BEFORE THE

KENTUCKY PUBLIC SERVICE COMMISSION

REBUTTAL TESTIMONY

OF

DYLAN W. D'ASCENDIS, CRRA, CVA
PARTNER
SCOTTMADDEN, INC.

ON BEHALF OF

THE WATER SERVICE CORPORATION OF KENTUCKY

November 23, 2022

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I. INTRODUCTION, PURPOSE, AND SUMMARY

Q. PLEASE STATE YOUR NAME AFFILIATION, AND BUSINESS ADDRESS.

A. My name is Dylan W. D'Ascendis. I am employed by ScottMadden, Inc. as Partner. My business address is 3000 Atrium Way, Suite 200, Mount Laurel, NJ 08054.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING THIS TESTIMONY?

A. I am submitting this rebuttal testimony (referred to throughout as my "Rebuttal Testimony") before the Kentucky Public Service Commission ("Commission") on behalf of The Water Service Corporation of Kentucky ("WSCKY" or the "Company").

Q. DID YOU FILE DIRECT TESTIMONY IN THIS PROCEEDING?

A. Yes, I did.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my Rebuttal Testimony is two-fold. First, I update my cost of common equity ("ROE") analyses to reflect current data. Second, I respond to the direct testimony of Mr. Richard A. Baudino, witness for the Kentucky Office of the Attorney General & The City of Clinton as it relates to the Company's ROE on its Kentucky jurisdictional rate base.

Q. HAVE YOU PREPARED SCHEDULES IN SUPPORT OF YOUR RECOMMENDATION?

A. Yes. I have prepared Schedules DWD-1R through DWD-8R, which were prepared by me or under my direction.

Q. PLEASE SUMMARIZE YOUR CONCLUSIONS.

A. Due to the passage of time since the analysis in my Direct Testimony, I have updated my ROE analyses as of October 14, 2022. Based on these updated analyses, my range of reasonable ROEs attributable to WSCKY is between 9.67% and 12.06% (unadjusted) and

10.67% to 13.06% (adjusted). Therefore, my specific ROE recommendation of 10.60% for WSCKY in this case continues to be reasonable, if not conservative.

Q. IN WHAT KEY AREAS ARE MR. BAUDINO'S ANALYSES AND RECOMMENDATIONS INCORRECT OR UNSUPPORTED?

A. There are several areas, including:

1. His sole reliance on the discounted cash flow ("DCF") model;
2. His application of the capital asset pricing model ("CAPM"); and
3. His exclusion of a size adjustment.

II. UPDATED ANALYSES

Q. HAVE YOU UPDATED YOUR COST OF COMMON EQUITY ANALYSES FOR YOUR REBUTTAL TESTIMONY?

A. Yes, I have. Due to the passage of time since my Direct Testimony analysis (data as of March 31, 2022), I have updated my analysis using data as of October 14, 2022.

Q. HAVE YOU UPDATED YOUR UTILITY PROXY GROUP FOR YOUR UPDATED ANALYSES?

A. Yes, I have. As noted by Mr. Baudino, The York Water Company is no longer covered by *Value Line Investment Survey's* ("*Value Line*") Standard edition.[1] As such, I have eliminated them from my updated Utility Proxy Group.

Q. HAVE YOU APPLIED ANY OF YOUR ROE MODELS DIFFERENTLY IN YOUR UPDATED ANALYSES?

A. No, I have not.

[1] Baudino Direct Testimony, at 15.

Q. WHAT ARE THE RESULTS OF YOUR UPDATED ANALYSES?

A. Using data available as of October 14, 2022, my updated results are presented in page 2 of Schedule DWD-1R and in Table 1, below.

Table 1: Updated Cost of Common Equity Results

Discounted Cash Flow Model	9.67%
Risk Premium Model	11.97%
Capital Asset Pricing Model	12.02%
Cost of Equity Models Applied to Comparable Risk, Non-Price Regulated Companies	12.06%
Indicated Range	9.67% - 12.06%
Size Adjustment	1.00%
Recommended Range	10.67% - 13.06%
Recommended Cost of Common Equity	10.60%

In view of the unadjusted and adjusted ranges of ROE, I maintain my original ROE recommendation of 10.60%. Since my recommended ROE of 10.60% is under the Company-specific indicated range of ROEs, it is a conservative measure of the Company's ROE at this time.

Q. DO ECONOMIC CONDITIONS INFLUENCE THE REQUIRED COST OF CAPITAL AND REQUIRED RETURN ON COMMON EQUITY?

A. Yes. The models used to estimate the cost of equity are meant to reflect, and therefore are influenced by, current and expected capital market conditions. Therefore, it is important to assess the reasonableness of any financial model's results in the context of observable market data.

Q. DOES YOUR UPDATED ROE ANALYSIS CONSIDER THE CURRENT CAPITAL MARKET ENVIRONMENT?

A. Yes, it does. From an analytical perspective, it is important that the inputs and assumptions used to arrive at a ROE recommendation, including assessments of capital market conditions, are consistent with the recommendation itself. Although all analyses require an element of judgment, the application of that judgment must be made in the context of the quantitative and qualitative information available to the analyst and the capital market environment in which the analyses were undertaken.

Q. HOW DO MARKET CONDITIONS COMPARE TO THOSE OBSERVED DURING MR. BAUDINO'S RECENT ROE RECOMMENDATIONS IN KENTUCKY?

A. Current capital market conditions are riskier now than they were in 2021. On Table 2, below, I have compared several measures of risk throughout each of the Company's last four rate cases. They are (1) proxy group average Beta coefficient ("beta"); (2) Fed Funds rate; (3) Average 30-year Treasury bond yield; (4) the Coefficient of Variation ("CoV") of 30-year Treasury bonds during the proceeding;[2] (5) Average A-rated public utility bond yields; (6) the CoV of A-rated utility bond yields; (7) Average inflation rate; (8) the annualized volatility[3] of the Utility Proxy Group; (9) the annualized volatility of the S&P 500; and (10) the average level of the Chicago Board of Exchange's Volatility Index, or VIX.

[2] The Coefficient of Variation is used by investors and economists to determine volatility.
[3] The annualized standard deviation of daily price movements.

Table 2: Comparison of Risk Measures During the Pendency of Two Recent Kentucky Rate Cases Mr. Baudino Participated in and the Instant Proceeding[4]

	Case No. 2021-00190	Case No. 2021-00214	Case No. 2022-00147
Average Beta	0.78	0.78	0.77
Fed Funds rate	0.00%-0.25%	0.00%-1.00%	0.75%-3.25%
Average 30-year Treasury yield	1.97%	2.18%	3.31%
CoV of 30-year Treasury bond	3.89%	4.73%	4.03%
Moody's A-Rated Utility bond Yield	3.02%	3.42%	5.00%
CoV of Moody's A-Rated Utility bond	2.43%	3.28%	3.05%
Average Inflation rate (CPI)	5.91%	6.83%	8.49%
Annualized Proxy Group Volatility	21.63%	23.05%	28.98%
Annualized S&P500 Volatility	12.21%	18.54%	24.47%
VIX Index	18.54	21.79	26.23

As show in Table 2, current measures of the Fed Funds target rate, 30-year Treasury bond yields, A-rated public utility bond yields, annualized volatility of the Utility Proxy Group, annualized volatility of the S&P 500, the level of VIX[5], and the Consumer Price Index ("CPI") are all the highest of the three rate cases, indicating higher risk. As an additional measure of risk, on page 9 of his direct testimony, Mr. Baudino notes that Utility Bond credit spreads have increased by 62 basis points from January 2022 through September 2022. Mr. Baudino acknowledges that as interest rates rise the cost of equity also increases but does not reflect the elevated capital costs in his recommendation, stating that it "has changed little since 2021".[6] In view of Table 2, Mr. Baudino's statement is misplaced.

[4] Source: Federal Reserve Data Download Program, Bloomberg Professional Services, *Value Line Investment Survey.*

[5] Mr. Baudino acknowledges that there was a "significant increase in market volatility during 2022" as illustrated by the VIX on page 12 of his direct testimony.

[6] Baudino Direct Testimony, at 5.

Q. PLEASE SUMMARIZE THE CURRENT CAPITAL MARKET ENVIRONMENT FROM WHICH YOUR UPDATED ANALYSIS IS BASED.

A. The economy is currently in an inflationary environment, as evidenced by increased levels of the CPI as compared to the Federal Reserve's ("Fed") traditional inflation target of 2.00%. Inflation can be characterized as an imbalance of supply and demand in the economy, specifically, when demand is in excess of supply. When demand is in excess of supply, the cost of goods and services increase.

Part of the Fed's Congressional mandate is to mitigate inflation and they have two main tools to achieve their mandate: (1) raising the Fed Funds Rate; or (2) decreasing the size of their balance sheet. In Fed Chairman Jerome H. Powell's Press Conference on November 2, 2022, he indicated that the Fed has the resolve to use both tools to restore price stability on behalf of American families and businesses.[7]

Overall, the current market environment can be summarized as one with increasing inflation[8], and expectations are that the Fed will implement both of its tools to limit inflation.

Q. HAS THE CPI RISEN RECENTLY?

A. Yes, it has. As shown on Chart 1, the CPI has increased exponentially since the beginning of the pandemic, and more recently has experienced year-over-year increases not seen since the early 1980s.

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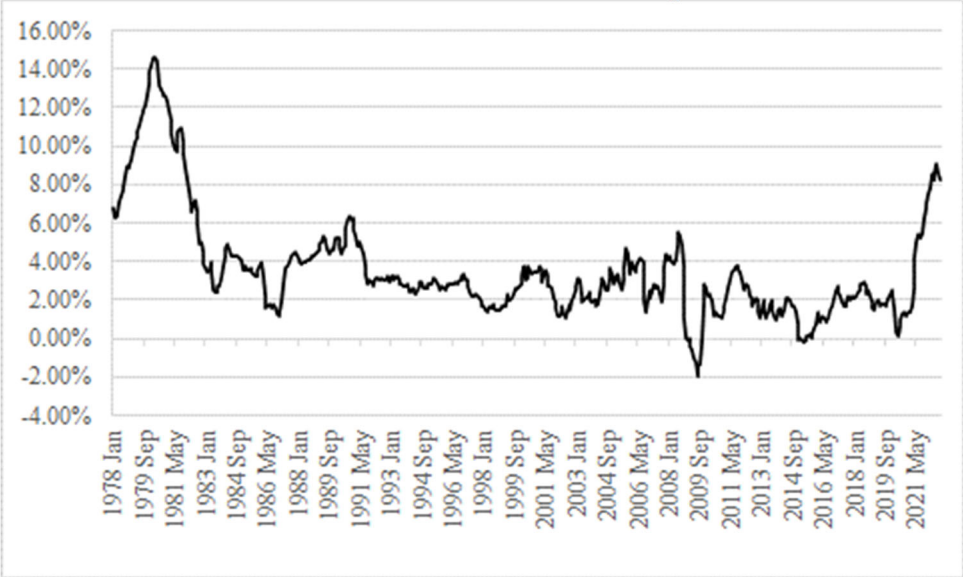
7 Transcript of Chair Powell's Press Conference, November 2, 2022.

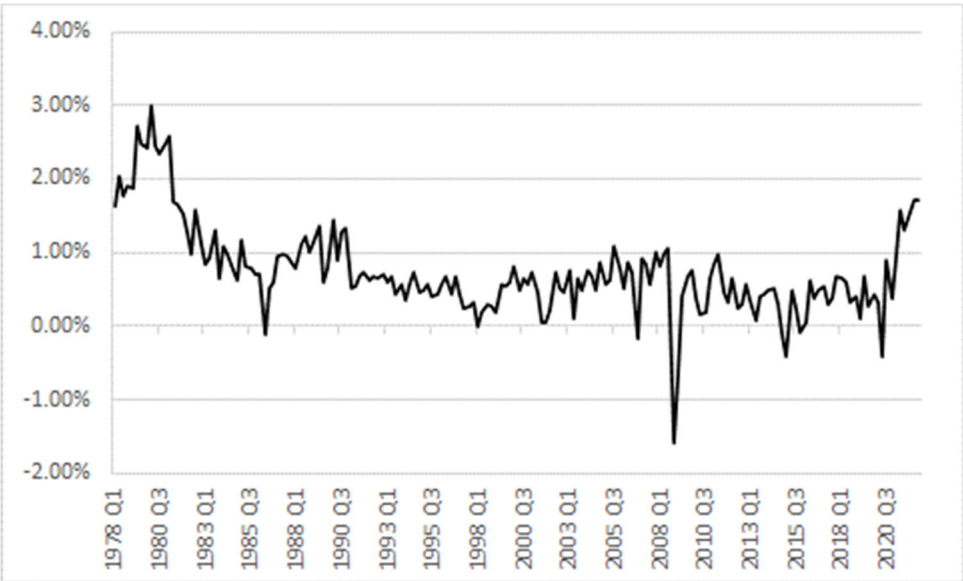
8 As noted by Mr. Baudino on page 9 of his direct testimony. Additionally, on page 10 of Mr. Baudino's testimony, he notes that the expected CPI level will average 2.80% per year, well above the Fed's 2.00% target.

Chart 1: Consumer Price Index Change, 1978-Current[9]



Further, looking to other measures of inflation such as the Personal Consumption Expenditures Index, both with and without food and energy costs, recent quarterly increases also are the highest they have been since the 1980s.

Chart 2: Personal Consumption Expenditures Index Change, 1978-Current[10]



[9] Source: Bureau of Labor Statistics, Series Title: All items in U.S. city average, all urban consumers, seasonally adjusted, Series ID: CUSR0000SA0 (https://data.bls.gov/timeseries/CUSR0000SA0?output_view=pct_1mth).

[10] Bureau of Economic Analysis. Table 2.3.4. Price Indexes for Personal Consumption Expenditures by Major Type of Product (https://apps.bea.gov/iTable/iTable.cfm?reqid=19&step=2#reqid=19&step=2&isuri=1&1921=survey)

Given the rise in these measures as shown in Charts 1 & 2, even if inflation were to moderate to a degree, it would remain significantly elevated compared to the last several years and the Fed's inflation target of 2.00%.

Q. IS INFLATION EXPECTED TO MODERATE TOWARDS THE FED'S TARGET OF 2.00% IN THE LONG TERM?

A. Yes, it is. In response to market conditions and Fed action, the 10- and 30-year breakeven inflation rates,[11] represented as the 10-year and 30-year Treasury Inflation-Protected Securities ("TIPS") spreads are 2.41% and 2.33% as of October 14, 2022. These data are consistent with Mr. Powell's statements in his November 2, 2022, press conference. Discussing the anchoring[12] of long-term inflation expectations, he warns: "But that [TIPS spreads] is not grounds for complacency; the longer the current bout of high inflation continues, the greater the chance that expectations of higher inflation will become entrenched."[13]

Market-based inflation expectations like the breakeven inflation rate are important benchmarks for the Fed. Michelle W. Bowman, Member of the Board of Governors of the Federal Reserve System noted that:

> One important factor that we often point to in driving today's spending decisions and inflation outlook are expectations of future inflation. Near-term expectations tend to rise as current inflation increases, but when inflation expectations over the longer-term – the next 5 to 10 years – begin to rise, it may indicate that consumers and businesses have less confidence in the Fed's ability to address higher inflation and return it to the Federal Open Market Committee's (FOMC) goal of 2 percent. If expectations move significantly above our 2 percent goal, it would make it more difficult to change

[11] The breakeven inflation rate is the market's determination of the level of inflation during the period it measures. For example, the 10-year breakeven inflation rate is the market's expectation of inflation over the next ten years.

[12] Anchoring of inflation expectations is characterized as the market's belief (as shown in market data) that inflation rates will normalize toward the Fed's target of 2.00%.

[13] Transcript of Chair Powell's Press Conference, November 2, 2022. [clarification added]

people's perceptions about the duration of high inflation and potentially more difficult to get inflation under control.[14]

Q. HAS MR. POWELL DESCRIBED THE FED'S APPROACH TO BRING INFLATION BACK TO ITS 2.00% TARGET?

A. Yes, he has. During his press conference on November 2, 2022 Mr. Powell stated:

> My colleagues and I are strongly committed to bringing inflation back down to our 2 percent goal. We have both the tools that we need and the resolve it will take to restore price stability on behalf of American families and businesses.
>
> ***
>
> Today, the FOMC [Federal Open Market Committee] raised our policy interest rate by 75 basis points, and we continue to anticipate that ongoing increases will be appropriate. We are moving our policy stance purposefully to a level that will be sufficiently restrictive to return inflation to 2 percent. In addition, we are continuing the process of significantly reducing the size of our balance sheet. Restoring price stability will likely require maintaining a restrictive stance of policy for some time.
>
> ***
>
> At some point, as I've said in the last two press conferences, it will become appropriate to slow the pace of increases, as we approach the level of interest rates that will be sufficiently restrictive to bring inflation down to our 2 percent goal. **There is significant uncertainty around that level of interest rates**. Even so, we still have some ways to go, and incoming data since our last meeting suggest that the ultimate level of interest rates will be higher than previously expected.
>
> ***
>
> We are taking forceful steps to moderate demand so that it comes into better alignment with supply. Our overarching focus is using our tools to bring inflation back down to our 2 percent goal and to keep longer-term inflation expectations well anchored. Reducing inflation is likely to require a sustained period of below-trend growth and some softening of labor market conditions. Restoring price stability is essential to set the stage for achieving maximum employment and stable prices in the longer run. The historical

[14] Michelle W. Bowman, "The Outlook for Inflation and Monetary Policy", At "Executive Officers Conference Massachusetts Bankers Association", Harwich, Massachusetts, June 23, 2022.

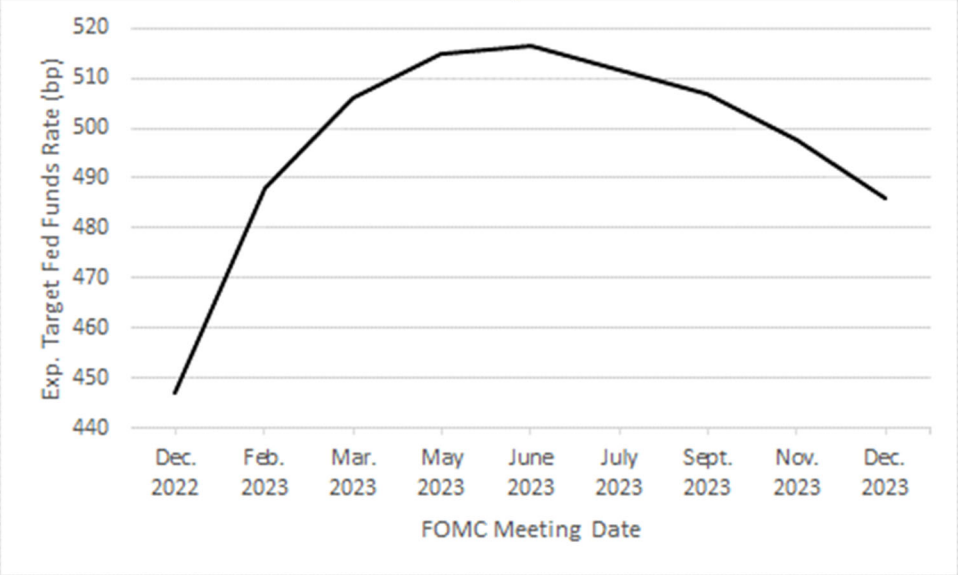
record cautions strongly against prematurely loosening policy. We will stay the course, until the job is done.[15]

As can be gleaned from statements by members of the Fed, they expect inflation to continue well into next year and they will continue to use the tools at their disposal to support the economy and the labor market, including accelerating the pace of rate increases of the Fed Funds Rate and the roll off assets from its balance sheet.

Q. IS THE MARKET CURRENTLY PRICING EXPECTATIONS OF SIGNIFICANT FUTURE FED FUNDS RATE INCREASES IN LINE WITH THE FED'S STATEMENTS?

A. Yes. The CME FedWatch Tool, as presented in Chart 3 below, indicates that investors are pricing a Fed Funds Rate in excess of 4.50% through the Fed's December 2023 meeting, as compared to the current level of the Fed Funds Rate between 3.75% and 4.00% as of November 2, 2022.

Chart 3: CME FedWatch Tool – Expected Fed Funds Rate Through December 2023 Meeting[16]



[15] Transcript of Chair Powell's Press Conference, November 2, 2022. [clarification and emphasis added]

[16] Source: https://www.cmegroup.com/trading/interest-rates/countdown-to-fomc.html, accessed November 2, 2022.

Q. HOW DOES THE CURRENT INFLATIONARY ENVIRONMENT AFFECT AUTHORIZED ROES AND INTEREST RATES?

A. Increasing inflation drives *all* costs higher (*e.g.,* prices for materials, labor, capital). This is an economic reality that affects companies across the board, and WSCKY is not immune to such increases. As a result, among other impacts inflation has on a utility's cost of service, higher inflation increases risk and the investor-required return for utility investors.

Q. PLEASE SUMMARIZE YOUR OBSERVATIONS OF THE CURRENT MARKET ENVIRONMENT.

A. In response to the current inflationary environment, the Fed recently raised the Fed Funds Rate and anticipates additional increases over the next year in addition to rolling off assets from their balance sheet. Regardless of current and future actions of the Fed, it has acknowledged that inflation is higher than its target average level of 2.00% and will continue to run higher than that target.

Utilities are not immune from those inflationary pressures which will lead to an increased level of risk and a higher investor-required return for utility investors.

III. <u>RESPONSE TO WITNESS BAUDINO</u>

Q. PLEASE SUMMARIZE MR. BAUDINO'S ROE RECOMMENDATIONS AS THEY RELATE TO THE COMPANY'S COST OF CAPITAL.

A. Mr. Baudino recommends an ROE range of 9.00% to 9.50%, with a point estimate of 9.25%, based primarily on the results of his Constant Growth DCF analyses applied to his proxy group of six regulated water utilities.[17] Mr. Baudino also performs three CAPM analyses, although he does not give those results weight in arriving at his ROE recommendation.[18]

[17] Baudino Direct Testimony, at 3.
[18] Baudino Direct Testimony, at 3.

A. SOLE RELIANCE ON THE DISCOUNTED CASH FLOW MODEL

Q. TO WHAT EXTENT DOES MR. BAUDINO'S RECOMMENDED ROE RELY ON HIS DCF MODEL?

A. As previously stated, Mr. Baudino relies exclusively on his constant growth DCF model results to determine his recommended ROE. As discussed in my Direct Testimony,[19] the use of multiple models, supported by both financial literature and regulatory precedent, adds reliability to the estimation of the common equity cost rate.

Q. CAN YOU PLEASE PROVIDE SOME EXAMPLES FROM FINANCIAL LITERATURE WHICH SUPPORT THE USE OF MULTIPLE COST OF COMMON EQUITY MODELS IN DETERMINING THE INVESTOR-REQUIRED RETURN?

A. Yes. In one example, Morin states:

> 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 a 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. (emphasis added)
>
> * * *
>
> There is ample academic support in the financial literature for the need to rely upon several financial models in arriving at a recommended common equity cost rate. Professor Eugene Brigham, a widely respected scholar and finance academic, asserts(footnote omitted):

[19] D'Ascendis Direct Testimony, at 41-42.

> *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. (italics in original) (emphasis added)*

Another prominent finance scholar, Professor Stewart Myers, in an early pioneering article on regulatory finance, stated(footnote omitted):

> *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. (italics in original) (emphasis added)*

* * *

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.'* (italics in original)

* * *

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. (emphasis added) [20]

Finally, Brigham and Gapenski note:

[20] Roger A. Morin, Modern Regulatory Finance, Public Utilities Reports, Inc., 2022, at 476-479. ("Morin")

> 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. (italics in original)[21]

In the academic literature cited above, three methods are consistently mentioned: the DCF, CAPM, and the risk premium model ("RPM"), all of which I used in my analyses.

Q. DOES THE COMMISSION HAVE A PREFERENCE FOR THE PRESENTATION OF MULTIPLE MODELS TO DETERMINE THE ROE?

A. Yes, it does. In its Order in Case No. 2021-00214 the Commission states:

> Most recently in Case Nos. 2021-00183,(footnote omitted) 2021-00185,(footnote omitted) and 2021-00190,(footnote omitted) the Commission explained why it is appropriate for utilities to present, and for the Commission to evaluate, multiple methodologies to estimate ROEs. Each approach has its own strengths and limiting assumptions. As demonstrated in the respective ROE testimonies in this proceeding, there is considerate variation in both data and application within each modelling approach, which can lead to very different results. The Commission's role is to conduct a balanced analysis of all presented models, while giving weight to current economic conditions and trends.

Q. IN ADDITION TO THE ABOVE, WHY IS SOLE RELIANCE ON THE DCF MODEL PROBLEMATIC AT THIS TIME?

A. Traditional rate base/rate of return regulation, where a market-based common equity cost rate is applied to a book value rate base, presumes that market-to-book ("M/B") ratios are at unity or 1.00. However, that is rarely the case. Morin states:

> 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

[21] Eugene F. Brigham and Louis C. Gapenski, Financial Management – Theory and Practice, 4th Ed. The Dryden Press, 1985 at 256.

> stocks understates the investor's expected return when the M/B ratio of a given stock exceeds unity. This was particularly relevant in the capital market environment of the early 2020s when utility stocks are 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[22].

As he explains, DCF models assume an M/B ratio of 1.0 and therefore under- or over-states investors' required return when market value exceeds or is less than book value, respectively. It does so because equity investors evaluate and receive their returns on the market value of a utility's common equity, whereas regulators authorize returns on the book value of common equity. This means that the market-based DCF will produce the total annual dollar return expected by investors only when market and book values of common equity are equal, a very rare and unlikely situation.

Q. WHY DO MARKET AND BOOK VALUES DIVERGE?

A. Market values can diverge from book values for a myriad of reasons including, but not limited to, earnings per share ("EPS") and dividends per share ("DPS") expectations, merger / acquisition expectations, interest rates, etc. As noted by Phillips:

> 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.[23]

In addition, Bonbright states:

> 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

[22] Morin, at 481-482.
[23] Charles F. Phillips, The Regulation of Public Utilities, Public Utilities Reports, Inc., 1993, at 395.

> commission did possess the power of control, any attempt to exercise it ... would result in harmful, uneconomic shifts in public utility rate levels. (italics added)[24]

Q. CAN THE UNDER- OR OVER-STATEMENT OF INVESTORS' REQUIRED RETURN BY THE DCF MODEL BE DEMONSTRATED MATHEMATICALLY?

A. Yes. Schedule DWD-2R demonstrates how a market-based DCF cost rate of 9.25%, when applied to a book value substantially below market value, will understate investors' required return on market value. As shown, there is no realistic opportunity to earn the expected market-based rate of return on book value. In Column [A], investors expect a 9.25% return on an average market price of $82.73 for Mr. Baudino's proxy group. Column [B] shows that when Mr. Baudino's 9.25% return rate is applied to a book value of $26.09,[25] the total annual return opportunity is $2.413. After subtracting dividends of $1.554, the investor only has the opportunity for $0.859 or 1.04% in market appreciation. The magnitude of the understatement of investors' required return on market value using Mr. Baudino's 9.25% cost rate is 6.33%, which is calculated by subtracting the market appreciation based on book value of 1.04% from Mr. Baudino's expected growth rate of 7.37%.

Q. HOW DO M/B RATIOS OF MR. BAUDINO'S PROXY GROUP COMPARE TO THEIR TEN-YEAR AVERAGE?

A. The M/B ratio of Mr. Baudino's proxy group is currently close to its ten-year average of approximately 2.81 times.

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[24] James C. Bonbright, Albert L. Danielsen and David R. Kamerschen, Principles of Public Utility Rates (Public Utilities Reports, Inc., 1988), at 334.

[25] Representing a market-to-book ratio of 170.43%.

Chart 4: M/B Ratios Compared with Ten-Year Average[26]

The significance of this is that the ten-year average M/B ratio has always been higher than 1.0x, which means that DCF model results have consistently understated the investor-required return.

Q. IS THERE ANOTHER WAY TO QUANTIFY THE INACCURACY OF THE DCF MODEL WHEN M/B RATIOS ARE DIFFERENT THAN UNITY?

A. Yes. One can quantify the inaccuracy of the DCF model when M/B ratios are not at unity by estimating the implied DCF model results (based on a market-value capital structure) to reflect a book-value capital structure. This can be measured by first calculating the market value of each proxy company's capital structure, which consists of the market value of the company's common equity (shares outstanding multiplied by price), and the fair value of the company's long-term debt and preferred stock. All these measures, except for price, are available in each company's SEC Form 10-K.

[26] Source: S&P Global Market Intelligence.

Second, one must de-leverage the implied cost of common equity based on the DCF. This is derived using the Modigliani / Miller equation[27] as illustrated in Schedule DWD-3R and shown below:

$$ku = ke - (((ku - i)(1 - t)) D/E) - (ku - d) P/E \quad \text{[Equation 1]}$$

Where:

ku	=	Unlevered (i.e., 100% equity) cost of common equity;
ke	=	Market determined cost of common equity;
i	=	Cost of debt;
t	=	Income tax rate;
D	=	Debt ratio;
E	=	Equity ratio;
d	=	Cost of preferred stock; and
P	=	Preferred equity ratio.

For example, using Mr. Baudino's average proxy group-specific data, the equation becomes:

$$ku = 9.25\% - (((ku - 4.04\%)(1 - 21\%))\ 25.31\% / 74.68\%) - (ku - 7.26\%)\ 0.02\% / 74.68\%$$

Solving for ku results in an unlevered cost of common equity of 8.15%. Next, one must re-lever those costs of common equity by relating them to each proxy group's average book capital structure as shown below:

$$ke = ku + (((ku - i)(1 - t)) D/E) + (ku - d) P/E \quad \text{[Equation 2]}$$

Once again, using Mr. Baudino's average proxy group-specific data, the equation becomes:

[27] The Modigliani / Miller theorem is an influential element of economic theory and forms the basis for modern theory on capital structure. *See,* F. Modigliani, and M. Miller, *The Cost of Capital, Corporation Finance and the Theory of Investment*, The American Economic Review, Vol. 48, No. 3, (June 1958), at 261-297.

ke = 8.15% + (((8.15%- 4.04%) (1-21%)) 50.40%/49.54%) + (8.15%-7.26%) 0.05%/49.54%

Solving for ke results in a 11.45% indicated cost of common equity relative to the book capital structure of the proxy group, which is an increase of 2.20% over Mr. Baudino's indicated DCF result of 9.25%. The leverage-adjusted DCF result 11.45% is still not applicable to the Company, as it does not reflect the higher risk that WSCKY faces relative to the proxy group given its smaller size.

Q. ARE YOU ADVOCATING A SPECIFIC ADJUSTMENT TO THE DCF RESULTS TO CORRECT FOR ITS MIS-SPECIFICATION OF THE INVESTOR-REQUIRED RETURN?

A. No. The purpose of this discussion was to demonstrate that like all cost of common equity models, the DCF has its limitations, and that the use of multiple cost of common equity models, in conjunction with informed expert judgment, provides a more accurate and reliable picture of the investor-required ROE than does a narrow evaluation of the results of one model.

B. <u>APPLICATION OF THE DISCOUNTED CASH FLOW MODEL</u>

Q. PLEASE BRIEFLY DESCRIBE MR. BAUDINO'S CONSTANT GROWTH DCF ANALYSIS AND RESULTS.

A. Mr. Baudino calculates an average dividend yield of 1.88% by dividing each proxy company's annualized dividend by its monthly stock price for the six-month period ending September 2022[28], noting that the average dividend yield for the proxy group ranged from 1.76% to 1.98% during the six-month period[29]. For the expected growth rate, Mr. Baudino relies on EPS growth rate projections from *Value Line*, Zacks, and Yahoo! Finance, as well

[28] Baudino Direct Testimony, at 16.
[29] Baudino Direct Testimony, at 16.

as DPS growth rate projections from *Value Line*.[30] Mr. Baudino then calculates his DCF results based on the mean and median growth rate of the four sources noted above. Mr. Baudino refers to the DCF results produced using mean growth rates as "Method 1", and DCF results produced using median growth rates as "Method 2". The mean DCF results of his Method 1 and 2 were 9.14% and 8.92%, respectively.[31] From these results, Mr. Baudino concludes that an appropriate ROE for the Company using the DCF model is between 9.00% and 9.50%.[32]

Q. DO YOU HAVE ANY CONCERNS WITH MR. BAUDINO'S APPLICATION OF THE DCF MODEL?

A. Not at this time. While I disagree with Mr. Baudino's inclusion of DPS growth rates in his DCF model, his indicated results are comparable to my updated DCF model results. My concern is that Mr. Baudino relies exclusively on his DCF analysis for his recommended ROE, as described above.

C. APPLICATION OF THE CAPITAL ASSET PRICING MODEL

Q. PLEASE DESCRIBE MR. BAUDINO'S CAPM ANALYSIS AND RESULTS.

A. Mr. Baudino calculates three sets of CAPM results. The first set relies on forward-looking estimates in determining the market risk premium ("MRP"), for which he derives ROE estimates ranging from 12.74% to 16.86%. The second set relies on historical MRP estimates, for which he derives results ranging from 8.72% to 9.66%.[33] The third set relies on MRP estimates from Kroll and Damodaran, for which he derives results ranging from

[30] Baudino Direct Testimony, at 18.
[31] Baudino Direct Testimony, at 19.
[32] Baudino Direct Testimony, at 3.
[33] Baudino Direct Testimony, at 28.

8.13% to 8.15%.[34] Mr. Baudino notes that he did not rely on the results of his CAPM in determining his recommended ROE, noting that it is less reliable than the DCF.[35]

Q. MR. BAUDINO CITES THAT A DISADVANTAGE WITH THE CAPM ANALYSIS IS THAT THE ANALYST'S APPLICATION OF JUDGMENT CAN SIGNIFICANTLY INFLUENCE THE RESULTS OBTAINED BY THE CAPM.[36] WHAT IS YOUR RESPONSE?

A. All ROE models are only as good as their inputs, and all ROE models can be easily manipulated by changing those inputs. For example, the DCF model has a number of inputs and variations of inputs that can drastically alter results as shown on Table 3:

Table 3: Various Inputs to DCF Models

Input	Variations of Inputs
Cash Flow Stream	Constant-Growth, Blended Growth, Multi-Stage Growth
Dividend Yield	Spot Dividend Yield, average dividend yield
Adjusted Dividend Yield	No adjustment, ½ g adjustment, full g adjustment, projected dividend
Growth Rates	Historical v. Projected v. Sustainable
Growth Measure	EPS, DPS, Book Value Per Share
Sources of Growth Rates	Value Line, Zacks, Yahoo, MorningStar, etc.

Q. ARE ALL COST OF EQUITY MODELS SUBJECT TO LIMITING ASSUMPTIONS THAT DO NOT HOLD IN REALITY?

A. Yes, they are. As discussed previously, all cost of equity models are subject to error when used in practice. To gain greater insight into the investor-required return, one must look to multiple models and not narrowly focus on the results of any one model, like Mr. Baudino has done.

[34] Baudino Direct Testimony, at 28.
[35] Baudino Direct Testimony, at 13.
[36] Baudino Direct Testimony, at 22.

Q. DO FIRMS USE MULTIPLE COMMON EQUITY MODELS, INCLUDING THE CAPM IN THEIR INTERNAL ANALYSES?

A. Yes, they do. Brigham and Daves state:

> 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.(footnote omitted) This is in sharp contrast to a 1982 survey which found tht only 30 percent of respondents used the CAPM.footnote omitted Approximately 16 percent now use the CF, down from 31 percent in 1982. The bond yield plus risk premium is used primarily by companies that aren't 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.[37]

This excerpt establishes four points: (1) most firms use multiple models; (2) the use of the CAPM is prevalent by firms in internal decision-making; (3) the importance of the DCF model in the decision-making process for firms have waned over time; and (4) regardless of which models one uses, judgment is the key ingredient in determining the cost of equity capital. In view of the above, the Commission should ignore Mr. Baudino's concerns regarding the applicability of the CAPM for cast of capital purposes.

Q. DO YOU HAVE ANY CONCERNS WITH MR. BAUDINO'S APPLICATION OF THE CAPM?

A. Yes, I do. I am concerned with Mr. Baudino's calculation of the "supply side" MRP, and his considerations of the Kroll and Damodaran MRPs in his analysis. I am also concerned with him not using the empirical form of the CAPM ("ECAPM"). Finally, while I am usually concerned with the use of current interest rates in forward-looking cost of common

[37] Eugene F. Brigham, Phillip R. Daves, Intermediate Financial Management, Ninth Edition, Thomson Southwestern, 2007, at 332-333.

equity models, Mr. Baudino's proposed risk-free rate of 3.80% is like my updated projected risk-free rate of 3.86% and is not a meaningful difference at this time.

Q. DO YOU GENERALLY AGREE WITH MR. BAUDINO'S HISTORICAL LONG-TERM ARITHMETIC MEAN MRP OF 7.40% AND THREE- TO FIVE-YEAR PROJECTED MARKET RETURN OF 17.55%?

A. Yes, I do. They are similar measures to what I use in the calculation of my average MRP.

Q. DO YOU AGREE WITH MR. BAUDINO'S SUPPLY SIDE MRP OF 6.22%?

A. No, I do not. The reason why I do not is because the MRP mismatches a projected return on the market with a historical bond yield. A more correct way to derive that MRP would be to use the projected return and subtract a projected risk-free rate. On page 208 of SBBI – 2022, the Ibbotson and Chen supply side model produces a forward-looking geometric return on the market of 9.38%.[38] Because the arithmetic mean is appropriate for cost of capital purposes,[39] the geometric mean projected market return of 9.38% must be converted to an arithmetic mean return. Converting the 9.38% geometric mean return to an arithmetic mean return results in an arithmetic, forward-looking market return of 11.31%.[40] Subtracting the applicable risk-free rate of 3.86% results in a forward-looking MRP of 7.45%.

Q. WHAT IS YOUR POSITION ON THE 5.50% MRP QUOTED BY KROLL?

A. A forecast is only as good as its inputs, and if the assumptions within those forecasts are by nature unpredictable (e.g., productivity growth forecasts), they are of little value. In addition, the determination of the MRP as calculated by Kroll is not transparent, especially

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38 SBBI – 2022, at 208.

39 SBBI – 2022, at 201.

40 The conversion of a geometric mean return to an arithmetic mean return is shown in SBBI – 2022, at 209. $11.31\% = 9.38\% + 19.64\%^2/2$

in view of the historical MRP and supply side MRP presented in SBBI – 2022, which is already well known by investors.

Q. PLEASE NOW RESPOND TO MR. BAUDINO'S USE OF THE DAMODARAN 5.47% MRP.

A. Damodaran's method, which is a two-stage form of the DCF model, calculates the present value of cash flows over the five-year initial period, together with the terminal price (based on the Gordon Model), to be received in the last (i.e., fifth) year. The model's principal inputs include the following assumptions:

- Over the coming five years, the S&P 500 Index (the "Index") will appreciate at a rate equal to the compound growth rate in "Operating Earnings";
- Cash flows associated with owning the Index will be equal to the historical average Earnings, Dividends, and Buyback yields, applied to the projected Index value each year; and
- Beginning in the terminal year, the Index will appreciate, in perpetuity, at a rate equal to the 30-day average yield on 30-year Treasury securities.

In terms of historical experience, over the long-term the broad economy has grown at a long-term compound average growth rate of 5.97%.[41] Considered from another perspective, Kroll reports the long-term rate of capital appreciation on Large Company stocks to be 8.20%.[42] Using current data as of October 2022,[43] Damodaran's model assumes, however, that the market index will grow by less than one-third that amount, 4.12%, over the coming five years.[44]

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41 Source: Bureau of Economic Analysis for the years 1929 to 2021. *See also*, www.bea.gov/data/gdp/gross-domestic-product.

42 Kroll, 2022 SBBI® Yearbook, 145.

43 From Damodaran Online, ERPOct22 Spreadsheet.

44 From Damodaran Online, ERPOct22 Spreadsheet. Five-year growth rate = (Expected Terminal Value / Intrinsic Value) ^ (1/5) – 1. (4,388.98 / 3,586.00) ^ (1/5) - 1 = 4.12%.

Mr. Baudino has not explained why growth beginning five years in the future and extending in perpetuity will be approximately one-half of long-term historical growth. Nowhere in his testimony has Mr. Baudino explained the fundamental, systemic changes that would so dramatically reduce long-term economic growth, or why they are best measured by the 30-day average long-term Treasury yield.

Further, research by the Federal Reserve Bank of San Francisco calls into question the relationship between interest rates and macroeconomic growth. As the authors noted, "[o]ver the past three decades, it appears that private forecasters have incorporated essentially no link between potential growth and the natural rate of interest: The two data series have a zero correlation."[45] In view of the above, the Commission should reject Mr. Baudino's use of Damodaran's MRP.

Q. HAS MR. BAUDINO CALCULATED AN ADDITIONAL MRP FROM HIS *VALUE LINE* INVESTMENT ANALYZER DATA IN PAST PROCEEDINGS?

A. Yes, he has. In North Carolina Docket Nos. E-2, Sub 1219 and E-7, Sub 1214, concerning Duke Energy Progress, LLC and Duke Energy Carolinas, LLC, Mr. Baudino used the average dividend yield and median projected three- to five-year growth rates in EPS and book value per share ("BVPS") to determine a projected market return.

Q. WHAT WOULD BE THE PROJECTED RETURN ON THE MARKET USING MR. BAUDINO'S *VALUE LINE* INVESTMENT ANALYZER DATA AS OF HIS SPOT DATE USING AVERAGE DIVIDEND YIELD AND MEDIAN PROJECTED EPS GROWTH RATES?

A. It would be 11.09%, as detailed in note 2 of Schedule DWD-4R. Subtracting the appropriate risk-free rate results in a forward-looking MRP of 7.23%. I did not consider

[45] FRBSF Economic Letter, *Does Slower Growth Imply Lower Interest Rates?*, November 10, 2014, at 3.

using the projected BVPS growth rates in the projected market return because projected EPS growth rates are the superior measure of growth in a DCF model.

Q. WHY ARE EPS PROJECTED GROWTH RATES SUPERIOR MEASURES OF GROWTH IN A DCF MODEL?

A. Over the long run, there can be no growth in DPS without growth in EPS. Earnings expectations have a more significant, but not sole, influence on market prices than dividend expectations. Thus, the use of earnings growth rates in a DCF analysis provides a better match between investors' market appreciation expectations implicit in market prices and the growth rate component of the DCF. Consequently, earnings expectations have a significant influence on market prices which affect market price appreciation, and hence, the "growth" experienced by investors. This should be evident even to unsophisticated investors just by listening to financial news reports on radio, TV, or reading newspapers. In fact, Morin states:

> 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 investor 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.
>
> * * *
>
> 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.[46]

However, while EPS is a significant factor influencing market prices, it is by no means the only factor that affects market prices, a fact recognized by Bonbright about public utilities, as previously discussed. In addition, studies performed by Cragg and Malkiel demonstrate that analysts' forecasts are superior to historical growth rate extrapolations. They state:

> 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 of 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.[47]

In addition, Vander Weide and Carleton conclude:

> . . . our studies affirm the superiority of analyst's 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.[48]

Q. WHAT IS MR. BAUDINO'S CAPM MRP AFTER CORRECTING HIS SUPPLY SIDE MODEL TO REFLECT AN ARITHMETIC RETURN, THE ELIMINATION

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46 Morin, at 371-373.

47 John G. Cragg and Burton G. Malkiel, Expectations and the Structure of Share Prices (University of Chicago Press, 1982) Chapter 4.

48 James H. Vander Weide and Willard T. Carleton, *Investor Growth Expectations: Analysts vs. History* (The Journal of Portfolio Management, Spring 1988) 78-82.

OF THE KROLL AND DAMODARAN MRPS, AND THE ADDITION OF MR. BAUDINO'S ALTERNATIVE MRP CALCULATION USED IN RECENT CASES?

A. As shown on Schedule DWD-4R, Mr. Baudino's corrected average MRP for use in the CAPM is 8.99%.[49]

Q. THE ECAPM IS ONE MEANS OF ADJUSTING THE CAPM FOR THE EMPIRICAL OBSERVATION THAT THE SECURITY MARKET LINE IS NOT AS STEEPLY SLOPED AS THE CAPM PREDICTS. HAS MR. BAUDINO INCLUDED AN ECAPM ANALYSIS?

A. No, he has not. In fact, numerous tests of the CAPM have confirmed the ECAPM's validity by showing that the empirical Security Market Line ("SML") described by the traditional CAPM is not as steeply sloped as the predicted SML. While the results of these tests support the notion that betas are related to security returns, the empirical SML described by the CAPM formula is not as steeply sloped as the predicted SML,[50] as discussed on pages 33-34 of my Direct Testimony.

Q. IS THERE ADDITIONAL EVIDENCE THAT SUPPORTS THE VALIDITY OF THE ECAPM?

A. Yes, there is. The empirical issues with the CAPM have been present since the presentation of the model, as noted by Dianna R. Harrington in her text Modern Portfolio Theory & the Capital Asset Pricing Model:

> 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 by 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

[49] 8.99% = (7.40% + 13.75% + 7.29% + 7.51%) / 4.
[50] Morin, at 207.

portfolios (the intercept) and the actual risk-free rate for the period should have been equal. They were not.

* * *

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 the investor expectations (a frequent assumption in CAPM tests). Using historical data, they generated estimates using what we call the market model:

$$R_{jt} = \alpha_j + \beta_j (R_{mt}) + \varepsilon_j$$

Where:

R = total returns
β = the slope of the line (the incremental return for risk)
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

* * *

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 did not find the evidence to support the other BJS conclusions.[51]

Harrington discusses Black's potential solution to this phenomenon:

> 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 the one with no volatility relative to the market – that is, a portfolio with a beta of zero. All investor-perceived levels of risk could be obtained from various linear combinations of Black's zero-beta portfolio and the market portfolio… Since R_z (the rate of return of 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_mY, R_z, is sold short and proceeds are invested in R_m. On segment R_zR_m, portions 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 sticks with betas greater than one and too high for stocks with betas of less than one.[52]

As such, while I still find the CAPM to be appropriate, if Mr. Baudino is of the opinion that the CAPM is not reliable, he should have applied an ECAPM analysis. Further, as discussed below, the ECAPM is not simply a second adjustment to a company's beta.

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[51] Dianna R. Harrington, Modern Portfolio Theory & the Capital Asset Pricing Model – A User's Guide, Prentice-Hall, Inc. 1983, at 43-45.

[52] Dianna R. Harrington, Modern Portfolio Theory & the Capital Asset Pricing Model – A User's Guide, Prentice-Hall, Inc. 1983, at 30-31.

Q. IS THE ECAPM AN ADJUSTMENT TO A COMPANY'S BETA AS ASSERTED BY MR. BAUDINO?[53]

A. No, it is not. A common critique of the ECAPM is the claim that using adjusted betas in a CAPM analysis addresses the empirical issues with the CAPM (discussed above), by increasing the expected returns for low beta stocks and decreasing the returns for high beta stocks, concluding that there is no need to use the ECAPM. This is an incorrect understanding of the ECAPM. Using adjusted betas in a CAPM analysis is not equivalent to using the ECAPM, nor is it an unnecessary redundancy.

Betas are adjusted because of their general regression tendency to converge toward 1.0 over time, i.e., over successive calculations of beta. As also noted above, numerous studies have determined that the SML described by the CAPM formula at any given moment in time is not as steeply sloped as the predicted SML. Morin states:

> The use of adjusted betas in a CAPM analysis is not equivalent to the ECAPM. Betas are adjusted because of the regression tendency of betas to converge toward 1.0 over time. We have seen that numerous empirical studies have determined that the SML described by the CAPM formula at *any given moment* in time is not as steeply sloped as the predicted SML. The slope of the SML should not be confused with beta.
>
> * * *
>
> The use of an adjusted beta by Value Line is correcting for a different problem than the ECPAM. The adjusted beta captures the fact that betas regress toward one over time. The ECAPM corrects for the fact that the CAPM under-predicts observed returns when beta is less than one and over-predicts observed returns when beta is greater than one.[54]

Moreover, the slope of the SML should not be confused with beta. As Brigham and Gapenski state:

> 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

[53] Baudino Direct Testimony, at 45.
[54] Morin, at 223-224.

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]

[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.[55]

In addition, in Appendix 6A of Brigham and Gapenski's textbook entitled "Calculating Beta Coefficients," the authors demonstrate that beta, which accounts for regression bias, is not a return adjustment, but rather is based on the slope of a different line.

A 1980 study by Litzenberger, *et al.* found the CAPM underestimates the ROE for companies, such as public utilities, with betas less than 1.00.[56] In that study, the authors applied adjusted betas and still found the CAPM to underestimate the ROE for low-beta companies. Similarly, Brattle Group's Risk and Return for Regulated Industries supports the use of adjusted betas in the ECAPM:

> 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.[57]

Hence, using adjusted betas does not address the previously discussed empirical issues with the CAPM. In view of the foregoing, using adjusted betas in both the traditional and empirical applications of the CAPM is neither incorrect nor inconsistent with the

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55 Eugene F. Brigham and Louis C. Gapenski, Financial Management – Theory and Practice, 4th Ed. (The Dryden Press, 1985), at 201-204.

56 Robert Litzenberger, Krishna Ramaswamy and Howard Sosin, On the CAPM Approach to the Estimation of A Public Utility's Cost of Equity Capital, The Journal of Finance, Vol. XXXV, No. 2, May 1980.

57 Bente Villadsen, *et. al*, Risk and Return for Regulated Industries (2017) at 95, endnote 147 of Chapter 4.

financial literature, and is not an unnecessary redundancy. In view of financial theory and practical research, it is therefore appropriate to include the ECAPM when estimating the cost of common equity.

Q. WHAT WOULD THE RESULTS OF MR. BAUDINO'S CAPM ANALYSIS BE IF CORRECTED TO USE AN APPROPRIATE MRP AND EMPLOY THE ECAPM AS DISCUSSED ABOVE?

A. Schedule DWD-4R, pages 1 and 2 presents the results of the corrected applications of both the traditional CAPM and the ECAPM of 10.92% and 11.38%, respectively. These indicated cost rates do not reflect WSCKY's risk profile, as they are not adjusted for the Company's small relative size to the proxy group.

Q. WHAT WOULD MR. BAUDINO'S COMMON EQUITY COST RATES BE BASED ON THE CORRECTIONS TO HIS CAPM ANALYSES DISCUSSED ABOVE?

A. The results of Mr. Baudino's DCF model and corrections to his CAPM are provided in Table 4, below:

Table 4: Summary of Baudino Corrected Results

Measure	Recommended Range	
Discounted Cash Flow Model	9.00% - 9.50%	
	CAPM	**ECAPM**
Capital Asset Pricing Model	10.92%	11.38%

In view of these corrected results, Mr. Baudino's reasonable range of ROEs would be from 9.00% to 11.38%. However, an indicated range of ROEs from 9.00% to 11.38% still understates WSCKY's ROE because it does not reflect their smaller size relative to the proxy group.

D. ADJUSTMENTS TO THE COST OF COMMON EQUITY

Q. DOES MR. BAUDINO CONSIDER A SIZE ADJUSTMENT IN HIS RECOMMENDED ROE?

A. No, he does not. Mr. Baudino claims that there is no consensus regarding the use of a size premium for utilities. He also claims that since WSCKY is part of CORIX Regulated Utilities ("CORIX"), it should not be allowed a size premium.[58]

Q. HAVE YOU CONDUCTED AN ADDITIONAL STUDY COMPARING THE SIZE OF WSCKY WITH THE AVERAGE PROXY COMPANY?

A. Yes, I have. Kroll's Cost of Capital Navigator: U.S. Cost of Capital Module ("Kroll") presents a Size Study based on the relationship of various measures of size and return. Relative to the relationship between average annual return and the various measures of size, Kroll states:

> **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 business,** simply because size has been shown to be a *predictor* of equity returns.
>
> Traditionally, researchers have used market value of equity (market capitalization or simply "market cap") as a measure of size in conducting historical rate of return studies. However, as we discuss later in this chapter, market cap is not the only measure of size that can be used to predict return, nor is it necessarily the best measure of size to use. [59]

The Size Study uses the following eight measures of size, all of which have empirically shown that over the long-term, the smaller the company, the higher the risk:

- Market Value of Common Equity (or total capital if no debt / equity);
- Book Value of Common Equity;
- Net Income (five-year average);

[58] Baudino Direct Testimony, at 30.
[59] Kroll, Cost of Capital Navigator: U.S. Cost of Capital Module, Size as a Predictor of Returns, at 1.

- Market Value of Invested Capital;
- Total Assets (Invested Capital);
- Earnings Before Interest, Taxes, Depreciation & Amortization (five-year average);
- Sales / Operating Revenues; and
- Number of Employees.

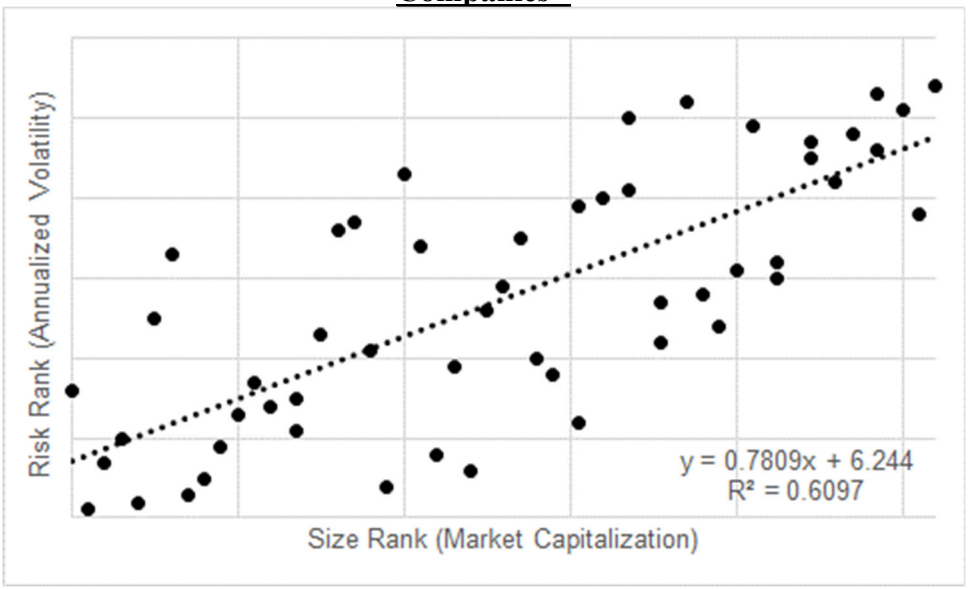
I used the Kroll Size Study to determine the approximate magnitude of any necessary risk premium due to the size of the WSCKY relative to the proxy group. As shown on Schedule DWD-5R, in all measures, WSCKY is smaller than the proxy group presented in this proceeding with associated size premiums between 1.31% and 3.42%. Though I disagree with the use of data of WSCKY's parent, CORIX, I also applied the Kroll Size Study to CORIX and found that in all measures, CORIX is smaller than the proxy group presented in this proceeding with associated size premiums between 1.00% and 1.60%. In view of these indicated size premiums, WSCKY is riskier than companies in the proxy group, and that an upward size adjustment of 1.00% to the indicated cost of common equity is extremely conservative.

Q. HAVE YOU PERFORMED STUDIES THAT LINK SIZE AND RISK FOR UTILITY COMPANIES?

A. Yes, I have performed two studies that link size and risk for utility companies. My first study included the universe of electric, gas, and water companies included in *Value Line Standard* and *Small and Mid-Cap Editions.* From each of the utilities' *Value Line* Ratings & Reports, I calculated the 10-year annualized volatility of daily prices (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), I made a scatter plot of the data, as shown on Chart 5, below:

Chart 5: Relationship Between Size and Risk for the *Value Line* Universe of Utility Companies[60]



As shown in Chart 5 above, as company size decreases (increasing size rank), the annualized volatility increases, linking size and risk for utilities, which is significant at 95.0% confidence level.

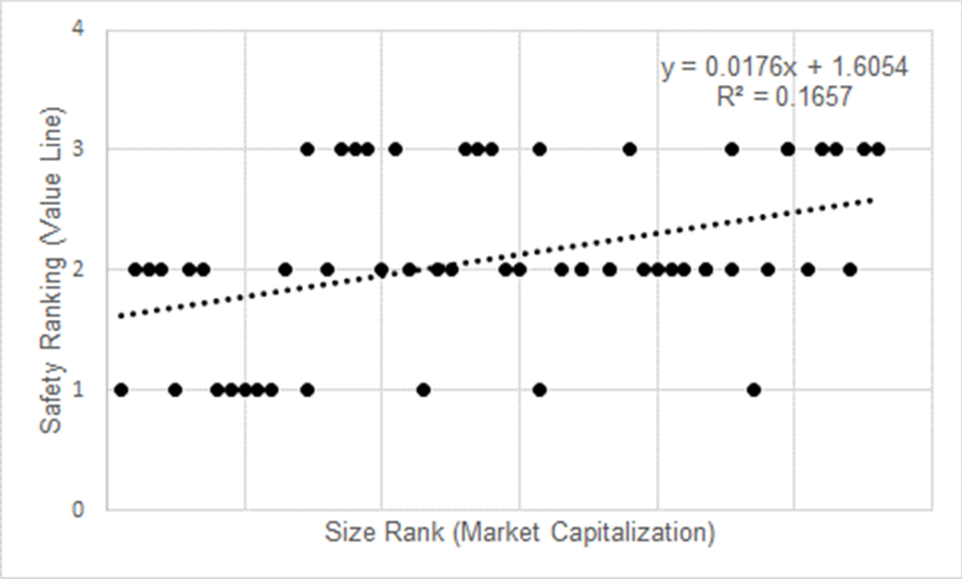
The second study used the same universe of companies, but instead of using annualized volatility, I used the *Value Line* Safety Ranking,[61] which is another measure of total risk agreed upon by Mr. Baudino.[62] After ranking the companies by size and Safety Ranking, I made a scatterplot of those data, as shown on Chart 6, below:

60 Source: *Value Line*.

61 *Value Line* also ranks stocks for Safety by analyzing the total risk of a stock compared to the approximately 1,700 stocks in the *Value Line* universe. Each of the stocks tracked in the *Value Line Investment Survey* is ranked in relationship to each other, from 1 (the highest rank) to 5 (the lowest rank). Safety is a quality rank, not a performance rank, and stocks ranked 1 and 2 are most suitable for conservative investors; those ranked 4 and 5 will be more volatile. Volatility means prices can move dramatically and often unpredictably, either down or up. The major influences on a stock's Safety rank are the company's financial strength, as measured by balance sheet and financial ratios, and the stability of its price over the past five years.

62 Baudino Direct Testimony, at 22.

Chart 6: Relationship Between Size and Safety Ranking for the *Value Line* Universe of Utility Companies[63]



Like the first study, as company size rank decreases, Safety Ranking degrades, indicating a link between size and risk for utilities. This study is also significant at the 95% confidence level.

Q. ARE YOU AWARE OF ANOTHER ACADEMIC ARTICLE RELATING TO THE APPLICABILITY OF A SIZE PREMIUM?

A. Yes. An article by Michael A. Paschall, ASA, CFA, and George B. Hawkins ASA, CFA, "Do Smaller Companies Warrant a Higher Discount Rate for Risk?" also supports the applicability of a size premium. As the article makes clear, all else equal, size is a risk factor which must be taken into account when setting the cost of capital or capitalization (discount) rate. Paschall and Hawkins state in their conclusion as follows:

> The current challenge to traditional thinking about a small stock premium is a very real and potentially troublesome issue. The challenge comes from bright and articulate people and has already been incorporated into some court cases, providing further ammunition for the IRS. Failing to consider the additional risk associated with most smaller companies, however, is to fail to acknowledge reality. Measured properly, small company stocks have proven to be more risky over a long period of time than have

[63] Source: *Value Line*.

> larger company stocks. This makes sense due to the various advantages that larger companies have over smaller companies. Investors looking to purchase a riskier company will require a greater return on investment to compensate for that risk. There are numerous other risks affecting a particular company, yet the use of a size premium is one way to quantify the risk associated with smaller companies.[64]

Hence, Paschall and Hawkins corroborate the need for a small size adjustment, all else equal.

Q. SINCE WSCKY IS A PART OF CORIX, WHY IS THE SIZE OF CORIX NOT MORE APPROPRIATE TO USE WHEN DETERMINING THE SIZE ADJUSTMENT?

A. The return derived in the proceeding will not apply to CORIX's operations, but only to WSCKY's operations. As such, WSCKY's operations should be considered a stand-alone company, as discussed in my Direct Testimony.[65] As demonstrated above and in Schedule DWD-5R, Using CORIX as a comparator to the Utility Proxy Group would still result in indicated size premiums from 1.00% to 1.60%.

Q. WHAT IS MR. BAUDINO'S RANGE OF ROES APPLICABLE TO WSCKY AFTER ADJUSTMENT?

A. Mr. Baudino's corrected, adjusted results are summarized in Table 5, below:

Table 5: Summary of Baudino Corrected Results with Adjustments

Measure	
Indicated Range of ROEs Before Adjustment	9.00% - 11.38%
Business Risk Adjustment	1.00%
Indicated Range of ROEs After Adjustment	10.00% - 12.38%

In view of these corrected and adjusted model results, Mr. Baudino's initial range of ROEs from 9.00% to 9.50% significantly understates the ROE for WSCKY currently.

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64 Michael A. Paschall, ASA, CFA and George B. Hawkins ASA, CFA, *Do Smaller Companies Warrant a Higher Discount Rate for Risk?*, CCH Business Valuation Alert, Vol. 1, Issue No. 2, December 1999.

65 D'Ascendis Direct Testimony, at 44-46.

E. CRITIQUES ON COMPANY TESTIMONY

Q. DOES MR. BAUDINO HAVE CRITIQUES OF YOUR ROE ANALYSES?

A. Yes. Mr. Baudino's critiques of my analyses are as follows:

1. My application of a size premium to my indicated ROE;
2. The application of my RPM;
3. The application of my CAPM and ECAPM;
4. My use of a non-price regulated proxy group comparable in total risk to my utility proxy group;

I have already addressed critique number one previously in my Rebuttal Testimony, so I will not address it again here. I will address the remaining critiques in turn below.

i. Risk Premium Model

Q. PLEASE SUMMARIZE MR. BAUDINO'S CRITIQUES OF YOUR RPM.

A. Mr. Baudino has the following critiques of my RPM: (1) that I did not demonstrate that the Predictive Risk Premium Model ("PRPM") is relied on by investors or accepted by utility commissions; (2) that the level of the PRPM results leads the model to be "deeply flawed"; (3) that the projected market returns used in my total market approach RPM are excessive; (4) that my regression-based equity risk premium ("ERP") is flawed; and (5) that my return on the S&P utilities index is flawed. I will address each of these critiques in turn.

Q. MR. BAUDINO CLAIMS THAT YOU HAVE NOT PROVED THAT YOUR PRPM IS RELIED ON BY INVESTORS.[66] PLEASE RESPOND.

A. As discussed in my Direct Testimony[67], the PRPM is based on the research of Dr. Robert F. Engle, dating back to the early 1980s. Dr. Engle discovered that the volatility of market prices, returns, and risk premiums clusters over time, making prices, returns, and risk

[66] Baudino Direct Testimony, at 38.
[67] D'Ascendis Direct Testimony, at 20-22.

premiums highly predictable. In 2003, he shared the Nobel Prize in Economics for this work, characterized as "methods of analyzing economic time series with time-varying volatility (ARCH).[68] Dr. Engle[69] noted that relative to volatility, "the standard tools have become the ARCH/GARCH[70] models." Hence, the methodology is not exclusively used by me, and would be relied on by investors.

Q. IS THE PRPM CITED IN ACADEMIC LITERATURE BESIDES THE ARTICLES CITED ABOVE?

A. Yes, it is. The PRPM is cited in the following textbooks on cost of capital by authors unaffiliated the authors of the academic articles cited above:

- Shannon Pratt and Roger Grabowski, *Cost of Capital: Applications and Examples*, (Fifth Edition), Wiley & Sons, 2015;
- Shannon Pratt and Roger Grabowski, *The Lawyer's Guide to Cost of Capital: Understanding Risk and Return for Valuing Businesses and Other Investments*, ABA Publishing, 2015; and
- Roger A. Morin, *Modern Regulatory Finance*, PUR Books, 2021.

Regarding the PRPM, Pratt and Grabowski state:

> Empirical testing of this new model has yielded data allowing a comparison of results with other techniques including the DCF and CAPM. The results- combined with the stability of PRPM estimates- suggests that the model is robust when applied to electric, natural gas, combination electric and gas, and water utility companies.[71]

In addition, Morin states:

> PRPM cost of capital estimates then began to proliferate based on extensive work published in the Journal of Regulatory Economics, The Electricity

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68 www.nobelprize.org

69 Robert Engle, *GARCH 101: The Use of ARCH/GARCH Models in Applied Econometrics*, Journal of Economic Perspectives, Volume 15, No. 4, Fall 2001, at 157-168.

70 Autoregressive Conditional Heteroskedasticity/Generalized Autoregressive Conditional Heteroskedasticity.

71 Shannon Pratt, Roger Grabowski, "The Lawyer's Guide to The Cost of Capital: Understanding Risk and Return for Valuing Businesses and Other Investments", American Bar Association, 2015, at 421.

Journal, and Energy Policy Journal. It is only a matter of time before the technique becomes more mainstream in regulatory proceedings.

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It is well known that security markets exhibit periods of relative calm and periodic high volatility for a variety of reasons. The GARCH technique does not explain the volatility but *models* its clustering. Investment analysts and financial institutions typically use models such as GARCH to estimate the volatility of returns for stocks, bonds, and market indices. They use the resulting information to help determine pricing decisions and judge which assets will potentially provide higher returns, as well as to forecast the returns. At its core, GARCH is a statistical modelling technique used in analyzing time-series data where the variance error is believed to be serially uncorrelated, and is used to help predict the volatility of returns on financial assets.[72]

Q. MR. BAUDINO STATES THAT YOU HAVE NOT SHOWN THAT THE PRPM HAS BEEN ACCEPTED BY REGULATORY JURISDICTIONS. PLEASE RESPOND.

A. As discussed on page 22 of my testimony, the PRPM has been accepted in part, or in full, by regulatory commissions. Mr. Baudino's concerns regarding the PRPM should be dismissed.

Q. MR. BAUDINO CLAIMS THAT BECAUSE THE RANGE OF MY PRPM RESULTS AND THE LEVEL OF INDICATED ROES PRODUCED BY THE MODEL SHOWS THAT THE PRPM IS DEEPLY FLAWED.[73] PLEASE RESPOND.

A. Mr. Baudino is mistaken on both counts. Regarding the range of PRPM results, even when proxy groups are carefully selected, it is common for analytical results to vary from company to company. It therefore is common for analytical results to reflect a wide range,

[72] Morin, at 139-141.
[73] Baudino Direct Testimony, at 38.

even for a group of similarly situated companies. For example, the indicated DCF results for my Utility Proxy Group range from 4.94% to 14.28% and the indicated results of the PRPM ranged from 11.36% to 18.88%. If the range of individual company results generated by a cost of common equity model determines whether it is "flawed" or not, the DCF model should also be viewed with caution.

Regarding the level of indicated ROEs being a determinant of the PRPM being a flawed model, Mr. Baudino only looks to the results and not the underlying theory of the model, which won the Nobel Prize for Economics, and has not been rebutted in the academic literature for a decade since being published in the *Journal of Economics and Business* in June 2011. Since Mr. Baudino does not rebut the underlying model nor uncovers any "flaws" in the calculation of the GARCH-in-mean model, his claim should be dismissed by the Commission.

Q. MR. BAUDINO NOTES THAT THE PROJECTED MARKET RETURNS USED IN YOUR ERP USING YOUR BETA ADJUSTED APPROACH ARE OVERSTATED.[74] HOW DO YOUR RECOMMENDED ERPS OF 6.20% (DIRECT) AND 5.77% (REBUTTAL) COMPARE TO THE HISTORICAL DISTRIBUTION OF ERPS FROM 1929-2021?

A. The ERPs recommended in my Direct and updated analysis fall within the 51st and 49th percentiles, respectively, of historical ERPs (as measured by the return on the S&P Utility Index less the yield on an A-rated utility bond). Mr. Baudino's concerns regarding the level of my ERPs in my RPM should be dismissed.

[74] Baudino Direct Testimony, at 39.

Q. PLEASE RESPOND TO MR. BAUDINO'S CRITIQUE OF YOUR REGRESSION BASED MRP.

A. Mr. Baudino states that because the R-squared value of my regression is low, my regression based MRP should be ignored as it "should not be relied upon to predicted market risk premium based on changes in bond yields."[75] Mr. Baudino's criticism is misplaced, as the relevant issue is whether the relationship examined has the expected sign and is statistically significant, not whether the R-square meets some unspecified threshold. The R-square measures the extent to which changes in the dependent variable (the risk premium) are explained by changes in the explanatory variable (AAA/AA Corporate bond yields); it does not measure statistical significance. As shown in Table 6, the T-statistics show that both the intercept and AAA/AA Corporate bond yields (the independent variable) are statistically significant.[76]

Table 6: Regression Coefficients for Regression MRP

	Coefficient	T-Statistic	P-Value	Standard Error
Intercept	0.137	9.567	0.000	0.014
AAA/AA Corporate bond yield	-1.283	-5.779	0.000	0.220

Q. MR. BAUDINO SUGGESTS THAT MARKET RETURNS CALCUALTED FROM THE S&P UTILITY INDEX SHOULD BE ESTIMATED AS A STRAIGHT AVERAGE, AND NOT AS A MARKET CAPITILIZATION WEIGHTED AVERAGE. PLEASE RESPOND.

A. I disagree with Mr. Baudino's suggestion. The market returns used in my S&P Utility Index Holding Returns ERP aim to estimate what the expected return of the S&P Utility

[75] Baudino Direct Testimony, at 42.

[76] As noted earlier, a T-statistic higher than 2.00 (absolute value) indicates a statistically significant relationship at the 95.00 percent confidence level.

Index is. In calculating the S&P Utilities Index, S&P Global uses a "float-adjusted market cap weighted" methodology, and not a straight average.[77] As a result, the most appropriate method to replicate the index is to apply the same methodology as the managers of the index, S&P Global. Further, I also note that I apply the same market cap weighted methodology in estimating my S&P 500 market returns, which Mr. Baudino does not take issue with.

ii. Capital Asset Pricing Model

Q. PLEASE SUMMARIZE MR. BAUDINO'S CRITIQUES ON YOUR APPLICATION OF THE CAPM.

A. Mr. Baudino critiques the following: (1) my projected market return; (2) the level of my MRPs; and (3) my use of the ECAPM. As I discussed the applicability of the ECAPM previously, I will not repeat that discussion here. I will address the remaining critiques in turn.

Q. PLEASE RESPOND TO MR. BAUDINO'S CLAIM THAT YOUR PROJECTED MRPS BASED ON YOUR MARKET DCF ANALYSIS ARE "SO HIGH."[78]

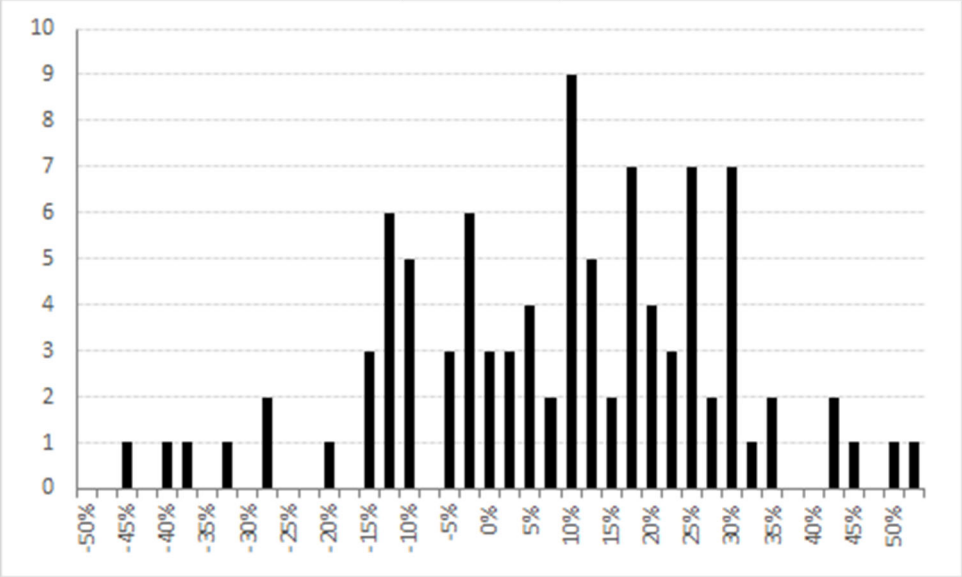
A. Mr. Baudino finds my projected market returns of 11.98% to 15.90% to be overstated. Again, Mr. Baudino fails to consider the other four measures I have considered. The average implied market return for my Direct (12.98%) and Rebuttal Testimonies (14.04%) represent the approximately 48th and 49th percentile of actual returns observed from 1926 to 2021 as shown on Schedule DWD-6R. As discussed above and as noted by Mr. Baudino, multiple measures give greater insight into the investor-required return than a limited number of measures. The average implied market return for my Direct and Rebuttal Testimonies are 12.98% and 14.04%, respectively, which are comparable to the average

[77] S&P Global, S&P 500 Utilities Sector Factsheet.
[78] Baudino Direct Testimony, at 44.

historical market return of approximately 12.00%. Moreover, because market returns historically have been volatile, my market return estimates are statistically indistinguishable from the long-term arithmetic average market data on which Mr. Baudino relies.[79]

Recalling that Mr. Baudino includes historical data among the methods he used to estimate the MRP, I produced a histogram of the annual MRPs reported by Kroll. The results of that analysis, which are presented in Chart 7 below, demonstrate average MRPs of 9.80% (Direct Testimony) to 10.18% (Rebuttal Testimony) occur approximately 53% of the time.

Chart 7: Frequency Distribution of Observed Market Risk Premia, 1926-2021[80]



Further, Mr. Baudino finds that the growth rates underlying the projected market returns "are not supportable when one further considers both historical and forecasted gross domestic product ("GDP") growth for the U.S."[81] To that end, I calculated the correlation coefficient between year-over-year GDP growth and Large-Capitalization Stock returns

[79] SBBI-2022, at Appendix A-1.
[80] Schedule DWD-6R.
[81] Baudino Direct Testimony, at 40.

since 1929 and found a correlation of 0.13, meaning little-to-no link between GDP growth and stock returns. In addition, the relationship between the two was not statistically significant.

Q. DO YOU AGREE WITH MR. BAUDINO THAT THE MRP FALLS IN A RANGE OF 5% TO 8%?

A. No, I do not. On page 45 of his direct testimony, Mr. Baudino cites to the eighth edition of "Principles of Corporate Finance" by Brealey, Myers, and Allen, which was published in 2006, to suggest that my MRP estimates are overstated. I do not agree that it is reasonable to compare generic estimates of the MRP from 16 years ago to current MRP estimates. It is readily discernible that there is an inverse relationship between the yield on interest rates and the ERP - in other words, as interest rates decline, the equity risk premium rises and vice versa, a result consistent with financial literature on the subject.[82] Since 2006, the 30-year Treasury yield has decreased from approximately 5% to approximately 3.56%, as reported by Mr. Baudino.[83] Given the well documented inverse relationship, it is not surprising that my estimate of the MRP based on current data is higher than it was in 2006.

Adding the 2006 risk-free rate of approximately 5% to Mr. Baudino's suggested 5% to 8% MRP implies a market return of 10% to 13%. As noted above, the implied market return in my CAPM is 12.98% (Direct) and 14.04% (Rebuttal).[84] That estimate of the market return falls within the range implied by Mr. Baudino.

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82 *See*, *e.g.*, Robert S. Harris and Felicia C. Marston, *The Market Risk Premium: Expectational Estimates Using Analysts' Forecasts*, Journal of Applied Finance, Vol. 11, No. 1, 2001, at pages 11 to 12; Eugene F. Brigham, Dilip K. Shome, and Steve R. Vinson, *The Risk Premium Approach to Measuring a Utility's Cost of Equity*, Financial Management, Spring 1985, at pages 33 to 45.

83 Exhibit RAB-4.

84 As shown on Page 22 of Schedule DWD-1R, an MRP of 10.18% plus projected risk-free rate of 3.86% equals an implied market return of 14.04%.

iii. Non-Price Regulated Group

Q. PLEASE SUMMARIZE MR. BAUDINO'S CONCERNS WITH YOUR NON-PRICE REGULATED PROXY GROUP.

A. Mr. Baudino's concern is that non-utility companies face risks that lower risk water companies like WSCKY do not face.[85]

Q. DOES MR. BAUDINO DISCUSS THE IMPORTANCE OF DETERMINING COMPARATIVE LEVELS OF RISK IN MAKING INVESTMENT DECISIONS?

A. Yes, he does. Mr. Baudino states the task of a rate of return analyst is to "estimate a return that is equal to the return being offered by other risk-comparable firms", which he notes could be a "utility stock, a utility bond, a mutual fund, a money market fund, or any other number of investment vehicles."[86] Mr. Baudino clearly recognizes that risk-comparable investments do not necessarily have to be utility based.

Q. HAVE YOU SHOWN YOUR NON-PRICE REGULATED PROXY GROUP TO BE COMPARABLE IN RISK TO YOUR UTILITY PROXY GROUP?

A. Yes, I have. As discussed in my Direct Testimony, the selection criteria for my Non-Price Regulated Proxy Group were based on a range of unadjusted betas (a measure of systematic risk) and a range of standard errors of the regression (a measure of unsystematic risk), which gave rise to those betas, and together measure total risk. [87]

As to the comparability of my Non-Price Regulated and Utility Proxy Groups, the selection criteria for my Non-Price Regulated Proxy Group was based on ranges of two measures of risk, the unadjusted beta of the proxy group, which measures systematic, or market risk, and the standard error of the regression, which gave rise to those betas,

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85 Baudino Direct Testimony, at 46.
86 Baudino Direct Testimony, at 4.
87 D'Ascendis Direct Testimony, at 39.

measuring non-systematic or diversifiable risk. Systematic plus non-systematic risk is one definition of total risk.[88] Mr. Baudino echoes this fact on pages 20-21 of his direct testimony.

Business and financial risks may vary between companies and proxy groups, but if the collective average betas and standard errors of the regression of the group are similar, then the total, or aggregate, non-diversifiable market risks and diversifiable risks are similar, as noted in "Comparable Earnings: New Life for an Old Precept" provided in Schedule DWD-7R. Thus, because the non-price regulated companies are selected based on analyses of market data, they are comparable in total risk (even though individual risks may vary) to the Utility Proxy Group. This is demonstrated clearly on page 273 of Jack C. Francis' Investments: Analysis and Management (page 3 of Schedule DWD-8R), which shows that total risk can be "partitioned into its systematic and unsystematic components." Companies that have similar betas and standard errors of regression have similar total investment risk.

Q. IS THERE A SPECIFIC ADVANTAGE TO USING YOUR SELECTION CRITERIA, WHICH USES MEASURES OF SYSTEMATIC AND UNSYSTEMATIC RISK, INSTEAD OF USING THE COMBINATION OF BUSINESS AND FINANCIAL RISK?

A. Yes. *Value Line* unadjusted betas and the standard error of the regressions giving rise to those betas are measurable objective values, whereas total business risk[89] and financial risk measures are more subjective. In view of all the above, Mr. Baudino's concerns regarding my Non-Price Regulated Proxy Group should be dismissed by the Commission.

[88] Business risk plus financial risk is a second definition of total risk.
[89] Business risk in excess of size risk, which is measurable, as discussed previously.

Q. HAVE YOU CONDUCTED ANOTHER ANALYSIS TO DETERMINE WHETHER YOUR UTILITY PROXY GROUP AND NON-PRICE REGULATED PROXY GROUP ARE OF COMPARABLE RISK?

A. Yes, I have. On page 22 of Mr. Baudino's direct testimony, he mentions that *Value Line's* Safety Ranking is a proxy for a company's total risk. I compared the average and median Safety Ranking for the Utility Proxy Group and Non-Price Regulated Proxy Group, as shown on Table 7, below:

Table 7: Comparison of Safety Rankings of Mr. D'Ascendis' Utility Proxy Group and Non-Price Regulated Proxy Group

Group	Average Safety Ranking	Median Safety Ranking
Utility Proxy Group	2.67	3.00
Non-Price Regulated Proxy Group	1.67	2.00

As shown, the Safety Rankings of the Utility Proxy Group and the Non-Price Regulated Proxy Group are comparable, indicating comparable total risk.[90] This, in addition to all of the above should lead the Commission to consider the results of my Non-Price Regulated Proxy Group in its determination of WSCKY's ROE in this proceeding.

IV. CONCLUSION

Q. PLEASE SUMMARIZE YOUR REBUTTAL TESTIMONY.

A. In this Rebuttal Testimony I updated my ROE models with market data as of October 14, 2022. The results of the ROE models produced indicated ranges of ROEs from 9.67% to 12.06% (unadjusted) and from 10.67% to 13.06% (adjusted).[91] Given these ranges, I

[90] I note that the highest possible Safety Rank is a 1, so Table 7 illustrates that my Non-Price Regulated Proxy Group is actually *less* risky than my Utility Proxy Group.

[91] D'Ascendis Rebuttal Testimony, Schedule DWD-1R, at 2.

maintain my initial recommendation of 10.60%, which, considering the current capital markets, is reasonable if not conservative.

Regarding Mr. Baudino's direct testimony, I discussed my disagreements with his analyses, which I supported with citations to the academic literature and empirical analyses. I also responded to any critiques to my Direct Testimony, again, supporting my responses with citations to the academic literature and empirical analyses.

Q. SHOULD ANY OR ALL OF THE ARGUMENTS MADE BY MR. BAUDINO PERSUADE THE COMMISSION TO LOWER THE RETURN ON COMMON EQUITY IT APPROVES FOR WSCKY BELOW YOUR RECOMMENDATION?

A. No, they should not. My recommended cost of common equity of 10.60% is both reasonable and conservative. It will provide the Company with sufficient earnings to enable it to attract necessary new capital efficiently and at a reasonable cost, to the benefit of both customers and investors.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes, it does.

AFFIDAVIT

The undersigned, DYLAN W. D'ASCENDIS, being duly sworn, deposes and says that he is a partner at ScottMadden, Inc. which provides consulting services to the Water Service Corporation of Kentucky, that he is authorized to submit this testimony on behalf of Water Service Corporation of Kentucky, and that the information contained in the testimony is true and accurate to the best of his knowledge, information and belief, after reasonable inquiry, and as to those matters that are based on information provided to him, he believes to be true and correct.

Dylan W. D'Ascendis, Affiant

NOTARY CERTIFICATE

STATE OF New Jersey

COUNTY OF Burlington

Subscribed, acknowledged and sworn to before me by Dylan W D'Ascendis on this 22 day of November, 2022.

My commission expires: 4/17/2024 (SB).

Stephanie B

NOTARY PUBLIC

STEPHANIE M. BASS
NOTARY PUBLIC OF NEW JERSEY
Commission # 2445382
My Commission Expires 04/17/2024

Water Service Corporation of Kentucky
Table of Contents
to Exhibit 9.5
of Dylan W. D'Ascendis, CRRA, CVA

Water Service Corporation of Kentucky
Recommended Capital Structure and Cost Rates
for Ratemaking Purposes

Type Of Capital	Ratios (1)	Cost Rate		Weighted Cost Rate
Long-Term Debt	50.29%	4.71%	(1)	2.37%
Common Equity	49.71%	10.60%	(2)	5.27%
Total	100.00%			7.64%

Notes:

(1) Company-provided.
(2) From page 2 of this Schedule.

Water Service Corporation of Kentucky
Brief Summary of Common Equity Cost Rate

Line No.	Principal Methods	Proxy Group of Six Water Companies	Proxy Group of Six Water Companies ex PRPM
1.	Discounted Cash Flow Model (DCF) (1)	9.67%	9.67%
2.	Risk Premium Model (RPM) (2)	11.97%	11.61%
3.	Capital Asset Pricing Model (CAPM) (3)	12.02%	11.83%
4.	Market Models Applied to Comparable Risk, Non-Price Regulated Companies (4)	12.06%	11.91%
5.	Indicated Common Equity Cost Rate before Adjustment for Unique Risk	9.67% - 12.06%	9.67% - 11.91%
6.	Business Risk Adjustment (5)	1.00%	1.00%
7.	Indicated Common Equity Cost Rate after Adjustment	10.67% - 13.06%	10.67% - 12.91%
	Recommended Common Equity Cost Rate	10.60%	

Notes: (1) From page 3 of this Schedule.
(2) From page 10 of this Schedule.
(3) From page 21 of this Schedule.
(4) From page 26 of this Schedule.
(5) Size risk adjustment to reflect Water Service Kentucky's smaller size compared to the Utility Proxy Group as detailed in Mr. D'Ascendis' Direct Testimony.

Water Service Corporation of Kentucky
Indicated Common Equity Cost Rate Using the Discounted Cash Flow Model for the
Proxy Group of Six Water Companies

Proxy Group of Six Water Companies	[1] Average Dividend Yield (1)	[2] Value Line Projected Five Year Growth in EPS (2)	[3] Zack's Five Year Projected Growth Rate in EPS	[4] Yahoo! Finance Projected Five Year Growth in EPS	[5] Average Projected Five Year Growth in EPS (3)	[6] Adjusted Dividend Yield (4)	[7] Indicated Common Equity Cost Rate (5)
American States Water Company	1.87 %	5.50 %	NA %	4.40 %	4.95 %	1.92 %	6.87 %
American Water Works Company, Inc.	1.78	3.00	8.10	8.30	6.47	1.84	8.31
California Water Service Group	1.71	6.50	NA	11.70	9.10	1.79	10.89
Essential Utilities Inc.	2.41	10.00	6.10	6.80	7.63	2.50	10.13
Middlesex Water Company	1.32	4.50	NA	2.70	3.60	1.34	4.94
SJW Group	2.25	14.00	NA	9.80	11.90	2.38	14.28
						Average	9.24 %
						Median	9.22 %
						Average of Mean and Median	9.23 %
						Average of Mean and Median Excluding Middlesex Water (6)	10.11 %
						Indicated DCF Result	9.67 %

NA= Not Available

Notes:

(1) Indicated dividend at 10/14/2022 divided by the average closing price of the last 60 trading days ending 10/14/2022 for each company.
(2) From pages 4 through 9 of this Schedule.
(3) Average of columns 2 through 4 excluding negative growth rates.
(4) This reflects a growth rate component equal to one-half the conclusion of growth rate (from column 5) x column 1 to reflect the periodic payment of dividends (Gordon Model) as opposed to the continuous payment. Thus, for American States Water Company, 1.87% x (1+(1/2 x 4.95%)) = 1.92%.
(5) Column 5 + column 6.
(6) The indicated DCF cost rate of Middlesex Water Company is excluded as it is below the yield of A-rated public utility bonds.

Source of Information:
Value Line Investment Survey
www.zacks.com Downloaded on 10/14/2022
www.yahoo.com Downloaded on 10/14/2022

AMER. STATES WATER NYSE-AWR

RECENT PRICE **82.11** | P/E RATIO **31.9** (Trailing: 36.8 Median: 27.0) | RELATIVE P/E RATIO **2.22** | DIV'D YLD **2.0%** | **VALUE LINE**

TIMELINESS 4 Lowered 6/10/22
SAFETY 2 Raised 7/20/12
TECHNICAL 3 Raised 8/19/22
BETA .65 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$71-$134	$103 (25%)

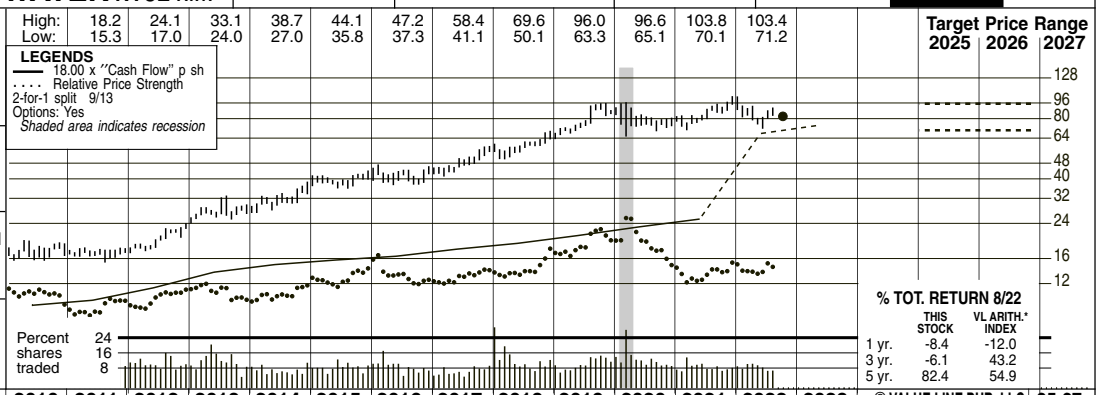
2025-27 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	95	(+15%)	*6%*
Low	70	(-15%)	*-1%*

Institutional Decisions

	4Q2021	1Q2022	2Q2022
to Buy	157	153	128
to Sell	117	121	150
Hld's(000)	27394	27827	26629

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	© VALUE LINE PUB. LLC	25-27
High:	18.2	24.1	33.1	38.7	44.1	47.2	58.4	69.6	96.0	96.6	103.8	103.4								
Low:	15.3	17.0	24.0	27.0	35.8	37.3	41.1	50.1	63.3	65.1	70.1	71.2								
	7.88	8.75	9.21	9.74	10.71	11.12	12.12	12.19	12.17	12.56	11.92	12.01	11.88	12.86	13.24	13.51	*13.70*	*14.00*	Revenues per sh	*18.15*
	1.45	1.65	1.69	1.70	2.11	2.13	2.48	2.65	2.67	2.81	2.70	2.96	2.84	3.26	3.34	3.64	*3.60*	*3.90*	"Cash Flow" per sh	*4.75*
	.67	.81	.78	.81	1.11	1.12	1.41	1.61	1.57	1.61	1.62	1.88	1.72	2.28	2.33	2.55	*2.45*	*2.60*	Earnings per sh [A]	*3.25*
	.46	.48	.50	.51	.52	.55	.64	.76	.83	.87	.91	.99	1.06	1.16	1.28	1.40	*1.53*	*1.62*	Div'd Decl'd per sh [B]■	*2.15*
	1.95	1.45	2.23	2.09	2.12	2.13	1.77	2.52	1.89	2.39	3.55	3.08	3.44	4.12	3.54	3.91	*4.10*	*4.00*	Cap'l Spending per sh	*4.25*
	8.32	8.77	8.97	9.70	10.13	10.84	11.80	12.72	13.24	12.77	13.52	14.45	15.19	16.33	17.39	18.57	*20.15*	*21.35*	Book Value per sh [D]	*23.75*
	34.10	34.46	34.60	37.06	37.26	37.70	38.53	38.72	38.29	36.50	36.57	36.68	36.76	36.85	36.89	36.94	*37.25*	*37.50*	Common Shs Outst'g [C]	*37.50*
	27.7	24.0	22.6	21.2	15.7	15.4	14.3	17.2	20.1	24.6	25.6	25.7	34.0	34.4	34.3	33.2	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*25.0*
	1.50	1.27	1.36	1.41	1.00	.97	.91	.97	1.06	1.24	1.34	1.29	1.84	1.83	1.76	1.82			Relative P/E Ratio	*1.40*
	2.5%	2.5%	2.9%	2.9%	3.0%	3.2%	3.1%	2.7%	2.6%	2.2%	2.2%	2.0%	1.8%	1.5%	1.6%	1.7%			Avg Ann'l Div'd Yield	*2.6%*
							466.9	472.1	465.8	458.6	436.1	440.6	436.8	473.9	488.2	498.9	*510*	*525*	Revenues ($mill)	*680*
							54.1	62.7	61.1	60.5	59.7	69.4	63.9	84.3	86.4	94.3	*91.0*	*98.0*	Net Profit ($mill)	*120*
							39.9%	36.3%	38.4%	38.4%	36.8%	36.0%	22.0%	22.6%	24.6%	24.4%	*24.0%*	*24.0%*	Income Tax Rate	*24.0%*
							2.5%	- -	- -	- -	- -	- -	- -	- -	2.5%	- -	*1.0%*	*1.5%*	AFUDC % to Net Profit	*1.5%*
							42.2%	39.8%	39.1%	41.1%	39.4%	38.0%	40.5%	44.4%	47.2%	46.1%	*46.5%*	*45.5%*	Long-Term Debt Ratio	*52.0%*
							57.8%	60.2%	60.9%	58.9%	60.6%	62.0%	59.5%	55.6%	52.8%	53.9%	*53.5%*	*54.5%*	Common Equity Ratio	*48.0%*
							787.0	818.4	832.6	791.5	815.3	854.9	938.4	1082.5	1216.2	1272.6	*1400*	*1450*	Total Capital ($mill)	*1710*
							917.8	981.5	1003.5	1060.8	1150.9	1205.0	1296.3	1415.7	1512.0	1626.0	*1720*	*1800*	Net Plant ($mill)	*2025*
							8.3%	8.9%	8.6%	9.0%	8.6%	9.3%	7.9%	8.9%	8.0%	8.3%	*7.5%*	*8.0%*	Return on Total Cap'l	*8.0%*
							11.9%	12.7%	12.0%	13.0%	12.1%	13.1%	11.4%	14.0%	13.5%	13.8%	*12.5%*	*12.5%*	Return on Shr. Equity	*13.5%*
							11.9%	12.7%	12.0%	13.0%	12.1%	13.1%	11.4%	14.0%	13.5%	13.8%	*12.5%*	*12.5%*	Return on Com Equity	*13.5%*
							6.6%	6.8%	5.7%	6.0%	5.3%	6.2%	4.5%	6.9%	6.1%	6.2%	*4.5%*	*4.5%*	Retained to Com Eq	*4.5%*
							45%	47%	53%	54%	56%	52%	61%	51%	55%	55%	*62%*	*62%*	All Div'ds to Net Prof	*66%*



CAPITAL STRUCTURE as of 6/30/22
Total Debt $670.8 mill. **Due in 5 Yrs** $33.5 mill.
LT Debt $446.9 mill. **LT Interest** $24.0 mill. (39% of Cap'l)

Leases, Uncapitalized: Annual rentals $2.6 mill.
Pension Assets-12/21 $233.5 mill. **Oblig.** $259.8 mill.
Pfd Stock None

Common Stock 36,956,824 shs.
as of 7/29/22

MARKET CAP: $3.0 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2020	2021	6/30/22
Cash Assets	36.7	5.0	10.8
Accts Receivable	29.2	34.4	27.1
Other	91.2	98.7	101.1
Current Assets	157.1	138.1	139.0
Accts Payable	63.8	65.9	71.9
Debt Due	.4	31.4	223.9
Other	54.4	58.3	52.9
Current Liab.	118.6	155.6	348.7

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '19-'21 to '25-'27
Revenues	2.5%	1.5%	*5.5%*
"Cash Flow"	5.5%	4.5%	*5.5%*
Earnings	9.0%	8.5%	*5.5%*
Dividends	9.5%	8.0%	*9.0%*
Book Value	5.5%	6.0%	*5.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2019	101.7	124.7	134.5	113.0	473.9
2020	109.1	121.3	133.6	124.2	488.2
2021	117.1	128.4	136.8	116.6	498.9
2022	108.6	122.6	*143.8*	*135*	*510*
2023	*112*	*130*	*145*	*138*	*525*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2019	.35	.72	.76	.45	2.28
2020	.38	.69	.72	.54	2.33
2021	.52	.72	.76	.55	2.55
2022	.38	.54	*.65*	*.88*	*2.45*
2023	*.50*	*.75*	*.75*	*.60*	*2.60*

Calendar	QUARTERLY DIVIDENDS PAID [B]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.255	.255	.275	.275	1.06
2019	.275	.275	.305	.305	1.16
2020	.305	.305	.335	.335	1.28
2021	.335	.335	.365	.365	1.40
2022	.365	.365	.3975		

BUSINESS: American States Water Co. operates as a holding company. Through its principal subsidiary, Golden State Water Co., it supplies water to 262,770 customers in 10 California counties. Service areas include the metropolitan areas of Los Angeles and Orange Counties. The company also provides electricity to 24,656 customers in Big Bear Lake and San Bernardino Cnty. Provides water & wastewater services to U.S. military bases through its ASUS subsidiary. Sold Chaparral City Wtr. of AZ. (6/11). Employs 808. BlackRock, Inc. owns 17.7% of out. shares; State St., 13.7%; off. & dir., 0.9% (4/22 Proxy). Chairman: Lloyd Ross. Pres. & CEO: Robert Sprowls. Inc: CA. Address: 630 East Foothill Blvd., San Dimas, CA 91773. Tel.: 909-394-3600. Internet: www.aswater.com.

American States Water had another difficult quarter. In the June interim, the company's share net came in at $0.54, versus last year's $0.72 showing. About $0.10 a share of the shortfall was the result of old rates still being in effect. Recall that the company's Golden States Water utility has already reached a settlement regarding higher rates with the state's Office of Public Advocate. The California Public Utility Commission (CPUC) has yet to approve the deal. Typically, the CPUC goes along with the Public Advocate's recommendation. (Indeed, as a body, it can be tougher on utilities than the CPUC.) Also, with the rate increase not in effect yet, third-quarter income will be hurt as well. It is important to note, however, that once the agreement is finalized, the utility will be able to collect these funds retroactive to the beginning of 2022.

We have lowered our earnings estimates for both 2022 and 2023. Assuming the CPUC makes a final ruling by the end of the year, we have still reduced our share-net estimate by a dime for this year and next. The main reason being that American States has to adjust the valuation of its portfolio of assets set aside for the pension program each quarter. Losses were incurred that impacted the June period by $0.10 a share. Moreover, we think the third quarter will cause another asset writedown, as both the bond and equity markets slumped.

Nonutility operations could be a growth catalyst out to 2025 to 2027. Through its ASUS subsidiary, American States provides water and waste treatment services to U.S. military bases. As the armed forces continue to privatize their water systems, we believe that ASUS will keep winning a fair amount of the 50-year contracts that are being put out for competitive bidding. This business is not regulated, so earnings here can exceed those in its other operations.

These shares do not hold much appeal at the recent quotation. In the near term, the equity is ranked to underperform the broader market averages in the coming year. Furthermore, over the three- to five-year pull, AWR's total return potential is well below that of the *Value Line* median.

James A. Flood *October 7, 2022*

(A) Primary earnings. Excludes nonrecurring gains/(losses):; '06, 3¢; '08, (14¢); '10, (23¢); '11, 10¢. Next earnings report due early Nov.
(B) Dividends historically paid in early March, June, September, and December. ■ Div'd reinvestment plan available.
(C) In millions, adjusted for split.
(D) Includes intangibles. As of 12/31/21; $1.1 million/$0.03 a share.

Company's Financial Strength	A
Stock's Price Stability	100
Price Growth Persistence	85
Earnings Predictability	95

AMERICAN WATER NYSE-AWK

RECENT PRICE **137.33** | P/E RATIO **31.0** (Trailing: 19.2 Median: 25.0) | RELATIVE P/E RATIO **2.15** | DIV'D YLD **2.0%** | **VALUE LINE**

TIMELINESS 2 Raised 9/16/22
SAFETY 3 New 7/25/08
TECHNICAL 3 Raised 10/7/22
BETA .90 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$132-$255	$194 (40%)

2025-27 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	185	(+35%)	*10%*
Low	125	(-10%)	*Nil*

Institutional Decisions

	4Q2021	1Q2022	2Q2022
to Buy	526	450	469
to Sell	369	473	415
Hld's(000)	156569	156704	151931

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
High:	32.8	39.4	45.1	56.2	61.2	85.2	92.4	98.2	129.9	172.6	189.6	189.3						
Low:	25.2	31.3	37.0	41.1	48.4	58.9	70.0	76.0	88.0	92.0	131.0	129.5						

LEGENDS
17.00 x "Cash Flow" p sh
Relative Price Strength
Options: Yes
Shaded area indicates recession

Target Price Range 2025 2026 2027

% TOT. RETURN 8/22

	THIS STOCK	VL ARITH.* INDEX
1 yr.	-17.2	-12.0
3 yr.	21.7	43.2
5 yr.	99.2	54.9

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	© VALUE LINE PUB. LLC	25-27
	13.08	13.84	14.61	13.98	15.49	15.18	16.25	16.28	16.78	17.72	18.54	18.81	19.04	19.97	20.83	21.58	*20.90*	*22.25*	Revenues per sh	*27.10*
	.65	d.47	2.87	2.89	3.56	3.73	4.27	4.36	4.75	5.13	5.26	5.14	6.15	6.65	7.24	10.46	*8.15*	*8.90*	"Cash Flow" per sh	*10.10*
	d.97	d2.14	1.10	1.25	1.53	1.72	2.11	2.06	2.39	2.64	2.62	2.38	3.15	3.43	3.91	6.95	*4.45*	*4.85*	Earnings per sh [A]	*5.75*
	- -	- -	.40	.82	.86	.90	1.21	.84	1.21	1.33	1.47	1.62	1.78	1.96	2.15	2.36	*2.57*	*2.80*	Div'd Decl'd per sh [B]■	*3.55*
	4.31	4.74	6.31	4.50	4.38	5.27	5.25	5.50	5.33	6.51	7.36	8.04	8.78	9.15	10.05	9.71	*13.75*	*11.75*	Cap'l Spending per sh	*11.50*
	23.86	28.39	25.64	22.91	23.59	24.11	25.11	26.52	27.39	28.25	29.24	30.13	32.42	33.83	35.58	40.18	*41.00*	*43.85*	Book Value per sh [D]	*57.80*
	160.00	160.00	160.00	174.63	175.00	175.66	176.99	178.25	179.46	178.28	178.10	178.44	180.68	180.81	181.30	181.61	*182.00*	*182.50*	Common Shs Outst'g [C]	*190.00*
	- -	- -	18.9	15.6	14.6	16.8	16.7	19.9	20.0	20.5	27.7	33.8	27.3	32.9	35.3	23.6	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*27.0*
	- -	- -	1.14	1.04	.93	1.05	1.06	1.12	1.05	1.03	1.45	1.70	1.47	1.75	1.81	1.28			Relative P/E Ratio	*1.50*
	- -	- -	1.9%	4.2%	3.8%	3.1%	3.4%	2.0%	2.5%	2.5%	2.0%	2.0%	2.1%	1.7%	1.6%	1.4%			Avg Ann'l Div'd Yield	*2.3%*
							2876.9	2901.9	3011.3	3159.0	3302.0	3357.0	3440.0	3610.0	3777.0	3920.0	*3800*	*4060*	Revenues ($mill)	*5150*
							374.3	369.3	429.8	476.0	468.0	426.0	567.0	621.0	709.0	1263.0	*810*	*885*	Net Profit ($mill)	*1095*
							40.7%	39.1%	39.4%	39.1%	39.2%	53.3%	28.2%	25.5%	23.3%	23.0%	*21.0%*	*22.0%*	Income Tax Rate	*24.0%*
							6.2%	5.1%	- -	- -	- -	- -	- -	- -	5.1%	2.9%	*5.0%*	*5.0%*	AFUDC % to Net Profit	*5.0%*
							53.9%	52.4%	52.4%	53.7%	52.4%	54.7%	56.3%	58.5%	59.1%	58.6%	*60.0%*	*61.0%*	Long-Term Debt Ratio	*60.0%*
							46.1%	47.6%	47.4%	46.2%	47.5%	45.3%	43.6%	41.4%	40.9%	41.4%	*40.0%*	*39.0%*	Common Equity Ratio	*40.0%*
							9635.5	9940.7	10364	10911	10967	11875	13433	14760	15787	17639	*19260*	*20500*	Total Capital ($mill)	*22000*
							11739	12391	12900	13933	14992	16246	17409	18232	19710	21084	*22900*	*24400*	Net Plant ($mill)	*26000*
							5.4%	5.1%	5.5%	5.7%	5.6%	4.9%	5.4%	5.4%	5.7%	8.2%	*5.5%*	*5.5%*	Return on Total Cap'l	*6.0%*
							8.4%	7.8%	8.7%	9.4%	9.0%	7.9%	9.7%	10.1%	11.0%	17.3%	*10.5%*	*10.5%*	Return on Shr. Equity	*10.5%*
							8.4%	7.8%	8.7%	9.4%	9.0%	7.9%	9.7%	10.1%	11.0%	17.3%	*10.5%*	*10.5%*	Return on Com Equity	*10.5%*
							3.6%	4.7%	4.3%	4.7%	4.0%	2.5%	4.2%	4.4%	5.0%	11.4%	*4.5%*	*4.5%*	Retained to Com Eq	*4.0%*
							57%	40%	50%	50%	56%	68%	56%	57%	55%	34%	*58%*	*58%*	All Div'ds to Net Prof	*62%*

CAPITAL STRUCTURE as of 6/30/22
Total Debt $11621 mil. **Due in 5 Yrs** $1849 mil.
LT Debt $11023 mil. **LT Interest** $414 mil.
(59% of Cap'l)

Leases, Uncapitalized: Annual rentals $12.0 mill.
Pension Assets 12/21 $2294.0 mill
Oblig. $1991.0 mill.
Pfd Stock $3.0 mill. **Pfd Div'd** $.2 mill

Common Stock 181,786,473 shares
as of 7/21/22

MARKET CAP: $25.0 billion (Large Cap)

CURRENT POSITION ($MILL.)	2020	2021	6/30/22
Cash Assets	576	136	97
Accts Receivable	321	271	383
Other	1009	1147	538
Current Assets	1906	1554	1018
Accts Payable	189	235	196
Debt Due	1611	641	598
Other	1081	1265	934
Current Liab.	2881	2141	1728

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '19-'21 to '25-'27
Revenues	3.5%	3.5%	*4.5%*
"Cash Flow"	9.0%	10.0%	*3.5%*
Earnings	12.0%	13.5%	*3.0%*
Dividends	9.5%	10.0%	*8.5%*
Book Value	4.5%	5.0%	*8.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2019	813	882	1013	902	3610
2020	844	931	1079	923	3777
2021	888	999	1082	951	3920
2022	842	937	*1081*	*940*	*3800*
2023	*895*	*1000*	*1165*	*1000*	*4060*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2019	.62	.94	1.33	.54	3.43
2020	.68	.97	1.46	.80	3.91
2021	.73	1.14	1.53	3.55	6.95
2022	.87	1.20	*1.55*	*.83*	*4.45*
2023	*.85*	*1.25*	*1.80*	*.95*	*4.85*

Calendar	QUARTERLY DIVIDENDS PAID [B]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.415	.455	.455	.455	1.78
2019	.455	.50	.50	.50	1.96
2020	.50	.55	.55	.55	2.15
2021	.55	.6025	.6025	.6025	2.36
2022	.6025	.655	.655		

BUSINESS: American Water Works Company, Inc. is the largest investor-owned water and wastewater utility in the U.S., providing services to approximately 14 million people in 24 states. Nonregulated business assists municipalities and military bases with the maintenance and upkeep as well. Regulated operations made up 86% of 2021 revenues. Pennsylvania is its largest market accounting for 21.5% of regulated revenues; New Jersey, 20.3%; Missouri, 13.9%. Has 6,400 employees. Vanguard owns 11.8% of outstanding shares; BlackRock, 8.9%; State St., 5.4%; officers & directors, less than 1.0% (4/22 Proxy). President & CEO: Susan N. Story. Chairman: George MacKenzie. Address: 1 Water Street, Camden, NJ 08102. Tel.: 856-346-8200. Internet: www.amwater.com.

Profits from American Water Works' operations ought to be flattish for the second half of this year. After deducting a $2.70-a-share one-time gain in 2021's final period, the company's share net was $2.38 over the third and fourth quarters. That is the same amount we expect the utility to make in the remainder of 2022.

The bottom line ought to get back on track in 2023. Assuming reasonable treatment from regulators, American Water's share net could well rise 9% to $4.85. A healthy percentage of the profit increase will come from the utility's acquisition strategy (more below).

The regulatory climate could change. American Water has enjoyed a good relationship with the authorities that determine the rates it's allowed to charge customers. State regulators have been cognizant that large capital expenditures are required to upgrade the existing infrastructure. The potential problem ahead is inflation. When prices were rising just 2% annually, it was easier to pass along higher rates to residents. When inflation is high, though, it makes it more difficult politically to approve hikes of 6%-8%, even if the costs are justified.

The construction program is massive. Management has been pursuing an aggressive building policy aimed mostly at replacing antiquated pipelines and wastewater systems. In 2022, the company is on pace to spend $2.5 billion. Since most of its pipelines and other assets are not in great shape, the spending should be ongoing.

Acquisitions ought to be a driver of income growth. There are thousands of small municipally run water district in the U.S. A good portion do not have the finances to fund the necessary repairs and upgrades needed to be in compliance with EPA guidelines. American Water has been absorbing many smaller entities over the decade. This has enabled it to expand its rate base, on which it earns a return. Also, there are redundancies in the industry that can be eliminated from the districts it purchases, which should increase operating margins.

These timely shares are not suitable for long-term accounts. The price of the equity is already trading within our projected 2025-2027 Target Price Range.

James A. Flood *October 7, 2022*

(A) Diluted earnings. Excludes nonrecur. losses: '08, $4.62; '09, $2.63; '11, $0.07. Disc. oper.: '06, ($0.04); '11, $0.03; '12, ($0.10); '13,($0.01). GAAP used as of 2014. Includes $2.70 sh. gain from sale of HOS sub.in Q4,'21. Next earnings report due late Oct.
(B) Dividends paid in March, June, September, and December. ■ Div. reinvestment available.
(C) In millions. **(D)** Includes intangibles. On 12/31/21: $1.231 billion, $6.67/share.
(E) Pro forma numbers for '06 & '07.

Company's Financial Strength	B++
Stock's Price Stability	80
Price Growth Persistence	100
Earnings Predictability	80

CALIFORNIA WATER NYSE-CWT

RECENT PRICE **55.60** | P/E RATIO **31.2** (Trailing: 33.7 Median: 27.0) | RELATIVE P/E RATIO **2.17** | DIV'D YLD **1.8%** | **VALUE LINE**

TIMELINESS 4 Lowered 8/12/22
SAFETY 3 Lowered 7/27/07
TECHNICAL 3 Raised 9/16/22
BETA .70 (1.00 = Market)

18-Month Target Price Range

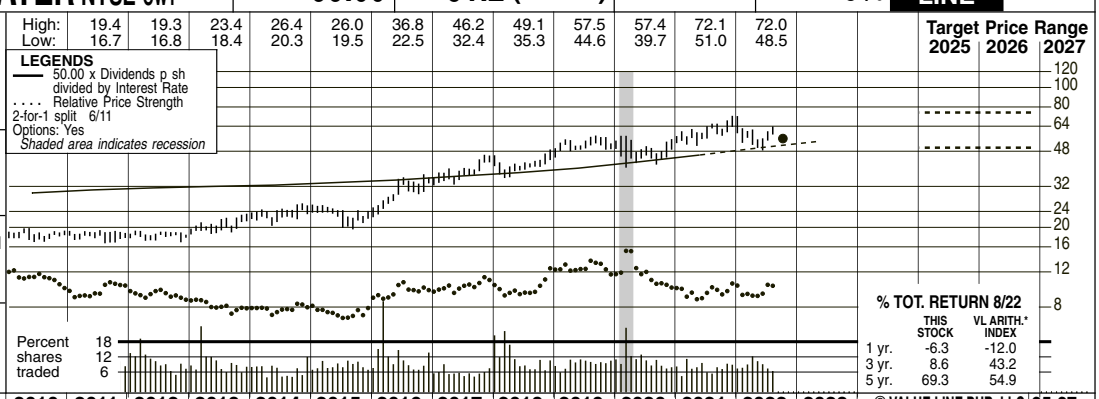
Low-High	Midpoint (% to Mid)
$47-$89	$68 (20%)

2025-27 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	75	(+35%)	*9%*
Low	50	(-10%)	*Nil*

Institutional Decisions

	4Q2021	1Q2022	2Q2022
to Buy	155	152	121
to Sell	109	127	141
Hld's(000)	42143	43279	43653



2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	© VALUE LINE PUB. LLC	25-27
8.10	8.88	9.90	10.82	11.05	12.00	13.34	12.23	12.50	12.29	12.70	13.89	14.53	14.72	15.78	14.72	*15.45*	*16.55*	Revenues per sh	*17.90*
1.36	1.56	1.86	1.93	1.93	2.07	2.32	2.21	2.47	2.22	2.34	3.00	3.11	3.14	3.88	3.91	*3.20*	*3.70*	"Cash Flow" per sh	*4.15*
.67	.75	.95	.98	.91	.86	1.02	1.02	1.19	.94	1.01	1.40	1.36	1.31	1.97	1.96	*1.70*	*2.15*	Earnings per sh [A]	*2.55*
.58	.58	.59	.59	.60	.62	.63	.64	.65	.67	.69	.72	.75	.79	.85	.92	*1.00*	*1.08*	Div'd Decl'd per sh [B] ■	*1.25*
2.14	1.84	2.41	2.66	2.97	2.83	3.04	2.58	2.76	3.69	4.77	5.40	5.65	5.64	5.93	5.46	*5.85*	*6.00*	Cap'l Spending per sh	*6.45*
9.07	9.25	9.72	10.13	10.45	10.76	11.28	12.54	13.11	13.41	13.75	14.44	15.19	16.07	18.30	21.92	*22.35*	*23.55*	Book Value per sh [C]	*25.50*
41.31	41.33	41.45	41.53	41.67	41.82	41.98	47.74	47.81	47.88	47.97	48.01	48.07	48.53	50.33	53.72	*53.75*	*52.00*	Common Shs Outst'g [D]	*50.00*
29.2	26.1	19.8	19.7	20.3	21.3	17.9	20.1	19.7	24.8	29.6	26.9	30.3	39.3	24.9	30.5	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*24.0*
1.58	1.39	1.19	1.31	1.29	1.34	1.14	1.13	1.04	1.25	1.55	1.35	1.64	2.09	1.28	1.67			Relative P/E Ratio	*1.30*
2.9%	3.0%	3.1%	3.1%	3.2%	3.4%	3.5%	3.1%	2.8%	2.9%	2.3%	1.9%	1.8%	1.5%	1.7%	1.5%			Avg Ann'l Div'd Yield	*2.0%*
						560.0	584.1	597.5	588.4	609.4	666.9	698.2	714.6	794.3	790.9	*830*	*860*	Revenues ($mill) [E]	*895*
						42.6	47.3	56.7	45.0	48.7	67.2	65.6	63.1	96.8	101.1	*92.0*	*112*	Net Profit ($mill)	*128*
						37.5%	30.3%	33.0%	36.0%	35.5%	30.1%	24.5%	19.1%	11.1%	20.1%	*21.0%*	*21.0%*	Income Tax Rate	*21.0%*
						8.0%	4.3%	2.7%	4.3%	6.1%	3.5%	3.1%	5.8%	3.3%	1.7%	*4.0%*	*5.0%*	AFUDC % to Net Profit	*5.0%*
						47.8%	41.6%	40.1%	44.4%	44.6%	42.7%	49.3%	50.2%	45.9%	47.3%	*44.0%*	*42.5%*	Long-Term Debt Ratio	*39.5%*
						52.2%	58.4%	59.9%	55.6%	55.4%	57.3%	50.7%	49.8%	54.1%	52.7%	*56.0%*	*57.5%*	Common Equity Ratio	*60.5%*
						908.2	1024.9	1045.9	1154.4	1191.2	1209.3	1440.2	1566.7	1702.4	2233.4	*2150*	*2125*	Total Capital ($mill)	*2100*
						1457.1	1515.8	1590.4	1701.8	1859.3	2048.0	2232.7	2406.4	2650.6	2846.9	*2950*	*2975*	Net Plant ($mill)	*3050*
						6.3%	6.0%	6.3%	5.2%	5.5%	7.1%	5.9%	5.5%	7.0%	5.5%	*5.0%*	*6.0%*	Return on Total Cap'l	*6.5%*
						9.0%	7.9%	9.1%	7.0%	7.4%	9.7%	9.0%	8.1%	10.5%	8.6%	*7.5%*	*9.0%*	Return on Shr. Equity	*10.0%*
						9.0%	7.9%	9.1%	7.0%	7.4%	9.7%	9.0%	8.1%	10.5%	8.6%	*7.5%*	*9.0%*	Return on Com Equity	*10.0%*
						3.4%	3.4%	4.1%	2.0%	2.4%	4.7%	4.0%	3.2%	6.0%	4.6%	*3.0%*	*4.5%*	Retained to Com Eq	*5.0%*
						62%	56%	55%	71%	68%	51%	55%	60%	43%	47%	*59%*	*50%*	All Div'ds to Net Prof	*49%*

CAPITAL STRUCTURE as of 6/30/22
Total Debt $1130.0 mill. **Due in 5 Yrs** $357.0 mill.
LT Debt $1054.2 mill. **LT Interest** $40.0 mill.
(Total interest coverage: 4.9x) (47% of Cap'l)

Pension Assets-12/21 $810.5 mill.
Oblig. $887.5 mill.

Pfd Stock None

Common Stock 54,356,000 shs.

MARKET CAP: $3.0 billion (Mid Cap)

CURRENT POSITION ($MILL.)	2020	2021	6/30/22
Cash Assets	44.6	78.4	61.7
Other	221.4	222.1	215.0
Current Assets	266.0	300.5	276.7
Accts Payable	131.7	144.4	139.7
Debt Due	375.1	40.2	75.8
Other	81.9	72.0	70.6
Current Liab.	588.7	256.6	286.1

BUSINESS: California Water Service Group provides regulated and nonregulated water service to 494,500 customers in 100 communities in the state of California. Accounts for about 94% of total customers. Also operates in Washington, New Mexico, and Hawaii. Main service areas: San Francisco Bay area, Sacramento Valley, Salinas Valley, San Joaquin Valley & parts of Los Angeles. Acquired Rio Grande Corp; West Hawaii Utilities (9/08). Revenue breakdown, '21: residential, 69%; business, 19%; industrial, 3%; public authorities, 5%; other 4%. Off. and dir. own 1% of common stock (4/22 proxy). Has 1,184 employees. Pres. and CEO: Martin A. Kropelnicki. Inc.: DE. Addr.: 1720 North First St., San Jose, CA 95112-4598. Tel.: 408-367-8200. Internet: www.calwatergroup.com.

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '19-'21 to '25-'27
Revenues	3.0%	4.0%	*3.0%*
"Cash Flow"	6.5%	9.0%	*2.0%*
Earnings	6.5%	11.0%	*6.5%*
Dividends	3.5%	5.0%	*6.5%*
Book Value	6.0%	7.0%	*5.0%*

Calendar	QUARTERLY REVENUES ($ mill.) [E] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2019	126.1	179.0	232.6	176.9	714.6
2020	125.6	175.5	304.1	189.1	794.3
2021	147.7	213.1	256.7	173.4	790.9
2022	173.0	206.2	*255*	*195.8*	*830*
2023	*175*	*220*	*265*	*200*	*860*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2019	d.16	.35	.88	.24	1.31
2020	d.42	.11	1.94	.31	1.97
2021	d.06	.75	1.20	.07	1.96
2022	.02	.36	*1.07*	*.25*	*1.70*
2023	*.10*	*.55*	*1.15*	*.35*	*2.15*

Calendar	QUARTERLY DIVIDENDS PAID [B] ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.1875	.1875	.1875	.1875	.75
2019	.1975	.1975	.1975	.1975	.79
2020	.2125	.2125	.2125	.2125	.85
2021	.230	.230	.230	.230	.92
2022	.250	.250	.250		

California Water Service Group has made some moves since our early-July review. First, the company's California- and Washington-based subsidiaries both inked deal's to acquire water system assets of two adjacent utilities. The acquisitions, which are still pending customary closing conditions and regulatory approval, ought to bolster California Water's residential operating footprint in these areas. Meanwhile, in Texas, the company recently entered into a long-term water supply agreement with the Guadalupe Blanco River Authority. The deal is imperative to meeting residential water demand in the growing region, and is likely to require substantial pipeline infrastructure development. Lastly, management continues to make progress on its 2021 cost of capital review and general rate case filing.

Earnings are apt to take a step back this year. California Water posted net income of $0.36 per share in the June period, roughly half that of the prior-year tally. The softer-than-expected showing can be attributed to costs associated with a change in deferred revenue, weaker customer water consumption, and an uptick in general and administrative expenses. That said, bottom-line comparisons are poised to improve over the back half of 2022, largely owing to prospects for customer rate increases. Even so, we are shaving $0.30 from our current-year earnings estimate, to $1.70 per share.

Significant infrastructure investment is on the docket over the pull to late decade. In addition to upgrading aging water delivery systems and treatment plants, California Water is allocating funds to shore up its preparation for unexpected wildfires and climate-related challenges. Meanwhile, the company's recently announced $350-million stock buyback program is imminent.

California Water shares lack investment appeal at this juncture. The stock has slipped one notch on our Timeliness ranking scale, to 4 (Below Average). Moreover, much of the growth we envision three to five years hence appears to already be factored into the recent quotation. All told, subscribers would do well to remain on the sidelines, for now.

Nicholas Patrikis *October 7, 2022*

(A) Basic EPS. Excl. nonrecurring gain (loss): '11, 4¢. Next earnings report due early Nov.
(B) Dividends historically paid in late Feb., May, Aug., and Nov. ■ Div'd reinvestment plan available.
(C) Incl. intangible assets. In '21 : $36.8 mill., $0.69/sh.
(D) In millions, adjusted for split.
(E) Excludes non-regulated revenues.

Company's Financial Strength	B++
Stock's Price Stability	95
Price Growth Persistence	85
Earnings Predictability	55

ESSENTIAL UTIL. NYSE-WTRG

RECENT PRICE **43.46** | P/E RATIO **23.9** (Trailing: 25.6 Median: 25.0) | RELATIVE P/E RATIO **1.66** | DIV'D YLD **2.7%** | **VALUE LINE**

TIMELINESS 3 Raised 9/16/22
SAFETY 3 Lowered 1/8/21
TECHNICAL 1 Raised 9/16/22
BETA .95 (1.00 = Market)

18-Month Target Price Range

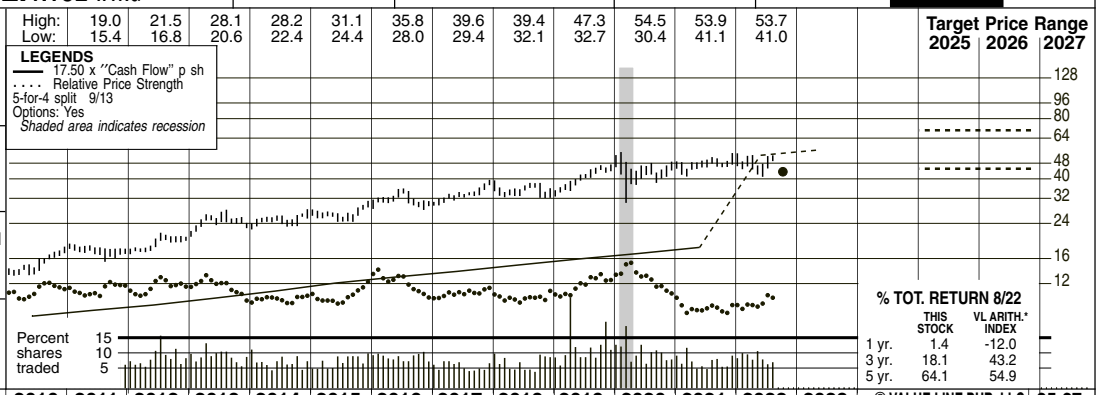
Low-High	Midpoint (% to Mid)
$38-$72	$55 (25%)

2025-27 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	70	(+60%)	*15%*
Low	45	(+5%)	*4%*

Institutional Decisions

	4Q2021	1Q2022	2Q2022
to Buy	313	292	277
to Sell	208	248	249
Hld's(000)	178560	181504	183099



2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	© VALUE LINE PUB. LLC	25-27
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	7.43	*8.25*	*8.25*	Revenues per sh	*8.95*
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	2.89	*3.00*	*3.20*	"Cash Flow" per sh	*4.00*
.56	.57	.58	.62	.72	.83	.87	1.16	1.20	1.14	1.32	1.35	1.08	1.04	1.12	1.67	*1.80*	*1.95*	Earnings per sh	*2.25*
.35	.38	.41	.44	.47	.50	.54	.58	.63	.69	.74	.79	.85	.91	.97	1.04	*1.11*	*1.20*	Div'd Decl'd per sh	*1.55*
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	4.04	*3.95*	*3.85*	Cap'l Spending per sh	*3.80*
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	20.50	*21.45*	*22.30*	Book Value per sh	*26.90*
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	252.87	*255.00*	*260.00*	Common Shs Outst'g	*280.00*
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	28.3	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*26.0*
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	2.03	1.55			Relative P/E Ratio	*1.45*
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%	2.2%			Avg Ann'l Div'd Yield	*2.7%*
						757.8	768.6	779.9	814.2	819.9	809.5	838.1	889.7	1462.7	1878.1	*2110*	*2150*	Revenues ($mill)	*2500*
						153.1	205.0	213.9	201.8	234.2	239.7	192.0	224.5	284.8	431.6	*460*	*505*	Net Profit ($mill)	*630*
						39.0%	10.0%	10.5%	6.9%	8.2%	6.6%	--	--	--	--	*4.0%*	*10.0%*	Income Tax Rate	*15.0%*
						--	1.1%	2.4%	3.1%	3.8%	6.3%	6.8%	7.2%	4.5%	4.8%	*5.0%*	*5.0%*	AFUDC % to Net Profit	*6.0%*
						52.7%	48.9%	48.5%	50.3%	48.4%	50.6%	54.4%	43.1%	54.0%	52.7%	*54.0%*	*54.5%*	Long-Term Debt Ratio	*53.0%*
						47.3%	51.1%	51.5%	49.7%	51.6%	49.4%	45.6%	56.9%	46.0%	47.3%	*46.0%*	*45.5%*	Common Equity Ratio	*47.0%*
						2929.7	3003.6	3216.0	3469.5	3587.7	3965.4	4407.8	6824.2	10192	10964	*11975*	*12800*	Total Capital ($mill)	*16000*
						3936.2	4167.3	4402.0	4688.9	5001.6	5399.9	5930.3	6345.8	9512.9	10252	*10900*	*11600*	Net Plant ($mill)	*13500*
						6.6%	8.0%	7.8%	6.9%	7.6%	7.1%	5.5%	4.2%	3.7%	4.8%	*5.5%*	*5.5%*	Return on Total Cap'l	*5.5%*
						11.0%	13.4%	12.9%	11.7%	12.7%	12.2%	9.6%	5.8%	6.1%	8.3%	*8.5%*	*8.5%*	Return on Shr. Equity	*8.5%*
						11.0%	13.4%	12.9%	11.7%	12.7%	12.2%	9.6%	5.8%	6.1%	8.3%	*8.5%*	*8.5%*	Return on Com Equity	*8.5%*
						4.3%	6.7%	6.1%	4.7%	5.6%	5.1%	2.1%	.9%	1.1%	3.3%	*3.0%*	*3.0%*	Retained to Com Eq	*2.5%*
						61%	50%	52%	60%	56%	59%	79%	84%	82%	60%	*62%*	*62%*	All Div'ds to Net Prof	*69%*

CAPITAL STRUCTURE as of 6/30/22
Total Debt $6213.3 mill. **Due in 5 Yrs** $882.1 mill.
LT Debt $6087.7 mill. **LT Interest** $216.0 mill. (53% of Cap'l)

Pension Assets-12/21 $433.1 mill. **Oblig.** $452.9 mill.

Pfd Stock None
Common Stock 262,170,763 shares
as of 7/22/22

MARKET CAP: $11.4 billion (Large Cap)

CURRENT POSITION ($MILL.)	2020	2021	6/30/22
Cash Assets	4.8	10.6	13.0
Receivables	154.8	141.0	143.4
Inventory (AvgCst)	58.4	109.6	128.6
Other	162.2	176.6	128.3
Current Assets	380.2	437.8	413.3
Accts Payable	177.5	192.9	194.1
Debt Due	162.6	197.1	125.6
Other	263.8	285.1	224.4
Current Liab.	603.9	675.1	544.1

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '19-'21 to '25-'27
Revenues	3.5%	5.0%	*7.5%*
"Cash Flow"	5.0%	3.0%	*10.0%*
Earnings	6.0%	1.0%	*10.0%*
Dividends	7.5%	7.0%	*8.0%*
Book Value	11.0%	14.0%	*6.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2019	201.1	218.9	243.6	226.1	889.7
2020	255.6	384.5	348.6	474.0	1462.7
2021	583.5	397.0	361.9	535.7	1878.1
2022	699.3	448.8	*391.9*	*570*	*2110*
2023	*660*	*475*	*420*	*595*	*2150*

Calendar	EARNINGS PER SHARE A Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2019	.09	.25	.38	.28	1.04
2020	.21	.29	.22	.40	1.12
2021	.72	.32	.19	.44	1.67
2022	.76	.31	*.22*	*.51*	*1.80*
2023	*.78*	*.37*	*.33*	*.47*	*1.95*

Calendar	QUARTERLY DIVIDENDS PAID B ■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.2047	.2047	.219	.219	.85
2019	.219	.219	.2343	.2343	.91
2020	.2343	.2343	.2507	.2507	.97
2021	.2507	.2507	.2682	.2682	1.04
2022	.2682	.2682	.287		

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 2021, Aqua Amer. provided water and wastewater services to about 5 million people in PA, OH, TX, IL, NC, NJ, IN, VA NS WS. Employs 3,211. Acquired AquaSource, 7/13; N. Maine Util., 7/15; and others. Water respn. for 52% of revenues in 2021; residential, 30%; commercial, 8.0%; industrial, wastewater & other, 14%. Gas 46%; other, 2.0%. Off. & dir. own less than 1% of the common stock; BlackRock, 10.6%; Vanguard, 9.7%; Can. Pen. Plan 8.6% (3/22 proxy). Pres. & CEO: Christopher Franklin. Inc.: PA Addr.: 762 W Lancaster Ave., Bryn Mawr, PA 19010. Tel.: 610-525-1400. Int.: www.essential.co.

Essential Utilities' second-quarter earnings were in line with our expectations. The water and gas utility posted share net of $0.31, versus our $0.32 estimate. Management reaffirmed the same guidance as before, so we are sticking with our previous bottom-line estimates of $1.80 and 1.95 for 2022 and 2023, respectively. These figures represent a solid 8% increase for both this year and next.

A potential acquisition of a large wastewater project has been shelved, for now. Last summer, Essential's Aqua America water subsidiary signed an exclusivity agreement with the Bucks County Water and Sewer Authority to discuss purchasing the asset for about $1.1 billion. In early September, the negotiations were suddenly halted. Aqua continues to express interest in completing the transaction, however. In any case, it has already closed two acquisitions this year and agreed to buy parts, or all of the assets of seven different water systems. The price tag will total approximately $365 million.

The policy of aggressively buying other water entities ought to help fuel long-term growth. America's water industry is incredibly fragmented with most water districts being run by small, undercapitalized municipal entities. Not only do they not have the funds required to replace old pipelines and treatment centers, but they are inefficient. When a bigger company, such as Aqua, takes over a smaller water authority, it can create significant efficiencies by eliminating many redundancies.

The dividend was hiked by a healthy percentage. The board increased the quarterly payout by 7%, to $0.287 a share in the latest quarter.

Shares of Essential do not look particularly attractive at this time. In the year ahead, the equity is just ranked to perform in line with the broader market averages. Also, the stock's total return potential is well below that of the average equity under *Value Line* review. Similar to others in this industry, Essential has many appealing features, including well-defined earnings and dividend growth, but they all appear to be more than reflected in the recent quotation.

James A. Flood *October 7, 2022*

(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 split.
(D) Includes intangibles: 12/31/21, $1.231 bill./$4.87 a share.

Company's Financial Strength	B++
Stock's Price Stability	90
Price Growth Persistence	90
Earnings Predictability	60

MIDDLESEX WATER NDQ-MSEX

RECENT PRICE **81.76** | P/E RATIO **35.5** (Trailing: 36.5 Median: 24.0) | RELATIVE P/E RATIO **2.47** | DIV'D YLD **1.4%** | **VALUE LINE**

TIMELINESS 3 Raised 9/9/22
SAFETY 2 New 10/21/11
TECHNICAL 3 Raised 10/7/22
BETA .70 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$77-$160	$119 (45%)

2025-27 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	90	(+10%)	4%
Low	65	(-20%)	-4%

Institutional Decisions

	4Q2021	1Q2022	2Q2022
to Buy	93	82	90
to Sell	84	90	93
Hld's(000)	12685	13008	11842

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
High:	19.4	19.6	22.5	23.7	28.0	44.5	46.7	60.3	67.7	76.1	121.4	121.1						
Low:	16.5	17.5	18.6	19.1	21.2	25.0	32.2	34.0	51.0	48.8	67.1	75.8						
Revenues per sh	6.16	6.50	6.79	6.75	6.60	6.50	6.98	7.19	7.26	7.77	8.16	8.00	8.42	7.72	8.10	8.17	*8.75*	*8.95*
"Cash Flow" per sh	1.33	1.49	1.53	1.40	1.55	1.46	1.56	1.72	1.84	1.97	2.17	2.24	2.89	2.90	3.25	3.28	*3.40*	*3.50*
Earnings per sh A	.82	.87	.89	.72	.96	.84	.90	1.03	1.13	1.22	1.38	1.38	1.96	2.01	2.18	2.07	*2.45*	*2.50*
Div'd Decl'd per sh B■	.68	.69	.70	.71	.72	.73	.74	.75	.76	.78	.81	.86	.91	.98	1.04	1.11	*1.18*	*1.25*
Cap'l Spending per sh	2.31	1.66	2.12	1.49	1.90	1.50	1.36	1.26	1.40	1.59	2.91	3.08	4.40	5.11	6.04	4.53	*5.00*	*5.25*
Book Value per sh	9.52	10.05	10.03	10.33	11.13	11.27	11.48	11.82	12.24	12.74	13.40	14.02	15.17	18.57	19.81	20.99	*21.70*	*22.40*
Common Shs Outst'g C	13.17	13.25	13.40	13.52	15.57	15.70	15.82	15.96	16.12	16.23	16.30	16.35	16.40	17.43	17.47	17.52	*17.75*	*17.85*
Avg Ann'l P/E Ratio	22.7	21.6	19.8	21.0	17.8	21.7	20.8	19.7	18.5	19.1	25.6	28.4	22.2	29.7	30.1	44.3		
Relative P/E Ratio	1.23	1.15	1.19	1.40	1.13	1.36	1.32	1.11	.97	.96	1.34	1.43	1.20	1.58	1.55	2.43		
Avg Ann'l Div'd Yield	3.7%	3.7%	4.0%	4.7%	4.2%	4.0%	4.0%	3.7%	3.7%	3.3%	2.3%	2.2%	2.1%	1.6%	1.6%	1.2%		
Revenues ($mill)							110.4	114.8	117.1	126.0	132.9	130.8	138.1	134.6	141.6	143.1	*155*	*160*
Net Profit ($mill)							14.4	16.6	18.4	20.0	22.7	22.8	32.5	33.9	38.4	36.5	*44.0*	*45.0*
Income Tax Rate							33.9%	34.1%	35.0%	34.5%	34.0%	32.7%	2.8%	--	2.8%	2.8%	*21.0%*	*21.0%*
AFUDC % to Net Profit							3.4%	1.9%	1.7%	1.9%	2.7%	3.1%	1.4%	3.4%	3.9%	3.9%	*2.5%*	*2.5%*
Long-Term Debt Ratio							41.5%	40.4%	40.5%	39.4%	37.9%	37.5%	37.8%	41.5%	44.0%	45.3%	*44.0%*	*43.5%*
Common Equity Ratio							57.4%	58.7%	58.8%	59.8%	61.5%	61.8%	61.6%	58.2%	55.7%	54.4%	*55.5%*	*56.0%*
Total Capital ($mill)							316.5	321.4	335.8	345.4	355.4	370.7	404.1	556.7	621.5	676.3	*690*	*710*
Net Plant ($mill)							435.2	446.5	465.4	481.9	517.8	557.2	618.5	705.7	796.6	865.4	*875*	*885*
Return on Total Cap'l							5.4%	5.9%	6.3%	6.6%	7.1%	6.9%	8.9%	6.7%	6.8%	6.0%	*6.5%*	*6.5%*
Return on Shr. Equity							7.8%	8.7%	9.2%	9.6%	10.3%	9.8%	12.9%	10.4%	11.0%	9.9%	*11.0%*	*11.0%*
Return on Com Equity							7.8%	8.7%	9.3%	9.6%	10.3%	9.9%	13.0%	10.4%	11.1%	9.9%	*11.5%*	*11.0%*
Retained to Com Eq							1.4%	2.4%	3.1%	3.5%	4.3%	3.8%	7.0%	5.4%	5.8%	4.6%	*6.0%*	*5.5%*
All Div'ds to Net Prof							83%	73%	67%	63%	58%	62%	46%	48%	48%	53%	*48%*	*50%*

Bold figures are Value Line estimates

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	25-27
Revenues per sh	*9.15*
"Cash Flow" per sh	*3.85*
Earnings per sh A	*2.75*
Div'd Decl'd per sh B■	*1.40*
Cap'l Spending per sh	*6.00*
Book Value per sh	*22.80*
Common Shs Outst'g C	*18.00*
Avg Ann'l P/E Ratio	*28.0*
Relative P/E Ratio	*1.30*
Avg Ann'l Div'd Yield	*1.8%*
Revenues ($mill)	*165*
Net Profit ($mill)	*50.0*
Income Tax Rate	*21.0%*
AFUDC % to Net Profit	*2.5%*
Long-Term Debt Ratio	*42.0%*
Common Equity Ratio	*57.5%*
Total Capital ($mill)	*715*
Net Plant ($mill)	*915*
Return on Total Cap'l	*7.5%*
Return on Shr. Equity	*12.0%*
Return on Com Equity	*12.0%*
Retained to Com Eq	*6.0%*
All Div'ds to Net Prof	*51%*

% TOT. RETURN 8/22

	THIS STOCK	VL ARITH.* INDEX
1 yr.	-17.9	-12.0
3 yr.	51.0	43.2
5 yr.	152.2	54.9

CAPITAL STRUCTURE as of 6/30/22
Total Debt $313.2 mill. **Due in 5 Yrs** $43.7 mill.
LT Debt $305.4 mill. **LT Interest** $7.5 mill.
(Total interest coverage: 5.0x)
(45% of Cap'l)

Pension Assets-12/21 $100.8 mill.
Oblig. $113.7 mill.
Pfd Stock $2.4 mill. **Pfd Div'd:** $.1 mill.

Common Stock 17,610,000 shs.
as of 7/29/22

MARKET CAP: $1.4 billion (Small Cap)

CURRENT POSITION ($MILL.)	2020	2021	6/30/22
Cash Assets	4.5	3.5	4.3
Other	29.6	30.9	34.7
Current Assets	34.1	34.4	39.0
Accts Payable	30.4	21.1	24.2
Debt Due	9.3	6.7	7.8
Other	17.1	28.8	46.8
Current Liab.	56.8	56.6	78.8

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '19-'21 to '25-'27
Revenues	2.0%	.5%	*2.5%*
"Cash Flow"	8.0%	9.5%	*3.5%*
Earnings	9.5%	11.0%	*4.5%*
Dividends	3.5%	6.0%	*5.0%*
Book Value	6.0%	9.0%	*2.5%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2019	30.7	33.4	37.8	32.7	134.6
2020	31.8	35.3	39.9	34.6	141.6
2021	32.5	36.7	39.9	34.0	143.1
2022	36.2	39.7	*41.0*	*38.1*	*155*
2023	*38.0*	*41.0*	*42.0*	*39.0*	*160*

Calendar	EARNINGS PER SHARE A Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2019	.39	.49	.66	.46	2.01
2020	.44	.55	.72	.47	2.18
2021	.39	.62	.65	.41	2.07
2022	.68	.50	*.75*	*.52*	*2.45*
2023	*.53*	*.60*	*.77*	*.60*	*2.50*

Calendar	QUARTERLY DIVIDENDS PAID B■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.22375	.22375	.22375	.24	.91
2019	.24	.24	.24	.2562	.98
2020	.2562	.2562	.2562	.2725	1.04
2021	.2725	.2725	.2725	.29	1.11
2022	.29	.29	.29		

BUSINESS: Middlesex Water Company engages in the ownership and operation of regulated water utility systems in New Jersey, Delaware, and Pennsylvania. It also operates water and wastewater systems under contract on behalf of municipal and private clients in NJ and DE. Its Middlesex System provides water services to 61,000 retail customers, primarily in Middlesex County, New Jersey. In 2021, the Middlesex System accounted for 59% of operating revenues. At 12/31/21, the company had 347 employees. Incorporated: NJ. President, CEO, and Chairman: Dennis W. Doll. Officers & directors own 2.0% of the com. stock; BlackRock Inst. Trust Co., 7.8% (4/22 proxy). Add.: 485 C Route 1 South, Suite 400, Iselin, NJ 08830. Telephone: 732-634-1500. Int.: www.middlesexwater.com.

Middlesex Water recently inked a deal to manage the Borough of Avalon, New Jersey's water and sewer utility operations. The new 10-year contract, which went into effect on September 1, 2022, replaces the previous decade-long agreement, and includes provisions for maintenance and customer services.

Periodic rate hikes have more than offset the company's regulated Delaware wastewater divestment from earlier this year. The latter resulted in approximately $0.7 million in reduced revenues for the June period. However, the top line is benefiting notably from the latest round of customer rate increases. To wit, the New Jersey Board of Public Utilities recently approved another rate hike, largely due to aggressive infrastructure and distribution system investments. In sum, we now look for revenues of $155 million this year (up from our previous call of $153 million) and $160 million in the next (up from $158 million).

Strong bottom-line expansion is likely on tap for 2022, despite a modest reduction to our current-year profit forecast. Earnings contracted about 20% year over year in the second quarter, to $0.50 per share. Expiring income tax benefits and higher operating expenses weighed on the figure. Consequently, we are shaving a dime from our full-year 2022 bottom-line estimate, to $2.45 per share.

Over the pull to late decade, leadership is poised to invest heavily on infrastructure-related upgrades. Indeed, aging water delivery systems and pipelines are long overdue for replacement. Management is apt to focus on facility treatment enhancements as well. Overall, aggressive spending on public infrastructure projects suggests that additional rate hikes are probably in the cards further down the road.

Middlesex stock is ranked to mirror the broader market averages over the coming six to 12 months. What's more, at the recent quotation, the equity lacks appeal over the 18-month and 3- to 5-year windows. Although the company is noncyclical and pays a stable quarterly dividend that is well-covered by earnings, we think waiting for a better entry point is the prudent move here at this juncture.

Nicholas Patrikis *October 7, 2022*

(A) Diluted earnings. Next earnings report due early November.

(B) Dividends historically paid in mid-Feb., May, Aug., and November.■ Div'd reinvestment plan available.

(C) In millions.

Company's Financial Strength	B++
Stock's Price Stability	85
Price Growth Persistence	90
Earnings Predictability	90

SJW GROUP NYSE-SJW

RECENT PRICE **59.57** | P/E RATIO **28.9** (Trailing: 34.2 Median: 23.0) | RELATIVE P/E RATIO **2.01** | DIV'D YLD **2.4%** | **VALUE LINE**

TIMELINESS 4 Lowered 8/12/22
SAFETY 3 New 4/22/11
TECHNICAL 3 Raised 10/7/22
BETA .80 (1.00 = Market)

18-Month Target Price Range

Low-High	Midpoint (% to Mid)
$57-$96	$77 (30%)

2025-27 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	90	(+50%)	*13%*
Low	60	(Nil)	*3%*

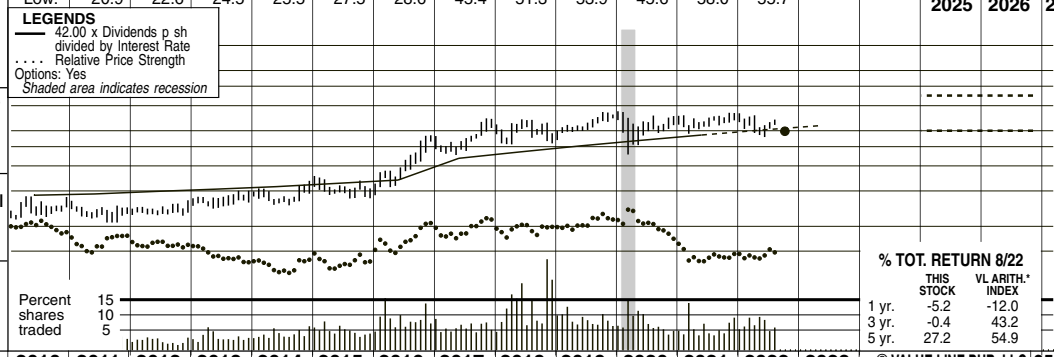
Institutional Decisions

	4Q2021	1Q2022	2Q2022
to Buy	98	93	78
to Sell	68	80	104
Hld's(000)	21890	21360	21790

	2025	2026	2027
Target Price Range			

High: 26.8 26.9 30.1 33.7 35.7 56.9 69.3 68.4 74.5 75.0 73.7 73.4
Low: 20.9 22.6 24.5 25.5 27.5 28.6 45.4 51.3 53.9 45.6 58.0 55.7

LEGENDS
42.00 x Dividends p sh divided by Interest Rate
Relative Price Strength
Options: Yes
Shaded area indicates recession



% TOT. RETURN 8/22

	THIS STOCK	VL ARITH.* INDEX
1 yr.	-5.2	-12.0
3 yr.	-0.4	43.2
5 yr.	27.2	54.9

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	© VALUE LINE PUB. LLC	25-27
10.35	11.25	12.12	11.68	11.62	12.85	14.01	13.73	15.76	14.97	16.61	18.97	14.00	14.78	19.77	19.01	*20.00*	*20.85*	Revenues per sh	*22.15*
2.38	2.30	2.44	2.21	2.38	2.80	2.97	2.90	4.42	3.86	4.76	5.24	3.29	3.13	5.28	5.13	*3.60*	*4.15*	"Cash Flow" per sh	*4.90*
1.19	1.04	1.08	.81	.84	1.11	1.18	1.12	2.54	1.85	2.57	2.86	1.82	.82	2.14	2.03	*1.95*	*2.50*	Earnings per sh [A]	*3.25*
.57	.61	.65	.66	.68	.69	.71	.73	.75	.78	.81	1.04	1.12	1.20	1.28	1.36	*1.44*	*1.52*	Div'd Decl'd per sh [B]■	*1.76*
3.87	6.62	3.79	3.17	5.65	3.75	5.67	4.68	5.02	5.24	6.95	7.26	5.08	6.25	7.44	8.32	*7.50*	*8.00*	Cap'l Spending per sh	*7.75*
12.48	12.90	13.99	13.66	13.75	14.20	14.71	15.92	17.75	18.83	20.61	22.57	31.31	31.27	32.12	34.28	*36.65*	*39.15*	Book Value per sh	*40.85*
18.28	18.36	18.18	18.50	18.55	18.59	18.67	20.17	20.29	20.38	20.46	20.52	28.40	28.46	28.56	30.18	*30.00*	*30.00*	Common Shs Outst'g [C]	*30.00*
23.5	33.4	26.2	28.7	29.1	21.2	20.4	24.3	11.2	16.6	15.7	18.8	32.7	NMF	30.0	32.9	*Bold figures are Value Line estimates*		Avg Ann'l P/E Ratio	*23.0*
1.27	1.77	1.58	1.91	1.85	1.33	1.30	1.37	.59	.84	.82	.95	1.77	NMF	1.54	1.80			Relative P/E Ratio	*1.30*
2.0%	1.7%	2.3%	2.8%	2.8%	2.9%	3.0%	2.7%	2.6%	2.5%	2.0%	1.9%	1.9%	1.9%	2.0%	2.0%			Avg Ann'l Div'd Yield	*2.3%*
261.5	276.9	319.7	305.1	339.7	389.2	397.7	420.5	564.5	573.7	*600*	*625*	Revenues ($mill)	*665*
22.3	23.5	51.8	37.9	52.8	59.2	38.8	23.4	61.5	60.5	*59.0*	*75.0*	Net Profit ($mill)	*98.0*
41.1%	38.7%	32.5%	38.1%	38.8%	36.7%	20.6%	26.4%	12.0%	12.2%	*21.5%*	*21.0%*	Income Tax Rate	*21.0%*
--	--	--	--	--	--	--	--	2.0%	1.5%	*1.5%*	*1.5%*	AFUDC % to Net Profit	*1.5%*
55.0%	51.1%	51.6%	49.8%	50.7%	48.2%	32.7%	59.1%	58.4%	59.1%	*57.5%*	*54.0%*	Long-Term Debt Ratio	*45.0%*
45.0%	48.9%	48.4%	50.2%	49.3%	51.8%	67.3%	40.9%	41.6%	40.9%	*42.5%*	*46.0%*	Common Equity Ratio	*55.0%*
610.2	656.2	744.5	764.6	855.0	894.3	1320.7	2173.6	2204.7	2527.5	*2575*	*2550*	Total Capital ($mill)	*2225*
831.6	898.7	963.0	1036.8	1146.4	1239.3	1328.8	2206.5	2334.9	2497.5	*2565*	*2650*	Net Plant ($mill)	*2825*
5.0%	5.0%	8.3%	6.3%	7.4%	7.9%	3.9%	1.8%	4.0%	3.5%	*3.0%*	*3.5%*	Return on Total Cap'l	*5.0%*
8.1%	7.3%	14.4%	9.9%	12.5%	12.8%	4.4%	2.6%	6.7%	5.8%	*5.5%*	*6.5%*	Return on Shr. Equity	*8.0%*
8.1%	7.3%	14.4%	9.9%	12.5%	12.8%	4.4%	2.6%	6.7%	5.8%	*5.5%*	*6.5%*	Return on Com Equity	*8.0%*
3.3%	2.8%	10.2%	5.7%	8.6%	8.2%	1.8%	NMF	2.7%	2.0%	*1.5%*	*2.5%*	Retained to Com Eq	*3.5%*
59%	62%	29%	42%	31%	36%	60%	NMF	59%	66%	*74%*	*61%*	All Div'ds to Net Prof	*54%*

CAPITAL STRUCTURE as of 6/30/22
Total Debt $1494.7 mill. **Due in 5 Yrs** $39.0 mill.
LT Debt $1455.7 mill. **LT Interest** $50.0 mill.
(LT Interest Coverage: 3.6x)
(59% of Cap'l)

Pension Assets-12/21 $310.2 mill.
Oblig. $383.8 mill.
Pfd Stock None.
Common Stock 30,248,000 shs.

MARKET CAP: $1.8 billion (Small Cap)

CURRENT POSITION ($MILL.)	2020	2021	6/30/22
Cash Assets	9.3	10.9	12.0
Accts Receivable	58.1	53.7	58.8
Other	59.9	69.5	68.0
Current Assets	127.3	134.1	138.8
Accts Payable	34.2	30.4	26.6
Debt Due	76.2	39.1	39.0
Other	240.4	133.8	212.2
Current Liab.	350.8	203.3	277.8

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '19-'21 to '25-'27
Revenues	4.0%	2.5%	*3.5%*
"Cash Flow"	6.0%	.5%	*2.5%*
Earnings	6.0%	-6.5%	*14.0%*
Dividends	6.5%	10.5%	*5.5%*
Book Value	9.0%	11.5%	*4.0%*

Calendar	QUARTERLY REVENUES ($ mill.) Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2019	77.7	103.0	114.0	125.8	420.5
2020	115.8	147.2	165.9	135.6	564.5
2021	114.8	152.2	166.9	139.8	573.7
2022	124.3	149.0	*175*	*151.7*	*600*
2023	*130*	*160*	*180*	*155*	*625*

Calendar	EARNINGS PER SHARE [A] Mar.31	Jun. 30	Sep. 30	Dec. 31	Full Year
2019	.21	.47	.33	d.19	.82
2020	.08	.69	.91	.46	2.14
2021	.09	.69	.64	.60	2.03
2022	.12	.38	*.75*	*.70*	*1.95*
2023	*.23*	*.57*	*.95*	*.75*	*2.50*

Calendar	QUARTERLY DIVIDENDS PAID [BD]■ Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2018	.28	.28	.28	.28	1.12
2019	.30	.30	.30	.30	1.20
2020	.32	.32	.32	.32	1.28
2021	.34	.34	.34	.34	1.36
2022	.36	.36	.36		

BUSINESS: SJW Group engages in the production, purchase, storage, purification, distribution, and retail sale of water. It provides water service to approximately 231,000 connections with a total population of roughly one million people in the San Jose area and 16,000 connections that reach about 49,000 residents in the region between San Antonio and Austin, Texas. The company merged with Connecticut Water (10/19) which provides service to approx. 138,000 connections with a total population of 450,000 people. Has 751 employees. Officers and directors own about 8.0% of outstanding shares (3/22 proxy). Chairman & CEO: Eric Thornburg. Incorporated: California. Address: 110 West Taylor Street, San Jose, CA 95110. Telephone: (408) 279-7800. Internet: www.sjwater.com.

SJW Group reported weaker-than-anticipated second-quarter bottom-line results. The East and West coast water utility operator earned $0.38 per share in the June period. Indeed, the figure, which was well short of consensus estimates, contracted about 45% year over year. On top of a softer revenue performance during the period (on an annual basis), higher administrative expenses, depreciation, and interest on long-term obligations weighed on the result. All told, despite management reaffirming an upbeat outlook for the remainder of the year, we are lowering our 2022 earnings estimate by $0.55, to $1.95 per share, which would mark the company's second-consecutive year of share profit declines.

We think 2023 holds more promise. To start, modest revenue growth ought to be underpinned by further customer rate hikes and a wider base. Regarding the former, SJW Group expects the currently pending 2021 California General Rate Case decision to be reached by the end of this year, which would allow the company to not only boost rates, but recoup revenues retroactively. Rate increases in Connecticut, Maine, and Texas were also recently approved by regulators. Moreover, prospects for a healthier economic backdrop should support increased water consumption. Elsewhere, we envision a notable earnings recovery in 2023. Leadership is likely to focus on curtailing operating expenses and lowering debt obligations.

Aggressive infrastructure investment remains on tap over the 3- to 5-year stretch. For this year, top brass has utilized roughly half of its $223 million capital investment budget. Funds are allocated across all operating regions, and support aging pipeline replacement, facility and treatment plant upgrades, as well as the company's advanced metering initiative. By late decade, SJW Group intends to spend approximately $1.3 billion on infrastructure upgrades.

Investors should turn the page, for now. SJW stock is unfavorably ranked (4) for relative year-ahead price performance. What's more, at the recent quotation, total return potential over the pull to 2025-2027 leaves much to be desired.

Nicholas Patrikis *October 7, 2022*

(A) Diluted earnings. Excludes nonrecurring losses: '06, $16.36; '08, $1.22; '10, $0.46. GAAP accounting as of 2013. Next earnings report due early November. Quarterly egs. may not add due to rounding.
(B) Dividends historically paid in early March, June, September, and December. ■ Div'd reinvestment plan available.
(C) In millions.
(D) Paid special dividend of $0.17 per share on 11/17.

Company's Financial Strength	B+
Stock's Price Stability	85
Price Growth Persistence	85
Earnings Predictability	45

Water Service Corporation of Kentucky
Summary of Risk Premium Models for the
Proxy Group of Six Water Companies

	Proxy Group of Six Water Companies	Proxy Group of Six Water Companies ex PRPM
Predictive Risk Premium Model (PRPM) (1)	12.17 %	NA
Risk Premium Using an Adjusted Total Market Approach (2)	11.77 %	11.61 %
Average	11.97 %	11.61 %

Notes:
(1) From page 11 of this Schedule.
(2) From page 12 of this Schedule.

Water Service Corporation of Kentucky
Indicated ROE
Derived by the Predictive Risk Premium Model (1)

Proxy Group of Six Water Companies	[1] LT Average Predicted Variance	[2] Spot Predicted Variance	[3] Recommended Variance (2)	[4] GARCH Coefficient	[5] Predicted Risk Premium (3)	[6] Risk-Free Rate (4)	[7] Indicated ROE (5)
American States Water Company	0.38%	0.40%	0.38%	1.8175	8.62%	3.86%	12.48%
American Water Works Company, Inc.	0.28%	0.33%	0.28%	4.1911	15.02%	3.86%	NMF
California Water Service Group	0.33%	0.42%	0.33%	1.8595	7.53%	3.86%	11.39%
Essential Utilities Inc.	0.45%	0.54%	0.45%	2.1551	12.22%	3.86%	16.08%
Middlesex Water Company	0.33%	0.68%	0.33%	1.9058	7.86%	3.86%	11.72%
SJW Group	0.41%	0.40%	0.41%	1.4632	7.50%	3.86%	11.36%
						Average	12.61%
						Median	11.72%
					Average of Mean and Median		12.17%

Notes:
(1) The Predictive Risk Premium Model uses historical data to generate a predicted variance and a GARCH coefficient. The historical data used are the equity risk premiums for the first available trading month as reported by Bloomberg Professional Service.
(2) Based on the long-term average predicted variance.
(3) (1+(Column [3] * Column [4])^12) - 1.
(4) From note 2 on page 22 of this Schedule.
(5) Column [5] + Column [6].

Water Service Corporation of Kentucky
Indicated Common Equity Cost Rate
Through Use of a Risk Premium Model
Using an Adjusted Total Market Approach

Line No.		Proxy Group of Six Water Companies	Proxy Group of Six Water Companies ex PRPM
1.	Prospective Yield on Aaa Rated Corporate Bonds (1)	5.18 %	5.18 %
2.	Adjustment to Reflect Yield Spread Between Aaa Rated Corporate Bonds and A2 Rated Public Utility Bonds (2)	0.70	0.70
3.	Adjusted Prospective Yield on A2 Rated Public Utility Bonds	5.88 %	5.88 %
4.	Adjustment to Reflect Bond Rating Difference of Proxy Group (3)	0.12	0.12
5.	Adjusted Prospective Bond Yield	6.00 %	6.00 %
6.	Equity Risk Premium (4)	5.77	5.61
7.	Risk Premium Derived Common Equity Cost Rate	11.77 %	11.61 %

Notes:
(1) Consensus forecast of Moody's Aaa Rated Corporate bonds from Blue Chip Financial Forecasts (see pages 18 and 19 of this Schedule).
(2) The average yield spread of A2 rated public utility bonds over Aaa rated corporate bonds of 0.70% from page 13 of this Schedule.
(3) Adjustment to reflect the A3 Moody's LT issuer rating of the Utility Proxy Group as shown on page 14 of this Schedule. The 0.12% upward adjustment is derived by taking 1/3 of the spread between A2 and Baa2 Public Utility Bonds (1/3 * 0.35% = 0.12%) as derived from page 13 of this Schedule.
(4) From page 16 of this Schedule.

Water Service Corporation of Kentucky
Interest Rates and Bond Spreads for
Moody's Corporate and Public Utility Bonds

Selected Bond Yields

	[1] Aaa Rated Corporate Bond	[2] A2 Rated Public Utility Bond	[3] Baa2 Rated Public Utility Bond
Sep-2022	4.57 %	5.26 %	5.60 %
Aug-2022	4.07	4.76	5.09
Jul-2022	4.06	4.78	5.15
Average	4.23 %	4.93 %	5.28 %

Selected Bond Spreads

A2 Rated Public Utility Bonds Over Aaa Rated Corporate Bonds: 0.70 % (1)

Baa2 Rated Public Utility Bonds Over A2 Rated Public Utility Bonds: 0.35 % (2)

Notes:
(1) Column [2] - Column [1].
(2) Column [3] - Column [2].

Source of Information:
Bloomberg Professional Service

Water Service Corporation of Kentucky
Comparison of Long-Term Issuer Ratings for
Proxy Group of Six Water Companies

	Moody's		Standard & Poor's	
	Long-Term Issuer Rating		Long-Term Issuer Rating	
	October 2022		October 2022	
Proxy Group of Six Water Companies	Long-Term Issuer Rating	Numerical Weighting (1)	Long-Term Issuer Rating	Numerical Weighting (1)
American States Water Company (2)	A2	6.0	A+	5.0
American Water Works Company, Inc. (3)	A3	7.0	A	6.0
California Water Service Group	NR	- -	A+	5.0
Essential Utilities Inc. (4)	Baa1	8.0	A	6.0
Middlesex Water Company	NR	- -	A	6.0
SJW Group (5)	NR	- -	A-	7.0
Average	A3	7.0	A	5.8

Notes:
(1) From page 15 of this Schedule.
(2) Ratings are that of Golden State Water Company.
(3) Ratings are that of New Jersey American Water Co., and Pennsylvania American Water Co.
(4) Ratings are that of PNG Companies and Aqua Pennsylvania, Inc. (S&P).
(5) Ratings are that of San Jose Water Company, Connecticut Water Inc. and Connecticut Water Service Inc.

Source Information: Moody's Investors Service
Standard & Poor's Global Utilities Rating Service

Numerical Assignment for Moody's and Standard & Poor's Bond Ratings

Moody's Bond Rating	Numerical Bond Weighting	Standard & Poor's Bond Rating
Aaa	1	AAA
Aa1	2	AA+
Aa2	3	AA
Aa3	4	AA-
A1	5	A+
A2	6	A
A3	7	A-
Baa1	8	BBB+
Baa2	9	BBB
Baa3	10	BBB-
Ba1	11	BB+
Ba2	12	BB
Ba3	13	BB-
B1	14	B+
B2	15	B
B3	16	B-

Water Service Corporation of Kentucky
Judgment of Equity Risk Premium for the
Proxy Group of Six Water Companies

Line No.		Proxy Group of Six Water Companies	Proxy Group of Six Water Companies ex PRPM
1.	Calculated equity risk premium based on the total market using the beta approach (1)	6.90 %	6.69 %
2.	Mean equity risk premium based on a study using the holding period returns of public utilities with A2 rated bonds (2)	4.64	4.52
3.	Average equity risk premium	5.77 %	5.61 %

Notes: (1) From page 17 of this Schedule.
(2) From page 20 of this Schedule.

Water Service Corporation of Kentucky
Derivation of Equity Risk Premium Based on the Total Market Approach
Using the Beta for the
Proxy Group of Six Water Companies

Line No.	Equity Risk Premium Measure	Proxy Group of Six Water Companies	Proxy Group of Six Water Companies ex PRPM
1.	Ibbotson Equity Risk Premium (1)	6.13 %	6.13 %
2.	Regression on Ibbotson Risk Premium Data (2)	7.09	7.09
3.	Ibbotson Equity Risk Premium based on PRPM (3)	10.12	NA
4.	Equity Risk Premium Based on Value Line Summary and Index (4)	10.85	10.85
5.	Equity Risk Premium Based on Value Line S&P 500 Companies (5)	11.48	11.48
6.	Equity Risk Premium Based on Bloomberg S&P 500 Companies (6)	7.36	7.36
7.	Conclusion of Equity Risk Premium	8.84 %	8.58 %
8.	Adjusted Beta (7)	0.78	0.78
9.	Forecasted Equity Risk Premium	6.90 %	6.69 %

Notes:

(1) Based on the arithmetic mean historical monthly returns on large company common stocks from Kroll 2022 Yearbook minus the arithmetic mean monthly yield of Moody's average Aaa and Aa2 corporate bonds from 1928-2021.

(2) This equity risk premium is based on a regression of the monthly equity risk premiums of large company common stocks relative to Moody's average Aaa and Aa2 rated corporate bond yields from 1928-2021 referenced in note 1 above. Using the equation generated from the regression, an expected equity risk premium is calculated using the average consensus forecast of Aaa corporate bonds of 5.18% (from page 12 of this Schedule).

(3) The Predictive Risk Premium Model (PRPM) is discussed in the accompanying direct testimony. The equity risk premium based on the PRPM is derived by applying the PRPM to the monthly risk premiums between large company common stock monthly returns and average Aaa and Aa2 corporate monthly bond yields, from January 1928 through September 2022.

(4) The equity risk premium based on the Value Line Summary and Index is derived by subtracting the average consensus forecast of Aaa corporate bonds of 5.18% (from page 12 of this Schedule) from the projected 3-5 year total annual market return of 16.03% (described fully in note 1 on page 22 of this Schedule).

(5) Using data from Value Line for the S&P 500, an expected total return of 16.66% was derived based upon expected dividend yields and long-term earnings growth estimates as a proxy for capital appreciation. Subtracting the average consensus forecast of Aaa corporate bonds of 5.18% results in an expected equity risk premium of 11.48%.

(6) Using data from the Bloomberg Professional Service for the S&P 500, an expected total return of 12.54% was derived based upon expected dividend yields and long-term earnings growth estimates as a proxy for capital appreciation. Subtracting the average consensus forecast of Aaa corporate bonds of 5.18% results in an expected equity risk premium of 7.36%.

(7) Average of mean and median beta from page 21 of this Schedule.

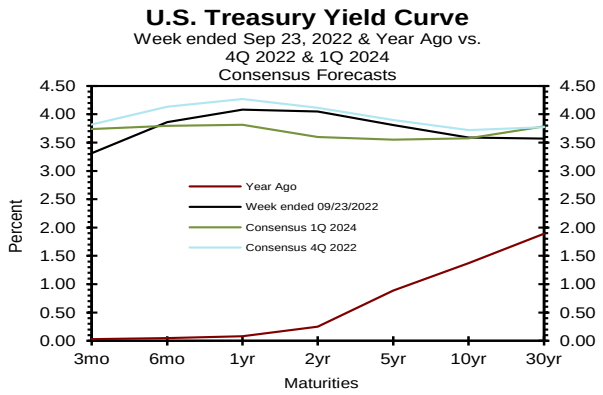
Sources of Information:

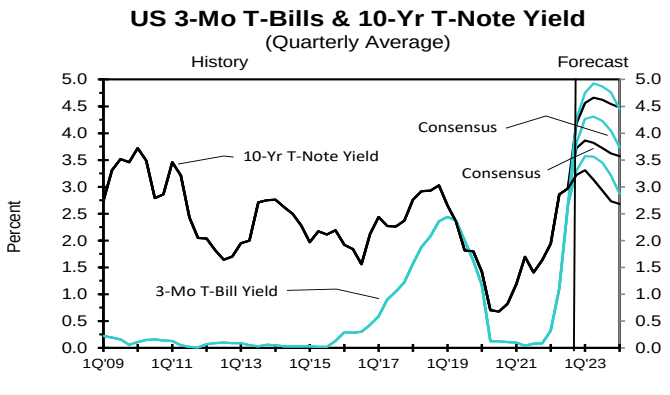
Stocks, Bonds, Bills, and Inflation - 2022 SBBI Yearbook, Kroll.
Industrial Manual and Mergent Bond Record Monthly Update.
Value Line Summary and Index
Blue Chip Financial Forecasts, June 1, 2022 and September 30, 2022
Bloomberg Professional Service

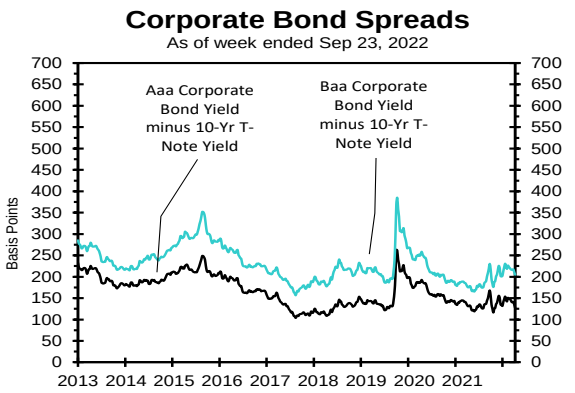
Consensus Forecasts of U.S. Interest Rates and Key Assumptions

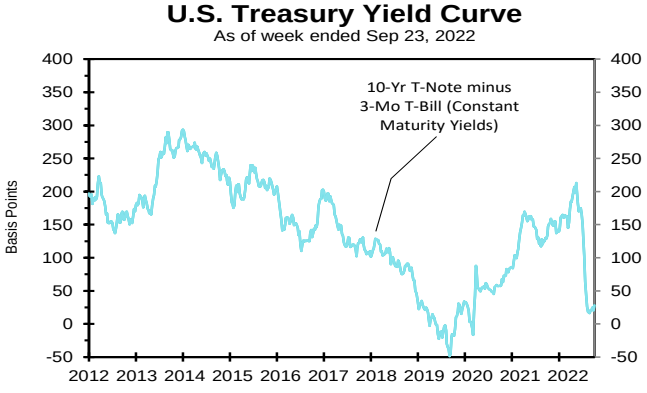
	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month			*Latest Qtr*	4Q	1Q	2Q	3Q	4Q	1Q
Interest Rates	Sep 23	Sep 16	Sep 9	Sep 2	Aug	Jul	Jun	3Q 2022*	2022	2023	2023	2023	2023	2024
Federal Funds Rate	2.33	2.33	2.33	2.33	2.33	1.68	1.21	2.12	**3.8**	**4.3**	**4.4**	**4.3**	**4.2**	**3.9**
Prime Rate	5.50	5.50	5.50	5.50	5.50	4.85	4.38	5.29	**6.9**	**7.4**	**7.5**	**7.4**	**7.3**	**6.9**
SOFR	2.55	2.28	2.28	2.29	2.28	1.60	1.11	2.09	**3.6**	**4.2**	**4.3**	**4.3**	**4.1**	**3.7**
Commercial Paper, 1-mo.	3.04	2.64	2.54	2.39	2.33	1.90	1.35	2.26	**3.8**	**4.4**	**4.5**	**4.4**	**4.3**	**3.9**
Treasury bill, 3-mo.	3.31	3.22	3.06	2.96	2.72	2.30	1.54	2.71	**3.8**	**4.3**	**4.3**	**4.2**	**4.0**	**3.7**
Treasury bill, 6-mo.	3.86	3.72	3.45	3.32	3.15	2.87	2.17	3.20	**4.1**	**4.5**	**4.5**	**4.3**	**4.1**	**3.8**
Treasury bill, 1 yr.	4.08	3.91	3.62	3.48	3.28	3.02	2.65	3.35	**4.3**	**4.5**	**4.5**	**4.3**	**4.1**	**3.8**
Treasury note, 2 yr.	4.05	3.77	3.50	3.45	3.25	3.04	3.00	3.33	**4.1**	**4.3**	**4.2**	**4.0**	**3.8**	**3.6**
Treasury note, 5 yr.	3.81	3.59	3.41	3.31	3.03	2.96	3.19	3.17	**3.9**	**4.1**	**4.0**	**3.8**	**3.7**	**3.6**
Treasury note, 10 yr.	3.59	3.42	3.31	3.17	2.90	2.90	3.14	3.05	**3.7**	**3.9**	**3.8**	**3.7**	**3.6**	**3.6**
Treasury note, 30 yr.	3.57	3.50	3.46	3.29	3.13	3.10	3.25	3.23	**3.8**	**3.9**	**4.0**	**3.9**	**3.8**	**3.8**
Corporate Aaa bond	4.86	4.77	4.73	4.57	4.35	4.39	4.52	4.49	**5.0**	**5.4**	**5.4**	**5.4**	**5.2**	**5.1**
Corporate Baa bond	5.64	5.53	5.48	5.33	5.08	5.15	5.22	5.24	**6.0**	**6.4**	**6.5**	**6.4**	**6.3**	**6.1**
State & Local bonds	4.35	4.21	4.16	4.08	3.84	3.82	3.94	3.95	**4.4**	**4.6**	**4.7**	**4.6**	**4.5**	**4.4**
Home mortgage rate	6.29	6.02	5.89	5.66	5.22	5.41	5.52	5.53	**6.3**	**6.4**	**6.3**	**6.2**	**6.1**	**5.9**
	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q
Key Assumptions	2020	2021	2021	2021	2021	2022	2022	2022**	2022	2023	2023	2023	2023	2024
Fed's AFE $ Index	105.1	103.4	102.9	105.0	107.0	108.4	113.7	118.5	**121.4**	**121.5**	**120.4**	**118.8**	**117.6**	**117.0**
Real GDP	3.9	6.3	7.0	2.7	7.0	-1.6	-0.6	1.4	**0.7**	**0.1**	**0.1**	**0.9**	**1.3**	**1.6**
GDP Price Index	2.5	5.2	6.3	6.2	6.8	8.3	9.0	4.9	**4.3**	**3.5**	**3.0**	**2.8**	**2.7**	**2.5**
Consumer Price Index	2.2	4.1	8.2	6.7	7.9	9.2	10.5	5.3	**3.9**	**3.4**	**3.0**	**2.6**	**2.5**	**2.4**
PCE Price Index	1.6	4.5	6.4	5.6	6.2	7.5	7.3	4.5	**3.7**	**3.2**	**2.7**	**2.5**	**2.4**	**2.3**

Forecasts for interest rates and the Federal Reserve's Advanced Foreign Economies Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index, CPI and PCE 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; SOFR from the New York Fed. *Interest rate data for 3Q 2022 based on historical data through the week ended Sep 23. **Data for 3Q 2022 for the Fed's AFE $ Index based on data through the week ended September 23. Figures for 3Q 2022 Real GDP, GDP Chained Price Index, Consumer Price Index, and PCE Price Index are consensus forecasts from the September 2022 survey.









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 2023 through 2028 and averages for the five-year periods 2024-2028 and 2029-2033. 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	
		2023	2024	2025	2026	2027	2028	2024-2028	2029-2033
1. Federal Funds Rate	**CONSENSUS**	**3.0**	**2.7**	**2.5**	**2.5**	**2.5**	**2.5**	**2.6**	**2.5**
	Top 10 Average	3.5	3.3	3.0	2.8	2.8	2.8	3.0	2.8
	Bottom 10 Average	2.6	2.1	2.0	2.2	2.2	2.2	2.2	2.1
2. Prime Rate	**CONSENSUS**	**6.1**	**5.9**	**5.7**	**5.6**	**5.6**	**5.6**	**5.7**	**5.6**
	Top 10 Average	6.6	6.4	6.1	6.0	6.0	6.0	6.1	5.9
	Bottom 10 Average	5.6	5.3	5.2	5.3	5.3	5.3	5.3	5.2
3. SOFR	**CONSENSUS**	**3.0**	**2.8**	**2.5**	**2.5**	**2.5**	**2.5**	**2.6**	**2.5**
	Top 10 Average	3.4	3.3	3.0	2.9	2.8	2.8	3.0	2.8
	Bottom 10 Average	2.7	2.2	2.0	2.2	2.2	2.2	2.2	2.1
4. Commercial Paper, 1-Mo	**CONSENSUS**	**3.2**	**2.9**	**2.6**	**2.6**	**2.6**	**2.6**	**2.7**	**2.6**
	Top 10 Average	3.5	3.4	3.1	2.9	2.9	2.9	3.0	2.9
	Bottom 10 Average	2.8	2.5	2.3	2.4	2.4	2.3	2.3	2.3
5. Treasury Bill Yield, 3-Mo	**CONSENSUS**	**3.0**	**2.8**	**2.6**	**2.6**	**2.6**	**2.5**	**2.6**	**2.5**
	Top 10 Average	3.6	3.4	3.1	3.1	3.0	2.9	3.1	2.9
	Bottom 10 Average	2.5	2.2	2.0	2.1	2.2	2.2	2.1	2.2
6. Treasury Bill Yield, 6-Mo	**CONSENSUS**	**3.2**	**2.9**	**2.7**	**2.7**	**2.7**	**2.6**	**2.7**	**2.6**
	Top 10 Average	3.8	3.6	3.2	3.2	3.1	3.0	3.2	3.0
	Bottom 10 Average	2.6	2.2	2.1	2.2	2.3	2.3	2.2	2.3
7. Treasury Bill Yield, 1-Yr	**CONSENSUS**	**3.2**	**3.0**	**2.9**	**2.9**	**2.8**	**2.8**	**2.9**	**2.8**
	Top 10 Average	3.9	3.8	3.5	3.4	3.3	3.2	3.4	3.2
	Bottom 10 Average	2.6	2.4	2.2	2.4	2.4	2.4	2.3	2.4
8. Treasury Note Yield, 2-Yr	**CONSENSUS**	**3.4**	**3.2**	**3.1**	**3.1**	**3.0**	**3.0**	**3.1**	**3.0**
	Top 10 Average	4.3	4.1	3.8	3.6	3.5	3.5	3.7	3.5
	Bottom 10 Average	2.7	2.4	2.3	2.5	2.6	2.5	2.4	2.5
9. Treasury Note Yield, 5-Yr	**CONSENSUS**	**3.5**	**3.4**	**3.3**	**3.3**	**3.3**	**3.2**	**3.3**	**3.3**
	Top 10 Average	4.3	4.2	4.1	3.9	3.8	3.8	3.9	3.8
	Bottom 10 Average	2.8	2.6	2.5	2.7	2.7	2.7	2.6	2.8
10. Treasury Note Yield, 10-Yr	**CONSENSUS**	**3.5**	**3.5**	**3.4**	**3.5**	**3.5**	**3.4**	**3.5**	**3.5**
	Top 10 Average	4.4	4.4	4.2	4.2	4.1	4.1	4.2	4.1
	Bottom 10 Average	2.8	2.5	2.6	2.9	2.9	2.8	2.7	2.8
11. Treasury Bond Yield, 30-Yr	**CONSENSUS**	**3.8**	**3.8**	**3.8**	**3.9**	**3.8**	**3.8**	**3.8**	**3.9**
	Top 10 Average	4.6	4.7	4.5	4.5	4.4	4.5	4.5	4.5
	Bottom 10 Average	3.0	2.9	3.0	3.3	3.2	3.2	3.1	3.2
12. Corporate Aaa Bond Yield	**CONSENSUS**	**5.0**	**5.0**	**4.9**	**5.0**	**5.0**	**4.9**	**4.9**	**5.0**
	Top 10 Average	5.7	5.7	5.6	5.5	5.5	5.5	5.5	5.6
	Bottom 10 Average	4.4	4.2	4.3	4.4	4.4	4.4	4.3	4.4
13. Corporate Baa Bond Yield	**CONSENSUS**	**6.0**	**5.9**	**5.8**	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**
	Top 10 Average	6.6	6.6	6.4	6.3	6.3	6.3	6.4	6.4
	Bottom 10 Average	5.4	5.3	5.2	5.4	5.4	5.4	5.3	5.4
14. State & Local Bonds Yield	**CONSENSUS**	**4.3**	**4.3**	**4.2**	**4.3**	**4.3**	**4.3**	**4.3**	**4.3**
	Top 10 Average	5.0	5.0	4.8	4.8	4.7	4.7	4.8	4.8
	Bottom 10 Average	3.7	3.7	3.7	3.9	3.9	3.9	3.8	3.9
15. Home Mortgage Rate	**CONSENSUS**	**5.7**	**5.5**	**5.4**	**5.4**	**5.4**	**5.4**	**5.4**	**5.4**
	Top 10 Average	6.4	6.4	6.1	6.0	6.0	6.0	6.1	6.0
	Bottom 10 Average	4.9	4.7	4.6	4.8	4.8	4.8	4.7	4.8
A. Fed's AFE Nominal $ Index	**CONSENSUS**	**113.8**	**112.8**	**111.9**	**111.0**	**110.6**	**110.4**	**111.3**	**109.8**
	Top 10 Average	115.6	114.7	114.0	113.4	113.1	112.8	113.6	112.7
	Bottom 10 Average	112.2	111.0	109.9	108.8	108.2	107.9	109.2	107.4
		Year-Over-Year, % Change						Five-Year Averages	
		2023	2024	2025	2026	2027	2028	2024-2028	2029-2033
B. Real GDP	**CONSENSUS**	**2.0**	**2.0**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.0**
	Top 10 Average	2.6	2.4	2.4	2.4	2.4	2.4	2.4	2.3
	Bottom 10 Average	1.5	1.5	1.8	1.8	1.8	1.8	1.7	1.8
C. GDP Chained Price Index	**CONSENSUS**	**3.0**	**2.4**	**2.3**	**2.3**	**2.2**	**2.2**	**2.3**	**2.2**
	Top 10 Average	3.7	2.8	2.7	2.6	2.6	2.6	2.7	2.6
	Bottom 10 Average	2.3	2.0	1.9	1.9	1.9	1.9	1.9	1.9
D. Consumer Price Index	**CONSENSUS**	**3.2**	**2.4**	**2.4**	**2.4**	**2.3**	**2.3**	**2.4**	**2.3**
	Top 10 Average	4.1	3.0	2.9	2.8	2.7	2.7	2.8	2.7
	Bottom 10 Average	2.3	1.8	2.0	2.0	1.9	1.9	1.9	1.9
E. PCE Price Index	**CONSENSUS**	**3.0**	**2.3**	**2.3**	**2.3**	**2.3**	**2.2**	**2.3**	**2.3**
	Top 10 Average	3.8	2.8	2.8	2.7	2.7	2.6	2.7	2.7
	Bottom 10 Average	2.2	1.8	1.9	1.9	1.9	1.8	1.9	1.9

Water Service Corporation of Kentucky
Derivation of Mean Equity Risk Premium Based Studies
Using Holding Period Returns and
Projected Market Appreciation of the S&P Utility Index

Line No.		Implied Equity Risk Premium	Implied Equity Risk Premium ex PRPM
1.	Historical Equity Risk Premium (1)	4.28 %	4.28 %
2.	Regression of Historical Equity Risk Premium (2)	4.80	4.80
3.	Forecasted Equity Risk Premium Based on PRPM (3)	5.13	NA
4.	Forecasted Equity Risk Premium based on Projected Total Return on the S&P Utilities Index (Value Line Data) (4)	3.65	3.65
5.	Forecasted Equity Risk Premium based on Projected Total Return on the S&P Utilities Index (Bloomberg Data) (5)	5.36	5.36
6.	Average Equity Risk Premium (6)	4.64 %	4.52 %

Notes:
(1) Based on S&P Public Utility Index monthly total returns and Moody's Public Utility Bond average monthly yields from 1928-2021. Holding period returns are calculated based upon income received (dividends and interest) plus the relative change in the market value of a security over a one-year holding period.
(2) This equity risk premium is based on a regression of the monthly equity risk premiums of the S&P Utility Index relative to Moody's A2 rated public utility bond yields from 1928 - 2021 referenced in note 1 above. Using the equation generated from the regression, an expected equity risk premium is calculated using the prospective A2 rated public utility bond yield of 5.88% (from line 3, page 12 of this Schedule).
(3) The Predictive Risk Premium Model (PRPM) is applied to the risk premium of the monthly total returns of the S&P Utility Index and the monthly yields on Moody's A2 rated public utility bonds from January 1928 - September 2022.
(4) Using data from Value Line for the S&P Utilities Index, an expected return of 9.53% was derived based on expected dividend yields as a proxy for income returns and long-term growth estimates as a proxy for market appreciation. Subtracting the expected A2 rated public utility bond yield of 5.88%, calculated on line 3 of page 12 of this Schedule results in an equity risk premium of 3.65%. (9.53% - 5.88% = 3.65%)
(5) Using data from Bloomberg Professional Service for the S&P Utilities Index, an expected return of 11.24% was derived based on expected dividend yields as a proxy for income returns and long-term growth estimates as a proxy for market appreciation. Subtracting the expected A2 rated public utility bond yield of 5.88%, calculated on line 3 of page 12 of this Schedule results in an equity risk premium of 5.36%. (11.24% - 5.88% = 5.36%)
(6) Average of lines 1 through 5.

Water Service Corporation of Kentucky
Indicated Common Equity Cost Rate Through Use
of the Traditional Capital Asset Pricing Model (CAPM) and Empirical Capital Asset Pricing Model (ECAPM)

Proxy Group of Six Water Companies	[1] Value Line Adjusted Beta	[2] Bloomberg Adjusted Beta	[3] Average Beta	[4] Market Risk Premium (1)	[5] Risk-Free Rate (2)	[6] Traditional CAPM Cost Rate	[7] ECAPM Cost Rate	[8] Indicated Common Equity Cost Rate (3)
American States Water Company	0.65	0.74	0.70	10.18 %	3.86 %	10.99 %	11.75 %	11.37 %
American Water Works Company, Inc.	0.90	0.89	0.90	10.18	3.86	13.03	13.28	13.15
California Water Service Group	0.70	0.81	0.75	10.18	3.86	11.50	12.13	11.82
Essential Utilities Inc.	0.95	0.86	0.91	10.18	3.86	13.13	13.36	13.24
Middlesex Water Company	0.70	0.75	0.72	10.18	3.86	11.19	11.90	11.55
SJW Group	0.80	0.72	0.76	10.18	3.86	11.60	12.21	11.90
Mean			0.79			11.90 %	12.44 %	12.17 %
Median			0.76			11.55 %	12.17 %	11.86 %
Average of Mean and Median			0.78			11.73 %	12.31 %	12.02 %

Results Excluding the PRPM MRP

Proxy Group of Six Water Companies	[1] Value Line Adjusted Beta	[2] Bloomberg Adjusted Beta	[3] Average Beta	[4] Market Risk Premium (1)	[5] Risk-Free Rate (2)	[6] Traditional CAPM Cost Rate	[7] ECAPM Cost Rate	[8] Indicated Common Equity Cost Rate (3)
American States Water Company	0.65	0.74	0.70	9.95 %	3.86 %	10.83 %	11.57 %	11.20 %
American Water Works Company, Inc.	0.90	0.89	0.90	9.95	3.86	12.82	13.07	12.94
California Water Service Group	0.70	0.81	0.75	9.95	3.86	11.32	11.95	11.64
Essential Utilities Inc.	0.95	0.86	0.91	9.95	3.86	12.92	13.14	13.03
Middlesex Water Company	0.70	0.75	0.72	9.95	3.86	11.03	11.72	11.37
SJW Group	0.80	0.72	0.76	9.95	3.86	11.42	12.02	11.72
Mean			0.79			11.72 %	12.24 %	11.98 %
Median			0.76			11.37 %	11.98 %	11.68 %
Average of Mean and Median			0.78			11.55 %	12.11 %	11.83 %

Notes on page 22 of this Schedule.

Water Service Corporation of Kentucky
Notes to Accompany the Application of the CAPM and ECAPM

Notes:

(1) The market risk premium (MRP) is derived by using six different measures from three sources: Ibbotson, Value Line, and Bloomberg as illustrated below:

Historical Data MRP Estimates:

Measure 1: Ibbotson Arithmetic Mean MRP (1926-2021)

Arithmetic Mean Monthly Returns for Large Stocks 1926-2021:	12.37	%
Arithmetic Mean Income Returns on Long-Term Government Bonds:	5.02	
MRP based on Ibbotson Historical Data:	7.35	%

Measure 2: Application of a Regression Analysis to Ibbotson Historical Data
(1926-2021) 8.76 %

Measure 3: Application of the PRPM to Ibbotson Historical Data:
(January 1926 - September 2022) 11.34 %

Value Line MRP Estimates:

Measure 4: Value Line Projected MRP (Thirteen weeks ending October 14, 2022)

Total projected return on the market 3-5 years hence*:	16.03	%
Projected Risk-Free Rate (see note 2):	3.86	
MRP based on Value Line Summary & Index:	12.17	%

*Forcasted 3-5 year capital appreciation plus expected dividend yield

Measure 5: Value Line Projected Return on the Market based on the S&P 500

Total return on the Market based on the S&P 500:	16.66	%
Projected Risk-Free Rate (see note 2):	3.86	
MRP based on Value Line data	12.80	%

Measure 6: Bloomberg Projected MRP

Total return on the Market based on the S&P 500:	12.54	%
Projected Risk-Free Rate (see note 2):	3.86	
MRP based on Bloomberg data	8.68	%
Average of Value Line, Ibbotson, and Bloomberg MRP:	10.18	%
Average MRP Excluding the PRPM MRP:	9.95	%

(2) For reasons explained in the Direct Testimony, the appropriate risk-free rate for cost of capital purposes is the average forecast of 30 year Treasury Bonds per the consensus of nearly 50 economists reported in Blue Chip Financial Forecasts. (See pages 18 and 19 of this Schedule.) The projection of the risk-free rate is illustrated below:

Fourth Quarter 2022	3.80	%
First Quarter 2023	3.90	
Second Quarter 2023	4.00	
Third Quarter 2023	3.90	
Fourth Quarter 2023	3.80	
First Quarter 2024	3.80	
2024-2028	3.80	
2029-2033	3.90	
	3.86	%

(3) Average of Column 6 and Column 7.

Sources of Information:
Value Line Summary and Index
Blue Chip Financial Forecasts, June 1, 2022 and September 30, 2022
Stocks, Bonds, Bills, and Inflation - 2022 SBBI Yearbook, Kroll.
Bloomberg Professional Services

Water Service Corporation of Kentucky
Basis of Selection of the Group of Non-Price Regulated Companies
Comparable in Total Risk to the Utility Proxy Group

The criteria for selection of the proxy group of twenty-seven non-price regulated companies was that the non-price regulated companies be domestic and reported in Value Line Investment Survey (Standard Edition).

The Non-Price Regulated Proxy Group were then selected based on the unadjusted beta range of 0.49 – 0.77 and residual standard error of the regression range of 2.8333 – 3.3793 of the Utility Proxy Group.

These ranges are based upon plus or minus two standard deviations of the unadjusted beta and standard error of the regression. Plus or minus two standard deviations captures 95.50% of the distribution of unadjusted betas and residual standard errors of the regression.

The standard deviation of the Utility Proxy Group's residual standard error of the regression is 0.1365. The standard deviation of the standard error of the regression is calculated as follows:

$$\text{Standard Deviation of the Std. Err. of the Regr.} = \frac{\text{Standard Error of the Regression}}{\sqrt{2N}}$$

where: N = number of observations. Since Value Line betas are derived from weekly price change observations over a period of five years, N = 259

$$\text{Thus, } 0.1365 = \frac{3.1063}{\sqrt{518}} = \frac{3.1063}{22.7596}$$

Source of Information: Value Line, Inc., September 2022
Value Line Investment Survey (Standard Edition)

Water Service Corporation of Kentucky
Basis of Selection of Comparable Risk
Domestic Non-Price Regulated Companies

	[1]	[2]	[3]	[4]
Proxy Group of Six Water Companies	Value Line Adjusted Beta	Unadjusted Beta	Residual Standard Error of the Regression	Standard Deviation of Beta
American States Water Company	0.65	0.44	2.6059	0.0604
American Water Works Company, Inc.	0.90	0.78	3.3488	0.0776
California Water Service Group	0.70	0.48	3.1091	0.0721
Essential Utilities Inc.	0.95	0.91	2.7564	0.0639
Middlesex Water Company	0.70	0.51	3.4761	0.0806
SJW Group	0.80	0.65	3.3417	0.0775
Average	0.78	0.63	3.1063	0.0720
Beta Range (+/- 2 std. Devs. of Beta)	0.49	0.77		
2 std. Devs. of Beta	0.14			
Residual Std. Err. Range (+/- 2 std. Devs. of the Residual Std. Err.)	2.8333	3.3793		
Std. dev. of the Res. Std. Err.	0.1365			
2 std. devs. of the Res. Std. Err.	0.2730			

Source of Information: Valueline Proprietary Database, September 2022

Water Service Corporation of Kentucky
Proxy Group of Non-Price Regulated Companies
Comparable in Total Risk to the
Proxy Group of Six Water Companies

Proxy Group of Twenty-Seven Non-Price Regulated Companies	[1] Value Line Adjusted Beta	[2] Unadjusted Beta	[3] Residual Standard Error of the Regression	[4] Standard Deviation of Beta
Balchem Corp.	0.75	0.56	3.3474	0.0776
Becton, Dickinson	0.75	0.59	2.9969	0.0695
Black Knight, Inc.	0.75	0.56	3.1415	0.0728
Booz Allen Hamilton	0.85	0.76	3.1644	0.0733
Bristol-Myers Squibb	0.85	0.70	2.9185	0.0676
C.H. Robinson	0.70	0.54	3.3437	0.0775
Chemed Corp.	0.80	0.66	2.8403	0.0658
CSG Systems Int'l	0.75	0.56	2.8967	0.0671
CSW Industrials	0.85	0.76	3.0218	0.0700
Heartland Express	0.70	0.51	3.0304	0.0702
Henry (Jack) & Assoc	0.85	0.70	2.9759	0.0690
Lilly (Eli)	0.80	0.63	3.3732	0.0782
McCormick & Co.	0.75	0.62	3.0694	0.0711
Merck & Co.	0.80	0.63	2.9122	0.0675
Monster Beverage	0.85	0.76	2.9657	0.0687
NewMarket Corp.	0.75	0.59	2.9165	0.0676
Northrop Grumman	0.80	0.67	3.3239	0.0770
Oracle Corp.	0.80	0.67	2.8812	0.0668
Pfizer, Inc.	0.80	0.69	2.9056	0.0673
Progressive Corp.	0.75	0.60	3.0605	0.0709
Quest Diagnostics	0.80	0.62	3.2991	0.0765
RLI Corp.	0.75	0.62	2.9185	0.0676
Rollins, Inc.	0.85	0.71	3.2681	0.0758
Selective Ins. Group	0.85	0.76	3.0002	0.0695
Watsco, Inc.	0.85	0.73	2.8872	0.0669
Werner Enterprises	0.75	0.56	3.3343	0.0773
Western Union	0.80	0.68	3.0050	0.0697
Average	0.79	0.65	3.0666	0.0711
Proxy Group of Six Water Companies	0.78	0.63	3.1063	0.0720

Source of Information: Valueline Proprietary Database, September 2022

Water Service Corporation of Kentucky
Summary of Cost of Equity Models Applied to
Proxy Group of Twenty-Seven Non-Price Regulated Companies
Comparable in Total Risk to the
Proxy Group of Six Water Companies

Principal Methods	Proxy Group of Twenty-Seven Non-Price Regulated Companies	Proxy Group of Twenty-Seven Non-Price Regulated Companies ex PRPM
Discounted Cash Flow Model (DCF) (1)	11.19 %	11.19 %
Risk Premium Model (RPM) (2)	12.92	12.71
Capital Asset Pricing Model (CAPM)	12.06 (3)	11.88 (4)
Mean	12.06 %	11.93 %
Median	12.06 %	11.88 %
Average of Mean and Median	12.06 %	11.91 %

Notes:
(1) From page 27 of this Schedule.
(2) From page 28 of this Schedule.
(3) From page 31 of this Schedule.
(4) From page 32 of this Schedule.

Water Service Corporation of Kentucky
DCF Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the
Proxy Group of Six Water Companies

	[1]	[2]	[3]	[4]	[6]	[7]	[8]
Proxy Group of Twenty-Seven Non-Price Regulated Companies	Average Dividend Yield	Value Line Projected Five Year Growth in EPS	Zack's Five Year Projected Growth Rate in EPS	Yahoo! Finance Projected Five Year Growth in EPS	Average Projected Five Year Growth Rate in EPS	Adjusted Dividend Yield	Indicated Common Equity Cost Rate (1)
Balchem Corp.	0.49 %	14.50 %	NA %	24.00 %	19.25 %	0.54 %	19.79 %
Becton, Dickinson	1.41	4.50	7.70	4.80	5.67	1.45	7.12
Black Knight, Inc.	-	10.50	10.20	10.15	10.28	-	NA
Booz Allen Hamilton	1.80	7.00	7.50	7.50	7.33	1.87	9.20
Bristol-Myers Squibb	3.02	NA	6.30	4.44	5.37	3.10	8.47
C.H. Robinson	2.05	8.50	9.00	6.00	7.83	2.13	9.96
Chemed Corp.	0.32	7.00	7.10	7.10	7.07	0.33	7.40
CSG Systems Int'l	1.85	12.00	NA	(5.00)	12.00	1.96	13.96
CSW Industrials	0.54	11.50	NA	12.00	11.75	0.57	12.32
Heartland Express	0.53	8.50	NA	13.30	10.90	0.56	11.46
Henry (Jack) & Assoc	1.00	9.00	9.00	14.00	10.67	1.05	11.72
Lilly (Eli)	1.24	11.50	19.50	18.13	16.38	1.34	17.72
McCormick & Co.	1.79	5.00	5.30	5.10	5.13	1.84	6.97
Merck & Co.	3.12	8.00	10.20	10.80	9.67	3.27	12.94
Monster Beverage	-	10.50	10.30	14.65	11.82	-	NA
NewMarket Corp.	2.80	(1.50)	NA	7.70	7.70	2.91	10.61
Northrop Grumman	1.44	6.50	2.20	3.00	3.90	1.47	5.37
Oracle Corp.	1.77	9.00	8.00	10.13	9.04	1.85	10.89
Pfizer, Inc.	3.41	6.50	12.50	NA	9.50	3.57	13.07
Progressive Corp.	0.33	6.50	18.70	25.80	17.00	0.36	17.36
Quest Diagnostics	2.03	3.50	NA	(14.72)	3.50	2.07	5.57
RLI Corp.	0.94	12.00	NA	9.80	10.90	0.99	11.89
Rollins, Inc.	1.11	10.50	NA	8.20	9.35	1.16	10.51
Selective Ins. Group	1.37	9.50	5.70	13.40	9.53	1.44	10.97
Watsco, Inc.	3.21	11.50	NA	15.00	13.25	3.42	16.67
Werner Enterprises	1.28	9.00	5.80	7.30	7.37	1.33	8.70
Western Union	6.20	8.00	NA	(2.74)	8.00	6.45	14.45
						Mean	11.40 %
						Median	10.97 %
						Average of Mean and Median	11.19 %

NA= Not Available
NMF= Not Meaningful Figure

(1) The application of the DCF model to the domestic, non-price regluated comparable risk companies is identical to the application of the DCF to the utility proxy group. The dividend yield is derived by using the 60 day average price and the spot indicated dividend as of October 14, 2022. The dividend yield is then adjusted by 1/2 the average projected growth rate in EPS, which is calculated by averaging the 5 year projected growth in EPS provided by Value Line, www.zacks.com, and www.yahoo.com (excluding any negative growth rates) and then adding that growth rate to the adjusted dividend yield.

Source of Information:
Value Line Investment Survey
www.zacks.com Downloaded on 10/14/2022
www.yahoo.com Downloaded on 10/14/2022

Water Service Corporation of Kentucky
Indicated Common Equity Cost Rate
Through Use of a Risk Premium Model
Using an Adjusted Total Market Approach

Line No.		Proxy Group of Twenty-Seven Non-Price Regulated Companies	Proxy Group of Twenty-Seven Non-Price Regulated Companies ex PRPM
1.	Prospective Yield on Baa2 Rated Corporate Bonds (1)	6.19 %	6.19 %
2.	Adjustment to Reflect Bond rating Difference of Non-Price Regulated Companies (2)	(0.17)	(0.17)
3.	Adjusted Prospective Bond Yield	6.02	6.02
4.	Equity Risk Premium (3)	6.90	6.69
5.	Risk Premium Derived Common Equity Cost Rate	12.92 %	12.71 %

Notes: (1) Average forecast of Baa2 corporate bonds based upon the consensus of nearly 50 economists reported in Blue Chip Financial Forecasts dated June 1, 2022 and September 30, 2022 (see pages 18 and 19 of this Schedule). The estimates are detailed below.

Fourth Quarter 2022	6.00 %
First Quarter 2023	6.40
Second Quarter 2023	6.50
Third Quarter 2023	6.40
Fourth Quarter 2023	6.30
First Quarter 2024	6.10
2024-2028	5.90
2029-2033	5.90
Average	6.19 %

(2) The average yield spread of Baa rated corporate bonds over A corporate bonds for the three months ending September 2022. To reflect the Baa1 average rating of the non-utility proxy group, the prosepctive yield on Baa corporate bonds must be adjusted by 1/3 of the spread between A and Baa corporate bond yields as shown below:

	A Corp. Bond Yield	Baa Corp. Bond Yield	Spread
Sep-22	5.16 %	5.68 %	0.52 %
Aug-22	4.65	5.15	0.50
Jul-22	4.67	5.21	0.54
		Average yield spread	0.52
		1/3 of spread	0.17

(3) From page 30 of this Schedule.

Water Service Corporation of Kentucky
Comparison of Long-Term Issuer Ratings for the
Proxy Group of Twenty-Seven Non-Price Regulated Companies of Comparable risk to the
Proxy Group of Six Water Companies

Proxy Group of Twenty-Seven Non-Price Regulated Companies	Moody's Long-Term Issuer Rating October 2022		Standard & Poor's Long-Term Issuer Rating October 2022	
	Long-Term Issuer Rating	Numerical Weighting (1)	Long-Term Issuer Rating	Numerical Weighting (1)
Balchem Corp.	NA	--	NA	--
Becton, Dickinson	Baa2	9.0	BBB	9.0
Black Knight, Inc.	Ba3	13.0	BB	12.0
Booz Allen Hamilton	NA	--	NA	--
Bristol-Myers Squibb	A2	6.0	A+	5.0
C.H. Robinson	Baa2	9.0	BBB+	8.0
Chemed Corp.	WR	--	NR	--
CSG Systems Int'l	NA	--	BB+	11.0
CSW Industrials	NA	--	NA	--
Heartland Express	NA	--	NA	--
Henry (Jack) & Assoc	NA	--	NA	--
Lilly (Eli)	A2	6.0	A+	5.0
McCormick & Co.	Baa2	9.0	BBB	9.0
Merck & Co.	A1	5.0	A+	5.0
Monster Beverage	NA	--	NA	--
NewMarket Corp.	Baa2	9.0	BBB+	8.0
Northrop Grumman	Baa1	8.0	BBB+	8.0
Oracle Corp.	Baa2	9.0	BBB	9.0
Pfizer, Inc.	A2	6.0	A+	5.0
Progressive Corp.	A2	6.0	A	6.0
Quest Diagnostics	Baa2	9.0	BBB+	8.0
RLI Corp.	Baa2	9.0	BBB	9.0
Rollins, Inc.	NA	--	NA	--
Selective Ins. Group	Baa2	9.0	BBB	9.0
Watsco, Inc.	NA	--	NA	--
Werner Enterprises	NA	--	NA	--
Western Union	Baa2	9.0	BBB	9.0
Average	Baa1	8.2	BBB+	7.9

Notes:
(1) From page 15 of this Schedule.

Source of Information:
Bloomberg Professional Services

Water Service Corporation of Kentucky
Derivation of Equity Risk Premium Based on the Total Market Approach
Using the Beta for
Proxy Group of Twenty-Seven Non-Price Regulated Companies of Comparable risk to the
Proxy Group of Six Water Companies

Line No.	Equity Risk Premium Measure	Proxy Group of Twenty-Seven Non-Price Regulated Companies	Proxy Group of Twenty-Seven Non-Price Regulated Companies ex PRPM
1.	Ibbotson Equity Risk Premium (1)	6.13 %	6.13 %
2.	Regression on Ibbotson Risk Premium Data (2)	7.09	7.09
3.	Ibbotson Equity Risk Premium based on PRPM (3)	10.12	NA
4.	Equity Risk Premium Based on Value Line Summary and Index (4)	10.85	10.85
5	Equity Risk Premium Based on Value Line S&P 500 Companies (5)	11.48	11.48
6.	Equity Risk Premium Based on Bloomberg S&P 500 Companies (6)	7.36	7.36
7.	Conclusion of Equity Risk Premium	8.84 %	8.58 %
8.	Adjusted Beta (7)	0.78	0.78
9.	Forecasted Equity Risk Premium	6.90 %	6.69 %

Notes:
(1) From note 1 of page 17 of this Schedule.
(2) From note 2 of page 17 of this Schedule.
(3) From note 3 of page 17 of this Schedule.
(4) From note 4 of page 17 of this Schedule.
(5) From note 5 of page 17 of this Schedule.
(6) From note 6 of page 17 of this Schedule.
(7) Average of mean and median beta from page 31 of this Schedule.

Sources of Information:
Stocks, Bonds, Bills, and Inflation - 2022 SBBI Yearbook, Kroll.
Value Line Summary and Index
Blue Chip Financial Forecasts, June 1, 2022 and September 30, 2022
Bloomberg Professional Services

Water Service Corporation of Kentucky
Traditional CAPM and ECAPM Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the
Proxy Group of Six Water Companies

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Twenty-Seven Non-Price Regulated Companies	Value Line Adjusted Beta	Bloomberg Beta	Average Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate	ECAPM Cost Rate	Indicated Common Equity Cost Rate (3)
Balchem Corp.	0.75	0.88	0.81	10.18 %	3.86 %	12.11 %	12.59 %	12.35 %
Becton, Dickinson	0.75	0.67	0.71	10.18	3.86	11.09	11.83	11.46
Black Knight, Inc.	0.75	0.65	0.70	10.18	3.86	10.99	11.75	11.37
Booz Allen Hamilton	0.85	0.81	0.83	10.18	3.86	12.31	12.75	12.53
Bristol-Myers Squibb	0.85	0.56	0.71	10.18	3.86	11.09	11.83	11.46
C.H. Robinson	0.70	0.87	0.79	10.18	3.86	11.90	12.44	12.17
Chemed Corp.	0.80	0.72	0.76	10.18	3.86	11.60	12.21	11.90
CSG Systems Int'l	0.70	0.80	0.75	10.18	3.86	11.50	12.13	11.82
CSW Industrials	0.85	0.90	0.87	10.18	3.86	12.72	13.05	12.89
Heartland Express	0.70	0.71	0.70	10.18	3.86	10.99	11.75	11.37
Henry (Jack) & Assoc	0.80	0.77	0.79	10.18	3.86	11.90	12.44	12.17
Lilly (Eli)	0.80	0.78	0.79	10.18	3.86	11.90	12.44	12.17
McCormick & Co.	0.75	0.73	0.74	10.18	3.86	11.40	12.06	11.73
Merck & Co.	0.80	0.52	0.66	10.18	3.86	10.58	11.45	11.01
Monster Beverage	0.85	0.82	0.83	10.18	3.86	12.31	12.75	12.53
NewMarket Corp.	0.75	0.62	0.69	10.18	3.86	10.89	11.68	11.28
Northrop Grumman	0.80	0.66	0.73	10.18	3.86	11.29	11.98	11.64
Oracle Corp.	0.80	0.94	0.87	10.18	3.86	12.72	13.05	12.89
Pfizer, Inc.	0.80	0.74	0.77	10.18	3.86	11.70	12.29	11.99
Progressive Corp.	0.75	0.72	0.74	10.18	3.86	11.40	12.06	11.73
Quest Diagnostics	0.80	0.63	0.72	10.18	3.86	11.19	11.91	11.55
RLI Corp.	0.75	0.81	0.78	10.18	3.86	11.80	12.36	12.08
Rollins, Inc.	0.85	0.86	0.86	10.18	3.86	12.62	12.97	12.80
Selective Ins. Group	0.85	0.76	0.80	10.18	3.86	12.01	12.52	12.26
Watsco, Inc.	0.85	0.97	0.91	10.18	3.86	13.13	13.36	13.24
Werner Enterprises	0.75	0.83	0.79	10.18	3.86	11.90	12.44	12.17
Western Union	0.80	0.86	0.83	10.18	3.86	12.31	12.75	12.53
Mean			0.78			11.75 %	12.33 %	12.04 %
Median			0.78			11.80 %	12.36 %	12.08 %
Average of Mean and Median			0.78			11.78 %	12.35 %	12.06 %

Notes:
(1) From page 22, note 1 of this Schedule.
(2) From page 22, note 2 of this Schedule.
(3) Average of CAPM and ECAPM cost rates.

Water Service Corporation of Kentucky
Traditional CAPM and ECAPM Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the
Proxy Group of Six Water Companies

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Twenty-Seven Non-Price Regulated Companies	Value Line Adjusted Beta	Bloomberg Beta	Average Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate	ECAPM Cost Rate	Indicated Common Equity Cost Rate (3)
Balchem Corp.	0.75	0.88	0.81	9.95 %	3.86 %	11.92 %	12.39 %	12.16 %
Becton, Dickinson	0.75	0.67	0.71	9.95	3.86	10.93	11.65	11.29
Black Knight, Inc.	0.75	0.65	0.70	9.95	3.86	10.83	11.57	11.20
Booz Allen Hamilton	0.85	0.81	0.83	9.95	3.86	12.12	12.54	12.33
Bristol-Myers Squibb	0.85	0.56	0.71	9.95	3.86	10.93	11.65	11.29
C.H. Robinson	0.70	0.87	0.79	9.95	3.86	11.72	12.24	11.98
Chemed Corp.	0.80	0.72	0.76	9.95	3.86	11.42	12.02	11.72
CSG Systems Int'l	0.70	0.80	0.75	9.95	3.86	11.32	11.95	11.64
CSW Industrials	0.85	0.90	0.87	9.95	3.86	12.52	12.84	12.68
Heartland Express	0.70	0.71	0.70	9.95	3.86	10.83	11.57	11.20
Henry (Jack) & Assoc	0.80	0.77	0.79	9.95	3.86	11.72	12.24	11.98
Lilly (Eli)	0.80	0.78	0.79	9.95	3.86	11.72	12.24	11.98
McCormick & Co.	0.75	0.73	0.74	9.95	3.86	11.22	11.87	11.55
Merck & Co.	0.80	0.52	0.66	9.95	3.86	10.43	11.27	10.85
Monster Beverage	0.85	0.82	0.83	9.95	3.86	12.12	12.54	12.33
NewMarket Corp.	0.75	0.62	0.69	9.95	3.86	10.73	11.50	11.11
Northrop Grumman	0.80	0.66	0.73	9.95	3.86	11.13	11.80	11.46
Oracle Corp.	0.80	0.94	0.87	9.95	3.86	12.52	12.84	12.68
Pfizer, Inc.	0.80	0.74	0.77	9.95	3.86	11.52	12.10	11.81
Progressive Corp.	0.75	0.72	0.74	9.95	3.86	11.22	11.87	11.55
Quest Diagnostics	0.80	0.63	0.72	9.95	3.86	11.03	11.72	11.37
RLI Corp.	0.75	0.81	0.78	9.95	3.86	11.62	12.17	11.90
Rollins, Inc.	0.85	0.86	0.86	9.95	3.86	12.42	12.77	12.59
Selective Ins. Group	0.85	0.76	0.80	9.95	3.86	11.82	12.32	12.07
Watsco, Inc.	0.85	0.97	0.91	9.95	3.86	12.92	13.14	13.03
Werner Enterprises	0.75	0.83	0.79	9.95	3.86	11.72	12.24	11.98
Western Union	0.80	0.86	0.83	9.95	3.86	12.12	12.54	12.33
Mean			0.78			11.57 %	12.13 %	11.85 %
Median			0.78			11.62 %	12.17 %	11.90 %
Average of Mean and Median			0.78			11.60 %	12.15 %	11.88 %

Notes:
(1) From page 22, note 1 of this Schedule.
(2) From page 22, note 2 of this Schedule.
(3) Average of CAPM and ECAPM cost rates.

Water Service Corporation of Kentucky
Derivation of Investment Risk Adjustment Based upon
Ibbotson Associates' Size Premia for the Decile Portfolios of the NYSE/AMEX/NASDAQ

Line No.		[1] Market Capitalization on October 14, 2022 (1) (millions)			[2] Applicable Decile of the NYSE/AMEX/ NASDAQ (2)	[3] Applicable Size Premium (3)	[4] Spread from Applicable Size Premium (4)
1.	Water Service Corporation of Kentucky	$ 10.910			10	4.80%	
2.	Proxy Group of Six Water Companies	$ 3,035.903	278.3	x	6	1.18%	3.62%
			[A]		[B]	[C]	[D]

	Decile	Market Capitalization of Smallest Company (millions)	Market Capitalization of Largest Company (millions)	Size Premium (Return in Excess of CAPM)*
Largest	1	$ 36,160.584	$ 2,324,390.219	-0.22%
	2	16,759.390	36,099.221	0.43%
	3	8,216.356	16,738.364	0.55%
	4	5,019.883	8,212.638	0.54%
	5	3,281.009	5,003.747	0.89%
	6	2,170.315	3,276.553	1.18%
	7	1,306.402	2,164.524	1.34%
	8	629.118	1,306.038	1.21%
	9	290.002	627.803	2.10%
Smallest	10	10.588	289.007	4.80%

*From 2022 Duff & Phelps Cost of Capital Navigator

Notes:

(1) From page 34 of this Schedule.
(2) Gleaned from Columns [B] and [C] on the bottom of this page. The appropriate decile (Column [A]) corresponds to the market capitalization of the proxy group, which is found in Column [1].
(3) Corresponding risk premium to the decile is provided in Column [D] on the bottom of this page.
(4) Line No. 1 Column [3] – Line No. 2 Column [3]. For example, the 3.62% in Column [4], Line No. 2 is derived as follows 3.62% = 4.8% - 1.18%.

Water Service Corporation of Kentucky
Market Capitalization of Water Service Corporation of Kentucky and the
Proxy Group of Six Water Companies

Company	Exchange	[1] Common Stock Shares Outstanding at Fiscal Year End 2021 (millions)	[2] Book Value per Share at Fiscal Year End 2021 (1)	[3] Total Common Equity at Fiscal Year End 2021 (millions)	[4] Closing Stock Market Price on October 14, 2022	[5] Market-to-Book Ratio on October 14, 2022 (2)	[6] Market Capitalization on October 14, 2022 (3) (millions)
Water Service Corporation of Kentucky		NA	NA	$ 3.843 (4)	NA		
Based upon Proxy Group of Six Water Companies						283.9 (5)	$ 10.910 (6)
Proxy Group of Six Water Companies							
American States Water Company	NYSE	36.936	$ 18.571	$ 685.947	$ 84.880	457.1 %	$ 3,135.152
American Water Works Company, Inc.	NYSE	181.611	40.185	7,298.000	128.440	319.6	23,326.128
California Water Service Group	NYSE	53.716	22.023	1,182.980	54.670	248.2	2,936.654
Essential Utilities Inc.	NYSE	252.868	20.503	5,184.450	39.910	194.7	10,091.947
Middlesex Water Company	NASDAQ	17.522	20.987	367.726	81.020	386.0	1,419.632
SJW Group	NYSE	30.181	34.277	1,034.519	62.200	181.5	1,877.280
Median		45.326	$ 21.505	$ 1,108.750	$ 71.610	283.9 %	$ 3,035.903

NA= Not Available

Notes: (1) Column 3 / Column 1.
(2) Column 4 / Column 2.
(3) Column 1 * Column 4.
(4) Requested rate base multiplied by requested common equity ratio.
(5) The market-to-book ratio of Water Service Corporation of Kentucky on October 14, 2022 is assumed to be equal to the market-to-book ratio of Proxy Group of Six Water Companies on October 14, 2022 as appropriate.
(6) Column [3] multiplied by Column [5].

Source of Information: 2021 Annual Forms 10K
Bloomberg Financial Services

Water Service Corporation of Kentucky
Demonstration of the Inadequacy of
a DCF Return Rate Related to Book Value
When Market Value is Greater than Book Value

Line No.		[A] Based on Mr. Baudino's Proxy Group Market Value	[B] Based on Mr. Baudino's Proxy Group Book Value
1.	Per Share	$ 82.73 (1)	$ 26.09 (2)
2.	DCF Cost Rate (3)	9.25%	9.25%
3.	Return in Dollars (4)	$ 7.652	$ 2.413
4.	Dividends (5)	$ 1.554	$ 1.554
5.	Growth in Dollars (6)	$ 6.098	$ 0.859
6.	Return on Market Value (7)	9.25%	2.92%
7.	Rate of Growth on Market Value (8)	7.37%	1.04%

Notes:

(1) Average market price calculated using the six-month dividend yield and annual dividend as shown on Exhibit RAB-2.
(2) Average book value calculated by dividing total common equity at year-end 2021 by common shares outstanding at year-end 2021 for each proxy group company.
(3) Recommended DCF cost rate for Mr. Baudino.
(4) Line 1 * Line 2.
(5) Dividends are based on Mr. Baudino's average dividend yield.
(6) Line 3 - Line 4.
(7) Line 3 / Line 1.
(8) Line 5 / Line 1.

Water Service Corporation of Kentucky
Calculation of Indicated DCF Applied to Book Value Capital Structure
of Mr. Baudino's Proxy Group

Un-lever Indicated Market Capital Structure DCF

Ku	=	Ke	-	(((	Ku	-	i	)	1	-	t	)	D	/	E	)	-	(	Ku	-	d	)	P	/	E
Ku	=	9.25%	-	(((	Ku	-	4.04%	)	1	-	21%	)	25.31%	/	74.68%	)	-	(	Ku	-	7.26%	)	0.02%	/	74.68%
Ku	=	9.25%	-	(((	Ku	-	4.04%	)		79.00%		)		33.89%		)	-	(	Ku	-	7.26%	)		0.03%	
Ku	=	9.25%	-	((	79.00%	*	Ku	-	3.1948%			)		33.89%		)	-	(	0.03%	*	Ku	-	0.00%	)	
Ku	=	9.25%	-	(	26.77%	*	Ku	-	1.08%			)		-0.03%		*		Ku	+	0.00%					
Ku	=	9.25%			-26.77%	*	Ku	+	1.08%					-0.03%		*		Ku	+	0.00%					
Ku	=	10.33%			-26.80%	*	Ku																		
126.80%	*	Ku	=		10.33%																				
		Ku	=		**8.15%**																				

Re-lever to Indicated Book Value Capital Structure DCF

Ke	=	Ku	+	(((	Ku	-	i	)	1	-	t	)	D	/	E	)	+	(	Ku	-	d	)	P	/	E
Ke	=	8.15%	+	(((	8.15%	-	4.04%	)	1	-	21%	)	50.40%	/	49.54%	)	+	(	8.15%	-	7.26%	)	0.05%	/	49.54%
Ke	=	8.15%	+	(((		4.11%		)		79%		)		101.73%		)	+	(		0.89%		)		0.11%	
Ke	=	8.15%	+	((	3.24%	)	101.73%	)	+	(	0.00%	)													
Ke	=	8.15%	+	(	3.30%	)	+		0.00%																
		Ke	=		**11.45%**																				

Where:

Ku = Un-levered (i.e., 100% equity) cost of common equity
Ke = Market determined cost of common equity
i = Cost of debt
t = Income tax rate
D = Debt ratio
E = Equity ratio
d = Cost of preferred stock
P = Preferred equity ratio

Water Service Kentucky
Calculation of the Capital Asset Pricing Model
to Reflect Forward-Looking Interest Rates, Market Risk Premiums
and the Employment of the ECAPM

	Arithmetic Mean	Value Line 3-5 Year Total Return	Value Line Investment Analyzer Market DCF	Ibbotson and Chen Prospective MRP	Average
		CAPM			
Long-Term Annual Return on Stocks	12.30% (1)	17.55% (1)	11.09% (2)	11.31% (3)	
Long-Term Annual Income Return on Long-Term Treas. Bonds	4.90%	3.80% (4)	3.80% (4)	3.80% (4)	
Market Risk Premium	7.40%	13.75%	7.29%	7.51%	**8.99%**
Proxy Group Beta, Value Line (6)	0.79	0.79	0.79	0.79	
Beta * Market Premium	5.86%	10.89%	5.77%	5.95%	
Prospective 30-Year Treasury Bond Yield	3.80%	3.80%	3.80%	3.80%	
CAPM Cost of Equity	**9.66%**	**14.69%**	**9.57%**	**9.75%**	**10.92%**
		ECAPM			
Historical Market Risk Premium	7.40%	13.75%	7.29%	7.51%	
Proxy Group Beta, Value Line	0.79	0.79	0.79	0.79	
Beta * Market Premium	5.86%	10.89%	5.77%	5.95%	
Prospective 30-Year Treasury Bond Yield	3.80%	3.80%	3.80%	3.80%	
ECAPM Cost of Equity (rf + 0.25(MRP) + 0.75(β*MRP))	**10.04%**	**15.40%**	**9.95%**	**10.14%**	**11.38%**

Notes:
(1) From Exhibit RAB-3.
(2) Calculated from Baudino Value Line Investment Analyzer workpapers, as shown below:

	Avg. Dividend Yield	Median Projected EPS Growth Rate	Adjusted Yield	Market DCF
Value Line Investment Analyzer Data	1.04%	10.00%	1.09%	11.09%

(3) Calculated by converting the Ibbotson and Chen projected return on the market from a geometric mean to an arithmetic mean as shown below:

$$R_A = R_G + \frac{\sigma^2}{2}$$

Where:
R_A = Arithmetic Mean
R_G = Geometric Mean
σ = Standard Deviation of Equity Returns

Geometric Mean Return	Standard Deviation of Equity Returns	Arithmetic Mean Return
9.38%	19.64%	11.31%

(4) Mr. Baudino's proposed risk-free rate.

Sources of Information:
Exhibit RAB-4
Baudino Workpapers
Kroll 2022 SBBI Yearbook

Water Service Corporation of Kentucky
Portfolio Ranks by Size and Risk Premiums over CAPM Results
as Compiled by Kroll Cost of Capital Navigator

Portfolio Rank by Size	B-1 Market Val. of Equity (in $millions)	RP	B-2 Average Book Val. (in $millions)	RP	B-3 5-yr Net Income (in $millions)	RP	B-4 Market Value of Invested Capital (in $millions)	RP	B-5 Total Assets (in $millions)	RP	B-6 5-yr EBITDA (in $millions)	RP	B-7 Sales (in $millions)	RP	B-8 Average Number of Employees	RP
1	$327,375 and Up	-0.98%	$48,552 and Up	1.18%	$7,602 and Up	0.83%	$371,743 and Up	-0.51%	$125,752 and Up	0.86%	$15,760 and Up	0.92%	$93,399 and Up	1.11%	231,203 and Up	0.61%
2	$77,985 - $327,375	0.47%	$17,943 - $48,552	1.77%	$2,533 - $7,602	1.64%	$100,161 - $371,743	0.71%	$56,658 - $125,752	1.51%	$5,692 - $15,760	1.70%	$31,788 - $93,399	1.92%	88,575 - 231,203	1.54%
3	$47,040 - $77,985	0.94%	$10,843 - $17,943	2.09%	$1,581 - $2,533	1.94%	$60,342 - $100,161	1.18%	$38,314 - $56,658	1.74%	$3,751 - $5,692	2.00%	$20,386 - $31,788	2.26%	61,445 - 88,575	1.87%
4	$32,207 - $47,040	1.29%	$7,886 - $10,843	2.26%	$1,090- $1,581	2.20%	$44,265 - $60,342	1.46%	$25,760 - $38,314	2.01%	$2,798 - $3,751	2.20%	$15,525 - $20,386	2.45%	47,209 - 61,445	2.08%
5	$24,317 - $32,207	1.56%	$6,098 - $7,886	2.41%	$831 - $1,090	2.37%	$34,274 - $44,265	1.66%	$19,484 - $25,760	2.23%	$2,166 - $2,798	2.37%	$12,379 - $15,525	2.60%	36,996 - 47,209	2.27%
6	$19,482 - $24,317	1.75%	$4,901 - $6,098	2.52%	$661 - $831	2.52%	$26,180 - $34,274	1.87%	$15,916 - $19,484	2.36%	$1,713 - $2,166	2.52%	$10,462 - $12,379	2.73%	29,306 - 36,996	2.46%
7	$15,882 - $19,482	1.93%	$3,932 - $4,901	2.63%	$542 - $661	2.64%	$21,040 - $26,180	2.08%	$12,920 - $15,916	2.48%	$1,379 - $1,713	2.66%	$9,043 - $10,462	2.81%	24,168 - 29,306	2.63%
8	$13,166 - $15,882	2.09%	$3,242 - $3,932	2.74%	$449 - $542	2.76%	$17,707 - $21,040	2.20%	$10,563 - $12,920	2.62%	$1,145 - $1,379	2.79%	$7,737 - $9,043	2.91%	20,191 - 24,168	2.75%
9	$10,839 - $13,166	2.24%	$2,809 - $3,342	2.83%	$375 - $449	2.87%	$14,685 - $17,707	2.35%	$8,847 - $10,563	2.74%	$975 - $1,145	2.89%	$6,603 - $7,737	3.01%	16,820 - 20,191	2.91%
10	$8,851 - $10,839	2.42%	$2,508 - $2,809	2.89%	$312 - $375	2.98%	$12,329 - $14,685	2.49%	$7,598 - $8,847	2.85%	$835 - $975	2.99%	$5,667 - $6,603	3.11%	14,606 - 16,820	3.03%
11	$7,364 - $8,851	2.58%	$2,210 - $2,508	2.94%	$264 - $312	3.09%	$10,316 - $12,329	2.63%	$6,719 - $7,598	2.93%	$720 - $835	3.08%	$4,920 - $5,667	3.20%	12,851 - 14,606	3.12%
12	$6,201 - $7,364	2.73%	$1,921 - $2,210	3.02%	$226 - $264	3.18%	$8,617 - $10,316	2.77%	$5,936 - $6,719	3.00%	$614 - $720	3.17%	$4,227 - $4,920	3.29%	11,248 - 12,851	3.23%
13	$5,274 - $6,201	2.87%	$1,678 - $1,921	3.09%	$194 - $226	3.27%	$7,480 - $8,617	2.91%	$5,166 - $5,936	3.09%	$528- $614	3.28%	$3,599 - $4,227	3.39%	9,938 - 11,248	3.33%
14	$4,547 - $5,274	3.00%	$1,465 - $1,678	3.16%	$166 - $194	3.37%	$6,632 - $7,480	2.99%	$4,364 - $5,166	3.18%	$466 - $528	3.36%	$3,138 - $3,599	3.49%	8,586 - 9,938	3.42%
15	$3,954 - $4,547	3.11%	$1,289 - $1,465	3.23%	$144 - $166	3.46%	$5,777 - $6,632	3.10%	$3,637 - $4,364	3.31%	$407 - $466	3.44%	$2,763 - $3,138	3.56%	7, 225 - 8,586	3.56%
16	$3,376 - $3,954	3.24%	$1,139 - $1,289	3.29%	$125 - $144	3.54%	$4,986 - $5,777	3.21%	$3,145 - $3,637	3.41%	$355 - $407	3.53%	$2,400 - $2,763	3.65%	6,168 - 7,225	3.69%
17	$2,884 - $3,376	3.38%	$996 - $1,139	3.35%	$107 - $125	3.63%	$4,247 - $4,986	3.33%	$2,719 - $3,145	3.49%	$304 - $355	3.61%	$2,098 - $2,400	3.73%	5,359 - 6,168	3.80%
18	$2,471 - $2,884	3.50%	$873 - $996	3.42%	$90 - $107	3.73%	$3,613 - $4,247	3.46%	$2,322 - $2,719	3.59%	$248 - $304	3.73%	$1,813 - $2,098	3.82%	4,582 - 5,359	3.91%
19	$2,083 - $2,471	3.64%	$764 - $873	3.49%	$73 - $90	3.84%	$3,029 - $3,613	3.58%	$1,983 - $2,322	3.69%	$201 - $248	3.87%	$1,518 - $1,813	3.92%	3,844 - 4,582	4.05%
20	$1,702 - $2,083	3.79%	$653- $764	3.56%	$58 - $73	3.99%	$2,486 - $3,029	3.74%	$1,668 - $1,983	3.80%	$166 - $201	3.99%	$1,243 - $1,518	4.04%	3,198 - 3,844	4.18%
21	$1,327 - $1,702	3.99%	$536 - $653	3.65%	$46 - $58	4.11%	$1,989 - $2,486	3.89%	$1,366 - $1,668	3.91%	$135 - $166	4.11%	$1,027 - $1,243	4.17%	2,568 - 3,198	4.33%
22	$993 - $1,327	4.21%	$424 - $536	3.77%	$36 - $46	4.26%	$1,487 - $1,989	4.09%	$1,044 - $1,366	4.05%	$105 - $135	4.24%	$827 - $1,027	4.28%	1,966 - 2,568	4.52%
23	$682 - $993	4.48%	$327 - $424	3.89%	$24 - $36	4.42%	$1,008 - $1,487	4.36%	$709 - $1,044	4.26%	$74 - $105	4.44%	$608 - $827	4.45%	1,433 - 1,966	4.75%
24	$348 -$682	4.86%	$197 - $327	4.03%	$12 - $24	4.75%	$511 - $1,008	4.72%	$369 - $709	4.56%	$40 - $74	4.69%	$335 - $608	4.68%	793 - 1,433	5.01%
25	Up To $348	5.84%	Up To $197	4.52%	Up To $12	5.47%	Up To $511	5.63%	Up To $369	5.22%	Up To $40	5.33%	Up To $335	5.35%	Up to 793	5.88%

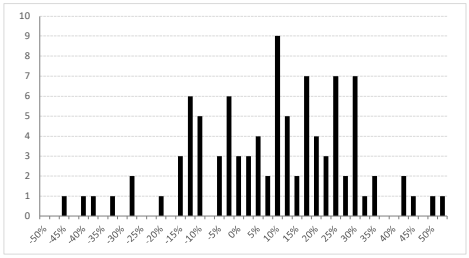
	B-1 Value	Portfolio Ranking	B-2 Value	Portfolio Ranking	B-3 Value	Portfolio Ranking	B-4 Value	Portfolio Ranking	B-5 Value	Portfolio Ranking	B-6 Value	Portfolio Ranking	B-7 Value	Portfolio Ranking	B-8 Value	Portfolio Ranking
Mr. Baudino's Proxy Group	$ 9,957	10	$ 2,626	10	$ 205	13	$ 13,643	10	$ 8,493	10	$ 531	13	$ 1,302	20	2,117	22
Water Service Corporation of Kentucky	$ 12	25	$ 3	25	$ 0.05	25	$ 12	25	$ 1	25	$ 0.2	25	$ 3	25	12	25
CRU	$ 1,419	21	$ 346	23	$ 18.0	24	$ 1,744	22	$ 1,043	23	$ 75.8	23	$ 211	25	500	25
Indicated Risk Premium - WSCKY	3.42%		1.63%		2.20%		3.14%		2.37%		2.05%		1.31%		1.36%	
Indicated Risk Premium - CRU	1.57%		1.00%		1.48%		1.60%		1.33%		1.16%		1.31%		1.36%	

Sources of Information:

Kroll Cost of Capital Navigator as of December 31, 2021.
Bloomberg Professional
SEC Form 10-K
Water Service Corporation of Kentucky and CRU financial statements
Company Provided Documents

Exhibit 9.5
Schedule DWD-5R
Page 1 of 1

Water Service Corporation of Kentucky
Frequency Distribution of Market Risk Premium, 1926 - 2021



Year	Large Company Stocks Total Returns Jan-Dec*	Long-Term Government Bond Income Returns Jan-Dec*	MRP Jan-Dec*
1926	0.1162	0.0373	0.0789
1927	0.3749	0.0341	0.3408
1928	0.4361	0.0322	0.4039
1929	-0.0842	0.0347	-0.1189
1930	-0.2490	0.0332	-0.2822
1931	-0.4334	0.0333	-0.4667
1932	-0.0819	0.0369	-0.1188
1933	0.5399	0.0312	0.5087
1934	-0.0144	0.0318	-0.0462
1935	0.4767	0.0281	0.4486
1936	0.3392	0.0277	0.3115
1937	-0.3503	0.0266	-0.3769
1938	0.3112	0.0264	0.2848
1939	-0.0041	0.0240	-0.0281
1940	-0.0978	0.0223	-0.1201
1941	-0.1159	0.0194	-0.1353
1942	0.2034	0.0246	0.1788
1943	0.2590	0.0244	0.2346
1944	0.1975	0.0246	0.1729
1945	0.3644	0.0234	0.3410
1946	-0.0807	0.0204	-0.1011
1947	0.0571	0.0213	0.0358
1948	0.0550	0.0240	0.0310
1949	0.1879	0.0225	0.1654
1950	0.3171	0.0212	0.2959
1951	0.2402	0.0238	0.2164
1952	0.1837	0.0266	0.1571
1953	-0.0099	0.0284	-0.0383
1954	0.5262	0.0279	0.4983
1955	0.3156	0.0275	0.2881
1956	0.0656	0.0299	0.0357
1957	-0.1078	0.0344	-0.1422
1958	0.4336	0.0327	0.4009
1959	0.1196	0.0401	0.0795
1960	0.0047	0.0426	-0.0379
1961	0.2689	0.0383	0.2306
1962	-0.0873	0.0400	-0.1273
1963	0.2280	0.0389	0.1891
1964	0.1648	0.0415	0.1233
1965	0.1245	0.0419	0.0826
1966	-0.1006	0.0449	-0.1455
1967	0.2398	0.0459	0.1939
1968	0.1106	0.0550	0.0556
1969	-0.0850	0.0595	-0.1445
1970	0.0386	0.0674	-0.0288
1971	0.1430	0.0632	0.0798
1972	0.1899	0.0587	0.1312
1973	-0.1469	0.0651	-0.2120
1974	-0.2647	0.0727	-0.3374
1975	0.3723	0.0799	0.2924
1976	0.2393	0.0789	0.1604
1977	-0.0716	0.0714	-0.1430
1978	0.0657	0.0790	-0.0133
1979	0.1861	0.0886	0.0975
1980	0.3250	0.0997	0.2253
1981	-0.0492	0.1155	-0.1647
1982	0.2155	0.1350	0.0805
1983	0.2256	0.1038	0.1218
1984	0.0627	0.1174	-0.0547
1985	0.3173	0.1125	0.2048
1986	0.1867	0.0898	0.0969
1987	0.0525	0.0792	-0.0267
1988	0.1661	0.0897	0.0764
1989	0.3169	0.0881	0.2288
1990	-0.0310	0.0819	-0.1129
1991	0.3047	0.0822	0.2225
1992	0.0762	0.0726	0.0036
1993	0.1008	0.0717	0.0291
1994	0.0132	0.0659	-0.0527
1995	0.3758	0.0760	0.2998
1996	0.2296	0.0618	0.1678
1997	0.3336	0.0664	0.2672
1998	0.2858	0.0583	0.2275
1999	0.2104	0.0557	0.1547
2000	-0.0910	0.0650	-0.1560
2001	-0.1189	0.0553	-0.1742
2002	-0.2210	0.0559	-0.2769
2003	0.2868	0.0480	0.2388
2004	0.1088	0.0502	0.0586
2005	0.0491	0.0469	0.0022
2006	0.1579	0.0468	0.1111
2007	0.0549	0.0486	0.0063
2008	-0.3700	0.0445	-0.4145
2009	0.2646	0.0347	0.2299
2010	0.1506	0.0425	0.1081
2011	0.0211	0.0382	-0.0171
2012	0.1600	0.0246	0.1354
2013	0.3239	0.0288	0.2951
2014	0.1369	0.0341	0.1028
2015	0.0138	0.0247	-0.0109
2016	0.1196	0.0230	0.0966
2017	0.2183	0.0267	0.1916
2018	-0.0438	0.0282	-0.0720
2019	0.3149	0.0255	0.2894
2020	0.1840	0.0142	0.1698
2021	0.2871	0.0173	0.2698
Average	0.1233	0.0487	0.0746
Std. Dev.	0.1964	0.0264	0.1979

Source: Kroll 2022 SBBI Yearbook

MRP

Bin	*Frequency*	*Cumulative %*
-50.00%	0	0.0%
-47.50%	0	0.0%
-45.00%	1	1.0%
-42.50%	0	1.0%
-40.00%	1	2.1%
-37.50%	1	3.1%
-35.00%	0	3.1%
-32.50%	1	4.2%
-30.00%	0	4.2%
-27.50%	2	6.3%
-25.00%	0	6.3%
-22.50%	0	6.3%
-20.00%	1	7.3%
-17.50%	0	7.3%
-15.00%	3	10.4%
-12.50%	6	16.7%
-10.00%	5	21.9%
-7.50%	0	21.9%
-5.00%	3	25.0%
-2.50%	6	31.3%
0.00%	3	34.4%
2.50%	3	37.5%
5.00%	4	41.7%
7.50%	2	43.8%
10.00%	9	53.1%
12.50%	5	58.3%
15.00%	2	60.4%
17.50%	7	67.7%
20.00%	4	71.9%
22.50%	3	75.0%
25.00%	7	82.3%
27.50%	2	84.4%
30.00%	7	91.7%
32.50%	1	92.7%
35.00%	2	94.8%
37.50%	0	94.8%
40.00%	0	94.8%
42.50%	2	96.9%
45.00%	1	97.9%
47.50%	0	97.9%
50.00%	1	99.0%
51.00%	1	100.0%

Count: 96

MRP from Direct	Rank
9.80%	52.60%
MRP from Rebuttal	**Rank**
10.18%	53.40%

Market Return - Direct		
	% Rank	Occurrence
12.98%	47.80%	50
Market Return - Rebuttal		
	% Rank	Occurrence
14.04%	49.00%	49

FINANCIAL QUARTERLY
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Comparable Earnings: New Life for an Old Precept

by
Frank J. Hanley
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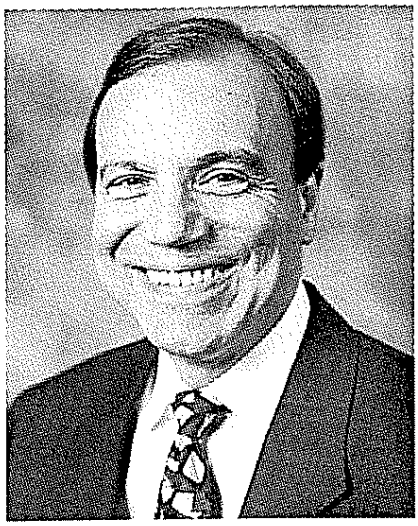
Comparable Earnings: New Life for an Old Precept

Accelerating deregulation has greatly increased the investment risk of natural gas utilities. As a result, the authors believe it more appropriate than ever to employ the comparable earnings model. We believe our application of the model overcomes the greatest traditional objection to it — lack of comparability of the selected non-utility proxy firms. Our illustration focuses on a target gas pipeline company with a beta of 0.96 — almost equal to the market's beta of 1.00.



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Introduction

The comparable earnings model used to determine a common equity cost rate is deeply rooted in the standard of "corresponding risk" enunciated in the landmark *Bluefield* and *Hope* decisions of the U.S. Supreme Court.[1] With such solid grounding in the foundations of rate of return regulation, comparable earnings should be accepted as a principal model, along with the currently popular market-based models, provided that its most common criticism, non-comparability of the proxy companies, is overcome.

Our comparable earnings model overcomes the non-comparability issue of the non-utility firms selected as a proxy for the target utility, in this example, a gas pipeline company. We should note that in the absence of common stock prices for the target utility (as with a wholly-owned subsidiary), it is appropriate to use the average of a proxy group of similar risk gas pipeline companies whose common stocks are actively traded. As we will demonstrate, our selection process results in a group of domestic, non-utility firms that is comparable in total risk, the sum of business and financial risk, which reflects both non-diversifiable systematic, or market, risk as well as diversifiable unsystematic, or firm-specific, risk.

Embedded in the Landmark Decisions

As stated in *Bluefield* in 1922: "A public utility is entitled to such rates as will permit it to earn a return ... on investments in other business undertakings which are attended by corresponding risks and uncertainties ..."

In addition, the court stated in *Hope* in 1944: "By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks."

Thus, the "corresponding risk" precept of *Bluefield* and *Hope* predates the use of such market-based cost-of-equity models as the Discounted Cash Flow (DCF) and Capital Asset Pricing (CAPM), which were developed later and are currently popular in rate-base/rate-of-return regulation. Consequently, the comparable earnings model has a longer regulatory and judicial history. However, it has far greater relevance now than ever before in its history because significant deregulation has substantially increased natural gas utilities' investment risk to a level similar to that of non-utility firms. As a result, it is

Comparable Earnings *from page 4*

more important than ever to look to similar-risk non-utility firms for insight into common equity cost rate, especially in view of the deficiencies inherent in the currently popular market-based cost of common equity models, particularly the DCF model.

Despite the fact that the landmark decisions are still regarded as having set the standards for determining a fair rate of return, the comparable earnings model has experienced decreased usage by expert witnesses, as well as less regulatory acceptance over the years. We believe the decline in the popularity of the comparable earnings model, in large measure, is attributable to the difficulty of selecting non-utility proxy firms that regulators will accept as comparable to the target utility. Regulatory acceptance is difficult to gain when the selection process is arbitrary. Our application of the model is objective and consistent with fundamental financial tenets.

Principles of Comparable Earnings

Regulation is a substitute for the competition of the marketplace. Moreover, regulated public utilities compete in the capital markets with all firms, including unregulated non-utilities. The comparable earnings model is based upon the opportunity cost principle; i.e., that the true cost of an investment is the return that could have been earned on the next best available alternative investment of similar risk. Consequently, the comparable earnings model is consistent with regulatory and financial principles, as it is a surrogate for the competition of the marketplace, and investors seek the greatest available rate of return for bearing similar risk.

The selection of comparable firms is the most difficult step in applying the comparable earnings model, as noted by Phillips[2] as well as by Bonbright, Danielsen and Kamerschen.[3] The selection of non-utility proxy firms should result in a sufficiently broad-based group in order to minimize the effect of company-specific aberrations. However, if the selection process is arbitrary, it likely would result in a proxy group that is too broad-based, such as the Standard & Poor's 500 Composite Index or the Value Line Industrial Composite. The use of such groups would require subjective adjustments to the comparable earnings results to reflect risk differences between the group(s) and the target utility, a gas pipeline company in this example.

Authors' Selection Criteria

We base the selection of comparable non-utility firms on market-based, objective, quantitative measures of risk resulting from market prices that subsume investors' assessments of all elements of risk. Thus, our approach is based upon the principle of risk and return; namely, that firms of comparable risk should be expected to earn comparable returns. It is also consistent with the "corresponding risk" standard established in *Bluefield* and *Hope*. We measure total investment risk as the sum of non-diversifiable systematic and diversifiable unsystematic risk. We use the unadjusted beta as a measure of systematic risk and the standard error of the estimate (residual standard error) as a measure of unsystematic risk. Both the unadjusted beta and the residual standard error are derived from a regression of the target utility's security returns relative to the market's returns, which takes the general form:

$$r_{it} = a_i + b_i r_{mt} + e_{it}$$

where:

- r_{it} = tth observation of the ith utility's rate of return
- r_{mt} = tth observation of the market's rate of return
- e_{it} = tth random error term
- a_i = constant least-squares regression coefficient
- b_i = least-squares regression slope coefficient, the unadjusted beta.

As shown by Francis,[4] the total variation or risk of a firm's return, Var (r_i), comes from two sources:

Var (r_i)= total risk of ith asset
= var($a_i + b_i r_m + e$)
substituting ($a_i + b_i r_m + e$) for r_i
= var($b_i r_m$) + var (e) since var(a_i) = 0
= b_i^2 var(r_m) + var (e) since var($b_i r_m$) = b_i^2 var(r_m)
= systematic + unsystematic risk

Francis[5] also notes: "The term $\sigma^2(r_i|r_m)$ is called the *residual variance around the regression line* in statistical terms or *unsystematic risk* in capital market theory language. $\sigma^2 (r_i|r_m)$ = ... = var (e). The residual variance is the squared standard error in regression language, a measure of unsystematic risk." Application of these criteria results in a group of non-utility firms whose average total investment risk is indeed comparable to that of the target gas pipeline.

As a measure of systematic risk, we use the Value Line unadjusted beta. Beta measures the extent to which market-wide or macro-economic events affect a firm's stock price. We use the unadjusted beta of the target utility as a starting point because it results from the regression of the target utility's security returns relative to the market's returns. Thus, the resulting standard deviation of beta relates to the unadjusted beta. We use the standard deviation of the unadjusted beta to determine the range around it as the selection criterion based on systematic risk.

We use the residual standard error of the regression as a measure of unsystematic risk. The residual standard error reflects the extent to which events specific to the firm's operations affect a firm's stock price. Thus, it is a measure of diversifiable, unsystematic, firm-specific risk.

An Illustration of Authors' Approach

Step One: We begin our approach by establishing the selection criteria as a range of both unadjusted beta and residual standard error of the target gas

continued on page 6

Comparable Earnings *from page 5*

pipeline company.

As shown in table 1, our target gas pipeline company has a Value Line unadjusted beta of 0.90, whose standard deviation is 0.1250. The selection criterion range of unadjusted beta is the unadjusted beta plus (+) and minus (-) three of its standard deviations. By using three standard deviations, 99.73 percent of the comparable unadjusted betas is captured.

Three standard deviations of the target utility's unadjusted beta equals 0.38 (0.1250 x 3 = 0.3750, rounded to 0.38). Consequently, the range of unadjusted betas to be used as a selection criteria is 0.52 - 1.28 (0.52 = 0.90 - 0.38) and (1.28 = 0.90 + 0.38).

Likewise, the selection criterion range of residual standard error equals the residual standard error plus (+) and minus (-) three of its standard deviations. The standard deviation of the residual standard error is defined as: $\sigma/\sqrt{2N}$.

As also shown in table 1, the target gas pipeline company has a residual standard error of 3.7867. According to the above formula, the standard deviation of the residual standard error would be 0.1664 (0.1664 = 3.7867/$\sqrt{2(259)}$ = 3.7867/22.7596, where 259 = N, the number of weekly price change observations over a period of five years). Three standard deviations of the target utility's residual standard error would be 0.4992 (0.1664 x 3 = .4992). Consequently, the range of residual standard errors to be used as a selection criterion is 3.2875 - 4.2859 (3.2875 = 3.7867 - 0.4992) and (4.2859 = 3.7867 + 0.4992).

Step Two: The step one criteria are applied to Value Line's data base of nearly 4,000 firms for which Value Line derives unadjusted betas and residual standard errors on a weekly basis. All firms with unadjusted betas and residual standard errors within the criteria ranges are then selected.

Step Three: In the regulatory ratemaking environment, authorized common equity return rates are applied to a book-value rate base. Thus, the earnings rates on book common equity, or net worth, of competitive, non-utility firms are highly relevant provided those firms are indeed comparable in total risk to the target gas pipeline. The use of the return rates of other utilities has no relevance because their allowed, and hence subsequently achieved, earnings rates are dependent upon the regulatory

table 1

Summary of the Comparable Earnings Analysis for the Proxy Group of 248 Non-Utility Companies Comparable in Total Risk to the Target Gas Pipeline Company[1]

	1	2	3	4	5	6	7	8
				rate of return on net worth				
	adj. beta	unadj. beta	residual standard error	3-year average[2]	4-year average[2]	5-year average[2]	5-year projected[3]	
average for the proxy group of 248 non-utility companies comparable in total risk to the target gas pipeline company	0.97	0.92	3.7705					
target gas pipeline company	0.96	0.90[4]	3.7867					
median				11.7%	12.0%	12.6%	15.5%	
average of the median historical returns					12.1%			
conclusion[5]								13.8%

[1]The criteria for selection of the non-utility group was that the non-utility companies be domestic and included in *Value Line Investment Survey*. The non-utility group was selected based on an unadjusted beta range of 0.52 to 1.28 and a residual standard error range of 3.2875 to 4.2859.
[2]Ending 1992.
[3]1996-1998/1997-1999.
[4]The average standard deviation of the target gas pipeline company's unadjusted beta is 0.1250.
[5]Equal weight given to both the average of the 3-, 4- and 5-year historical medians (12.1%) and 5-year projected median rate of return on net worth (15.5%). Thus, 13.8% = (12.1% + 15.5% / 2).
Source: Value Line Inc., March 15, 1994
Value Line Investment Survey

Comparable Earnings *from page 6*

process. Consequently, we believe all utilities must be eliminated to avoid circularity. Moreover, we believe non-domestic firms must be eliminated because their reporting methods differ significantly from U.S. firms.

Step Four: We then eliminated those firms for which Value Line does not publish a "Ratings & Report" in *Value Line Investment Survey* so that the historical and projected returns on net worth[6] are from a consistent source. We use historical returns on net worth for the most recent five years, as well as those projected three to five years into the future. We believe it is logical to evaluate both historical and projected return rates because it is reasonable to assume that investors avail themselves of both when they are available from widely disseminated information services, such as Value Line Inc. The use of Value Line's return rates on net worth understates the common equity return rates for two reasons. First, preferred stock is included in net worth. Second, the net worth return rates are as of the end of each period. Thus, the use of average common equity return rates would yield higher results.

Step Five: Median returns based on the historical average three, four and five years ending 1992 and projected 1996-1998 or 1997-1999 rates of return on net worth are then determined as shown in columns 4 through 7 of table 1. The median is used due to the wide variations and skewness in rates of return on net worth for the non-utility firms as evidenced by the frequency distributions of those returns as shown in illustration 1.

However, we show the average unadjusted beta, 0.92, and residual standard error, 3.7705, for the proxy group in columns 2 and 3 of table 1 because their frequency distributions are not significantly skewed, as shown in illustration 2.

Step Six: Our conclusion of a com-

continued on page 8

Illustration 1

Rates of Return on Net Worth for the Proxy Group of 248 Non-Utility Companies[1]

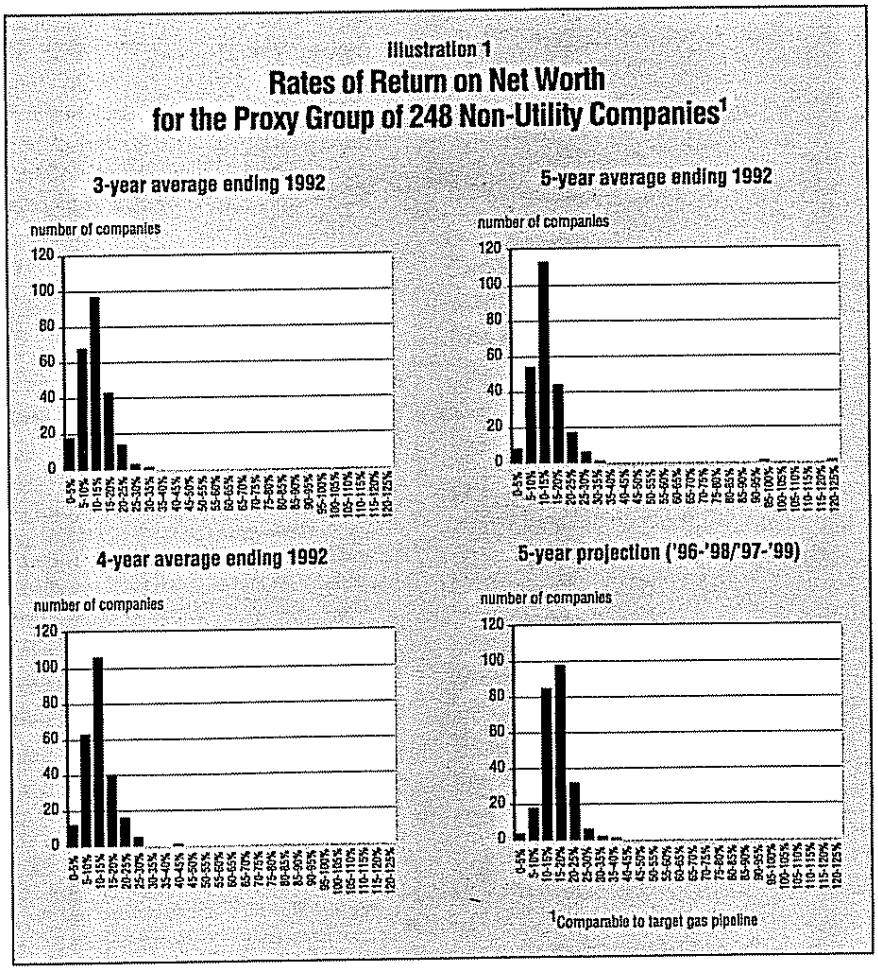
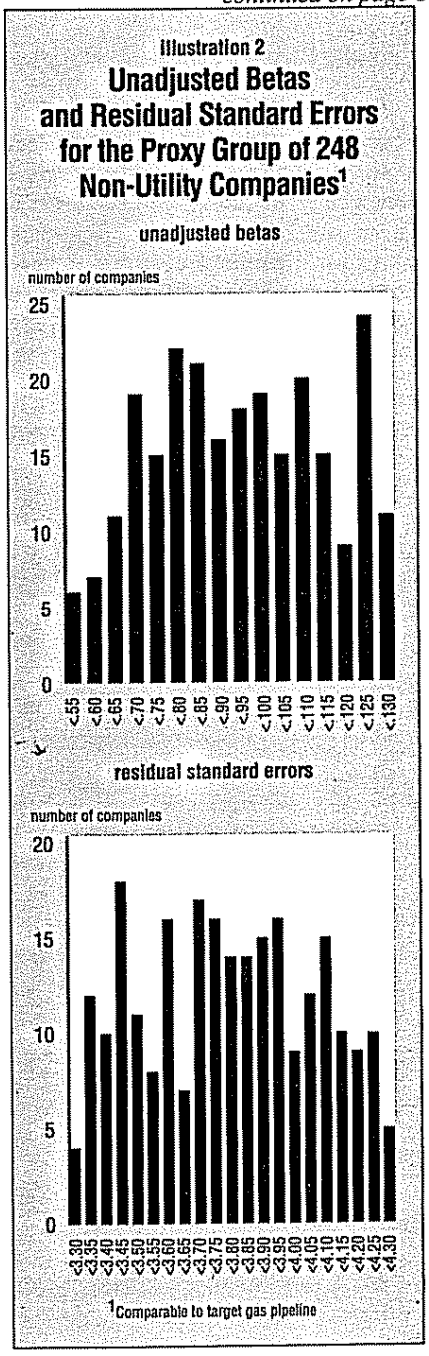


Illustration 2

Unadjusted Betas and Residual Standard Errors for the Proxy Group of 248 Non-Utility Companies[1]



Comparable Earnings *from page 7*

parable earnings cost rate is based upon the mid-point of the average of the median three-, four- and five-year historical rates of return on net worth of 12.1 percent as shown in column 5 and the median projected 1996-1998/1997-1999 rate of return on net worth of 15.5 percent as shown in column 7 of table 1. As shown in column 8, it is 13.8 percent.

Summary

Our comparable earnings approach demonstrates that it is possible to select a proxy group of non-utility firms that is comparable in total risk to a target utility. In our example, the 13.8 percent comparable earnings cost rate is very conservative as it is an expected achieved rate on book common equity (a regulatory allowed rate should be greater) and because it is based on end-of-period net worth. A similar rate on average net worth would be about 20 to 40 basis points higher (i.e., 14.0 to 14.2 percent) and still understate the appropriate regulatory allowed rate of return on book common equity.

Our selection criteria are based upon measures of systematic and unsystematic risk, specifically unadjusted beta and residual standard error. They provide the basis for the objective selection of comparable non-utility firms. Our selection criteria rely on changes in market prices over approximately five years. We compare the aggregate total risk, or the sum of systematic and unsystematic risk, which reflects investors' aggregate assessment of both business and financial risk. Thus, no adjustments are necessary to the proxy group results to compensate for the differences in business risk and financial risk, such as accounting practices and debt/equity ratios. Moreover, it is inappropriate to attempt a comparison of the target utility with any individual firm, or subset of firms, in the proxy group because only the average firm of the group is relevant.

Because the comparable earnings model is firmly anchored in the "corresponding risk" precept established in the landmark court decisions, it is worthy of consideration as a principal model for use in estimating the cost rate of common equity capital of a regulated utility. Our approach to the comparable earnings model produces a proxy group that is indeed comparable in total risk because the selection process is objective and quantitative. It therefore overcomes criticism linked to arbitrary selection processes.

All cost-of-common-equity models, including the DCF and CAPM, are fraught with deficiencies, usually stemming from the many necessary but unrealistic assumptions that underlie them. The effects of the deficiencies of individual models can be mitigated by using more than one model when estimating a utility's common equity cost rate. Therefore, when the non-comparability issue is overcome, the comparable earnings model deserves to receive the same consideration as a primary model, as do the currently popular market-based models. ■

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[1] *Bluefield Water Works Improvement Co. v. Public Service Commission*, 262 U.S. 679 (1922) and *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 519 (1944).

[2] Charles F. Phillips Jr., The Regulation of Public Utilities: Theory and Practice, Public Utilities Reports Inc., 1988, p. 379.

[3] James C. Bonbright, Albert L. Danielsen and David R. Kamerschen, Principles of Public Utilities Rates, 2nd edition, Public Utilities Reports Inc., 1988, p. 329.

[4] Jack Clark Francis, Investments: Analysis and Management, 3rd edition, McGraw-Hill Book Co., 1980, p. 363.

[5] Id., p. 548.

[6] Returns on net worth must be used when relying on Value Line data because returns on book common equity for non-utility firms are not available from Value Line.

Report Lists Pipeline, Storage Projects

More than $9 billion worth of projects to expand the nation's natural gas pipeline network are in various stages of development, according to an A.G.A. report. These projects involve nearly 8,000 miles of new pipelines and capacity additions to existing lines and represent 15.3 billion cubic feet (Bcf) per day of new pipeline capacity.

During 1993 and early 1994, construction on 3,100 miles of pipeline was completed or under way, at a cost of nearly $4 billion, says A.G.A. These projects are adding 5.4 Bcf in daily delivery capacity nationwide.

Among the projects completed in 1993 were Pacific Gas Transmission Co.'s 805 miles of looping that allows increased deliveries of Canadian gas to the West Coast; Northwest Pipeline Corp.'s addition of 433 million cubic feet of daily capacity for customers in the Pacific Northwest and Rocky Mountain areas; and the 156-mile Empire State Pipeline in New York.

In addition, major construction projects were started on the systems of Texas Eastern Transmission Corp. and Algonquin Gas Transmission Co. — both subsidiaries of Panhandle Eastern Corp. — and along Florida Gas Transmission Co.'s pipeline.

The report goes on to discuss another $5 billion in proposed projects, which, if completed, will add nearly 5,000 miles of pipeline and 9.8 Bcf per day in capacity, much of it serving Florida and West Coast markets.

A.G.A. also identifies 47 storage projects and says that if all of them are built, existing storage capacity will increase by more than 500 Bcf, or 15 percent.

For a copy of *New Pipeline Construction: Status Report 1993-94* (#F00103), call A.G.A. at (703) 841-8490. Price per copy is $6 for employees of member companies and associates and $12 for other customers.

Investments: Analysis and Management

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Jack Clark Francis

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Beta Measurements The beta coefficient is an *index of systematic risk.* Beta coefficients may be used for ranking the systematic risk of different assets. If the beta is larger than 1, $b > 1.0$, then the asset is more volatile than the market and is called an **aggressive asset.** If the beta is less than 1, $b < 1.0$, the asset is a **defensive asset;** its price fluctuations are less volatile than the market's. Figure 10-1 illustrates the characteristic lines for three different assets that have low, medium, and high levels of beta (or undiversifiable risk).

Figure 10-2 shows that IBM is a stock with an average amount of systematic risk. IBM's beta of 1.02 indicates that its return tends to increase 2 percent more than the return on the market average when the market is rising. When the market falls, IBM's return tends to fall 2 percent more than the market's. The characteristic line for IBM has an above average correlation coefficient of $\rho = .7495$, indicating that the returns on this security follow its particular characteristic line slightly more closely than those of the average stock.

Partitioning Risk Total risk can be measured by the variance of returns, denoted Var(r). This measure of *total risk is partitioned into its systematic and unsystematic components in Equation (10-8).*[7]

$$\begin{aligned} \text{Var}(r_i) &= \text{total risk of } i\text{th asset} \\ &= \text{Var}(a_i + b_i r_{m,t} + e_{i,t}) \\ &\quad \text{by substituting } (a_i + b_i r_{m,t} + e_{i,t}) \text{ for } r_{i,t} \\ &= 0 + \text{Var}(b_i r_{m,t}) + \text{Var}(e_{i,t}) \\ &\quad \text{since Var}(a_i) = 0 \end{aligned} \tag{10-8}$$

$$\begin{aligned} \text{Var}(r_i) &= b_i^2 \text{ Var}(r_m) + \text{Var}(e) \qquad \text{since Var}(b_i r_m) = b_i^2 \text{ Var}(r_m) \\ &= \text{systematic} + \text{unsystematic risk} \end{aligned} \tag{10-8a}$$

$$.01389 = .00780 + .00609 \qquad \text{for IBM}$$

The unsystematic risk measure Var(e) is called in regression language the *residual variance* or, synonymously, the *standard error squared.*

Undiversifiable Proportion The percentage of total risk that is systematic can be measured by the coefficient of determination ρ^2 (that is, the characteristic line's squared correlation coefficient).

[7]In this context, **partition** is a technical statistical term that means to divide the total variance into *mutually exclusive* and *exhaustive* pieces. This partition is only possible if the returns from the market are statistically independent from the residual error terms that occur simultaneously, $\text{Cov}(r_{m,t}, e_{i,t}) = 0$. The mathematics of regression analysis will orthogonalize the residuals and thus ensure that the needed statistical independence exists.

$$\frac{\text{Systematic risk}}{\text{Total risk}} = \frac{b_i^2 \text{ Var}(r_m)}{\text{Var}(r_m)} = \rho^2 \qquad (10\text{-}9)$$

$$\frac{.007802}{.01389} = \frac{(1.021)^2\ (.00749)}{.00749} = .5617 \times 100 = 56.17\% \quad \text{for IBM}$$

Diversifiable Proportion The percentage of unsystematic risk equals $(1.0 - \rho^2)$.

$$\frac{\text{Unsystematic risk}}{\text{Total risk}} = \frac{\text{Var}(e)}{\text{Var}(r_i)} = (1.0 - \rho^2)$$

$$\frac{.00609}{.01389} = (1.0 - .5617) = .438 \times 100 \qquad (10\text{-}10)$$

$$= 43.8\% \text{ unsystematic} \quad \text{for IBM}$$

Studies of the characteristic lines of hundreds of stocks listed on the NYSE indicate that the average correlation coefficient is approximately $\rho = .5$.[8] This means that about $\rho^2 = 25$ percent of the total variability of return in most NYSE securities is explained by movements in the market.

	NYSE average	IBM
Systematic risk: ρ^2	.25	.5617
Unsystematic risk: $(1.0 - \rho^2)$	.75	.4383
Total risk: 100%	1.00	1.0000

As explained above, systematic changes are common to all stocks and are therefore undiversifiable.

A primary use of the characteristic line (or *market model,* or the *single-index model,* as it is also called) is to assess the risk characteristics of one asset.[9] The statistics in Table 10-2, for instance, indicate that IBM's common stock is slightly more risky than the average common stock in terms of total risk and

[8]The average ρ was found to be about .5, as reported in Marshall Blume, "On the Assessment of Risk," *Journal of Finance,* March 1971, p. 4. For similar estimates, see J. C. Francis, "Statistical Analysis of Risk Surrogates for NYSE Stocks," *Journal of Financial and Quantitative Analysis,* Dec. 1979.

[9]Professor Jensen reformulated the characteristic line in a risk-premium form. See M. C. Jensen, "The Performance of Mutual Funds in the Period 1945 through 1964," *Journal of Finance,* May 1968, pp. 389–416. See also M. C. Jensen, "Risk, the Pricing of Capital Assets, and the Evaluation of Investment Portfolios," *Journal of Business,* vol. XLII, 1969. Jensen interprets the alpha intercept term of the characteristic line, as he formulates it, as an investment performance measure. It has been suggested that Jensen's performance measure is biased. See Keith V. Smith and Dennis A. Tito, "Risk-Return Measures of Ex-Post Portfolio Performance," *Journal of Financial and Quantitative Analysis,* Dec. 1969, vol. IV, no. 4, p. 466.

systematic risk.[10] New risk measurements must be made periodically, however, because the risk and return of an asset may change with the passage of time.[11]

10-3 CAPITAL ASSET PRICING MODEL (CAPM)

An old axiom states "there is no such thing as a free lunch." This means that you cannot expect to get something for nothing—a rule that certainly applies to investment returns. Investors who want to earn high average rates of return must take high risks and endure the associated loss of sleep, the possibility of ulcers, and the chance of bankruptcy. The question to which we now turn is: Should investors worry about total risk, undiversifiable risk, diversifiable risk, or all three?

In Chapter 1 it was suggested that *investors should seek investments that have the maximum expected return in their risk class.* Their happiness from investing is presumed to be derived as indicated in the expected utility $E(U)$ function below.

$$E(U) = f[E(r), \sigma]$$

The investment preferences of wealth-seeking risk-averse investors represented by the function above cause them to maximize their expected utility (or, equivalently, happiness) by (1) maximizing their expected return in any given risk class, $\partial E(U)/\partial E(r) > 0$, or, conversely, (2) minimizing their total risk at any given rate of expected return, $\partial E(U)/\partial \sigma < 0$. However, in selecting individual assets, investors will not be particularly concerned with the asset's total risk σ. Figure 9-1 showed that the unsystematic portion of total risk can be easily diversified by holding a portfolio of different securities. But, systematic risk affects all stocks in the market because it is undiversifiable. Portfolio theory therefore suggests that only the undiversifiable (or systematic) risk is worth avoiding.[12]

[10]Statements about the relative degree of total risk are made in the context of a long-run horizon—that is, over at least one *complete business cycle*. Obviously, an accurate short-run forecast which says that some particular company will go bankrupt next quarter makes it more risky than IBM, although IBM may have had more historical variability of return.

[11]Empirical studies documenting the intertemporal instability of betas have been published. Marshall Blume, "Betas and Their Regression Tendencies," *Journal of Finance,* June 1975, pp. 785–795. See also J. C. Francis, "Statistical Analysis of Risk Coefficients for NYSE Stocks," *Journal of Financial and Quantitative Analysis,* Dec. 1979, vol. XIV, no. 5, pp. 981–997. An appendix at the end of this chapter reviews some evidence about shifting betas, standard deviations, and correlations.

[12]Both the systematic and unsystematic portions of total risk must be considered by **undiversified investors.** Entrepreneurs who have their entire net worth invested in one business, for example, can be bankrupted by a piece of bad luck that could be easily averaged away to zero in a diversified portfolio. Poorly diversified investors should not treat diversifiable risk lightly. Only well-diversified investors can afford to ignore diversifiable risk.