5.6%	8.7%	8.2%	8.1%	9.5%	7.3%	3.5%	*9.0%*	*7.0%*	*7.5%*						
Return on Com Equity	11.1%	10.4%	5.0%	5.6%	8.7%	8.2%	8.1%	9.5%	7.9%	3.2%	*9.0%*	*7.0%*	*7.5%*						
Retained to Com Eq	4.9%	4.3%	1.0%	1.5%	3.7%	3.3%	3.3%	4.7%	2.7%	NMF	*3.5%*	*2.0%*	*3.0%*						
All Div'ds to Net Prof	56%	59%	81%	73%	58%	59%	60%	51%	66%	NMF	*61%*	*76%*	*62%*						

CAPITAL STRUCTURE as of 6/30/21
Total Debt $3510.8 mill. **Due in 5 Yrs** $1720.0 mill.
LT Debt $2939.0 mill. **LT Interest** $135.0 mill.
(Total interest coverage: 2.0x)

Leases, Uncapitalized Annual rentals $8.8 mill.
Pension Assets-9/20 $897.9 mill.
Oblig. $1401.3 mill.
Pfd Stock $242.0 mill. **Pfd Div'd** $14.8 mill.
Common Stock 51,684,120 shs.
as of 7/31/21

MARKET CAP: $3.7 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	5.8	4.1	23.9
Other	608.7	586.5	874.4
Current Assets	614.5	590.6	898.3
Accts Payable	301.5	243.3	352.1
Debt Due	783.2	708.4	571.8
Other	384.1	497.5	367.9
Current Liab.	1468.8	1449.2	1291.8
Fix. Chg. Cov.	272%	373%	385%

ANNUAL RATES (of change (per sh))	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	-8.0%	- -	*7.5%*
"Cash Flow"	4.5%	8.5%	*8.0%*
Earnings	1.5%	4.5%	*10.0%*
Dividends	4.5%	6.0%	*4.5%*
Book Value	7.0%	5.5%	*7.5%*

Fiscal Year Ends	QUARTERLY REVENUES ($ mill.)[A] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2018	561.8	813.4	350.6	239.2	1965.0
2019	602.0	803.5	321.3	225.6	1952.4
2020	566.9	715.5	321.1	251.9	1855.4
2021	512.6	1104.9	327.8	*254.7*	*2200*
2022	*530*	*892*	*325*	*253*	*2000*

Fiscal Year Ends	EARNINGS PER SHARE [A B F] Dec.31	Mar.31	Jun.30	Sep.30	Full Fiscal Year
2018	2.39	2.03	.52	d.51	4.33
2019	1.32	3.04	d.09	d.74	3.52
2020	1.24	2.54	d1.87	d.45	1.44
2021	1.65	3.55	.03	*d.53*	*4.70*
2022	*1.75*	*2.78*	*.05*	*d.58*	*4.00*

Cal-endar	QUARTERLY DIVIDENDS PAID [C ■] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.525	.525	.525	.525	2.10
2018	.5625	.5625	.5625	.5625	2.25
2019	.5925	.5925	.5925	.5925	2.37
2020	.6225	.6225	.6225	.6225	2.49
2021	.65	.65	.65		

BUSINESS: Spire Inc., formerly known as the Laclede Group, Inc., is a holding company for natural gas utilities, which distributes natural gas across Missouri, including the cities of St. Louis and Kansas City, Alabama, and Mississippi. Has roughly 1.7 million customers. Acquired Missouri Gas 9/13, Alabama Gas Co 9/14. Utility therms sold and transported in fiscal 2020: 3.3 bill. Revenue mix for regulated operations: residential, 68%; commercial and industrial, 22%; transportation, 6%; other, 4%. Has about 3,583 employees. Officers and directors own 3.0% of common shares; BlackRock, 12.0% (1/21 proxy). Chairman: Edward Glotzbach; CEO: Suzanne Sitherwood. Inc.: Missouri. Address: 700 Market Street, St. Louis, Missouri 63101. Tel.: 314-342-0500. Internet: www.spireenergy.com.

Spire Inc. seems to be headed toward a record fiscal 2021, which ends on September 30th. Through the first nine months, earnings per share were $5.23, some 2.7 times higher than the year-ago tally of $1.91 (hurt by the effects of the coronavirus). One supporting factor was the Gas Utility unit, aided by increased Infrastructure System Replacement Surcharge (ISRS) revenues for the Missouri operations, the impact of colder weather, plus rate adjustments at Spire Alabama. Furthermore, favorable market conditions, particularly in February when Winter Storm Uri struck parts of the United States, boosted results of the Gas Marketing division. If there are no major downside surprises in the fourth quarter, it appears that full-year profits will surge more than threefold, to $4.70 a share, compared to the fiscal 2020 total of $1.44. Concerning fiscal 2022, we anticipate diminished, though still respectable, share net of $4.00, given that this year's second-quarter number will be difficult to beat.

Corporate finances are in solid condition. When the June period concluded, cash on hand stood at nearly $24 million. Moreover, there was $975 million available through a revolving credit facility expiring in October, 2023. Also, long-term debt was a manageable 52% of total capital, and short-term obligations were not a big obstacle. So, the company should continue to satisfy its various commitments with little trouble.

Prospects out to mid-decade look decent. The gas utilities boast 1.7 million customers in Mississippi, Alabama, and Missouri, providing a measure of regional diversity. Furthermore, the other businesses, especially pipelines, hold promise. Additional expansionary projects and technological enhancements in customer service and elsewhere ought to help Spire, as well. Lastly, acquisitions are possible, supported, of course, by the healthy balance sheet.

The good-quality stock ought to draw the interest of total return-focused accounts with a long-term view. Capital appreciation potential during the 2024-2026 period seems appealing. Consider, also, the promising dividend growth possibilities. But these shares are untimely.

Frederick L. Harris, III August 27, 2021

(A) Fiscal year ends Sept. 30th. **(B)** Based on diluted shares outstanding. Excludes nonrecurring loss: '06, 7¢. Excludes gain from discontinued operations: '08, 94¢. Next earnings report due late Oct. **(C)** Dividends paid in early January, April, July, and October. ■ Dividend reinvestment plan available. **(D)** Incl. deferred charges. In '20: $1,171.6 mill., $22.71/sh. **(E)** In millions. **(F)** Qtly. egs. may not sum due to rounding or change in shares outstanding.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	60
Earnings Predictability	50

DUKE ENERGY NYSE-DUK

RECENT PRICE 106.19 | P/E RATIO 20.2 (Trailing: 27.0 Median: 18.0) | RELATIVE P/E RATIO 1.05 | DIV'D YLD 3.7% | VALUE LINE

TIMELINESS 3 Raised 5/7/21
SAFETY 2 New 6/1/07
TECHNICAL 4 Lowered 7/30/21
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$52-$130	$91 (-15%)

2024-26 PROJECTIONS

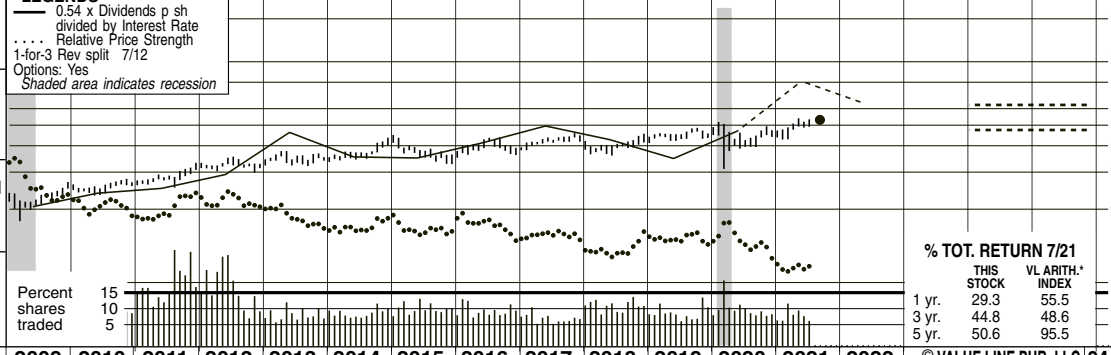
	Price	Gain	Ann'l Total Return
High	125	(+20%)	*8%*
Low	95	(-10%)	*2%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	686	763	796
to Sell	702	683	681
Hld's(000)	464090	472627	483371

	High:	55.8	66.4	71.1	75.5	87.3	90.0	87.8	91.8	91.4	97.4	103.8	108.0
	Low:	46.4	50.6	59.6	64.2	67.1	65.5	70.2	76.1	72.0	82.5	62.1	85.6

LEGENDS
0.54 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
1-for-3 Rev split 7/12
Options: Yes
Shaded area indicates recession



% TOT. RETURN 7/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	29.3	55.5
3 yr.	44.8	48.6
5 yr.	50.6	95.5

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
- -	25.32	30.24	31.15	29.18	32.22	32.63	27.88	34.84	33.84	34.10	32.49	33.66	33.73	34.21	31.04	*32.15*	*33.05*	Revenues per sh	*36.00*
- -	7.86	8.11	7.34	7.58	8.49	8.68	6.80	8.56	9.11	9.40	9.20	10.01	10.49	12.13	10.89	*12.60*	*13.30*	"Cash Flow" per sh	*15.50*
- -	2.76	3.60	3.03	3.39	4.02	4.14	3.71	3.98	4.13	4.10	3.71	4.22	4.13	5.07	3.92	*5.15*	*5.45*	Earnings per sh [A]	*6.50*
- -	- -	2.58	2.70	2.82	2.91	2.97	3.03	3.09	3.15	3.24	3.36	3.49	3.64	3.75	3.82	*3.90*	*3.98*	Div'd Decl'd per sh [B] ■	*4.25*
- -	8.07	7.43	10.35	9.85	10.84	9.80	7.81	7.83	7.62	9.83	11.29	11.50	12.91	15.17	12.88	*13.60*	*16.60*	Cap'l Spending per sh	*15.50*
- -	62.30	50.40	49.51	49.85	50.84	51.14	58.04	58.54	57.81	57.74	58.62	59.63	60.27	61.20	59.82	*61.15*	*62.60*	Book Value per sh [C]	*68.50*
- -	418.96	420.62	423.96	436.29	442.96	445.29	704.00	706.00	707.00	688.00	700.00	700.00	727.00	733.00	769.00	*770.00*	*770.00*	Common Shs Outst'g [D]	*770.00*
- -	- -	16.1	17.3	13.3	12.7	13.8	17.5	17.4	17.9	18.2	21.3	19.9	19.4	17.7	22.4	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*17.0*
- -	- -	.85	1.04	.89	.81	.87	1.11	.98	.94	.92	1.12	1.00	1.05	.94	1.16			Relative P/E Ratio	*.95*
- -	- -	4.4%	5.2%	6.2%	5.7%	5.2%	4.7%	4.4%	4.3%	4.3%	4.3%	4.2%	4.5%	4.2%	4.4%			Avg Ann'l Div'd Yield	*3.9%*
14529	19624	24598	23925	23459	22743	23565	24521	25079	23868	*24750*	*25450*	Revenues ($mill)	*27800*						
1839.0	2136.0	2813.0	2934.0	2854.0	2560.0	2963.0	2928.0	3755.0	2996.0	*4080*	*4315*	Net Profit ($mill)	*5100*						
31.3%	30.2%	32.6%	30.6%	32.2%	31.0%	30.4%	14.2%	12.7%	4.9%	*7.0%*	*7.0%*	Income Tax Rate	*7.0%*						
23.2%	22.3%	8.8%	7.2%	9.2%	11.7%	12.3%	13.0%	7.9%	8.9%	*7.0%*	*7.0%*	AFUDC % to Net Profit	*7.0%*						
45.1%	47.0%	48.0%	47.7%	48.6%	52.6%	54.0%	53.8%	54.0%	53.7%	*54.0%*	*54.5%*	Long-Term Debt Ratio	*54.5%*						
54.9%	52.9%	52.0%	52.3%	51.4%	47.4%	46.0%	46.2%	44.1%	44.4%	*44.0%*	*44.0%*	Common Equity Ratio	*43.5%*						
41451	77307	79482	78088	77222	86609	90774	94940	101807	103589	*106550*	*109700*	Total Capital ($mill)	*120900*						
42661	68558	69490	70046	75709	82520	86391	91694	102127	106782	*111500*	*118275*	Net Plant ($mill)	*134100*						
5.6%	3.6%	4.6%	4.8%	4.8%	4.0%	4.3%	4.2%	4.8%	3.9%	*5.0%*	*5.0%*	Return on Total Cap'l	*5.5%*						
8.1%	5.2%	6.8%	7.2%	7.2%	6.2%	7.1%	6.7%	8.0%	6.2%	*8.5%*	*8.5%*	Return on Shr. Equity	*9.5%*						
8.1%	5.2%	6.8%	7.2%	7.2%	6.2%	7.1%	6.7%	8.3%	6.3%	*8.5%*	*8.5%*	Return on Com Equity [E]	*9.5%*						
2.2%	.9%	1.5%	1.7%	1.5%	.6%	1.2%	1.0%	2.4%	.4%	*2.0%*	*2.5%*	Retained to Com Eq	*3.5%*						
72%	82%	78%	76%	79%	91%	83%	84%	71%	94%	*76%*	*74%*	All Div'ds to Net Prof	*66%*						

CAPITAL STRUCTURE as of 3/31/21
Total Debt $64418 mill. **Due in 5 Yrs** $21060 mill.
LT Debt $54768 mill. **LT Interest** $2178 mill.
Incl. $845 mill. finance leases.
(LT interest earned: 2.2x)
Leases, Uncapitalized Annual rentals $229 mill.
Pension Assets-12/20 $9337 mill.
Oblig $8634 mill.
Pfd Stock $1962 mill. **Pfd Div'd** $107 mill.
40 mill. shs. 5.75%, cum., $25 liq. value, redeemable at $25.50 prior to 6/15/24; 1 mill. shs. 4.875%, cum., $1000 liq. value.
Common Stock 769,218,956 shs. **as of 4/30/21**
MARKET CAP: $82 billion (Large Cap)

ELECTRIC OPERATING STATISTICS

	2018	2019	2020
% Change Retail Sales (KWH)	+3.9	-.9	-2.3
Avg. Indust. Use (MWH)	2953	2934	NA
Avg. Indust. Revs. per KWH (¢)	NA	NA	NA
Capacity at Peak (Mw)	NA	NA	NA
Peak Load, Summer (Mw)	NA	NA	NA
Annual Load Factor (%)	NA	NA	NA
% Change Customers (avg.)	+1.4	+1.5	NA
Fixed Charge Cov. (%)	218	233	183

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	.5%	-1.0%	*1.5%*
"Cash Flow"	3.5%	4.5%	*5.5%*
Earnings	2.5%	1.5%	*7.0%*
Dividends	3.0%	3.5%	*2.0%*
Book Value	2.0%	1.0%	*2.0%*

QUARTERLY REVENUES ($ mill.)

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	6135	5643	6628	6115	24521
2019	6163	5873	6940	6103	25079
2020	5949	5421	6721	5777	23868
2021	6150	*5650*	*6900*	*6050*	*24750*
2022	*6350*	*5800*	*7100*	*6200*	*25450*

EARNINGS PER SHARE [A]

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1.17	.71	1.63	.61	4.13
2019	1.24	1.12	1.82	.89	5.07
2020	1.24	1.08	1.74	d.13	3.92
2021	1.25	*1.10*	*1.80*	*1.00*	*5.15*
2022	*1.35*	*1.15*	*1.90*	*1.05*	*5.45*

QUARTERLY DIVIDENDS PAID [B] ■

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.855	.855	.89	.89	3.49
2018	.89	.89	.9275	.9275	3.64
2019	.9275	.9275	.945	.945	3.75
2020	.945	.945	.965	.965	3.82
2021	.965	.965	.985		

BUSINESS: Duke Energy Corporation is a holding company for utilities with 7.6 mill. elec. customers in NC, FL, IN, SC, OH, & KY, and 1.6 mill. gas customers in OH, KY, NC, SC, and TN. Owns independent power plants & has 25% stake in National Methanol in Saudi Arabia. Acq'd Progress Energy 7/12; Piedmont Natural Gas 10/16; discontinued most int'l ops. in '16. Elec. rev. breakdown: residential, 45%; commercial, 28%; industrial, 13%; other, 14%. Generating sources: gas, 31%; nuclear, 30%; coal, 18%; other, 2%; purchased, 19%. Fuel costs: 27% of revs. '20 reported deprec. rate: 3.0%. Has 27,500 employees. Chairman, President & CEO: Lynn J. Good. Inc.: DE. Address: 550 South Tryon St., Charlotte, NC 28202-1803. Tel.: 704-382-3853. Internet: www.duke-energy.com.

Duke Energy has come under criticism from an investor group. Elliott Management, with an undisclosed stake in Duke, is proposing the separation of Duke into three utilities, believing that the performance of those in Florida and the Midwest need improvement. Duke responded by stating its belief that the company's scale is an asset. So far, this does not appear to have had a large effect on the share price, but this bears attention from investors.

Earnings will likely be much improved in 2021. The bottom line fell into the red in the fourth quarter of 2020 due to coal-ash remediation costs that the company was unable to recover from customers. Duke is also benefiting from rate relief. Our estimate is at the midpoint of management's targeted range of $5.00-$5.30 a share.

Rate relief should help lift the bottom line in 2022. In Florida, the state commission approved a settlement calling for electric tariff hikes of $67 million in 2022, $49 million in 2023, and $79 million in 2024. The allowed return on equity is 8.85%-10.85% and the common-equity ratio is 53%. In North Carolina, Piedmont Gas is seeking an increase of $109 million (10.4%), based on an ROE of 10.25% and a common-equity ratio of 53%. New rates will be in place as early as November of 2021. Note that earlier this year, Duke's electric utilities in North Carolina received rate hikes, so a full year's effect of these increases will boost earnings in 2022.

Duke is awaiting regulatory approval of an asset sale. The company intends to raise over $2 billion through the sale of its Indiana electric utility in two phases. This would take care of its equity needs through 2025. The proposed sale has come under some criticism, however.

The board raised the dividend, effective with the September payment. The 2.1% increase was $0.02 a share. This growth rate is well below the industry average because the payout ratio is high.

The dividend yield is slightly above the utility mean. There is some speculative appeal if anything happens from the conflict with Elliott Management. Note, too, that in 2020 NextEra Energy reportedly expressed interest in buying Duke.

Paul E. Debbas, CFA *August 13, 2021*

(A) Dil. EPS. Excl. nonrec. losses: '12, 70¢; '13, 24¢; '14, 67¢; '17, 15¢; '18, 41¢; '20, $2.21; losses on disc. ops.: '14, 80¢; '16, 60¢; '18, '20 EPS don't sum due to rounding. Next egs. due early Nov. **(B)** Div'ds paid mid-Mar., June, Sept., & Dec. ■ Div'd reinv. plan avail. **(C)** Incl. intang. In '20: $41.25/sh. **(D)** In mill., adj. for rev. split. **(E)** Rate base: Net orig. cost. Rate all'd on com. eq. in '21 in NC: 9.6%; in '19 in SC: 9.5%; in '20 in FL: 9.5%-11.5%; in '20 in IN: 9.7%; earn. on avg. com. eq., '20: 9.9%. Reg. Clim.: NC, SC Avg.; OH, IN Above Avg.

Company's Financial Strength	A
Stock's Price Stability	95
Price Growth Persistence	40
Earnings Predictability	90

NISOURCE INC. NYSE-NI

RECENT PRICE **25.64** | P/E RATIO **18.2** (Trailing: 19.3 Median: 21.0) | RELATIVE P/E RATIO **0.95** | DIV'D YLD **3.4%** | **VALUE LINE**

TIMELINESS 4 Lowered 6/4/21
SAFETY 3 Lowered 3/19/21
TECHNICAL 3 Raised 6/18/21
BETA .85 (1.00 = Market)

18-Month Target Price Range
Low-High **Midpoint (% to Mid)**
$14-$31 $23 (-10%)

2024-26 PROJECTIONS

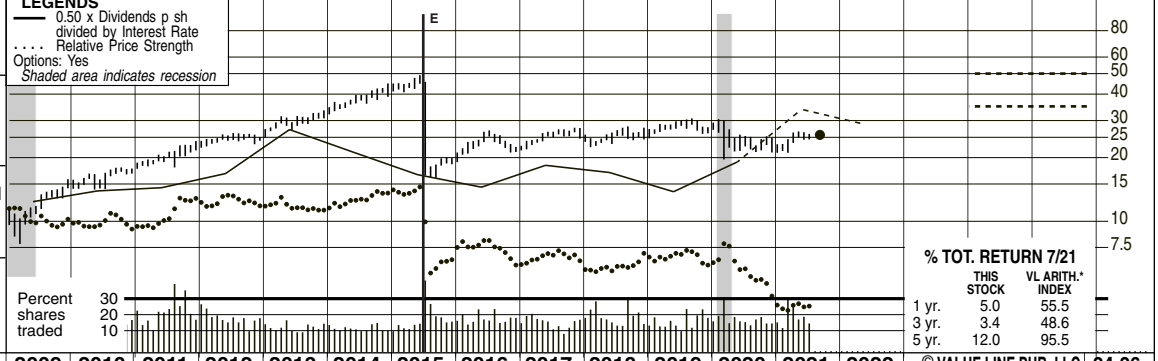
	Price	Gain	Ann'l Total Return
High	50	(+95%)	*20%*
Low	35	(+35%)	*11%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	200	198	252
to Sell	202	219	188
Hld's(000)	361290	359962	361696

	18.0	24.0	26.2	33.5	44.9	49.2	26.9	27.8	28.1	30.7	30.5	26.6
High:	14.1	17.7	22.3	24.8	32.1	16.0	19.0	21.7	22.4	24.7	19.6	21.1

LEGENDS
0.50 x Dividends p sh divided by Interest Rate
.... Relative Price Strength
Options: Yes
Shaded area indicates recession



Target Price Range

2024	2025	2026

% TOT. RETURN 7/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	5.0	55.5
3 yr.	3.4	48.6
5 yr.	12.0	95.5

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
28.97	27.37	28.96	32.36	24.02	22.99	21.33	16.31	18.04	20.47	14.58	13.90	14.46	13.74	13.63	11.95	*12.90*	*13.75*	Revenues per sh	*16.25*
3.14	3.18	3.20	3.32	2.96	3.19	2.98	3.13	3.41	3.60	2.27	2.71	2.07	2.86	3.17	3.15	*3.10*	*3.40*	"Cash Flow" per sh	*4.20*
1.08	1.14	1.14	1.34	.84	1.06	1.05	1.37	1.57	1.67	.63	1.00	.39	1.30	1.31	1.32	*1.35*	*1.60*	Earnings per sh [A]	*2.25*
.92	.92	.92	.92	.92	.92	.92	.94	.98	1.02	.83	.64	.70	.78	.80	.84	*.88*	*.92*	Div'd Decl'd per sh [B] ■	*1.04*
2.17	2.33	2.88	3.54	2.81	2.88	3.99	4.83	5.99	6.42	4.26	4.57	5.03	4.88	4.72	4.49	*4.55*	*4.50*	Cap'l Spending per sh	*4.35*
18.09	18.32	18.52	17.24	17.54	17.63	17.71	17.90	18.77	19.54	12.04	12.60	12.82	13.08	13.36	12.66	*14.15*	*14.45*	Book Value per sh [C]	*15.55*
272.62	273.65	274.18	274.26	276.79	279.30	282.18	310.28	313.68	316.04	319.11	323.16	337.02	372.36	382.14	391.76	*395.00*	*400.00*	Common Shs Outst'g [D]	*415.00*
21.4	19.2	18.8	12.1	14.3	15.3	19.4	17.9	18.9	22.7	37.3	23.2	NMF	19.3	21.3	18.7	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*19.0*
1.14	1.04	1.00	.73	.95	.97	1.22	1.14	1.06	1.19	1.88	1.22	NMF	1.04	1.13	.96			Relative P/E Ratio	*1.05*
4.0%	4.2%	4.3%	5.7%	7.6%	5.7%	4.5%	3.8%	3.3%	2.7%	3.5%	2.8%	2.8%	3.1%	2.9%	3.4%			Avg Ann'l Div'd Yield	*2.5%*
6019.1	5061.2	5657.3	6470.6	4651.8	4492.5	4874.6	5114.5	5208.9	4681.7	*5100*	*5500*	Revenues ($mill)	*6740*
303.8	410.6	490.9	530.7	198.6	328.1	128.6	478.3	549.8	562.6	*525*	*630*	Net Profit ($mill)	*850*
35.0%	34.4%	34.8%	36.9%	41.6%	35.7%	71.0%	19.7%	17.0%	18.3%	*19.0%*	*19.0%*	Income Tax Rate	*19.0%*
- -	- -	- -	- -	- -	- -	- -	- -	2.9%	2.0%	*2.0%*	*2.0%*	AFUDC % to Net Profit	*2.0%*
55.6%	55.1%	56.3%	56.9%	60.7%	59.8%	63.5%	55.3%	56.8%	61.2%	*60.0%*	*60.0%*	Long-Term Debt Ratio	*60.0%*
44.4%	44.9%	43.7%	43.1%	39.3%	40.2%	36.5%	37.9%	36.9%	32.9%	*40.0%*	*40.0%*	Common Equity Ratio	*40.0%*
11264	12373	13480	14331	9792.0	10129	11832	12856	13843	15058	*16200*	*16625*	Total Capital ($mill)	*18330*
11800	12916	14365	16017	12112	13068	14360	15543	16912	16620	*16750*	*17000*	Net Plant ($mill)	*17500*
4.4%	5.0%	5.2%	5.3%	4.0%	5.0%	2.6%	5.1%	5.3%	5.0%	*3.5%*	*4.0%*	Return on Total Cap'l	*5.0%*
6.1%	7.4%	8.3%	8.6%	5.2%	8.1%	3.0%	8.3%	9.2%	9.6%	*8.5%*	*9.5%*	Return on Shr. Equity	*11.5%*
6.1%	7.4%	8.3%	8.6%	5.2%	8.1%	3.0%	9.6%	9.7%	10.5%	*8.5%*	*9.5%*	Return on Com Equity	*11.5%*
.9%	2.5%	3.1%	3.4%	NMF	3.0%	NMF	4.0%	3.8%	3.7%	*2.5%*	*3.5%*	Retained to Com Eq	*5.5%*
85%	67%	62%	61%	NMF	63%	NMF	60%	64%	67%	*71%*	*63%*	All Div'ds to Net Prof	*50%*

CAPITAL STRUCTURE as of 6/30/21
Total Debt $9246.9 mill. **Due in 5 Yrs** $2651 ill.
LT Debt $9201.6 mill. **LT Interest** $379 mill.
(Interest cov. earned: 2.2x) (58% of Cap'l)

Leases, Uncapitalized Annual rentals $32.7 mill.
Pension Assets-12/20 $2.1 bill. **Oblig.** $2.1 bill.

Pfd Stock $880 mill. **Pfd Div'd** $28.5 mill.

Common Stock 392,410,381 shs.
as of 7/26/21
MARKET CAP: $10.1 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	139.3	116.5	77.5
Other	1714.6	1542.9	1306.7
Current Assets	1853.9	1659.4	1384.2
Accts Payable	666.0	589.0	480.4
Debt Due	1783.6	526.3	45.3
Other	1296.2	1164.1	1181.2
Current Liab.	3745.8	2279.4	1706.9
Fix. Chg. Cov.	250%	250%	255%

ANNUAL RATES (of change (per sh))	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	-7.0%	-6.0%	*3.5%*
"Cash Flow"	-.5%	- -	*6.0%*
Earnings	2.0%	.5%	*9.5%*
Dividends	-1.5%	-3.0%	*4.5%*
Book Value	-3.0%	-5.0%	*4.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	1750.8	1007.0	895.0	1461.7	5114.5
2019	1869.8	1010.4	931.5	1397.2	5208.9
2020	1605.5	962.7	902.5	1211.0	4681.7
2021	1545.6	986.0	*1075*	*1493.4*	*5100*
2022	*1630*	*1120*	*1160*	*1590*	*5500*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.77	.07	.10	.38	1.30
2019	.82	.05	- -	.45	1.31
2020	.76	.13	.09	.34	1.32
2021	.77	.13	*.10*	*.35*	*1.35*
2022	*.83*	*.20*	*.17*	*.40*	*1.60*

Calendar	QUARTERLY DIVIDENDS PAID [B] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.175	.175	.175	.175	.70
2018	.195	.195	.195	.195	.78
2019	.200	.200	.200	.200	.80
2020	.21	.21	.21	.21	.84
2021	.22	.22	.22		

BUSINESS: NiSource Inc. is a holding company for Northern Indiana Public Service Company (NIPSCO), which supplies electricity and gas to the northern third of Indiana. Customers: 479,185 electric in Indiana, 3,200,000 million gas in Indiana, Ohio, Pennsylvania, Kentucky, Virginia, Maryland, through its Columbia subsidiaries. Revenue breakdown, 2020: electrical, 31%; gas, 69%; other, less than 1%. Generating sources, coal, 69.4%; purchased & other, 30.6%. 2020 reported depreciation rates: 2.9% electric, 2.2% gas. Has 7,304 employees. Chairman: Richard L. Thompson. President & Chief Executive Officer: Joseph Hamrock. Incorporated: Indiana. Address: 801 East 86th Avenue, Merrillville, Indiana 46410. Telephone: 877-647-5990. Internet: www.nisource.com.

NiSource Inc. posted somewhat mixed June-quarter financials. To that point, revenues advanced 2.4%, to $986 million, reflecting a 13.3% rise in Electricity volumes, to $403.7 million, and a 24.5% increase in Corporate & Other sales, to $125.6 million, partially offset by a 5.3% downturn in Gas Distribution volumes, to $577.3 million. On the profitability front, operating expenses decreased 490 basis points, as a percentage of the top line. However, a sizable portion of that improvement was related to a large loss on the sale of assets that occurred in 2020. After accounting for a moderate uptick in corporate taxes, NI's earnings remained unchanged at $0.13 per share. This was a bit below our call of $0.15.

Consequently, we have sliced a nickel off our 2021 share-net estimate, to $1.35. Our revised figure would represent a year-over-year gain of about 2.5%. This falls in line with management's updated guidance range of $1.32-$1.36. It should be supported by an estimated increase in revenues of about 9%, to $5.1 billion. Electricity operations continue to grow nicely. Meanwhile, the Gas Distribution segment has multiple rate cases filed across numerous geographies. In total, the Columbia Gas of Ohio, Kentucky, and Maryland units have filed for nearly $253 million in base-rate increases. Finally, the NIPSCO utility unit filed for a rate increase of $52.3 million. Once approved, these should help the company to achieve a nice return on its investment in capital growth projects. On that note, NiSource is planning on spending $10 billion through 2024 to fund growth, safety, reliability, and modernization projects. Those efforts are bearing fruit in the form of two renewable energy projects that have been recently brought on line. What's more, the Indiana Crossroads Wind Project is on pace to be placed into service in the fourth quarter.

Short-term accounts will want to look elsewhere. Since our May review, these shares have fallen one notch in Timeliness, to 4, suggesting the stock will lag the broader market averages in the coming year. That said, a healthy payout and attractive capital appreciation potential may appeal to patient investors.

Bryan J. Fong *August 27, 2021*

(A) Dil. EPS. Excl. nonrec. gains (losses): '05, (4¢); gains (losses) on disc. ops.: '05, 10¢; '06, (11¢); '07, 3¢; '08, ($1.14); '15, (30¢); '18, ($1.48). Next egs. report due late Nov. Qtl'y egs. may not sum to total due to rounding. **(B)** Div'ds historically paid in mid-Feb., May, Aug., Nov. ■ Div'd reinv. avail. **(C)** Incl. intang in '20: $1485.9 million, $3.79/sh. **(D)** In mill. **(E)** Spun off Columbia Pipeline Group (7/15)

Company's Financial Strength	B+
Stock's Price Stability	95
Price Growth Persistence	25
Earnings Predictability	45

PPL CORPORATION NYSE-PPL

RECENT PRICE **28.46** | P/E RATIO **23.9** (Trailing: 17.9 Median: 13.0) | RELATIVE P/E RATIO **1.24** | DIV'D YLD **5.8-3.5%** | **VALUE LINE**

TIMELINESS 5 Lowered 6/4/21
SAFETY 2 Raised 8/21/15
TECHNICAL 4 Lowered 8/13/21
BETA 1.10 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$11-$38	$25 (-15%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	30	(+5%)	*6%*
Low	20	(-30%)	*-2%*

Institutional Decisions

	3Q2020	4Q2020	1Q2021
to Buy	317	332	368
to Sell	386	373	352
Hld's(000)	519491	510525	507894

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
High:	33.1	30.3	30.2	33.6	38.1	36.7	39.9	40.2	32.5	36.3	36.8	30.0						
Low:	23.8	24.1	26.7	28.4	29.4	29.2	32.1	30.7	25.3	27.8	18.1	26.2						

Target Price Range 2024 | 2025 | 2026

% TOT. RETURN 7/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	11.3	55.5
3 yr.	14.7	48.6
5 yr.	-3.8	95.5

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
	16.36	17.92	17.41	21.47	20.03	17.63	22.02	21.11	18.82	17.27	11.38	11.06	10.74	10.81	10.13	9.89	*7.60*	*7.75*	Revenues per sh	*8.50*
	3.84	4.26	5.10	4.71	3.47	3.66	4.59	4.84	4.64	4.58	3.78	4.28	3.68	4.16	3.94	3.81	*2.60*	*2.85*	"Cash Flow" per sh	*3.25*
	1.92	2.29	2.63	2.45	1.19	2.29	2.61	2.61	2.38	2.38	2.37	2.79	2.11	2.58	2.37	2.04	*1.15*	*1.30*	Earnings per sh [A]	*1.50*
	.96	1.10	1.22	1.34	1.38	1.40	1.40	1.44	1.47	1.49	1.50	1.52	1.58	1.64	1.65	1.66	*1.66*	*1.00*	Div'd Decl'd per sh [B] ■	*1.00*
	2.13	3.62	4.51	3.79	3.25	3.30	4.30	5.34	6.68	6.14	5.24	4.30	4.52	4.50	4.02	4.23	*2.70*	*2.05*	Cap'l Spending per sh	*1.75*
	11.62	13.30	14.88	13.55	14.57	16.98	18.72	18.01	19.78	20.47	14.72	14.56	15.52	16.18	16.93	17.39	*11.90*	*12.25*	Book Value per sh [C]	*13.50*
	380.15	385.04	373.27	374.58	377.18	483.39	578.41	581.94	630.32	665.85	673.86	679.73	693.40	720.32	767.23	768.91	*772.00*	*774.00*	Common Shs Outst'g [D]	*780.00*
	15.1	14.1	17.3	17.6	25.7	11.9	10.5	10.9	12.8	14.1	13.9	12.8	17.6	11.3	13.3	13.9	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*17.5*
	.80	.76	.92	1.06	1.71	.76	.66	.69	.72	.74	.70	.67	.89	.61	.71	.71			Relative P/E Ratio	*.95*
	3.3%	3.4%	2.7%	3.1%	4.5%	5.1%	5.1%	5.1%	4.8%	4.4%	4.5%	4.2%	4.2%	5.6%	5.2%	5.8%			Avg Ann'l Div'd Yield	*3.8%*
	12737	12286	11860	11499	7669.0	7517.0	7447.0	7785.0	7769.0	7607.0	*5850*	*6000*	Revenues ($mill)	*8750*
	1456.0	1536.0	1541.0	1583.0	1603.0	1902.0	1449.0	1827.0	1746.0	1571.0	*885*	*1020*	Net Profit ($mill)	*1115*
	31.0%	26.2%	23.1%	33.0%	22.5%	25.4%	24.2%	20.0%	19.0%	20.3%	*22.5%*	*22.5%*	Income Tax Rate	*22.5%*
	4.0%	4.1%	3.7%	2.8%	1.6%	1.6%	1.9%	2.0%	1.9%	1.8%	*4.0%*	*3.0%*	AFUDC % to Net Profit	*3.0%*
	61.9%	64.1%	62.3%	58.0%	65.2%	64.3%	64.8%	63.3%	61.5%	61.7%	*54.0%*	*54.5%*	Long-Term Debt Ratio	*58.0%*
	37.2%	35.9%	37.7%	42.0%	34.8%	35.7%	35.2%	36.7%	38.5%	38.3%	*46.0%*	*45.5%*	Common Equity Ratio	*42.0%*
	29071	29205	33058	32484	28482	27707	30608	31726	33712	34926	*19900*	*20750*	Total Capital ($mill)	*25300*
	27266	30032	33087	34597	30382	30074	33092	34458	36482	38892	*25475*	*25875*	Net Plant ($mill)	*26000*
	6.5%	7.0%	6.2%	6.5%	7.1%	8.4%	6.2%	7.2%	6.6%	5.9%	*5.5%*	*6.0%*	Return on Total Cap'l	*5.5%*
	13.1%	14.7%	12.4%	11.6%	16.2%	19.2%	13.5%	15.7%	13.4%	11.7%	*9.5%*	*10.5%*	Return on Shr. Equity	*10.5%*
	13.3%	14.6%	12.4%	11.6%	16.2%	19.2%	13.5%	15.7%	13.4%	11.7%	*9.5%*	*10.5%*	Return on Com Equity [E]	*10.5%*
	6.4%	6.7%	5.3%	4.5%	6.0%	8.8%	3.5%	6.0%	4.3%	2.2%	*NMF*	*2.5%*	Retained to Com Eq	*3.0%*
	52%	54%	57%	61%	63%	54%	74%	62%	68%	81%	*NMF*	*76%*	All Div'ds to Net Prof	*70%*

CAPITAL STRUCTURE as of 3/31/21
Total Debt $15698 mill. **Due in 5 Yrs** NA
LT Debt $13715 mill. **LT Interest** $549 mill.
Incl. 23 mill. units 7.75%, $25 liq. value; 82,000 units 8.23%, $1000 face value.
(LT interest earned: 3.0x)

Leases, Uncapitalized Annual rentals $27 mill.
Pension Assets-12/20 $14038 mill.
Oblig $13549 mill.

Pfd Stock None
Common Stock 769,427,879 shs.
as of 4/30/21
MARKET CAP: $22 billion (Large Cap)

ELECTRIC OPERATING STATISTICS

	2018	2019	2020
% Change Retail Sales (KWH)	+2.0	-3.4	-5.2
Avg. Indust. Use (MWH)	NA	NA	NA
Avg. Indust. Revs. per KWH (¢)	NA	NA	NA
Capacity at Peak (Mw)	NA	NA	NA
Peak Load, Winter (Mw)	NA	NA	NA
Annual Load Factor (%)	NA	NA	NA
% Change Customers (yr-end)	NA	NA	NA
Fixed Charge Cov. (%)	292	283	278

ANNUAL RATES of change (per sh)

	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	-6.5%	-8.5%	*NMF*
"Cash Flow"	- -	-1.5%	*NMF*
Earnings	1.5%	-.5%	*NMF*
Dividends	2.0%	2.0%	*NMF*
Book Value	1.0%	-1.5%	*NMF*

QUARTERLY REVENUES ($ mill.)

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	2126	1848	1872	1939	7785.0
2019	2079	1803	1933	1954	7769.0
2020	2054	1739	1885	1929	7607.0
2021	1498	*1350*	*1475*	*1527*	*5850*
2022	*1550*	*1400*	*1500*	*1550*	*6000*

EARNINGS PER SHARE [A]

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.65	.73	.62	.57	2.58
2019	.64	.60	.65	.48	2.37
2020	.72	.45	.50	.38	2.04
2021	.26	*.24*	*.35*	*.30*	*1.15*
2022	*.30*	*.30*	*.38*	*.32*	*1.30*

QUARTERLY DIVIDENDS PAID [B] ■

Calendar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.38	.395	.395	.395	1.57
2018	.395	.41	.41	.41	1.63
2019	.41	.4125	.4125	.4125	1.65
2020	.4125	.415	.415	.415	1.66
2021	.415	.415	.415		

BUSINESS: PPL Corporation (formerly PP&L Resources, Inc.) is a holding company for PPL Electric Utilities (formerly Pennsylvania Power & Light Company), which distributes electricity to 1.4 million customers in eastern & central PA. Acq'd Kentucky Utilities and Louisville Gas and Electric (1.3 mill. customers) 11/10. Has electric distribution sub. in U.K. (7.9 mill. customers). Sold gas distribution sub. in '08. Spun off power-generating sub. in '15. Electric rev. breakdown: residential, 46%; commercial, 21%; industrial, 11%; other, 22%. Fuel costs: 17% of revs. '20 reported depr. rate: 2.8%. Has 12,500 empls. Chairman: William H. Spence. Pres. & CEO: Vincent Sorgi. Inc.: PA. Address: Two North Ninth St., Allentown, PA 18101-1179. Tel.: 800-345-3085. Internet: www.pplweb.com.

PPL Corporation has completed the sale of its utilities in the United Kingdom. These operations are solidly profitable, but regulatory, political, and currency risks had held down the price of PPL stock in recent years. The sale raised over $10 billion. PPL will use the cash for an acquisition (see below) and the reduction of $3.0 billion-$3.5 billion of debt. The use of the remaining proceeds is to be determined. Due to the sale, the company recorded a loss from discontinued operations of $2.65 a share in the March quarter. Earnings will be depressed in 2021 because of the loss of income from the U.K. utilities, so the year-to-year comparisons are not meaningful.

The acquisition of a utility in Rhode Island is pending. PPL has agreed to pay $3.8 billion in cash for Narragansett Electric, an electric and gas company. The purchase is expected to be completed by March of 2022. PPL has stated that it expects no change in the disbursement until after the purchase is completed. Once this occurs, PPL's board of directors will presumably cut the dividend, to reflect the company's lower earning power. Thus, we show a split dividend at the top of the page. Its goal for the payout ratio is 60%-65%. Our estimates and projections will exclude Narragansett Electric until after the deal is completed. The utility's net profit was $150 million for the 12-month period that ended on March 31st.

The Kentucky commission has issued rate orders for PPL's utilities in the state. Louisville Gas and Electric received electric and gas increases of $73 million (6.4%) and $20 million (5.7%), respectively, and Kentucky Utilities was granted an electric hike of $106 million (6.5%), based on a 9.4% return on equity. The order was somewhat disappointing, as the regulators reduced the increases proposed in a settlement by a total of $19 million. New tariffs took effect on July 1st. A full year's effect of rate relief in Kentucky, along with lower interest expense, should help lift earnings in 2022.

We believe the stock price already reflects the expected dividend cut. If the annual disbursement is reduced to $1.00 a share, this would provide an average dividend yield at the equity's recent quotation.

Paul E. Debbas, CFA *August 13, 2021*

(A) Dil. EPS. Excl. nonrec. gain (losses): '07, (12¢); '10, (8¢); '11, 8¢; '13, (62¢); '20, (13¢); gains (losses) on disc. ops.: '07, 19¢; '08, 3¢; '09, (10¢); '10, (4¢); '12, (1¢); '14, 23¢; '15, ($1.36); '21, ($2.65). '18, '20 EPS don't sum due to rounding. Next earnings report due early Nov. **(B)** Div'ds paid in early Jan., Apr., July, & Oct. ■ Div'd reinv. plan avail. **(C)** Incl. intang. In '20: $6.89/sh. **(D)** In mill. **(E)** Rate base: Fair value. Rate all'd on com. eq. in PA in '16: none spec.; in KY in '19: 9.725%; earned on avg. com. eq., '20: 11.9%. Regulatory Climate: Avg.

Company's Financial Strength	B++
Stock's Price Stability	75
Price Growth Persistence	15
Earnings Predictability	80

ESSENTIAL UTIL. NYSE-WTRG

RECENT PRICE **46.48** | P/E RATIO **28.2** (Trailing: 28.0 Median: 23.0) | RELATIVE P/E RATIO **1.49** | DIV'D YLD **2.3%** | **VALUE LINE**

TIMELINESS 3 Lowered 7/30/21
SAFETY 3 Lowered 1/8/21
TECHNICAL 3 Raised 9/3/21
BETA 1.00 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$37-$87	$62 (35%)

2024-26 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	65	(+40%)	*11%*
Low	45	(-5%)	*2%*

Institutional Decisions

	4Q2020	1Q2021	2Q2021
to Buy	264	258	244
to Sell	221	238	231
Hld's(000)	169334	176001	171680

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	© VALUE LINE PUB. LLC	24-26
High:	18.4	19.0	21.5	28.1	28.2	31.1	35.8	39.6	39.4	47.3	54.5	51.4								
Low:	13.2	15.4	16.8	20.6	22.4	24.4	28.0	29.4	32.1	32.7	30.4	41.1								
	3.08	3.23	3.61	3.71	3.93	4.21	4.10	4.32	4.32	4.37	4.61	4.62	4.56	4.71	4.03	5.96	*7.45*	*8.00*	Revenues per sh	*8.70*
	.97	1.01	1.10	1.14	1.29	1.42	1.45	1.51	1.82	1.89	1.87	2.07	2.12	1.90	1.73	2.21	*2.55*	*2.80*	"Cash Flow" per sh	*3.05*
	.57	.56	.57	.58	.62	.72	.83	.87	1.16	1.20	1.14	1.32	1.35	1.08	1.04	1.12	*1.70*	*1.80*	Earnings per sh [A]	*2.00*
	.32	.35	.38	.41	.44	.47	.50	.54	.58	.63	.69	.74	.79	.85	.91	.97	*1.04*	*1.12*	Div'd Decl'd per sh [B]■	*1.40*
	1.47	1.64	1.43	1.58	1.66	1.89	1.90	1.98	1.73	1.84	2.07	2.16	2.69	2.78	2.49	3.41	*4.00*	*4.00*	Cap'l Spending per sh	*3.75*
	5.04	5.57	5.85	6.26	6.50	6.81	7.21	7.90	8.63	9.27	9.78	10.43	11.02	11.28	17.58	19.09	*20.90*	*21.80*	Book Value per sh	*24.15*
	161.21	165.41	166.75	169.21	170.61	172.46	173.60	175.43	177.93	178.59	176.54	177.39	177.71	178.09	220.76	245.39	*253.00*	*254.50*	Common Shs Outst'g [C]	*270.00*
	31.8	34.7	32.0	24.9	23.1	21.1	21.3	21.9	21.2	20.8	23.5	23.9	24.7	32.6	39.1	39.6			Avg Ann'l P/E Ratio	*27.0*
	1.69	1.87	1.70	1.50	1.54	1.34	1.34	1.39	1.19	1.09	1.18	1.25	1.24	1.76	2.08	2.06			Relative P/E Ratio	*1.50*
	1.8%	1.8%	2.1%	2.8%	3.1%	3.1%	2.8%	2.8%	2.4%	2.5%	2.6%	2.3%	2.4%	2.4%	2.2%	2.2%			Avg Ann'l Div'd Yield	*2.8%*
							712.0	757.8	768.6	779.9	814.2	819.9	809.5	838.1	889.7	1462.7	*1890*	*2040*	Revenues ($mill)	*2350*
							144.8	153.1	205.0	213.9	201.8	234.2	239.7	192.0	224.5	284.8	*420*	*455*	Net Profit ($mill)	*540*
							32.9%	39.0%	10.0%	10.5%	6.9%	8.2%	6.6%	- -	6.6%	6.6%	*5.0%*	*6.0%*	Income Tax Rate	*7.0%*
							- -	- -	1.1%	2.4%	3.1%	3.8%	6.3%	6.8%	7.2%	4.5%	*7.0%*	*7.5%*	AFUDC % to Net Profit	*6.0%*
							52.7%	52.7%	48.9%	48.5%	50.3%	48.4%	50.6%	54.4%	43.1%	54.0%	*54.0%*	*56.0%*	Long-Term Debt Ratio	*55.0%*
							47.3%	47.3%	51.1%	51.5%	49.7%	51.6%	49.4%	45.6%	56.9%	46.0%	*46.0%*	*44.0%*	Common Equity Ratio	*45.0%*
							2646.8	2929.7	3003.6	3216.0	3469.5	3587.7	3965.4	4407.8	6824.2	10192	*11325*	*12400*	Total Capital ($mill)	*14500*
							3612.9	3936.2	4167.3	4402.0	4688.9	5001.6	5399.9	5930.3	6345.8	9512.9	*10175*	*10875*	Net Plant ($mill)	*12300*
							6.9%	6.6%	8.0%	7.8%	6.9%	7.6%	7.1%	5.5%	4.2%	3.7%	*4.5%*	*5.0%*	Return on Total Cap'l	*5.5%*
							11.6%	11.0%	13.4%	12.9%	11.7%	12.7%	12.2%	9.6%	5.8%	6.1%	*8.0%*	*8.5%*	Return on Shr. Equity	*8.5%*
							11.6%	11.0%	13.4%	12.9%	11.7%	12.7%	12.2%	9.6%	5.8%	6.1%	*8.0%*	*8.5%*	Return on Com Equity	*8.5%*
							4.6%	4.3%	6.7%	6.1%	4.7%	5.6%	5.1%	2.1%	.9%	1.1%	*3.0%*	*3.0%*	Retained to Com Eq	*3.0%*
							60%	61%	50%	52%	60%	56%	59%	79%	84%	82%	*63%*	*62%*	All Div'ds to Net Prof	*70%*

Bold figures are Value Line estimates

CAPITAL STRUCTURE as of 6/30/21
Total Debt $5799.7 mill. **Due in 5 Yrs** $1102 mill.
LT Debt $5648.2 mill. **LT Interest** $203.0 mill.
(42% of Cap'l)

Pension Assets-12/20 $426.8 mill.
Oblig. $486.2 mill.

Pfd Stock None
Common Stock 245,757,399 shares
as of 7/23/21

MARKET CAP: $11.4 billion (Large Cap)

CURRENT POSITION ($MILL.)	2019	2020	6/30/21
Cash Assets	1868.9	4.8	8.4
Receivables	67.1	154.8	129.2
Inventory (AvgCst)	18.4	58.4	63.4
Other	58.3	162.2	103.7
Current Assets	2012.7	380.2	304.7
Accts Payable	74.9	177.5	131.8
Debt Due	130.8	162.6	151.5
Other	113.1	263.8	185.9
Current Liab.	318.8	603.9	469.2

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '18-'20 to '24-'26
Revenues	2.0%	2.0%	*10.0%*
"Cash Flow"	4.5%	1.0%	*6.5%*
Earnings	5.5%	-1.5%	*10.0%*
Dividends	7.5%	7.5%	*7.5%*
Book Value	9.5%	11.5%	*6.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	194.3	211.9	226.2	205.7	838.1
2019	201.1	218.9	243.6	226.1	889.7
2020	255.6	384.5	348.6	474.0	1462.7
2021	583.6	397.0	*389.4*	*520*	*1890*
2022	*600*	*435*	*435*	*570*	*2040*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.29	.37	.44	d.02	1.08
2019	.09	.25	.38	.28	1.04
2020	.21	.29	.22	.40	1.12
2021	.72	.32	*.23*	*.43*	*1.70*
2022	*.67*	*.33*	*.35*	*.45*	*1.80*

Calendar	QUARTERLY DIVIDENDS PAID [B] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2017	.1913	.1913	.2047	.2047	.79
2018	.2047	.2047	.219	.219	.85
2019	.219	.219	.2343	.2343	.91
2020	.2343	.2343	.2507	.2507	.97
2021	.2507	.2507	.2682		

LEGENDS
1.60 x Dividends p sh divided by Interest Rate
Relative Price Strength
5-for-4 split 9/13
Options: Yes
Shaded area indicates recession

Target Price Range 2024 | 2025 | 2026

% TOT. RETURN 8/21

	THIS STOCK	VL ARITH.* INDEX
1 yr.	19.3	49.7
3 yr.	42.1	46.9
5 yr.	82.3	96.6

BUSINESS: Essential Utilities, Inc. became the new name for Aqua America on Feb. 3, 2020, to reflect the acquisition of Peoples, a natural gas utility, which occurred in 3/20. In 2020, Aqua Amer. provided water and wastewater services to about 5 million people in PA, OH, TX, IL, NC, NJ, IN, VA NS WS. Employed 3,180 Acquired AquaSource, 7/13; North Maine Utilities, 7/15; and others. Water respn. for 65% of revenues in 2020; residential, 39%; commercial, 10%; industrial, wastewater & other, 16%. Gas 35%. Off. & dir. own less than 1% of the common stock; Vanguard, 10.1%; BlackRock, 10.0%; Canadian Pension Plan about 8.8% (5/21 proxy). Pres. & CEO: Christopher Franklin. Inc.: PA Addr.: 762 W Lancaster Ave., Bryn Mawr, PA 19010. Tel.: 610-525-1400. Int.: www.essential.co.

Shares of Essential Water have not performed well of late. Since our July report, the price of the stock is up less than 1%. This compares unfavorably to the equities of other water utilities and the S&P 500 Index. Indeed, WTRG has trailed all but one equity in the group.

A major rate case has been filed in Pennsylvania. In late August, the company petitioned state regulators to recover the $1.1 billion (an average of $2,235 per customer), it has invested since its last filing. These funds were spent on replacing more than 400 miles of pipes and upgrading treatment plants. Historically, the regulatory commission has reached constructive decisions, as it's a recognized fact that like most other members in the industry, Essential's water infrastructure is badly in need of repair. If the full request is permitted, the average residential monthly bill would rise from $55.51 to $73.95. So, even though previous rulings have been positive, regulatory commissions are under pressure to keep rates low. Due to the necessity of these outlays, and knowing that the company must continue making large expenditures, we think state authorities will be fair.

Second-quarter earnings were better than expected. The June period was the first three-month income report in which Essential's numbers could be compared on an apple-to-apple basis to the previous year. (Recall that the company is the result of a large acquisition of the natural gas utility Peoples in mid-March of 2020.) Share net of $0.32 was 23% higher than we had forecast. This came despite weak demand for gas resulting from warmer-than-anticipated temperatures. We now expect the company to post earnings per share of $1.70, slightly above management's $1.64 to $1.69 range. In 2022, a more moderate advance of about 6% seems to be in the cards.

This neutrally ranked stock does not stand out for near- or long-term total return potential. However, its prospects are still better than most in the industry, and its dividend was recently raised a healthy 7%. Investors should also bear in mind that WTRG is no longer a pure water utility play, as its gas operations are now substantial.

James A. Flood *October 8, 2021*

(A) Diluted egs. Excl. nonrec. gains: '12, 18¢. Excl. gain from disc. operations: '12, 7¢; '13, 9¢; '14, 11¢. Quarterly EPS do not add in '19 due to a large change in the number of shares outstanding in the Dec. period. Next earnings report early November. **(B)** Dividends historically paid in early March, June, Sept., & Dec. ■ Div'd. reinvestment plan available (5% discount). **(C)** In millions, adjusted for stock splits. **(D)** Includes intangibles: 6/30/21, $2.341 bill./$9.53 a share.

Company's Financial Strength	B+
Stock's Price Stability	85
Price Growth Persistence	90
Earnings Predictability	60