The Shrinking Equity Premium

Historical facts and future forecasts.

Jeremy J. Siegel

Few conundrums have caught the imagination of economists and practitioners as much as the "Equity Premium Puzzle," the title chosen by Rajneesh Mehra and Edward Prescott for their seminal 1985 article in the *Journal of Monetary Economics*. Mehra and Prescott show that the historical return on stocks has been too high in relation to the return on risk-free assets to be explained by the standard economic models of risk and return without invoking unreasonably high levels of risk aversion.[1] They calculate the margin by which stocks outperformed safe assets — the *equity premium* — to be in excess of 6 percentage points per year, and claim that the profession is at a loss to explain its magnitude.

There have been many attempts since to explain the size of the equity premium by variations of the standard finance model. I shall not enumerate them here, but refer readers to reviews by Abel [1991], Kocherlakota [1996], Cochrane [1997], and Siegel and Thaler [1997].

I review here the estimates of the equity premium derived from historical data, and offer some reasons why I believe that most of the historical data underestimate the real return on fixed-income assets and overestimate the expected return on equities. I shall also offer some reasons why, given the current high level of the stock market relative to corporate earnings, the forward-looking equity premium may be considerably lower than the historical average.

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REAL RETURNS ON "RISK-FREE" ASSETS

From 1889 through 1978, Mehra and Prescott estimate the real return on short-dated fixed-income assets (commercial paper until 1920 and Treasury bills thereafter) to have been 0.8%. In 1976 and again in 1982, Roger Ibbotson and Rex Sinquefield formally estimated the real risk-free rate to be even lower — at zero, based on historical data analyzed from 1926. This extremely low level of the short-term real rate is by itself puzzling, and has been termed the "real rate puzzle" by Weil [1989]. The essence of this puzzle is that, given the historical growth of per capita income, it is surprising that the demand to borrow against tomorrow's higher consumption has not resulted in higher borrowing rates.

The low measured level of the risk-free rate may in fact be in part an artifact of the time period examined. There is abundant evidence that the real rate both during the nineteenth century and after 1982 has been substantially higher. Exhibit 1, based on Siegel [1998], indicates that over the entire period from 1802 through 1998, the real compound annual return on Treasury bills (or equivalent safe assets) has been 2.9%, while the realized return on long-term government bonds has been 3.5%. Exhibit 2 presents the historical equity premium for selected time periods for both bonds and bills based on the same data.[2]

EXHIBIT 1
COMPOUND ANNUAL REAL RETURNS (%)
U.S. DATA, 1802-1998

	Stocks	Bonds	Bills	Gold	Inflation
1802-1998	7.0	3.5	2.9	–0.1	1.3
1802-1870	7.0	4.8	5.1	0.2	0.1
1871-1925	6.6	3.7	3.2	–0.8	0.6
1926-1998	7.4	2.2	0.7	0.2	3.1
1946-1998	7.8	1.3	0.6	–0.7	4.2

Source: Siegel [1998] updated.

The danger of using historical averages — even over long periods — to make forecasts is readily illustrated by noting Ibbotson and Sinquefield's long-term predictions made in 1976 and again in 1982 on the basis of their own analysis of the historical data. In 1976, they made predictions for the twenty-five-year period from

EXHIBIT 2
EQUITY PREMIUMS (%) — U.S. DATA, 1802-1998

	Equity Premium with Bonds		Equity Premium with Bills	
	Geometric	Arithmetic	Geometric	Arithmetic
1802-1998	3.5	4.7	5.1	5.5
1802-1870	2.2	3.2	1.9	2.9
1871-1925	2.9	4.0	3.4	4.6
1926-1998	5.2	6.7	6.7	8.6
1946-1998	6.5	7.3	7.2	8.6

Source: Siegel [1998] updated.

1976 through 2000, and in 1982 they made predictions for the twenty-year period from 1982 through 2001. Their forecasts are shown in Exhibit 3. Since we now have data for most of these forecast periods, it is of interest to assess their estimates.

The last two decades have been extremely good for financial assets, so it is not surprising that Ibbotson and Sinquefield underestimate all their real returns. But their most serious underestimation is for fixed-income assets, where they forecast the real bill rate to average essentially zero and the real return on bonds to be less than 2%. Given the standard deviation of estimates, realized annual real bond and bill returns have been 9.9% and 2.9%, respectively, significantly above their estimates. Since negative real returns on fixed-income assets persisted between the two surveys, Ibbotson and Sinquefield more seriously underestimate long-term real bill rates in their 1982 forecasts than they did in 1976.[3]

My purpose here is not to highlight errors in Ibbotson's and Sinquefield's past forecasts. Their analysis was state-of-the-art, and their data have rightly formed the benchmark for the risk and return estimates used by both professional and academic economists. I bring these forecasts to light to show that even the fifty-year history of financial returns available to economists at that time was insufficient to estimate future real fixed-income returns.

It is not well understood why the real rate of returns on fixed-income assets was so low during the 1926-1980 period. The bursts of unanticipated inflation following the end of World War II and during the 1970s certainly had a negative effect on the realized real returns from long-term bonds. Perhaps the shift from a gold standard to a paper monetary standard had a negative effect on these real returns until investors fully adjusted to the inflationary bias inherent in the new monetary standard.[4]

Whatever the reasons, the current yields on the Treasury inflation-protected securities, or TIPS, first issued in 1997 support the assertion that the future real returns on risk-free assets will be substantially above the level estimated over the Ibbotson-Sinquefield period. This is so even when the estimating period includes the higher real rates of the past two decades. In August 1999, the ten- and thirty-year TIPS bond yielded 4.0%, nearly twice the realized rate of return on long-dated government bonds over the past seventy-five years.[5]

The market projects real returns on risk-free assets to be substantially higher in the future than they have been over most of this century. It is also likely that the expected returns in the past are substantially greater than they have turned out ex post, especially for longer-dated securities. If one uses a 3.5% real return on fixed-income assets, the geometric equity premium for a 7.0% real stock return falls to 3.5%.

EXHIBIT 3
LONG-TERM FORECASTS OF REAL RETURNS — COMPOUND ANNUAL RATES OF RETURN

Forecast Period		Stocks	Bonds	Bills	Inflation
1976-2000	Forecast	6.3 (23.5)	1.5 (8.0)	0.4 (4.6)	6.4 (4.8)
	Actual*	11.0	5.3	2.1	4.8
1982-2001	Forecast	7.6 (21.9)	1.8 (8.3)	0.0 (4.4)	12.8 (5.1)
	Actual*	14.6	9.9	2.9	3.3

*Data through 1998.
Standard deviations of annual returns in parentheses.
Source: Ibbotson and Sinquefield [1976, 1982].

HISTORICAL EQUITY RETURNS AND SURVIVORSHIP BIAS

The real return on stocks, as I have emphasized [1998], has displayed a remarkable long-term stability. Over the entire 196-year period that I examine, the long-term after-inflation geometric annual rate of return on equity averages 7.0%. In the 1926-1998 period, the real return has been 7.4%, and since 1946 (when virtually all the thirteenfold increase in the consumer price index over the past two hundred years has taken place) the real return on equity has been 7.8%. The relative stability of long-term real equity returns is in marked contrast to the unstable real returns on fixed-income assets.

Some economists believe the 7% historical real return on equities very likely overstates the true expected return on stocks. They claim that using the ex post equity returns in the United States to represent returns expected by shareholders is misleading. This is because no investor in the nineteenth or early twentieth century could know for certain that the United States would be the most successful capitalist country in history and experience the highest equity returns.

This "survivorship bias" hypothesis, as it has been called, is examined by Jorion and Goetzmann [1999] in "Global Stock Markets in the Twentieth Century." They conclude that of thirty-nine equity markets that existed in 1921, none of them show as high a real capital appreciation as the United States, and most of them have had substantial disruptions in their operations or have disappeared altogether. They report that the median real capital appreciation of non-U.S. markets has been only 0.8% per year as opposed to 4.3% in the U.S.[6]

But this evidence may be misleading. Total returns of a portfolio, especially over long periods of time, are a very non-linear function of the returns of the individual components. Mathematically it can be shown that if individual stock returns are lognormal, the performance of the *median* stock is almost always worse than the market portfolio performance.[7]

So, it is not surprising that the median performance of individual countries will not match the "world portfolio" or the returns in the dominant market. Jorion and Goetzmann recognize this near the end of their study when they show that compound annual real return on a GDP-weighted portfolio of equities in all countries falls only 28 basis points short of the U.S. return. In fact, because of the real depreciation of the dollar over this time, the compound annual *dollar* return on a GDP-weighted world is actually 30 basis points *higher* than the return on U.S. equities.[8]

But examining international stock returns alone does not give us a better measure of the equity premium. The equity premium measures the *difference* between the returns on stocks and safe bonds. Although stock returns may be lower in foreign countries than the U.S., the real returns on foreign bonds are substantially lower. Almost all disrupted markets experienced severe inflation, in some instances wiping out the value of fixed-income assets. (One could say that the equity premium in Germany covering any period including the 1922-1923 hyperinflation is over 100%, since the real value of fixed-income assets fell to zero while equities did not.)

Even investors who purchased bonds that promised precious metals or foreign currency experienced significant defaults. It is my belief that if one uses a world portfolio of stocks and bonds, the equity *premium* will turn out higher, not lower, than found in the U.S.[9]

TRANSACTION COSTS AND DIVERSIFICATION

I believe that 7.0% per year does approximate the long-term real return on equity indexes. But the return on equity *indexes* does not necessarily represent the *realized* return to the equityholder. There are two reasons for this: transaction costs and the lack of diversification.[10]

Mutual funds and, more recently, low-cost "index funds" were not available to investors of the nineteenth or early twentieth century. Prior to 1975, brokerage commissions on buying and selling individual stocks were fixed by the New York Stock Exchange, and were substantially higher than today. This made the accumulation and maintenance of a fully diversified portfolio of stocks quite costly.

The advent of mutual funds has substantially lowered the cost of maintaining a diversified portfolio. And the cost of investing in mutual funds has declined over the last several decades. Rea and Reid [1998] report a decline of 76 basis points (from 225 to 149) in the average annual fee for equity mutual funds from 1980 to 1997 (see also Bogle [1999, p. 69]). Index funds with a cost of less than 20 basis points per year are now available to small investors.

Furthermore, the risk experienced by investors unable to fully diversify their portfolios made the risk-return trade-off less desirable than that calculated from stock indexes. On a risk-adjusted basis, a less-than-fully diversified portfolio has a lower expected return than the total market.

Given transaction costs and inadequate diversification, I assume that equity investors experienced real returns more in the neighborhood of 5% to 6% over most of the nineteenth and twentieth century rather than the 7% calculated from indexes. Assuming a 3.5% real return on bonds, the historical equity premium may be more like 1.5 to 2.5 percentage points, rather than the 6.0 percentage points recorded by Mehra and Prescott.

PROJECTING FUTURE EQUITY RETURNS

Future stock returns should not be viewed independently of current fundamentals, since the price of stocks is the present discounted value of all expected future cash flows. Earnings are the source of these cash flows, and the average price-to-earnings (P-E) ratio in the U.S. from 1871 through 1998 is 14 (see Shiller [1989] for an excellent source for this series).

Using data from August 13, 1999, the S&P 500 stock index is 1327, and the mean 1999 estimate for operating earnings of the S&P 500 stock index of fifteen analysts polled by Bloomberg News is $48.47.[11] This yields a current P-E ratio on the market of 27.4. But due to the increased number of write-offs and other special charges taken by management over the last several years, operating earnings have exceeded total earnings by 10% to 15%.[12] On the basis of reported earnings, which is what most historical series report (including Shiller's), the P-E ratio of the market is currently about 32.[13]

There are two long-term consequences of the high level of stock prices relative to fundamentals. Either 1) future stock returns are going to be lower than historical averages, or 2) earnings (and hence other fundamentals such as dividends or book value) are going to rise at a more rapid rate in the future. A third possibility, that P-E ratios will rise continually without bound, is ruled out since this would cause an unstable bubble in stock prices that must burst.

If future dividends grow no faster than they have in the past, forward-looking real stock returns will be lower than the 7% historical average. As is well known from the dividend discount model, the rate of return on stocks can be calculated by adding the current dividend yield to the expected rate of growth of future dividends. The current dividend yield on the S&P 500 index is 1.2%. Since 1871, the growth of real per share dividends on the index has been 1.3%, but since 1946, due in part to a higher reinvestment rate, growth has risen to 2.1%. If we assume future growth of real per share dividends to be close to the most recent average of 2.1%, we obtain a 3.3% real return on equities, less than one-half the historical average.

A second method of calculating future real returns yields a similar figure. If the rate of return on capital equals the return investors require on stocks, the *earnings yield*, or the reciprocal of the price-earnings ratio, equals the forward-looking real long-term return on equity (see Phillips [1999] for a more formal development of this proposition). Long-term data support this contention; a 14 price-to-earnings ratio corresponds to a 7.1% earnings yield, which approximates the long-term real return on equities. The current P-E ratio on the S&P 500 stock index is between 27 to 32, depending on whether total or operating earnings are considered. This indicates a current earnings yield, and hence a future long-term and real return, of between 3.1% to 3.7% on equities.

One way to explain these projected lower future equity returns is that investors are bidding up the price of stocks to higher levels as the favorable historical data about the risks and returns in the equity market become incorporated into investor decisions.[14] Lower transaction costs further enable investors to assemble diversified portfolios of stocks to take advantage of these returns. The desirability of stocks may be further reinforced by the perception that the business cycle has become less severe over time and has reduced the inherent risk in equities.[15]

If these factors are the cause of the current bull market, then the revaluation of equity prices is a one-time adjustment. This means that future expected equity returns should be lower, not higher, than in the past. During this period of upward price adjustment, however, equity returns will be higher than average, increasing the historical measured returns in the equity market.

This divergence between increased historical returns and lower future returns could set the stage for some significant investor disappointment, as survey evidence suggests that many investors expect future returns to be higher, not lower, than in the past (see "PaineWebber Index of Investor Optimism" [1999]).

SOURCES OF FASTER EARNINGS GROWTH

Although the increased recognition of the risks and returns to equity may be part of the explanation for the bull market in stocks, there must be other reasons. This is because the forward-looking rates of return we derive for equities fall below the current 4.0% yield on inflation-protected government bonds. Although one could debate whether in the long run stocks or *nominal* bonds are riskier in real terms, there should be no doubt that the inflation-protected bonds are safer than equities and should have a lower expected return.

Hence, some part of the current bull market in stocks must be due to the expectations that future earnings (and dividend) growth will be significantly above the historical average. Optimists frequently cite higher growth of real output and enhanced productivity, enabled by the technological and communications revolution, as the source of this higher growth. Yet the long-run relation between the growth of real output and *per share* earnings growth is quite weak on both theoretical and empirical grounds. Per share earnings growth has been primarily determined by the reinvestment rate of the firm, or the earnings yield minus the dividend yield, not the rate of output growth.[16]

The reason why output growth does not factor into per share earnings growth is that new shares must be issued (or debt floated) to cover the expansion of productive technology needed to increase output. Over the long run, the returns to technological progress have gone to workers in the form of higher real wages, while the return per unit of capital has remained essentially unchanged. Real output growth could spur growth in per share earnings only if it were "capital-enhancing," in the growth terminology, which is contrary to the labor-augmenting and wage-enhancing technological change that has marked the historical data (see Diamond [1999] for a discussion of growth and real return).

But there are factors that may contribute to higher future earnings growth of U.S. corporations, at least temporarily. The United States has emerged as the leader in the fastest-growing segments of the world economy: technology, communications, pharmaceuticals, and, most recently, the Internet and Internet technology. Furthermore, the penetration of U.S. brand names such as Coca-Cola, Procter & Gamble, Disney, Nike, and others into the global economy can lead to temporarily higher profit growth for U.S. firms.

Nonetheless, the level of corporate earnings would have to double to bring the P-E ratio down to the long-term average, or to increase by 50% to bring the P-E ratio down to 20. A 20 price-to-earnings yield corresponds to a 5% earnings yield or a 5% real return, a return that I believe approximates realized historical equity returns after transaction costs are subtracted. For per share earnings to temporarily grow to a level 50% above the long-term trend is clearly possible in a world economy where the U.S. plays a dominant role, but it is by no means certain.

CONCLUSION

The degree of the equity premium calculated from data estimated from 1926 is unlikely to persist in the future. The real return on fixed-income assets is likely to be significantly higher than that estimated on earlier data. This is confirmed by the yields available on Treasury inflation-linked securities, which currently exceed 4%. Furthermore, despite the acceleration in earnings growth, the return on equities is likely to fall from its historical level due to the very high level of equity prices relative to fundamentals.[17]

All of this makes it very surprising that Ivo Welch [1999] in a survey of over 200 academic economists finds that most estimate the equity premium at 5 to 6 percentage points over the next thirty years. Such a premium would require a 9% to 10% real return on stocks, given the current real yield on Treasury inflation-indexed securities. This means that real per share dividends would have to grow by nearly 8.0% to 9.0% per year, given the current 1.2% dividend yield, to prevent the P-E ratio from rising farther from its current record levels. This growth rate is more than six times the growth rate of real dividends since 1871 and more than triple their growth rate since the end of World War II.

Unless there is a substantial increase in the productivity of capital, dividend growth of this magnitude would mean an ever-increasing share of national income going to profits. This by itself might cause political ramifications that could be negative for shareholders.

ENDNOTES

This article is adapted from a paper delivered at the UCLA Conference, "The Equity Premium and Stock Market Valuations," and a Princeton Center for Economic Policy Studies Conference, "What's Up with the Stock Market?" both held in May 1999. The author thanks participants in these seminars and particularly Jay Ritter, Robert Shiller, and Peter L. Bernstein for their comments.

[1]A few economists believe these high levels of risk aversion are not unreasonable; see, e.g., Kandel and Stambaugh [1991].

[2]In the capital asset pricing model, equity risk premiums are derived from the *arithmetic* and not geometric returns. Compound annual geometric returns are almost universally used in characterizing long-term returns.

[3]Their wildly high 12.8% long-term inflation estimate in 1982 is derived by subtracting their low historical real yield from the high nominal bond rate. This overprediction has no effect on their estimated *real* returns.

[4]But real rates on *short-dated* bonds, for which unanticipated inflation should have been less important, were also extremely low between 1926 and 1980.

[5]I am very persuaded by the research of Campbell and Viceira [1998], who argue that in a multiperiod world the proper risk-free asset is an inflation-indexed annuity rather than the short-dated Treasury bill. This conclusion comes from intertemporal models where agents desire to hedge against unanticipated changes in the real rate of interest. The duration of such an indexed annuity is closely approximated by the ten-year inflation-indexed bonds.

[6]They are unable to construct dividend series for most foreign countries, but they make a not-unreasonable assumption that dividend yields in the U.S. were at least as high as abroad.

[7]Intuitively, the return of the winners more than compensates for the lower returns of the more numerous losers.

[8]Furthermore, the dollar return on the foreign portfolio is much better measured than the real return. These data are taken from Jorion and Goetzmann [1991], Tables VI and VII.

[9]To avoid the problems with default, gold is considered the "risk-free" alternative in many countries. But gold's long-term real returns are negative in the U.S. even before one considers storage and insurance costs. And precious metals are far from risk-free in real terms. The real return on gold since 1982 has been a negative 7% per year.

[10]I abstract from taxes, which reduce the return on both bonds and stocks.

[11]These data were taken from the Bloomberg terminal on August 16, 1999.

[12]From 1970 through 1989, operating earnings exceeded reported earnings by an average of 2.29%. Since 1990, the average has been 12.93%.

[13]There are other factors that distort reported earnings, some upward (underreporting option costs: see Murray, Smithers, and Emerson [1998]) and some downward (overexpensing R&D; see Nakamura [1999]). No clear bias is evident.

[14]This is particularly true on a long-term, after-inflation basis. See Siegel [1998, Chapter 2].

[15]Bernstein [1998] has emphasized the role of economic stability in stock valuation. Also see Zarnowitz [1999] and Romer [1999]. Other reasons given for the high price of equities rely on demographic factors, specifically the accumulations of "baby boomers." This should, however, reduce both stock and bond returns, yet we see real bond returns as high if not higher than historically.

[16]From 1871 to 1998, the growth of real per share earnings is only 1.7% per year, slightly less than obtained by subtracting the median dividend yield of 4.8% from the median earnings yield of 7.2%.

[17]This should not be construed as predicting that equity prices need fall significantly, or that the expected returns on equities are not higher, even at current levels, than those on fixed-income investments.

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Utilities' Profit Recipe: Spend More

To expand regulator-imposed earnings caps, electricity producers splurge on new equipment, boosting customers' bills

Every time Southern California Edison replaces a 50-year-old pole with a new one, it has a fresh investment on which it is eligible to earn an annual profit. *PHOTO: FRED PROUSER/REUTERS*

By
Rebecca Smith
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Families in New York are paying 40% more for electricity than they were a decade ago. Meanwhile, the cost of the main fuel used to generate electricity in the state—natural gas—has plunged 39%.

Why haven't consumers felt the benefit of falling natural-gas prices, especially since fuel accounts for at least a quarter of a typical electric bill?

One big reason: utilities' heavy capital spending. New York power companies poured $17 billion into new equipment—from power plants to pollution-control devices—in the past decade, a spending surge that customers have paid for.

New York utilities' spending plans could push electricity prices up an additional 63% in the next decade, said Richard Kauffman, the former chairman of Levi Strauss & Co. who became New York's energy czar in 2013. It's "not a sustainable path for New York," he said.

New York is no outlier. Capital spending has climbed at utilities nationwide—and so have their customers' bills.

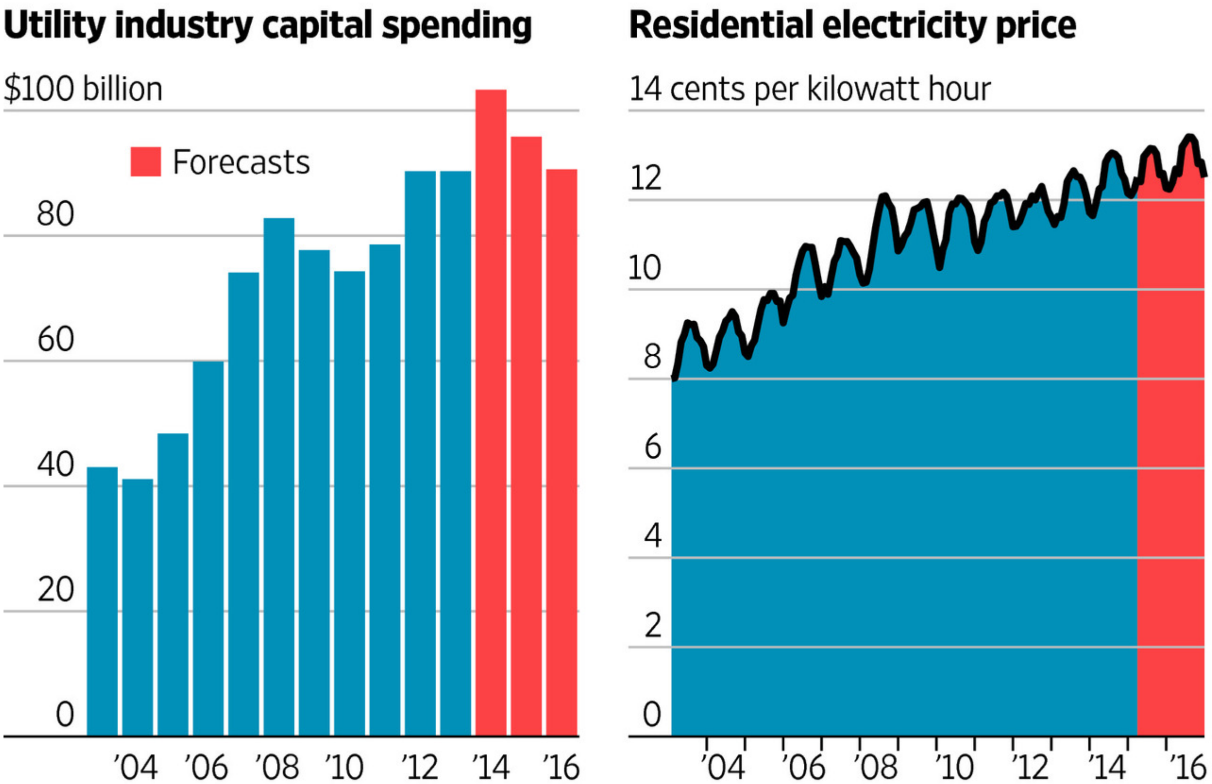
The average price of a kilowatt-hour of electricity rose 3.1% last year to 12.5 cents a kilowatt-hour, far above the rate of inflation. Since 2004, U.S. residential electricity prices have jumped 39%, according to federal statistics.

Over that same period, annual capital expenditures by investor-owned utility companies more than doubled—jumping to $103 billion in 2014 from $41 billion in 2004, according to the Edison Electric Institute, a trade association. The group expects total capital spending from 2003 through 2016 to top $1 trillion.

"This is the biggest splurge in capital spending we've seen in at least 30 years—it's the reason rates have been going up," said Bob Burns, an independent consultant and former energy researcher at Ohio State University.

Power Gauge

Regulators are trying to rein in utilities' capital spending, which has ramped up over the past 10 years, driving up electricity prices.



Sources: Edison Electric Institute (spending); Energy Dept. (prices) THE WALL STREET JOURNAL.

The biggest chunk of that spending—38% in 2013—went into new power lines and other delivery systems, the Edison Electric Institute said. Almost as much went to generation, often for new gas-fired plants to replace coal-fired ones that don't meet new environmental rules.

Experts say there are several reasons for soaring spending, including environmental mandates, and the need to harden the grid to protect it from storms, physical attacks and cyber hacking.

But utilities have another incentive for heavy spending: It actually boosts their bottom lines—the result of a regulatory system that turns corporate accounting on its head.

In most industries, companies generate revenue, deduct their costs, and are left with profits, which can be expressed as a percentage of revenues—the profit margin. Regulated utilities work differently. State regulators usually set an acceptable profit margin for utilities, and then set electric rates at levels that generate enough revenue to cover their expenses and allow them to make a profit.

At the moment, it is common for utilities' allowable profit to be capped at 10% or so of the shareholders' equity that they have tied up in transmission lines, power plants and other assets. So the more they spend, the more profits they earn.

Critics say this can prompt utilities to spend on projects that may not be necessary, like electric-car charging stations, or to choose high-cost alternatives over lower-cost ones.

"Until we change things so utilities don't get rewarded based on how much they spend, it's hard to break that mentality," says Jerry R. Bloom, an energy lawyer at Winston & Strawn in Los Angeles who often represents independent power companies.

Southern California Edison, a unit of Edison International in Rosemead, Calif., plans to spend about $1 billion in debt and equity replacing or repairing thousands of power poles, which cost $13,000 each. Every time the company replaces a 50-year-old pole with a new one, it has a fresh investment on which it is eligible to earn an annual profit, currently 10.45%, for 45 years.

The sudden interest in poles "suggests they've been negligent in the past or they're just looking for ways to spend money," said Bob Finkelstein, a lawyer at the Utility Reform Network, a San Francisco-based watchdog group.

Mike Marelli, SoCal Edison's rates director, said his company analyzed 5,000 poles before deciding a massive program was needed to deal with deferred maintenance.

'Until we change things so utilities don't get rewarded based on how much they spend, it's hard to break that mentality.'

—Jerry R. Bloom, an energy lawyer at Winston & Strawn

Overall, SoCal Edison intends to spend $15 billion to $17 billion on dozens of initiatives from 2014 through 2017. Similarly, Charlotte, N.C.-based Duke Energy Corp. **DUK -0.69 %** expects to make $17 billion worth of capital expenditures from 2014 and 2016. A rule of thumb it recently shared with investors: for every billion dollars in assets it adds to its inventory, it boosts earnings by about 8 cents a share.

Utilities can't bill customers for new capital expenditures without first getting the consent of state or federal regulators, notes Richard McMahon, a vice president at the Edison Electric Institute.

But Ken Rose, an energy consultant in Chicago, says that regulators don't always do enough to make sure projects are the best deal for the customers footing the bills. He says companies have a propensity to choose expensive solutions to problems—building a new power plant instead of promoting energy efficiency, for example—because it puts big chunks of capital to work that lift profits.

Some analysts say utilities' capital spending has been necessary and smart at a time of low interest rates.

“I don’t subscribe to the belief that utility companies are gold-plating their systems just to increase profits,” says Jim Hempstead, associate managing director of the global infrastructure finance at Moody’s Investors Service.

Utilities earned $36 billion in 2013, excluding nonrecurring items, up 36% from 2004, according to the Edison Electric trade group.

So long as electricity consumption is growing, utilities can spread hefty costs across their customers without increasing rates. But since 2008, power sales haven’t been growing fast enough to absorb the impact of all the added spending.

Kansas City Power & Light has raised rates about 60% since it kicked off its current investment cycle in 2007. It is seeking rate increases of 12.5% in Kansas and 15.5% in Missouri.

Some states are pushing back.

In New York, regulators balked at Consolidated Edison Inc. **ED -0.53 %** ’s plan to build a $1 billion electrical substation in Brooklyn and Queens by 2017. Instead, the company has decided to help customers cut energy use by improving the efficiency of their electrical equipment through a $500 million program that defers a decision about a new substation for at least a decade.

“What we’re doing is an alternative that’s less costly,” said Stuart Nachmias, vice president of regulatory affairs for ConEd.

From now on, utilities must prove that their spending will make an electric system cleaner, more efficient or stronger, says Audrey Zibelman, chair of the New York Public Service Commission. “Business as usual has become unaffordable.”

The Equity Risk Premium: An Annotated Bibliography

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The equity risk premium is broadly defined as the difference between the expected total return on an equity index and the return on a riskless asset. The magnitude of the equity risk premium, arguably the most important variable in financial economics, affects the asset allocation decisions of individual and institutional investors, and the premium is a critical factor in estimating companies' costs of capital. This literature review explores research by academics and practitioners on this topic during the past three decades.

The equity risk premium (or, simply, equity premium) is broadly defined as the difference between the expected total return on an equity index and the return on a riskless asset. (Which index and which riskless asset need to be defined precisely before numerically estimating this premium.) The equity premium is considered the most important variable in financial economics. The magnitude of the equity premium strongly affects the asset allocation decisions of individual investors and institutional investors, including pensions, endowment funds, foundations, and insurance companies, and is a critical factor in estimating companies' costs of capital.

History of Research on the Equity Risk Premium

The topic of the equity risk premium (ERP) has attracted attention from academics and practitioners. There are three major themes in the intellectual history of the equity premium. The first theme builds on Gordon and Shapiro's suggestion that a dividend discount model (DDM) be used to estimate the required return on capital for a corporate project, and, by extension, the expected return on an equity (if the equity is fairly priced).[1] Specifically, the DDM says that expected total equity return equals the dividend yield plus the expected dividend growth rate; the equity premium is this sum minus the riskless rate. The DDM was widely used by practitioners to estimate the equity premium until Ibbotson and Sinquefield (1976) introduced a different approach based on historical returns. An early work by Diermeier, Ibbotson, and Siegel (1984) attempted to bolster the use of the DDM for long-range forecasting, but it was not widely used; the recent, and quite remarkable, revival of the DDM as an estimator of the equity premium dates back only to the late 1990s.

The second theme arose from Ibbotson and Sinquefield's 1976 article, which decomposed historical returns on an equity index into a part attributable to the riskless rate and a part attributable to the equity premium. The arithmetic mean of the equity premium part is assumed to be stationary—that is, the same in the future as in the past. Thus, if equities had beaten riskless Treasury bills by an arithmetic mean margin of 7 percent a year over the historical measurement period, which was usually 1926 through the then-current time, then equities were forecast to beat bills by the same amount in the future. This approach dominated practitioners' estimates of the equity premium starting in the late 1970s, but its influence has faded recently, under attack from both the DDM and the "puzzle" literature that began with Mehra and Prescott (1985).

Mehra and Prescott's 1985 article, "The Equity Premium: A Puzzle," began a third theme. The puzzle they described is that the historical equity risk premium during the period of 1889–1978 (or any other similarly long period, such as 1926 to the present) was too high, by at least an order of magnitude, to be explained by standard

[1] Myron J. Gordon and Eli Shapiro, "Capital Equipment Analysis: The Required Rate of Profit," *Management Science*, vol. 3, no. 1 (October 1956):102–110.

"general equilibrium" or "macroeconomic" asset-pricing models. Using these models, such a high premium can only be explained by a very high coefficient of risk aversion, one in the range of 30 to 40. Risk aversion parameters observed in other aspects of financial behavior are around 1. So, Mehra and Prescott argued, either the model used to describe investors' behavior is flawed or equity investors have received a higher return than they expected.

We call the asset-pricing models referenced by Mehra and Prescott (1985) "macroeconomic" because they originated in that specialty, but more importantly to distinguish them from asset-pricing models commonly used in investment finance—such as the capital asset pricing model, the three-factor Fama–French model, and arbitrage pricing theory—that are silent on the absolute size of the risk premium (in fact, requiring it as an input) and that distinguish instead among the expected *relative* returns on specific securities or portfolios.

The rest of this introductory essay focuses on attempts to resolve the equity premium "puzzle" identified by Mehra and Prescott (1985). Their "puzzle" has stimulated a remarkable response in the academic literature. Most practitioners today, however, use estimates of the equity premium that emerge from the DDM—the earliest method. Moreover, practitioner debates tend to focus on which DDM estimate to use and the extent to which the estimate should be influenced by historical returns, not the question of whether either the DDM or the historical approach can be reconciled with that of Mehra and Prescott. Reflecting practitioners' concerns, this annotated bibliography covers all three major themes in the literature.

Reconciling the "Puzzle"

Research on the question of why the realized equity premium was so large can be grouped into two broad categories: (1) studies alleging bias in the historical data and (2) studies suggesting improvements in the macroeconomic model. A third category, studies that set forth methods for estimating for the equity risk premium *independent* of the macroeconomic model, is also addressed in this review.

Biases in Historical Data. Potential biases in the historical data vary from survivorship bias and variations in transaction and tax costs to the choice of short-term bills versus long-term bonds as the riskless asset.

- *Survivorship bias*. Brown, Goetzmann, and Ross (1995) argued that the historical equity premium calculated using U.S. data is likely to overstate the true (expected) premium because the U.S. stock market turned out to be the most successful in world history. However, Dimson, Marsh, and Staunton (2006) examined stock and bond returns using data from 1900 to 2005 for 17 countries and concluded that the high historical equity premium obtained for the United States is comparable with that of other countries.
- *Transaction costs, regulations, and taxes*. McGrattan and Prescott (2001) suggested that the higher historical equity premium is mainly because of a large run-up in the equity price caused by the sharp decline in the tax rate on dividends. In their 2003 article, they claimed that the equity premium is less than 1 percent after accounting for taxes, regulations, and costs.
- *Short-term bills vs. long-term bonds as the riskless asset*. McGrattan and Prescott (2003) argued that short-term bills provide considerable liquidity services and are a negligible part of individuals' long-term debt holdings. As a result, long-term bonds should be used as the riskless asset in equity premium calculations. Siegel (2005) argued that the riskless asset that is relevant to most investors (that is, to long-term investors) is "an annuity that provides a constant real return over a long period of time" (p. 63). And the return on long-term inflation-indexed government bonds is the closest widely available proxy for such an annuity.
- *Unanticipated repricing of equities*. Bernstein (1997) suggested that because equities started the sample period (which begins in 1926) at a price-to-earnings ratio (P/E) of about 10, and ended the period at a P/E of about 20, the actual return on equities was higher than investors expected or required. Thus, the historical return overstates the future expected return. This finding was bolstered by Fama and French (2002), who used the DDM to show that investors expected an equity risk premium of about 3 percent, on average, from 1926 to the present.
- *Unanticipated poor historical bond returns*. Historical bond returns may have been biased downward because of unexpected double-digit inflation in the 1970s and 1980s (Arnott and Bernstein 2002; Siegel 2005). However, subsequent disinflation and declines in bond yields have caused the bond yield to end the historical study period only a little above where it started, thus mostly negating the validity of this objection.

Improvements in the Theoretical Model. The second broad category of research on the equity risk premium is a large body of literature exploring a variety of improvements in the original Mehra and Prescott (1985) model.

- *Rare events*. Rietz (1988) suggested that the ERP puzzle can be solved by incorporating a very small probability of a very large drop in consumption. If such a probability exists, the predicted equity premium is large (to compensate investors for the small risk of a very bad outcome). In the same year, Mehra and Prescott countered that Rietz's model requires a 1 in 100 chance of a 25 percent decline in consumption to reconcile the equity premium with a risk aversion parameter of 10, which is the approximate degree of risk aversion that would be required to predict an equity premium equal to that which was realized.[2] However, they argued, the largest aggregate consumption decline in the last 100 years was only 8.8 percent. Campbell, Lo, and MacKinlay pointed out in 1997 that "the difficulty with Rietz's argument is that it requires not only an economic catastrophe, but one which affects stock market investors more seriously than investors in short-term debt instruments" (p. 311).[3] Recently, Barro (2006) extended Rietz's model and argued that it does provide a plausible resolution of the equity premium "puzzle."
- *Recursive utility function*. One critique of the power utility function used by Mehra and Prescott (1985) is the tight link between risk aversion and intertemporal substitution. Hall argued that this link is inappropriate because the intertemporal substitution concerns the willingness of an investor to move consumption between different time periods whereas the risk aversion parameter concerns the willingness of an investor to move consumption between states of the world.[4] However, Weil (1989) showed that the ERP puzzle cannot be solved by simply separating risk aversion from intertemporal substitution. More recently, Bansal and Yaron (2004) argued that risks related to varying growth prospects and fluctuating economic uncertainty, combined with separation between the intertemporal substitution and risk aversion, can help to resolve the ERP puzzle.
- *Habit formation*. Constantinides (1990) introduced habit persistence in an effort to explain the ERP puzzle. His model assumes that an investor's utility is affected by both current and past consumption and that a small fall in consumption can generate a large drop in consumption net of the subsistence level. This preference makes investors extremely averse to consumption risk even when risk aversion is small. Constantinides showed that the historical equity premium can be explained if past consumption generates a subsistence level of consumption that is about 80 percent of the normal consumption rate.

Abel defined a similar preference, called "catching up with the Joneses," where one's utility depends not on one's absolute level of consumption, but on how one is doing relative to others.[5]

- *Borrowing constraints and life-cycle issues*. Constantinides, Donaldson, and Mehra (2002) introduced life-cycle and borrowing constraints. They argued that as the correlation of equities with personal income changes over the life of the investor, so too does the attractiveness of equities to that investor. The young, who should borrow to smooth consumption and to invest in equities, cannot do so. Therefore, equities are priced almost exclusively by middle-aged investors, who find equities to be unattractive. Thus, equities are underpriced and bonds are overpriced, producing a higher equity risk premium than predicted by Mehra and Prescott (1985).
- *Limited market participation*. Mankiw and Zeldes (1991) examined whether the consumption of stockholders differs from that of nonstockholders and whether this difference helps explain the historical equity risk premium. They showed that aggregate consumption of stockholders is more highly correlated with the stock market and is more volatile than the consumption of nonstockholders. A risk aversion parameter of 6 can explain the size of the equity premium based on consumption of stockholders alone. Although this value is still too large to be plausible, it is much less than the magnitude of 30 to 40 derived by Mehra and Prescott (1985) using the aggregate consumption data of both stockholders and nonstockholders.

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[2]Rajnish Mehra and Edward C. Prescott, "The Equity Premium: A Solution?" *Journal of Monetary Economics*, vol. 22, no. 1 (July 1988):133–136.

[3]John Y. Campbell, Andrew W. Lo, and A. Craig MacKinlay, *The Econometrics of Financial Markets* (Princeton, NJ: Princeton University Press, 1997).

[4]Robert E. Hall, "Intertemporal Substitution in Consumption," *Journal of Political Economy*, vol. 96, no. 2 (December 1988):212–273.

[5]Andrew B. Abel, "Asset Prices under Habit Formation and Catching Up with the Joneses," *American Economic Review Papers and Proceedings*, vol. 80, no. 2 (May 1990):38–42.

■ *Incomplete markets*. Heaton and Lucas introduced uninsurable, idiosyncratic income risk into standard and dynamic general equilibrium models and showed that it can increase the risk premium.[6] Brav, Constantinides, and Geczy (2002) showed that the equity premium can be "explained with a stochastic discount factor calculated as the weighted average of the individual households' marginal rate of substitution with low and economically plausible values of the rate of risk aversion coefficient." This explanation relies on incomplete markets in that all risks would be insurable if markets were "complete."

■ *Behavioral approach*. Starting with prospect theory as proposed by Kahneman and Tversky,[7] a large swath of behavioral finance literature argues that the combination of "myopic" loss aversion and narrow framing can help to resolve the ERP puzzle, including works by Benartzi and Thaler (1995), Barberis, Huang, and Santos (2001), and Barberis and Huang (2006).

Summary

The various (and quite different, almost unrelated) approaches to estimating the equity risk premium is best summarized by Ibbotson and Chen, who categorized the estimation methods into four groups:[8]

1. *Historical method*. The historical equity risk premium, or difference in realized returns between stocks and bonds (or stocks and cash), is projected forward into the future. See Ibbotson and Sinquefield (1976), which is updated annually by Ibbotson Associates (now Morningstar), and Dimson, Marsh, and Staunton (2002).
2. *Supply-side models*. This approach uses fundamental information, such as earnings, dividends, or overall economic productivity, to estimate the equity risk premium. See Diermeier, Ibbotson, and Siegel (1984); Siegel (1999); Shiller (2000); Fama and French (1999); Arnott and Ryan (2001); Campbell, Diamond, and Shoven (2001); Arnott and Bernstein (2002); and Grinold and Kroner (2002).
3. *Demand-side models*. This approach uses a general equilibrium or macroeconomic model to calculate the expected equity return by considering the payoff demanded by investors for bearing the risk of equity investments. Mehra and Prescott (1985) is the best known example of this approach, and the "puzzle debate" is an attempt to reconcile the results of this approach with the much higher ERP estimates given by the other approaches.
4. *Surveys*. An estimate of the equity risk premium is obtained by surveying financial professionals or academics (e.g., Welch 2000). Such results presumably incorporate information from the other three methods.

In closing, the equity risk premium has been the topic of intense and often contentious research over at least the last three decades. As Siegel (2005) said, although there are good reasons why the future equity risk premium should be lower than it has been historically, a projected equity premium of 2 percent to 3 percent (over long-term bonds) will still give ample reward for investors willing to bear the risk of equities.

[6]John Heaton and Deborah Lucas, "Evaluating the Effects of Incomplete Markets on Risk Sharing and Asset Pricing," *Journal of Political Economy*, vol. 104, no. 3 (June 1996):443–487.

[7]Daniel Kahneman and Amos Tversky, "Prospect Theory: An Analysis of Decisions under Risk," *Econometrica*, vol. 47, no. 2 (March 1979):263–292.

[8]Roger Ibbotson and Peng Chen, "The Supply of Stock Market Returns," Ibbotson Associates, 2001.

Bibliography

Aït-Sahalia, Yacine, Jonathan A. Parker, and Yogo Motohiro. 2004. "Luxury Goods and the Equity Premium." *Journal of Finance*, vol. 59, no. 6 (December):2959–3004.

This article proposes a partial solution to the ERP puzzle by distinguishing between the consumption of basic goods and that of luxury goods. The authors argue that the aggregate consumption does not measure the marginal risk of investing in the stock market. Using several novel datasets on luxury goods consumption, such as sales of imported luxury automobiles, this study shows that the covariance of luxury goods and excess returns implies a risk aversion parameter of 7, significantly lower than that implied by aggregate consumption data.

Ang, Andrew, and Angela Maddaloni. 2005. "Do Demographic Changes Affect Risk Premiums? Evidence from International Data." *Journal of Business*, vol. 78, no. 1 (January):341–379.

This article examines empirically the relation between the equity risk premium and demographics using a long-term data sample (1900–2001) from the United States, Japan, the United Kingdom, Germany, and France as well as a shorter-term data sample (1970–2000) for 15 countries. By pooling international data, the authors show that a negative relation exists between the equity risk premium and the percentage of adults over 65 years old. The international results from this study support Abel's prediction that the equity risk premium is likely to decrease as the Baby Boom generation enters retirement.[9]

Arnott, Robert D., and Clifford S. Asness. 2003. "Surprise! Higher Dividends = Higher Earnings Growth." *Financial Analysts Journal*, vol. 59, no. 1 (January/February):70–87.

Contrary to the predictions of Ibbotson and Chen (2003) and others who apply Modigliani and Miller (M&M) dividend invariance intertemporally, earnings growth has been fastest when dividend payout is highest, not lowest, because of diminishing marginal productivity of capital. Thus, investors should not look to today's low payout ratios as a sign of stronger-than-historical earnings growth in the future.

Arnott, Robert D., and Peter L. Bernstein. 2002. "What Risk Premium Is 'Normal'?" *Financial Analysts Journal*, vol. 58, no. 2 (March/April):64–85.

The expected equity return equals the dividend yield, plus dividend growth, plus the expected change in valuation, if any. As of year-end 1925, investors expected about 5.1 percent (about 1.4 percent more than the bond yield). The subsequent positive surprise was because of four historical accidents: (1) bonds had unanticipated losses; (2) valuations quadrupled, as measured by the price-to-dividend ratio (P/D); (3) the market survived; and (4) accelerated growth in real dividends and earnings occurred because of regulatory reform. These observations are used to construct a framework for estimating the equity risk premium at each point in time, including the present. The "normal" equity risk premium, or historical average of what investors were actually expecting, is 2.4 percent, and the current equity risk premium is around zero.

[9]Andrew B. Abel, "Will Bequests Attenuate the Predicted Meltdown in Stock Prices when Baby Boomers Retire?" *Review of Economics and Statistics*, vol. 83, no. 2 (November 2001):589–595; "The Effects of a Baby Boom on Stock Prices and Capital Accumulation in the Presence of Social Security," *Econometrica*, vol. 71, no. 2 (March 2003):551–578.

Arnott, Robert, and Ronald Ryan. 2001. "The Death of the Risk Premium: Consequences of the 1990s." *Journal of Portfolio Management*, vol. 27, no. 3 (Spring):61–74.

Applying the dividend discount model to then-current (January 2000) valuations produces an equity risk premium of –0.9 percent, consisting of a real equity expected return of 3.2 percent minus a real Treasury Inflation-Protected Securities (TIPS) yield of 4.1 percent. A similar analysis of the equity risk premium at the end of 1925 shows that it was 2.7 percent. Pension funds, especially (because of their liability characteristics), should invest more in bonds given these estimates.

Avramov, Doron, and Tarun Chordia. 2006. "Predicting Stock Returns." *Journal of Financial Economics*, vol. 82, no. 2 (November):387–415. [added April 2008; abstract by Luis Garcia-Feijoo, CFA]

The authors construct optimal portfolios that allow for company-level equity expected returns, variances, and covariances to vary conditional on a set of macroeconomic variables. Predictability-based investments outperform static and dynamic investments in the market, the Fama–French plus momentum factors, and strategies that invest in stocks with similar size, book-to-market, and prior return characteristics. Returns on individual stocks are predictable out-of-sample because of alpha variation, not because of equity premium predictability.

Bansal, Ravi, and Amir Yaron. 2004. "Risk for the Long Run: A Potential Resolution of Asset Pricing Puzzles." *Journal of Finance*, vol. 59, no. 4 (August):1481–1509.

This article presents a model that can explain the equity risk premium. Dividend and, thus, consumption growth are assumed to consist of two components: a small persistent expected growth rate component and a time-varying economic uncertainty component. The authors show that the historical equity risk premium can be quantitatively justified by the model using a risk aversion parameter of 7.5 to 10.

Barberis, Nicholas, and Ming Huang. 2006. "The Loss Aversion/Narrow Framing Approach to the Equity Premium Puzzle." In *Handbook of Investments: Equity Risk Premium*. Edited by Rajnish Mehra. Amsterdam: North Holland.

The authors review the behavioral approach to understanding the ERP puzzle. The key elements of this approach are loss aversion and narrow framing, two well-known features of decision making under risk in experimental settings. By incorporating these features into traditional utility functions, Barberis and Huang show that a large equity premium and a low and stable risk-free rate can be generated simultaneously, even when consumption growth is smooth and only weakly correlated with the stock market.

Barberis, Nicholas, Ming Huang, and Tano Santos. 2001. "Prospect Theory and Asset Prices." *Quarterly Journal of Economics*, vol. 116, no. 1 (February):1–53.

This paper proposes a new approach for pricing assets by incorporating two psychological ideas into the traditional consumption-based model. Investors are assumed to be more sensitive to losses than to gains, and their risk aversion changes over time depending on their prior investment outcomes. The authors show that this framework can help explain the high historical equity risk premium.

Barro, Robert. 2006. "Rare Disasters and Asset Markets in the Twentieth Century." *Quarterly Journal of Economics*, vol. 121, no. 3 (August):823–866.

This paper extends the analysis of Rietz (1988) and argues that it does provide a plausible resolution of the ERP puzzle. The author suggests that the rare-disasters framework (i.e., the allowance for low-probability disasters proposed by Rietz) can explain the ERP puzzle while "maintaining the tractable framework of a representative agent, time-additive and iso-elastic preferences, and complete markets" (p. 823). These technical terms refer to assumptions that are embedded in Mehra and Prescott (1985) and that are considered standard in general equilibrium or macroeconomic models.

Benartzi, Shlomo, and Richard H. Thaler. 1995. "Myopic Loss Aversion and the Equity Premium Puzzle." *Quarterly Journal of Economics*, vol. 110, no. 1 (February):73–92.

This article proposes an explanation for the equity premium based on two concepts from the psychology of decision making. The first concept is called "loss aversion," meaning that investors are more sensitive to losses than to gains. The second concept is called "mental accounting," which points out that investors mentally separate their portfolios into subportfolios for which they have quite different utility functions or risk aversion parameters. For example, investors may have one set of portfolios that they never evaluate and another set that they evaluate every day. Benartzi and Thaler show that the size of the historical equity premium can be explained if investors evaluate their portfolio at least annually.

Bernstein, Peter L. 1997. "What Rate of Return Can You Reasonably Expect... or What Can the Long Run Tell Us about the Short Run?" *Financial Analysts Journal*, vol. 53, no. 2 (March/April):20–28.

By studying historical intervals when stock valuation (P/D or P/E) was the same at the end of the interval as at the beginning, one can avoid incorporating unexpected valuation changes into long-term rate of return studies. The analysis gives an equity risk premium of 3 percent, although the more interesting finding is that equity returns are mean-reverting whereas bond returns have no mean to which to regress. Thus, in the very long run and in real terms, stocks are safer than bonds.

Blanchard, Olivier J., Robert Shiller, and Jeremy J. Siegel. 1993. "Movements in the Equity Premium." *Brookings Papers on Economic Activity*, no. 2:75–138.

The authors show that the expected equity premium has gone steadily down since the 1950s from an unusually high level in the late 1930s and 1940s. Blanchard et al. show the positive relation between inflation and the equity premium, and they conclude that the equity premium is expected to stay at its current level of 2–3 percent if inflation remains low. Implications of this forecast for the macroeconomy are explored.

Brav, Alon, George M. Constantinides, and Christopher C. Geczy. 2002. "Asset Pricing with Heterogeneous Consumers and Limited Participation: Empirical Evidence." *Journal of Political Economy*, vol. 110, no. 4 (August):793–824.

This paper shows that the equity risk premium can be explained with a stochastic discount factor (SDF) calculated as the weighted average of the individual households' marginal rate of substitution. Important components of the SDF are cross-section variance and skewness of the households' consumption growth rates.

Brown, Stephen J., William N. Goetzmann, and Stephen A. Ross. 1995. "Survival." *Journal of Finance*, vol. 50, no. 3 (July):853–873.

This paper suggests that survival could induce a substantial spurious equity premium and at least partially explain the equity premium puzzle documented by Mehra and Prescott (1985). (That is, to explain it away, because the returns used to frame the "puzzle" were neither expected nor were they achieved by many investors.)

Campbell, John Y., Peter A. Diamond, and John B. Shoven. 2001. "Estimating the Real Rate of Return on Stocks over the Long Term." Social Security Advisory Board. (www.ssab.gov/Publications/Financing/estimated%20rate%20of%20return.pdf)

This collection of papers presented to the Social Security Advisory Board explores expected equity rates of return for the purpose of assessing proposals to invest Social Security assets in the stock market.

Under certain stringent conditions, the earnings-to-price ratio (E/P) is an unbiased estimator of the expected equity return. Noting that earnings are highly cyclical, Campbell, in "Forecasting U.S. Equity Returns in the 21st Century," produces a more stable numerator for E/P by taking the 10-year trailing

average of real earnings, E* (after Graham and Dodd;[10] see also Campbell and Shiller 1998, Shiller 2000, and Asness[11]). From this perspective, current data suggest that the structural equity risk premium is now close to zero or that prices will fall, causing the equity risk premium to rise to a positive number. A little of each is the most likely outcome. Departing from the steady-state assumptions used to equate E/P with the expected equity return and using a macroeconomic growth forecast and sensible assumptions about the division, by investors, of corporate risk between equities and bonds, a real interest rate of 3–3.5 percent is forecast, along with an equity risk premium of 1.5–2.5 percent geometric (3–4 percent arithmetic).

In "What Stock Market Returns to Expect for the Future?" Diamond explores the implications of an assumed 7 percent real rate of return on equities. Stocks cannot earn a real total return of 7 percent or else they will have a market capitalization of 39.5 times U.S. GDP by the year 2075 (assuming a 2 percent dividend-plus-share-buyback yield). In contrast, the current capitalization/GDP ratio is 1.5. Changing the GDP growth rate within realistic bounds does not change the answer much. To justify a real total return of 7 percent, stocks must fall by 53 percent in real terms over the next 10 years (assuming a 2 percent dividend yield). Increasing the dividend payout does reduce the projected capitalization/GDP ratio materially, but in no case does it reduce the ratio below 7.86 in 2075.

In "What Are Reasonable Long-Run Rates of Return to Expect on Equities?" Shoven examines what is likely to happen to rates of return over the next 75 years. Dividends are irrelevant, because of tax policy; what counts is total cash flow to the investor. In a steady state, the expected return on equities (per share) equals the dividend yield, plus the share buyback yield, plus the growth rate of macroeconomic aggregates. This analysis produces an expected real total return on equities of 6.125 percent (say, 6–6.5 percent). Because of high (3 percent) real rates as projected—not the very high, current TIPS yield—the equity risk premium is only 3–3.5 percent, but these projections require one to reduce the 7 percent real equity return projection used by the Social Security Advisory Board only a little. At a P/E of 15, the real equity return projection would be a little better than 7 percent.

Campbell, John Y., and Robert J. Shiller. 1998. "Valuation Ratios and the Long-Run Stock Market Outlook." *Journal of Portfolio Management*, vol. 28, no. 2 (Winter):11–26. (Updated in Cowles Foundation Discussion Paper #1295, Yale University, March 2001.)

The dividend-to-price ratio (D/P) can forecast either changes in dividend, which is what efficient market theory suggests, or changes in price, or both. Empirically, it forecasts only changes in price. At the current D/P, the forecast is extraordinarily bearish: The stock market will lose about two-thirds of its real value. The forecast becomes less drastically bearish (although still quite bearish) when one uses (dividend + share buybacks), earnings, the 10-year moving average of earnings in constant dollars, or other variables in the denominator. Real stock returns close to zero over the next 10 years are forecast. A number of statistical weaknesses in the analysis are acknowledged: The historical observations are not independent, and the analysis depends on valuation ratios regressing to their historical means, whereas the actual means are not known and could conceivably lie outside the historical range.

The 2001 update reaches the same conclusion and an even more bearish forecast.

[10]Benjamin Graham and David Dodd, *Security Analysis* (New York: McGraw-Hill, 1934).

[11]Clifford S. Asness, "Stocks versus Bonds: Explaining the Equity Risk Premium," *Financial Analysts Journal*, vol. 56, no. 2 (March/ April 2000):96–113.

Carhart, Mark M., and Kurt Winkelmann. 2003. "The Equity Risk Premium." In *Modern Investment Management*. Edited by William N. Goetzmann and Roger G. Ibbotson. Hoboken, NJ: John Wiley & Sons:44–54.

Historical perspective and an equilibrium estimate of the equity risk premium are discussed. The authors estimate that the U.S. corporate bond yield above Treasury bonds is 2.25 percent, and the expected U.S. corporate bond risk premium is thus 1.5 percent after subtracting an expected default loss of 0.75 percent. This amount (1.5 percent) is considered to be the lower bound of the current equity risk premium. Because equity volatility is two or three times higher than that of corporate bonds, the authors "cautiously" suggest an equity risk premium of 3 percent or higher.

Claus, James, and Jacob Thomas. 2001. "Equity Premia as Low as Three Percent? Evidence from Analysts' Earnings Forecasts for Domestic and International Stock Markets." *Journal of Finance*, vol. 56, no. 5 (October):1629–1666.

The Ibbotson or historical-extrapolation method gives ERP estimates that are much too high, relative to both purely utility-based estimates (Mehra and Prescott 1985) and estimates based on valuation (for example, Campbell and Shiller 1998). Estimates of the equity risk premium were calculated for each year since 1985 by subtracting the 10-year risk-free rate from the discount rate that equates U.S. stock market valuations with forecasted future flows, and results suggest that the equity risk premium is probably no more than 3 percent. International evidence from Canada, France, Germany, Japan, and the United Kingdom also support this claim. Known upward biases in analysts' earnings forecasts are corrected in making the estimates. Possible reasons why the historical method might have overstated the expected equity risk premium in recent years are discussed.

Cochrane, John H. 1997. "Where Is the Market Going? Uncertain Facts and Novel Theories." *Economic Perspectives*, Federal Reserve Bank of Chicago, vol. 21, no. 6 (November/December):3–37.

This paper summarizes the statistical evidence on average stock return and surveys economic theories that try to explain it. Standard models can only justify a low equity risk premium, whereas new models that can explain the 8 percent historical equity premium drastically modify the description of stock market risk. The author concludes that low forecast stock returns do not imply that the investor should change his portfolio unless he is different from the average investor in risk exposure, attitude, or information.

Constantinides, George M. 1990. "Habit Formation: A Resolution of the Equity Premium Puzzle." *Journal of Political Economy*, vol. 98, no. 3 (June):519–543.

Constantinides introduces habit persistence in an effort to explain the ERP puzzle. This model assumes that an investor's utility is affected by both current and past consumption and that a small drop in consumption can generate a large drop in consumption net of the subsistence level. The author shows that the historical equity premium can be explained if past consumption generates a subsistence level of consumption that is about 80 percent of the normal consumption rate.

———. 2002. "Rational Asset Prices." *Journal of Finance*, vol. 57, no. 4 (August):1567–1591.

This article examines the extent to which historical asset returns can be explained by relaxing the assumptions of the traditional asset pricing model. Constantinides reviews statistical evidence on historical equity returns and premiums and discusses the limitations of existing theories. The author suggests that it is promising to try to explain the equity risk premium by integrating the notions of incomplete market, life-cycle issues, borrowing constraints, and limited stock participation (i.e., stockholdings are concentrated in the hands of the wealthiest few), along with investors' deviation from rationality.

Constantinides, George M., John B. Donaldson, and Rajnish Mehra. 2002. "Junior Can't Borrow: A New Perspective on the Equity Premium Puzzle." *Quarterly Journal of Economics*, vol. 117, no. 1 (February):269–296.

As the correlation of equities with personal income changes over the life of the investor, so does the attractiveness of equities to that investor. The young, who should borrow to smooth consumption and to invest in equities, can't do so. Therefore, equities are priced almost exclusively by middle-aged investors, who find equities to be unattractive. (Middle-aged investors have a shorter time horizon and also prefer bonds because they smooth consumption in retirement, as wages do when one is working.) The result is a decreased demand for equities and an increased demand for bonds relative to what it would be in a perfectly competitive market. Thus, equities are (on average, over time) underpriced and bonds are overpriced, producing a higher equity risk premium than predicted by Mehra and Prescott (1985).

Cornell, Bradford. 1999. *The Equity Risk Premium*. New York: Wiley.

The literature on the equity risk premium is extensively reviewed and somewhat popularized in this book. The conclusion is that the equity risk premium will be lower in the future than it was in the past. A premium of 3.5–5.5 percent over Treasury bonds and 5–7 percent over Treasury bills is projected.

Dichev, Ilia D. 2007. "What Are Stock Investors' Actual Historical Returns? Evidence from Dollar-Weighted Returns." *American Economic Review*, vol. 97, no. 1 (March):386–401. [added April 2008, abstract by Bruce D. Phelps, CFA]

For the NYSE and Amex, the author finds that dollar-weighted returns are 1.9 percent per year lower on average than value-weighted (or buy-and-hold) returns. For the NASDAQ, dollar-weighted returns are 5.3 percent lower. Similar results hold internationally. Because actual investor returns are lower than published returns, empirical measurements of the equity risk premium and companies' cost of equity are potentially overstated.

Diermeier, Jeffrey J., Roger G. Ibbotson, and Laurence B. Siegel. 1984. "The Supply of Capital Market Returns." *Financial Analysts Journal*, vol. 40, no. 2 (March/April):74–80.

Stock total returns must equal dividend yields plus the growth rate of dividends, which cannot, in the long run, exceed the growth rate of the economy. If infinite-run expected dividend growth exceeded infinite-run expected economic growth, then dividends would crowd out all other economic claims. Net new issues, representing new capital (transferred from the labor market) that is needed so the corporate sector can grow, may cause the dividend growth rate to be slower than the GDP growth rate. Thus, the equity risk premium equals the dividend yield (minus new issues net of share buybacks), plus the GDP growth rate, minus the riskless rate.

As far as we know, this is the first direct application of the dividend discount model of John Burr Williams (writing in the 1930s) and Myron Gordon and Eli Shapiro (in the 1950s) to the question of the equity risk premium for the whole equity market as opposed to an individual company. The "supply side" thread thus begins with this work.

Dimson, Elroy, Paul Marsh, and Mike Staunton. 2002. *Triumph of the Optimists: 101 Years of Global Investment Returns*. Princeton, NJ: Princeton University Press.

This book provides a comprehensive examination of returns on stocks, bonds, bills, inflation, and currencies for 16 countries over the period from 1900 to 2000. This evidence suggests that the high historical equity premium obtained for the United States is comparable with that of other countries. The point estimate of the historical equity premium for the United States and the United Kingdom is about 1.5 percent lower than reported in previous studies, and the authors attribute the difference to index construction bias (for the United Kingdom) and a longer time frame (for the United States). The prospective risk premium that investors can expect going forward is also discussed. The estimated geometric mean premium for the United States is 4.1 percent, 2.4 percent for the United Kingdom, and 3.0 percent for the 16-country world index. Implications for individual investors, investment institutions, and companies are carefully explored.

———. 2003. "Global Evidence on the Equity Risk Premium." *Journal of Applied Corporate Finance*, vol. 15, no. 4 (Summer):27–38.

This article examines the historical equity risk premium for 16 countries using data from 1900 to 2002. The geometric mean annualized equity risk premium for the United States was 5.3 percent, and the average risk premium across the 16 countries was 4.5 percent. The forward-looking risk premium for the world's major markets is likely to be around 3 percent on a geometric mean basis and about 5 percent on an arithmetic mean basis.

———. 2006. "The Worldwide Equity Premium: A Smaller Puzzle." Working paper.

This paper is an updated version of Dimson, Marsh, and Staunton (2003). Using 1900–2005 data for 17 countries, the authors show that the annualized equity premium for the rest of the world was 4.2 percent, not too much below the U.S. equity premium of 5.5 percent over the same period.

The historical equity premium is decomposed into dividend growth, multiple expansion, the dividend yield, and changes in the real exchange rate. Assuming zero change in the real exchange rate and no multiple expansion, and a dividend yield 0.5–1 percent lower than the historical mean (4.49 percent), the authors forecast a geometric equity premium on the world index around 3–3.5 percent and 4.5–5 percent on an arithmetic mean basis.

Elton, Edwin J. 1999. "Presidential Address: Expected Return, Realized Return and Asset Pricing Tests." *Journal of Finance*, vol. 54, no. 4 (August):1199–1220.

At one time, researchers felt they had to (weakly) defend the assumption that expected returns were equal to realized returns. Now, they just make the assumption without defending it. This practice embeds the assumption that information surprises cancel to zero; evidence, however, shows they do not. The implications of this critique are applied to asset-pricing tests, not to the equity risk premium.

Fama, Eugene F., and Kenneth R. French. 1999. "The Corporate Cost of Capital and the Return on Corporate Investment." *Journal of Finance*, vol. 54, no. 6 (December):1939–1967.

The authors use Compustat data to estimate the internal rate of return (IRR) of the capitalization-weighted corporate sector from 1950 to 1996. This IRR, 10.72 percent, is assumed to have been the nominal weighted average cost of capital (WACC). By observing the capital structure and assuming a corporate debt yield 150 bps above Treasuries, and making the usual tax adjustment to the cost of debt, a nominal expected equity total return of 12.8 percent is derived, which produces an equity risk premium of 6.5 percent. The cash flow from the "sale" of securities in 1996 is a large proportion of the total cash flow studied, so the sensitivity of the result to the 1996 valuation is analyzed. Because the period studied is long, the result is not particularly sensitive to the exit price.

———. 2002. "The Equity Premium." *Journal of Finance*, vol. 57, no. 2 (April):637–659.

This paper compares alternative estimates of the unconditional expected stock return between 1872 and 2000, and provides explanation to the low expected return estimates derived from fundamentals such as dividends and earnings for the 1951–2000 period. The authors conclude that the decline in discount rates largely causes the unexplained capital gain of the last half-century.

Faugère, Christophe, and Julian Van Erlach. 2006. "The Equity Premium: Consistent with GDP Growth and Portfolio." *Financial Review*, vol. 41, no. 4 (November):547–564. [added April 2008; abstract by Stephen Phillip Huffman, CFA]

Two macroeconomic equity premium models are derived and tested for consistency with historical data. The first model illustrates that the long-term equity premium is directly related to per capita growth in GDP. The second model, based on a portfolio insurance strategy of buying put options, illustrates that debtholders are paying stockholders an insurance premium, which is essentially the equity premium.

Fisher, Lawrence, and James H. Lorie. 1964. "Rates of Return on Investments in Common Stocks." *Journal of Business*, vol. 37, no. 1 (January):1–21.

This paper presents the first comprehensive data on rates of return on investments in common stocks listed on New York Stock Exchange over the period from 1926 to 1960. The authors show that the annually compounded stock return was 9 percent with reinvestment of dividend for tax-exempt institutions during this period.

Geweke, John. 2001. "A Note on Some Limitations of CRRA Utility." *Economic Letters*, vol. 71, no. 3 (June): 341–345.

This paper points out that the equity premium calculated from the standard growth model in Mehra and Prescott (1985) is quite sensitive to small changes in distribution assumptions. As such, it is questionable to use this kind of growth model to interpret observed economic behavior.

Goyal, Amit, and Ivo Welch. 2006. "A Comprehensive Look at the Empirical Performance of Equity Premium Prediction." Working paper.

This paper examines a wide range of variables that have been proposed by economists to predict the equity premium. The authors find that the prediction models have failed both in sample and out of sample using data from 1975 to 2004 and that out-of-sample predictions of the models are unexpectedly poor. They conclude that "the models would not have helped an investor with access only to the information available at the time to time the market" (p. 1).

Grinold, Richard, and Kenneth Kroner. 2002. "The Equity Risk Premium." *Investment Insights*, Barclays Global Investors, vol. 5, no. 3 (July):1–24.

The authors examine the four components of the expected equity risk premium separately (income return, expected real earnings growth, expected inflation, and expected repricing) and suggest a current risk premium of about 2.5 percent. The authors argue that neither the "rational exuberance" view (5.5 percent equity risk premium) and "risk premium is dead" (zero or negative premium) view can be justified without making extreme and/or irrational assumptions.

The authors also forcefully attack the "puzzle" literature by arguing that literature on the equity risk premium puzzle is too academic and is dependent on unrealistic asset-pricing models.

Ibbotson, Roger G., and Peng Chen. 2003. "Long-Run Stock Returns: Participating in the Real Economy." *Financial Analysts Journal*, vol. 59, no. 1 (January/February):88–98.

If one simply uses the dividend discount model to forecast stock returns, the forecast violates M&M dividend invariance because the current dividend yield is much lower than the average dividend yield over the period from which historical earnings growth rates were taken. Applying M&M intertemporally, lower dividend payouts should result in higher earnings growth rates. The solution is to add, to the straight dividend discount model estimate, an additional-growth term of 2.28 percent *as well as* using a current-dividend number of 2.05 percent, which is what the dividend yield would have been in 2000 if the dividend payout ratio had equaled the historical average of 59.2 percent. The equity risk premium thus estimated is about 4 percent (geometric) or 6 percent (arithmetic), about 1.25 percent lower than the straight historical estimate.

Ibbotson, Roger G., and Rex A. Sinquefield, 1976. "Stocks, Bonds, Bills and Inflation: Year-by-Year Historical Returns (1926–74)." *Journal of Business*, vol. 49, no. 1 (January):11–47. (Updated in *Stocks, Bonds, Bills and Inflation: 2006 Yearbook*; Chicago: Morningstar, 2006.)

Total equity returns consist of a stationary part (the equity risk premium) and a nonstationary part (the interest rate component, which consists of a real interest rate plus compensation for expected inflation). The estimator of the future arithmetic mean equity risk premium is the past arithmetic mean premium, which is currently about 7 percent. To this is added the current interest rate, 4.8 percent (on 20-year Treasury bonds). The sum of these, about 12 percent, is the arithmetic mean expected total return on equities. This method is justified by the assertion that in the long run, investors should and do conform their expectations to what is actually realizable. As a result, the historical equity risk premium reflects equilibrium at all times and forms the proper estimator of the future equity risk premium. (Note that the 2006 update discusses other methods rather than supporting a doctrinaire "future equals past" interpretation of historical data.)

Jagannathan, Ravi, Ellen R. McGrattan, and Anna Scherbina. 2000. "The Declining U.S. Equity Premium." *Quarterly Review*, Federal Reserve Bank of Minneapolis, vol. 24, no. 4 (Fall):3–19.

The IRR equating expected future dividends from a stock portfolio with the current price is the expected total return on equities; subtracting the bond yield, one arrives at the equity risk premium. This number is estimated at historical points in time and is shown to have declined over the sample period (1926–1999). The expected total return on equities is about the same in the 1990s as it was in the 1960s, but the equity risk premium is smaller because bond yields have increased. The equity risk premium in 1999 is –0.27 percent for the S&P 500, –0.05 percent for the "CRSP portfolio," and 2.71 percent for the "Board of Governors stock portfolio" (a broad-cap portfolio with many small stocks that pay high dividend yields). The analysis is shown to be reasonably robust when tested for sensitivity to the dividend yield being too low because of share repurchases and the bond yield being too high. If dividend growth is assumed equal to GNP growth, instead of being 1.53 percentage points lower as it was historically, then the equity risk premium based on the S&P 500 rises to 1.26 percent.

Jorion, Philippe, and William N. Goetzmann. 1999. "Global Stock Markets in the Twentieth Century." *Journal of Finance*, vol. 54, no. 3 (June):953–980.

The U.S. equity market experience in the 20th century is an unrepresentative sample of what can and does happen. The high equity risk premium observed globally is mostly a result of high equity returns in the United States (with a 4.3 percent real capital appreciation return), which had a large initial weight in the GDP-weighted world index. All other surviving countries had lower returns (with a median real capital appreciation return of 0.8 percent), and there were many nonsurviving countries. Although the large capitalization of the United States was in a sense the market's forecast of continued success, investors did not know in advance that they would be in the highest-returning country or even in a surviving one. Nonsurvival or survival with poor returns should be factored in when reconstructing the history of investor expectations (and should conceivably be factored into current expectations too). This finding contrasts with that of Dimson, Marsh, and Staunton (2002, 2003, 2006).

Kocherlakota, Narayana R. 1996. "The Equity Premium: It Is Still a Puzzle." *Journal of Economic Literature*, vol. 34, no. 1 (March):42–71.

After reviewing the literature on modifications of investor risk preference and on market friction, the author suggests that the ERP puzzle is still unsolved. Kocherlakota concludes that the equity risk premium puzzle should be solved by discovering the fundamental features of goods and asset markets rather than patching existing models.

Kritzman, Mark P. 2001. "The Equity Risk Premium Puzzle: Is It Misspecification of Risk?" *Economics and Portfolio Strategy* (15 March), Peter L. Bernstein, Inc.

Investors do not know when they are going to need their money back (for consumption), so the terminal-wealth criterion used by Mehra and Prescott (1985) to frame the ERP puzzle greatly understates the risk of equities (but not of bonds). In addition, some investors face risk from "breaching a threshold" that is not captured by classical utility theory. Thus, a much higher equity risk premium is justified by utility theory than is proposed by Mehra and Prescott.

Longstaff, Francis A., and Monika Piazzesi. 2004. "Corporate Earnings and the Equity Premium." *Journal of Financial Economics*, vol. 74, no. 3 (December):401–421.

Most studies assume that aggregate dividends equal aggregate consumption. This article argues that separating corporate cash flow from aggregate consumption is critical because "corporate cash flows have historically been far more volatile and sensitive to economic shocks than has aggregate consumption" (p. 402). The authors show that the equity premium consists of three components, identified by allowing aggregate dividends and consumption to follow distinct dynamic processes. The first component is called the consumer-risk premium, which is the Mehra and Prescott (1985) equity risk premium proportional to the variance of consumption growth. The second component is the event-risk premium, which compensates for downward jumps. And the third component is the corporate-risk premium, which is proportional to the covariance between the consumption growth rate and the "corporate fraction" (defined as the ratio of aggregate dividends to consumption). Using a risk aversion parameter of 5, the three components are 0.36 percent, 0.51 percent, and 1.39 percent, summing to a total equity premium of 2.26 percent. The authors admit that their model does not solve the ERP puzzle completely and suggest that the ultimate resolution may lie in the integration of their model with other elements, such as habit formation or investor heterogeneity in incomplete markets.

Lundblad, Christian. 2007. "The Risk Return Tradeoff in the Long Run: 1836–2003." *Journal of Financial Economics*, vol. 85, no. 1 (July):123–150. [added April 2008; abstract by Yazann S. Romahi, CFA]

Although the risk–return trade-off is fundamental to finance, the empirical literature has offered mixed results. The author extends the sample considerably and analyzes nearly two centuries of both U.S. and U.K. market returns and finds a positive and statistically significant risk–return trade-off in line with the postulated theory.

Mankiw, N. Gregory. 1986. "The Equity Premium and the Concentration of Aggregate Shocks." *Journal of Financial Economics*, vol. 17, no. 1 (September):211–219.

This article shows that one cannot judge the appropriateness of the equity premium from aggregate data alone, as Mehra and Prescott (1985) did. In an economy where aggregate shocks are not dispersed equally throughout the population, the equity premium depends on the concentrations of these aggregate shocks in particular investors and can be made arbitrarily large by making the shock more and more concentrated.

Mankiw, N. Gregory, and Stephen P. Zeldes. 1991. "The Consumption of Stockholders and Non-Stockholders." *Journal of Financial Economics*, vol. 29, no. 1 (March):97–112.

This article examines whether the consumption of stockholders differs from that of nonstockholders and whether this difference helps to explain the historical equity risk premium. It shows that aggregate consumption of stockholders is more highly correlated with the stock market and is more volatile than the consumption of nonstockholders. A risk aversion parameter of 6 (relative to the magnitude of 30–40 in Mehra and Prescott 1985) can explain the size of the equity premium based on consumption of stockholders alone.

McGrattan, Ellen R., and Edward C. Prescott. 2000. "Is the Stock Market Overvalued?" *Quarterly Review*, Federal Reserve Bank of Minneapolis (Fall):20–40.

Standard macroeconomic growth theory (Cobb–Douglas, etc.) is used to value the corporate sector in the United States. The current capitalization-to-GDP ratio of 1.8 is justified, so the market is not overvalued. "[T]heory . . . predicts that the real returns on debt and equity should both be near 4 percent" (p. 26). Thus, the predicted equity risk premium is small.

———. 2001. "Taxes, Regulations, and Asset Prices." NBER Working Paper #8623.

This paper shows that the large run-up in equity value relative to GDP between 1962 and 2000 is mainly caused by (1) large reductions in individual tax rates, (2) increased opportunities to hold equity in a nontaxed pension plan, and (3) increases in intangible and foreign capital. The authors argue that the high equity risk premium documented by Mehra and Prescott (1985) is not puzzling after these three factors are accounted for. However, in the future, one should expect no further gains from tax policy; the currently expected real return on equities is about 4 percent, down from 8 percent in the early postwar period.

———. 2003. "Average Debt and Equity Returns: Puzzling?" *American Economic Review*, vol. 93, no. 2 (May):392–397.

This article shows that the realized equity premium in the last century was less than 1 percent after accounting for taxes, regulations, and diversification costs. The authors also argue that Treasury bills "provide considerable liquidity services and are a negligible part of individuals' long-term debt holdings" (p. 393). Long-term savings instruments replace short-term government debt in their equity premium calculation.

Mehra, Rajnish. 2003. "The Equity Premium: Why Is It a Puzzle?" *Financial Analysts Journal*, vol. 59, no. 1 (January/February):54–69.

The ERP puzzle literature is easily misunderstood because of its difficulty. Here, the puzzle is stated in language that is accessible to most finance practitioners. First, empirical facts regarding the returns and risks of major asset classes are presented. Then, the theory responsible for the "puzzle" is summarized. Modern asset pricing theory assumes that economic agents pursue and, on average, get fair deals. When one follows this line of reasoning to its conclusion, using the tools of classic growth and real business cycle theory, an equity risk premium of at most 1 percent emerges. An extensive discussion reveals why this is the case and addresses various attempts made by other authors to resolve the puzzle.

Mehra, Rajnish, and Edward C. Prescott. 1985. "The Equity Premium: A Puzzle." *Journal of Monetary Economics*, vol. 15, no. 2 (March):145–161.

In this seminal work, Mehra and Prescott first document the "equity premium puzzle" using a consumption-based asset-pricing model in which the quantity of risk is defined as the covariance of excess stock return with consumption growth and the price of risk is the coefficient of relative risk aversion. Because of the low risk resulting from the smooth historical growth of consumption, the 6 percent equity risk premium in the 1889–1978 period can only be explained by a very high coefficient of risk aversion in the magnitude of 30 to 40. Risk aversion parameters observed in other aspects of financial behavior are around 1. Such a risk aversion parameter is consistent with at most a 1 percent equity risk premium, and possibly one as small as 0.25 percent.

Note that Mehra and Prescott assumed that consumption was equal to aggregate dividends. Because consumption is very smooth and dividends are not as smooth, this comparison may be troublesome.

Philips, Thomas K. 1999. "Why Do Valuation Ratios Forecast Long-Run Equity Returns?" *Journal of Portfolio Management*, vol. 25, no. 3 (Spring):39–44.

In this article, the Edwards–Bell–Ohlson equation,

$$P_0 = B_0 + \sum_{i=1}^{\infty} \left\{ \frac{E\left[\left(ROE_i - r\right) B_{i-1}\right]}{\left(1+r\right)} \right\},$$

where P is price, B is book value, ROE is return on book equity, r is the expected return on equity, and i is the time increment, is first used to derive closed-form expressions for the expected return on equities, stated in terms of both dividends and earnings. Then, the GDP growth rate is introduced as an indicator of earnings growth. Share repurchases are considered to be a part of dividends. This setup leads to the following conclusions: (1) The expected return increases monotonically with book-to-price ratio (B/P), E/P, and D/P; (2) if a corporation's return on equity equals its cost of capital (expected return), then its price-to-book ratio (P/B) should be 1 and its expected return should equal E/P. The analysis suggests that nominal total expected equity returns shrank from almost 14 percent in 1982 to 6.5 percent in 1999 (a larger decline than can be explained by decreases in unanticipated inflation). This decrease in expected return was accompanied by very high concurrent actual returns that were misread by investors as evidence of an *increase* in the expected return. Going forward, investors will not get an increased return.

Rietz, Thomas A. 1988. "The Equity Risk Premium: A Solution." *Journal of Monetary Economics*, vol. 22, no. 1 (July):117–131.

Rietz suggests that the ERP puzzle can be solved by incorporating a very small probability of a very large drop in consumption. In such a scenario, the risk-free rate is much lower than the equity return. In an article published in the same issue, Mehra and Prescott argued that Rietz's model requires a 1 in 100 chance of a 25 percent decline in consumption to reconcile the equity premium with a risk aversion parameter of 10. However, the author says, the largest consumption decline in the last 100 years was only 8.8 percent. Campbell, Lo, and MacKinlay (see Note 3) point out that "the difficulty with Rietz's argument is that it requires not only an economic catastrophe, but one which affects stock market investors more seriously than investors in the short-term debt instruments" (p. 311).

But during the Great Depression, the stock market fell by 86 percent from peak to trough and dividends fell by about half; consumption by stockholders over that period thus probably fell by much more than 8.8 percent. Aggregate consumption at that time included many lower-income people, especially farmers, whose consumption was not directly affected by falling stock prices.

Shiller, Robert J. 2000. *Irrational Exuberance*. Princeton, NJ: Princeton University Press.

This influential book provides a wealth of historical detail on the equity risk premium. Using 10 years of trailing real earnings (see, originally, Graham and Dodd) to estimate normalized P/Es, Shiller concludes that the market is not only overpriced but well outside the range established by previous periods of high stock prices.

Siegel, Jeremy J. 1999. "The Shrinking Equity Premium." *Journal of Portfolio Management*, vol. 26, no. 1 (Fall):10–19.

In contrast to Siegel (2002), analysis of dividend and earnings multiples suggests a real return (not an equity risk premium) of only 3.1–3.7 percent for stocks, lower than the then-current real TIPS yield. Although then-current high prices suggest higher-than-historical earnings growth, investors are likely to realize lower returns than in the past. (Incidentally, past achieved returns are lower than index returns because of transaction costs and lack of diversification.) On the positive side, the Jorion and Goetzmann (1999) finding that world markets returned a real capital gain of only 0.8 percent from 1921 to the present, compared with 4.3 percent in the United States, is misstated because the analysis is of the median portfolio, not the average. The GDP-weighted average is only 0.28 percent short of the U.S. return and is higher than the U.S. return if converted to dollars (although Jorion and Goetzmann point out that the large initial size of the United States causes the annualized world index return to lie within 1 percent of the U.S. return by construction).

———. 2002. *Stocks for the Long Run*. 3rd ed. New York: McGraw-Hill.

Siegel argues for a U.S. equity risk premium of 2–3 percent, about half of the historic equity risk premium. He expects a future real return on equity of about 6 percent, justified by several positive factors. Siegel considers an equity risk premium as low as 1 percent but clearly sees that stocks must yield more than inflation-indexed bond yields (3.5 percent at the time of the book). He turns to earnings yield arguments to answer the question of how much more. A Tobin's *q* greater than 1 in 2001 leads Siegel to see the earnings yield as understated. In addition, the overinvestment in many technology companies led to a drop in the cost of productivity-enhancing investments, which allows companies to buy back shares or raise dividends. In technology, an excess supply of capital, overbuilding, and a subsequent price collapse provide a technological base to benefit the economy and future shareholder returns. Also, the United States is still seen as an entrepreneurial nation to attract a growing flow of investment funds seeking a safe haven, leading to higher equity prices. Furthermore, short-run room for growth in corporate profits is another positive factor for future real return enhancement.

———. 2005. "Perspectives on the Equity Risk Premium." *Financial Analysts Journal*, vol. 61, no. 6 (November/December):61–73.

This article reviews and discusses the ERP literature as follows: (1) a summary of data used in equity premium calculation and their potential biases, (2) a discussion of academic attempts to find models to fit the data, (3) the practical applications of some proposed models, and (4) a discussion of the future equity risk premium.

Siegel, Jeremy J., and Richard H. Thaler. 1997. "Anomalies: The Equity Premium Puzzle." *Journal of Economic Perspectives*, vol. 11, no. 1 (Winter):191–200.

Proposed resolutions of the ERP puzzle fall into two categories: (1) observations that the stock market is riskier, or the equity risk premium is smaller, than generally thought, and (2) different theoretical frameworks that would make the observed risk aversion rational. Neither approach has been "completely successful" in explaining why, if stocks are so rewarding, investors don't hold more of them.

Weil, Philippe. 1989. "The Equity Premium Puzzle and the Risk-Free Rate Puzzle." *Journal of Monetary Economics*, vol. 24, no. 3 (November):401–421.

A critique of the power utility function used by Mehra and Prescott (1985) is the tight link between risk aversion and intertemporal substitution. This article shows that the ERP puzzle cannot be solved by simply separating risk aversion for intertemporal substitution.

Weitzman, Martin L. "Prior-Sensitive Expectations and Asset-Return Puzzles." Forthcoming. *American Economic Review*.

This article presents one unified Bayesian theory that explains the ERP puzzle, risk-free rate puzzle, and excess volatility puzzle. The author shows that Bayesian updating of unknown structural parameters introduces a permanent thick tail to posterior expectation that can account for, and even reverse, major asset-return puzzles.

Welch, Ivo. 2000. "Views of Financial Economists on the Equity Premium and Professional Controversies." *Journal of Business*, vol. 73, no. 4 (October):501–537.

This paper presents the results of a comprehensive survey of 226 financial economists. The main findings are: (1) the average arithmetic 30-year equity premium forecast is about 7 percent; (2) short-term forecasts are lower than the long-term forecast, in the range of 6–7 percent; (3) economists perceive that their consensus is about 0.5–1 percent higher than it actually is.

———. 2001. "The Equity Premium Consensus Forecast Revisited." Working paper, Yale University.
The equity premium forecast in this 2001 survey declined significantly compared with the 1998 survey. The one-year forecast is 3–3.5 percent, and the 30-year forecast stands at 5–5.5 percent.

I would like to thank Laurence Siegel, research director of the Research Foundation of CFA Institute, for his assistance and for providing much of the foundation for this project with his earlier work on the equity risk premium. I am also grateful to the Research Foundation for financial support.

This publication qualifies for 1 CE credit.

S&P 500® January Price Return: -3.70%
S&P SmallCap 600® January Price Return: -3.45%

The Market

S&P 500

The market began 2010 with a six-day rally (the record is 7 days in 1987) until into the arms of volatility it fell. Over the following five days (days 10 through 14), the market moved at least 1% on higher volume. Later in January, three consecutive days of declines produced a 5.08% loss for the S&P 500, and saw the VIX jump from 17.58 to 27.31. The VIX settled the month at 24.66. The largest daily downturn, however, was the 2.21% decline on January 22nd, which, when compared to 2009 at this time, is mild.

The S&P 500 finished January down 3.70%, its second monthly loss (October 2009 at -1.98%) since the March 2009 recovery. The index is still 58.73% up from its March low, however. Of the 82 Januarys in the history of S&P 500 from 1929, 52 have been positive and 29 have been negative. Of the 52 January gains, 42 were positive for the entire year and 9 were down (1947 was flat). Of the 29 Januarys that were down, 18 were down for the year and 11 were up. The result is that 60 of the 81 (74.1%) Januarys in the index's history ended the full year in the same direction as it opened, and 21 did not (25.9%).

Nine of the ten sectors were down in January, with Health Care posting the only sector gain for the month, at +0.42%. Telecommunications was the sector that was down the most in January, with a 9.32% decline. T, which represents 52% of the sector, was down 9.53% for the month. One-year returns remain strongly positive for eight of the ten sectors, with Telecommunications and Utilities showing mild single-digit gains of +4.62% and +2.19%, respectively.

S&P SmallCap 600

The S&P SmallCap 600 started 2010 with a broad 2.11% advance. Unfortunately, that was the best day of the month for the index. As uncertainty set in with low volume, an upward seesaw period pushed the S&P SmallCap 600 up 3.42% by January 19th, to a market level not seen since October 1, 2008. From there, however, the markets turned negative due to a combination of domestic banking and tax issues, as well as global concerns over China pulling back on its lending. From January 19th on, the index declined 6.64% to post a 3.45% loss for the month; its second monthly loss (October 2009 at -5.79%) since the market recovery started in March 2009. Just as the opening gain was broad, the monthly loss was broad as well with just 188 issues up for the month averaging +9.57%, compared to 536 issues up in December 2009 averaging +10.38%, and 408 issues declining with an average of 7.91% in January versus 63 decliners averaging 5.14% in December 2009.

All ten sectors within the S&P SmallCap 600 were in the red for the month, with Telecommunications declining another 16.73% for a one-year decline of 43.06%. For the year, the other nine sectors remain positive. Of greater concern this month was Information Technology, which declined 6.59% due to concerns regarding sales and growth for 2010 – the sector makes up 17.23% of the index.

Percent Price Change: S&P 500

	JANUARY 2010	3-MONTHS 10/30/2009	YTD 1/30/2009	1-YEAR 1/31/2008	5-YEARS 1/31/2005	FROM 3/24/2000	10-YEARS ANNUALIZED
S&P 500	**-3.70%**	**3.64%**	**30.03%**	**-22.10%**	**-9.09%**	**-29.70%**	**-2.58%**
Consumer Discret	-2.95%	8.07%	50.70%	-10.93%	-14.63%	-20.06%	-1.83%
Consumer Staples	-1.25%	1.86%	18.93%	-4.47%	13.07%	62.68%	3.40%
Energy	-4.51%	-2.76%	9.74%	-23.57%	38.48%	96.10%	6.97%
Financials	-1.48%	1.00%	53.98%	-51.01%	-52.46%	-42.89%	-4.77%
Health Care	0.42%	11.56%	19.10%	-6.64%	7.26%	13.61%	0.50%
Industrials	-1.21%	8.57%	32.64%	-29.09%	-14.79%	-11.99%	-0.34%
Info Technology	-8.45%	1.50%	51.05%	-5.76%	8.69%	-65.39%	-7.57%
Materials	-8.66%	3.13%	43.00%	-26.82%	2.84%	33.80%	2.61%
Telecomm Svc	-9.32%	0.88%	4.64%	-31.44%	-12.86%	-67.16%	-10.38%
Utilities	-5.10%	4.01%	2.19%	-25.43%	3.89%	1.43%	-0.50%

Percent Price Change: S&P SmallCap 600

	JANUARY 2010	3-MONTHS (10/31/2009)	1-YEAR (1/31/2009)	2-YEAR (1/31/2008)	3-YEAR (1/31/2007)	FROM 10/9/2002	FROM 3/24/2000
S&P 600	**-3.45%**	**7.38%**	**37.05%**	**-14.48%**	**-21.29%**	**88.10%**	**46.55%**
Energy	-5.26%	3.74%	60.59%	-9.71%	1.62%	303.66%	302.64%
Materials	-8.01%	7.88%	62.65%	-24.88%	-28.20%	120.60%	77.72%
Industrials	-4.88%	4.64%	27.30%	-16.83%	-15.91%	116.51%	78.66%
Consumer Discret	-1.51%	7.41%	71.32%	-14.55%	-37.70%	38.20%	43.04%
Consumer Staples	-2.97%	7.97%	43.49%	22.40%	14.87%	119.80%	197.26%
Health Care	-1.41%	12.09%	29.63%	-9.55%	-3.01%	114.02%	119.27%
Financials	-0.17%	9.74%	18.29%	-35.00%	-50.98%	-1.04%	37.27%
Info Technology	-6.59%	5.83%	50.75%	-7.81%	-10.25%	115.33%	-45.84%
Telecomm Svc	-16.72%	-3.95%	-43.06%	-75.88%	-85.81%	-72.04%	-98.22%
Utilities	-3.88%	4.71%	1.63%	-4.61%	-7.29%	87.29%	109.23%

Breadth

Monthly Breadth: S&P 500

PERIOD	UP ISSUES	UNCHANGED ISSUES	DOWN ISSUES	AVERAGE % CHANGE	TOP 10 BY MKT VAL % AVG CHG	TOP 50 BY MKT VAL % AVG CHG	S&P 500 % CHANGE
Jan,'10	133	1	366	-3.16	-2.62	-2.89	-3.70
Dec,'09	377	0	123	4.63	-0.16	0.75	1.78
Nov,'09	403	2	95	5.19	5.65	6.29	5.74
Oct,'09	162	0	338	-3.52	-0.22	-0.65	-1.98

Monthly Breadth: S&P SmallCap 600

PERIOD	AVERAGE % CHANGE	UP ISSUES	AVERAGE % CHANGE	DOWN ISSUES	AVERAGE % CHANGE	TOP 100	BOTTOM 100	S&P 600 % CHANGE
Jan,'10	-2.38	188	9.57	408	-7.91	-3.02	-1.25	-3.45
Dec,'09	8.73	536	10.38	63	-5.14	9.73	8.78	8.49
Nov,'09	2.59	346	9.35	254	-6.61	4.48	-0.50	2.53
Oct,'09	-7.13	134	6.84	466	-11.14	-3.03	-15.79	-5.79

Earnings

S&P 500

With 214 issues (56.2% of the market value) reported, earnings on a weighted basis are running well above expectations, and are drastically better than the Q4 2008 comparisons – a quarter which posted the worst earnings in S&P 500 history. Sales in aggregate are running 4.1% ahead of estimates and 6.5% above Q4 2008. However, ex the Financials sector, sales are only up 2.6% from estimates and 3.3% from Q4 2008. Operating margins are high again at 8.09%, with S&P's full quarter estimate at 7.22%, as slow growth is offset by prior cost cutting to produce a bottom-line improvement. As Reported margins are at 7.15%, and are expected to decline to 6.45% as some unusual items are posted. Overall, however, the numbers show continued bottom-line improvement but a much slower top-line advance. For the recovery to continue, sales will need to increase.

To date, 75.6% of the issues have beaten their estimated sales, with 57.9% beating last year's sales, and 48.3% beating both. 71.8% of the issues have beaten their estimated Operating EPS, with 65.6% beating last year's EPS, and 46.7% doing both.

S&P SmallCap 600

Price-to-earnings ratios were high based on 2009 EPS. EPS ratios were more moderate when based on 2010, however, reflecting the expected 81% gain in 2010 over 2009 after a 4% decline over 2008 and a 46% decline in 2007.

Operating EPS Change: S&P 500

QUARTERTLY CHANGE	Q2 2009 OVER Q2 2008	Q3 2009 OVER Q3 2008	Q4 2009 OVER Q4 2008	Q1 2010 OVER Q1 2009
S&P 500	-18.85%	-1.12%	17966.84%	69.56%
Consumer Discretionary	65.35%	157.35%	1019.15%	676.41%
Consumer Staples	8.11%	4.62%	8.62%	9.24%
Energy	-66.26%	-71.39%	49.80%	1621.39%
Financials	196.09%	124.71%	112.56%	439.59%
Health Care	4.13%	10.11%	19.56%	10.55%
Industrials	-37.18%	-40.63%	-19.67%	10.31%
Information Technology	-20.55%	3.03%	122.00%	73.09%
Materials	-64.80%	-33.90%	142.73%	143.17%
Telecommunication Services	-16.41%	-10.58%	-2.30%	-4.20%
Utilities	-5.93%	-4.99%	6.85%	9.58%

Operating EPS Change: S&P SmallCap 600

QUARTERTLY CHANGE	Q2 2009 OVER Q2 2008	Q3 2009 OVER Q3 2008	Q4 2009 OVER Q4 2008	Q1 2010 OVER Q1 2009
S&P SmallCap600	-57.13%	-35.55%	493.88%	429.73%
Consumer Discretionary	-59.66%	358.06%	329.84%	281.99%
Consumer Staples	11.56%	29.63%	-20.91%	-15.48%
Energy	-67.30%	-81.54%	120.96%	318.75%
Financials	-150.98%	-402.69%	118.69%	170.44%
Health Care	-1.77%	31.90%	10.66%	19.31%
Industrials	-45.62%	-32.85%	9.16%	55.84%
Information Technology	-95.01%	-1.50%	1085.37%	410.76%
Materials	-39.48%	-12.02%	181.71%	31381.27%
Telecommunication Services	-102.48%	-75.38%	113.10%	-51.93%
Utilities	0.32%	-42.44%	11.48%	11.83%

Returns

Monthly Returns: S&P 500

MONTH OF	PRICE CLOSE	PRICE CHANGE	1 MONTH % CHANGE	3 MONTH % CHANGE	6 MONTH % CHANGE	1 YEAR % CHANGE
01/2010	1073.87	-41.23	-3.70%	3.64%	8.75%	30.03%
12/2009	1115.10	19.47	1.78%	5.49%	21.30%	23.45%
11/2009	1095.63	59.44	5.74%	7.35%	19.20%	22.25%
10/2009	1036.19	-20.88	-1.98%	4.93%	18.72%	6.96%
09/2009	1057.08	36.45	3.57%	14.98%	32.49%	-9.37%
08/2009	1020.62	33.14	3.36%	11.04%	38.84%	-20.44%
07/2009	987.48	68.16	7.41%	13.14%	19.57%	-22.08%
06/2009	919.32	0.18	0.02%	15.22%	1.78%	-28.18%
05/2009	919.14	46.33	5.31%	25.04%	2.56%	-34.36%
04/2009	872.81	74.94	9.39%	5.68%	-9.90%	-37.01%
03/2009	797.87	62.77	8.54%	-11.67%	-31.59%	-39.68%
02/2009	735.09	-90.79	-10.99%	-17.98%	-42.70%	-44.76%
01/2009	825.88	-77.37	-8.57%	-14.75%	-34.84%	-40.09%

Monthly Returns: S&P SmallCap 600

MONTH OF	PRICE CLOSE	PRICE CHANGE	1 MONTH % CHANGE	3 MONTH % CHANGE	6 MONTH % CHANGE	1 YEAR CHANGE
01/2010	321.14	-11.49	-3.45%	7.38%	8.59%	37.05%
12/2009	332.63	26.02	8.49%	4.79%	23.97%	23.78%
11/2009	306.62	7.56	2.53%	1.45%	15.75%	20.83%
10/2009	299.06	-18.37	-5.79%	1.13%	14.61%	3.96%
09/2009	317.43	15.21	5.03%	18.30%	42.71%	-11.99%
08/2009	302.22	6.50	2.20%	14.09%	46.74%	-21.98%
07/2009	295.73	27.40	10.21%	13.33%	26.21%	-20.53%
06/2009	268.32	3.43	1.30%	20.63%	-0.15%	-26.48%
05/2009	264.89	3.96	1.52%	28.61%	4.39%	-32.99%
04/2009	260.93	38.50	17.31%	11.36%	-9.29%	-31.13%
03/2009	222.43	16.47	8.00%	-17.23%	-38.33%	-38.99%
02/2009	205.96	-28.36	-12.10%	-18.84%	-46.83%	-43.37%
01/2009	234.32	-34.41	-12.80%	-18.55%	-37.03%	-37.60%

Dividends

S&P 500

2009 marked the worst year on record for dividends since 1955. For the year, there were 1,191 increases, which is a drop of 36.4% from the 1,874 increases of 2008, and a 52.6% decline from the 2,513 increases of 2007. The year saw 804 decreases, marking a 631% gain over the 110 decreases of 2007.

In January, 15 issues increased, 3 initiated, 0 decreased and 0 suspended versus 17 increases, 0 initiations, 10 decreases, and 1 suspension for the same period in 2009 and 31 increases, 0 initiations, 5 decreases, and 1 suspension for January 2008. For the month, payers outperformed non-payers by losing less: payers were down 2.48% compared to non-payers decline of 4.75%. Outside of the S&P 500 (NY, ASE, NASD common) dividends continued to improve. January saw 133 increases compared to 114 increases for January 2009 and 223 increases for January 2008, and 17 decreases for the month compared to 92 decreases in January 2009 and 20 decreases in January 2008.

Issue Indicated Dividend Rate Change: S&P 500

	INCREASES	INITIALS	DECREASES	SUSPENSIONS
2010: January	15	3	1	0
2009: January	17	0	10	1
2008: January	31	0	5	1
2007: January	28	1	1	1

Dividend Total Return Performance: S&P 500

	Average S&P 500 Payers	Average S&P 500 Non-payers
Month - average change	-2.48%	-4.75%
12 Month	35.82%	62.99%
Issues	366	134
Average Yield	2.03%	

World Markets

Global markets started 2010 positive, continuing to add to their 34% 2009 record. However, as January progressed, the markets lost momentum. While rates remained relatively stable, China moved to restrict its lending policy and excess liquidity in an effort to reduce the speed of growth. As a result, China posted a 10.7% Q4 2009 GDP gain, while in the United States, Q4 2009 GDP came in higher than expected at 5.7%. For the month, emerging markets were mixed, with seven markets gaining and thirteen declining. Overall, emerging markets were down 5.33%, with Egypt up 8.34% and Taiwan (-6.86%), China (-8.49%), and Brazil (-10.62%) all declining. Developed markets were down 3.97% in January, with 22 of the 25 markets in the red. Notable was Japan, which gained 2.00%, Greece which declined 10.86% due to debt issues, and the United States which was down 3.51% for the month.

S&P Global Broad Market Index (BMI): Emerging, January 2010

BMI MEMBER	1-MONTH	3-MONTHS	1 YEAR	2-YEARS
Global	**-4.12%**	**1.77%**	**40.45%**	**-21.47%**
Global Ex-U.S.	**-4.56%**	**0.01%**	**46.43%**	**-22.24%**
Emerging	**-5.33%**	**3.12%**	**83.31%**	**-11.68%**
Egypt	8.34%	-2.17%	72.67%	-33.37%
Turkey	3.87%	16.66%	128.75%	0.64%
Indonesia	3.14%	11.64%	155.55%	-8.21%
Czech Republic	3.11%	0.00%	51.61%	-25.56%
Russia	2.44%	9.08%	144.23%	-33.56%
Chile	1.98%	14.90%	68.66%	11.51%
Israel	1.17%	12.39%	61.26%	8.63%
Morocco	0.61%	-3.04%	15.84%	-24.42%
Hungary	0.48%	2.56%	132.88%	-25.45%
Malaysia	-0.43%	0.65%	50.41%	-17.59%
Poland	-1.61%	4.30%	83.79%	-33.41%
India	-4.35%	7.07%	92.76%	-21.55%
Philippines	-4.80%	2.83%	65.36%	-20.07%
Thailand	-5.12%	2.35%	71.25%	-12.61%
South Africa	-5.29%	4.52%	66.91%	-2.01%
Mexico	-5.55%	6.23%	67.88%	-17.82%
Peru	-5.78%	-3.61%	84.80%	3.61%
Taiwan	-6.86%	6.11%	89.69%	-1.33%
China	-8.49%	-4.15%	65.47%	-9.41%
Brazil	-10.62%	-1.51%	93.46%	-5.85%

S&P Global Broad Market Index (BMI): Developed, January 2010

BMI MEMBER	1-MONTH	3-MONTHS	1 YEAR	2-YEARS
Developed	**-3.97%**	1.60%	36.31%	-22.57%
Developed Ex-U.S.	**-4.37%**	-0.72%	39.57%	-24.42%
Denmark	**2.32%**	3.73%	45.83%	-19.91%
Finland	**2.01%**	7.33%	39.78%	-43.76%
Japan	**2.00%**	0.72%	13.40%	-21.53%
Ireland	**-1.60%**	6.21%	54.33%	-56.13%
Belgium	**-2.21%**	-0.33%	56.64%	-42.30%
Sweden	**-2.33%**	-2.27%	81.62%	-14.09%
Switzerland	**-2.85%**	0.26%	36.85%	-10.91%
Netherlands	**-3.40%**	2.17%	48.63%	-22.99%
United States	**-3.51%**	4.37%	32.67%	-20.52%
Austria	**-3.55%**	-4.98%	62.25%	-39.56%
Norway	**-4.12%**	5.66%	78.79%	-22.51%
United Kingdom	**-4.37%**	0.02%	41.59%	-28.01%
New Zealand	**-4.84%**	-4.66%	50.53%	-31.39%
Korea	**-5.01%**	2.99%	67.25%	-18.34%
Singapore	**-5.57%**	3.70%	76.54%	-10.39%
Hong Kong	**-6.07%**	-3.75%	57.29%	-17.62%
France	**-6.89%**	-2.54%	38.22%	-25.28%
Canada	**-7.07%**	3.17%	51.35%	-19.66%
Australia	**-7.28%**	-3.32%	84.57%	-18.80%
Italy	**-8.05%**	-6.18%	32.12%	-40.22%
Germany	**-8.40%**	-2.49%	37.41%	-30.76%
Portugal	**-9.62%**	-10.10%	31.06%	-34.63%
Greece	**-10.86%**	-30.37%	19.09%	-57.94%
Luxembourg	**-10.99%**	13.31%	66.00%	-34.94%
Spain	**-11.17%**	-10.20%	35.00%	-26.11%

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Market Attributes: U.S. Equities is a monthly snapshot of the U.S. market, as measured by the S&P 500 and the S&P SmallCap 600. It seeks to highlight those statistical factors that have impacted market performance over the course of the month, such as stock buybacks, cash levels, and dividend payments.
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2014 OASDI Trustees Report

2. Estimates as a Percentage of Gross Domestic Product

This section contains long-range projections of the operations of the theoretical combined Old-Age and Survivors Insurance and Disability Insurance (OASI and DI) Trust Funds and of the Hospital Insurance (HI) Trust Fund, expressed as a percentage of gross domestic product (GDP). While expressing fund operations as a percentage of taxable payroll is the most useful approach for assessing the financial status of the programs (see section IV.B.1), expressing them as a percentage of the total value of goods and services produced in the United States provides an additional perspective.

Table VI.G4 shows non-interest income, total cost, and the resulting balance of the combined OASI and DI Trust Funds, of the HI Trust Fund, and of the combined OASI, DI, and HI Trust Funds, expressed as percentages of GDP on the basis of each of the three alternative sets of assumptions. Table VI.G4 also contains estimates of GDP. For OASDI, non-interest income consists of payroll tax contributions, proceeds from taxation of benefits, and reimbursements from the General Fund of the Treasury, if any. Cost consists of scheduled benefits, administrative expenses, financial interchange with the Railroad Retirement program, and payments for vocational rehabilitation services for disabled beneficiaries. For HI, non-interest income consists of payroll tax contributions (including contributions from railroad employment), up to an additional 0.9 percent tax on earned income for relatively high earners, proceeds from taxation of OASDI benefits, and reimbursements from the General Fund of the Treasury, if any. Cost consists of outlays (benefits and administrative expenses) for insured beneficiaries. The Trustees show income and cost estimates on a cash basis for the OASDI program and on an incurred basis for the HI program.

The Trustees project the OASDI annual balance (non-interest income less cost) as a percentage of GDP to be negative throughout the projection period under the intermediate and high-cost assumptions, and to be negative through 2076 under the low-cost assumptions. Under the low-cost assumptions the OASDI annual deficit as a percentage of GDP decreases through 2018. After 2018, deficits increase to a peak in 2033 and then decrease through 2076, after which annual balances are positive, reaching 0.07 percent of GDP in 2088. Under the intermediate assumptions, annual deficits decrease from 2014 to 2015, generally increase through 2037, decrease from 2037 through 2051, and mostly increase thereafter. Under the high-cost assumptions, annual deficits increase throughout the projection period.

The Trustees project that the HI balance as a percentage of GDP will be positive throughout the projection period under the low-cost assumptions. Under the intermediate assumptions, the HI balance is negative for each year of the projection period except for 2015-21. Annual deficits increase through 2049 and remain relatively stable thereafter. Under the high-cost assumptions, the HI balance is negative for all years of the projection period. Annual deficits reach a peak in 2075 and mostly decline thereafter.

The combined OASDI and HI annual balance as a percentage of GDP is negative throughout the projection period under both the intermediate and high-cost assumptions. Under the low-cost assumptions, the combined OASDI and HI balance is negative through 2015, positive from 2016 through 2024, negative from 2025 through 2037, and then positive and mostly rising thereafter. Under the intermediate assumptions, combined OASDI and HI annual deficits decline from 2014 through 2017, increase from 2017 through 2041, and mostly decrease through 2052. After 2052, annual deficits generally rise, reaching 2.18 percent of GDP by 2088. Under the high-cost assumptions, combined annual deficits rise throughout the projection period.

By 2088, the combined OASDI and HI annual balances as percentages of GDP range from a positive balance of 0.85 percent for the low-cost assumptions to a deficit of 7.01 percent for the high-cost assumptions. Balances differ by a much smaller amount for the tenth year, 2023, ranging from a positive balance of 0.11 percent for the low-cost assumptions to a deficit of 1.82 percent for the high-cost assumptions.

The summarized long-range (75-year) balance as a percentage of GDP for the combined OASDI and HI programs varies among the three alternatives by a relatively large amount, from a positive balance of 0.53 percent under the low-cost assumptions to a deficit of 4.20 percent under the high-cost assumptions. The 25-year summarized balance varies by a smaller amount, from a positive balance of 0.35 percent to a deficit of 2.12 percent. Summarized rates are calculated on a present-value basis. They include the trust fund balances on January 1, 2014 and the cost of reaching a target trust fund level equal to 100 percent of the following year's annual cost at the end of the period. (See section IV.B.4 for further explanation.)

Table VI.G4.—OASDI and HI Annual and Summarized Income, Cost, and Balance as a Percentage of GDP, Calendar Years 2014-90

Calendar year	OASDI Income[a]	OASDI Cost	OASDI Balance	HI Income[a]	HI Cost	HI Balance	Combined Income[a]	Combined Cost	Combined Balance	GDP in dollars (billions)
Intermediate:										
2014	4.46	4.92	-0.45	1.45	1.50	-0.05	5.92	6.42	-0.50	$17,557
2015	4.57	4.94	-.37	1.47	1.44	.03	6.04	6.38	-.34	18,426
2016	4.59	4.97	-.38	1.49	1.44	.05	6.08	6.41	-.33	19,377
2017	4.63	5.01	-.38	1.51	1.45	.06	6.14	6.46	-.32	20,400
2018	4.67	5.06	-.39	1.53	1.48	.05	6.20	6.55	-.34	21,475
2019	4.70	5.13	-.44	1.54	1.50	.04	6.24	6.63	-.39	22,578
2020	4.71	5.21	-.50	1.55	1.53	.02	6.27	6.74	-.47	23,694
2021	4.73	5.29	-.55	1.56	1.56	[b]	6.30	6.85	-.55	24,815
2022	4.75	5.38	-.63	1.57	1.60	-.03	6.32	6.98	-.66	25,935
2023	4.76	5.48	-.72	1.58	1.63	-.05	6.34	7.11	-.77	27,091
2025	4.76	5.66	-.90	1.60	1.74	-.15	6.36	7.41	-1.05	29,575
2030	4.76	6.01	-1.25	1.63	1.91	-.28	6.39	7.92	-1.53	36,750
2035	4.75	6.16	-1.41	1.66	2.06	-.40	6.41	8.21	-1.81	45,659
2040	4.73	6.12	-1.39	1.67	2.17	-.50	6.40	8.29	-1.89	57,003
2045	4.70	6.03	-1.33	1.69	2.24	-.55	6.39	8.27	-1.88	71,254
2050	4.67	5.97	-1.30	1.70	2.26	-.56	6.37	8.24	-1.87	88,833

2055	4.64	5.97	-1.33	1.72	2.27	-.54	6.36	8.24	-1.88	110,392
2060	4.61	6.01	-1.40	1.74	2.28	-.54	6.35	8.29	-1.94	136,921
2065	4.58	6.05	-1.47	1.76	2.31	-.55	6.34	8.36	-2.02	169,890
2070	4.55	6.09	-1.54	1.77	2.35	-.57	6.32	8.44	-2.11	211,004
2075	4.52	6.10	-1.57	1.78	2.38	-.59	6.31	8.47	-2.16	262,181
2080	4.50	6.07	-1.57	1.79	2.37	-.58	6.29	8.44	-2.15	325,644
2085	4.48	6.08	-1.61	1.80	2.36	-.55	6.28	8.44	-2.16	403,770
2090	4.46	6.14	-1.68	1.82	2.34	-.52	6.28	8.48	-2.20	499,900
Summarized rates: c										
25-year:										
2014-38	5.33	5.87	-.54	1.64	1.83	-.19	6.97	7.70	-.73	
50-year:										
2014-63	5.04	5.91	-.87	1.67	2.00	-.34	6.71	7.91	-1.20	
75-year:										
2014-88	4.91	5.93	-1.02	1.70	2.08	-.39	6.61	8.01	-1.41	
Low-cost:										
2014	4.44	4.85	-.40	1.45	1.45	b	5.90	6.29	-.40	17,771
2015	4.58	4.77	-.18	1.47	1.35	.12	6.06	6.12	-.06	19,032
2016	4.59	4.73	-.14	1.49	1.32	.17	6.08	6.05	.03	20,464
2017	4.65	4.73	-.08	1.51	1.30	.21	6.16	6.04	.12	21,918
2018	4.71	4.76	-.06	1.53	1.31	.22	6.23	6.07	.16	23,335
2019	4.74	4.80	-.06	1.54	1.29	.24	6.28	6.09	.18	24,843
2020	4.76	4.84	-.08	1.55	1.29	.25	6.31	6.13	.18	26,401
2021	4.79	4.88	-.09	1.56	1.30	.26	6.34	6.18	.17	27,969
2022	4.82	4.93	-.12	1.57	1.30	.26	6.38	6.24	.15	29,611
2023	4.84	4.99	-.16	1.57	1.31	.27	6.41	6.30	.11	31,324
2025	4.84	5.10	-.26	1.59	1.34	.25	6.44	6.44	-.01	35,064
2030	4.85	5.28	-.43	1.64	1.34	.30	6.49	6.62	-.13	46,398
2035	4.85	5.31	-.45	1.68	1.31	.37	6.53	6.61	-.08	61,419
2040	4.85	5.20	-.35	1.71	1.23	.48	6.56	6.43	.13	81,834
2045	4.84	5.06	-.22	1.74	1.17	.57	6.58	6.23	.35	109,456
2050	4.82	4.97	-.14	1.77	1.12	.65	6.59	6.08	.51	146,344
2055	4.81	4.93	-.12	1.80	1.08	.72	6.61	6.01	.60	195,464
2060	4.80	4.93	-.13	1.83	1.07	.76	6.63	6.00	.63	261,102
2065	4.79	4.91	-.11	1.85	1.08	.76	6.64	5.99	.65	349,338
2070	4.78	4.87	-.09	1.87	1.11	.76	6.65	5.98	.66	468,439
2075	4.77	4.80	-.03	1.88	1.13	.75	6.65	5.94	.72	629,283
2080	4.77	4.71	.06	1.89	1.14	.75	6.66	5.85	.81	845,859
2085	4.77	4.68	.09	1.91	1.14	.77	6.67	5.82	.86	1,135,314
2090	4.77	4.72	.06	1.93	1.15	.78	6.70	5.86	.84	1,521,298
Low-cost (Cont.):										
Summarized rates: c										
25-year:										

2014-38	5.36	5.28	.08	1.64	1.37	.27	6.99	6.65	.35	
50-year:										
2014-63	5.12	5.13	-.01	1.70	1.25	.45	6.82	6.38	.43	
75-year:										
2014-88	5.03	5.03	b	1.75	1.22	.53	6.77	6.24	.53	
High-cost:										
2014	4.49	5.01	-.52	1.45	1.56	-.11	5.94	6.57	-.63	17,268
2015	4.54	5.14	-.61	1.47	1.54	-.08	6.01	6.69	-.68	17,750
2016	4.57	5.26	-.68	1.49	1.57	-.08	6.06	6.83	-.77	18,332
2017	4.60	5.35	-.75	1.51	1.61	-.10	6.11	6.97	-.85	19,002
2018	4.64	5.46	-.82	1.53	1.68	-.15	6.17	7.15	-.98	19,710
2019	4.65	5.58	-.92	1.54	1.74	-.19	6.20	7.32	-1.12	20,442
2020	4.67	5.70	-1.03	1.56	1.81	-.25	6.23	7.51	-1.29	21,200
2021	4.68	5.80	-1.12	1.57	1.89	-.32	6.25	7.69	-1.44	21,983
2022	4.69	5.92	-1.23	1.59	1.98	-.39	6.28	7.90	-1.62	22,758
2023	4.70	6.05	-1.36	1.60	2.06	-.46	6.29	8.11	-1.82	23,522
2025	4.70	6.31	-1.62	1.61	2.29	-.68	6.30	8.60	-2.30	25,060
2030	4.68	6.85	-2.17	1.63	2.76	-1.12	6.32	9.61	-3.30	29,275
2035	4.66	7.16	-2.49	1.65	3.28	-1.63	6.31	10.44	-4.12	34,167
2040	4.63	7.25	-2.61	1.66	3.77	-2.11	6.29	11.01	-4.72	39,978
2045	4.59	7.25	-2.66	1.66	4.21	-2.55	6.25	11.46	-5.21	46,683
2050	4.54	7.26	-2.72	1.66	4.51	-2.85	6.20	11.77	-5.57	54,209
2055	4.49	7.34	-2.84	1.66	4.68	-3.02	6.16	12.02	-5.86	62,586
2060	4.45	7.46	-3.01	1.67	4.77	-3.11	6.12	12.24	-6.12	71,948
2065	4.41	7.61	-3.20	1.67	4.82	-3.14	6.08	12.43	-6.34	82,599
2070	4.37	7.77	-3.41	1.68	4.87	-3.19	6.05	12.64	-6.59	94,757
2075	4.33	7.92	-3.59	1.69	4.90	-3.20	6.02	12.81	-6.79	108,592
2080	4.29	8.02	-3.73	1.70	4.86	-3.16	5.99	12.88	-6.89	124,200
2085	4.25	8.14	-3.88	1.71	4.79	-3.08	5.96	12.93	-6.97	141,718
2090	4.22	8.25	-4.03	1.72	4.83	-3.12	5.94	13.09	-7.15	161,487
Summarized rates: c										
25-year:										
2014-38	5.32	6.57	-1.26	1.64	2.50	-.86	6.96	9.07	-2.12	
50-year:										
2014-63	4.98	6.86	-1.88	1.65	3.30	-1.65	6.63	10.16	-3.53	
75-year:										
2014-88	4.83	7.07	-2.24	1.66	3.63	-1.97	6.49	10.70	-4.20	

a Income for individual years excludes interest on the trust funds. Interest is implicit in all summarized values.

[b] Between 0 and 0.005 percent of GDP.

[c] Summarized rates are calculated on a present-value basis. They include the value of the trust funds on January 1, 2014 and the cost of reaching a target trust fund level equal to 100 percent of annual cost at the end of the period.

Note: Totals do not necessarily equal the sums of rounded components.

To compare trust fund operations expressed as percentages of taxable payroll and those expressed as percentages of GDP, table VI.G5 displays ratios of OASDI taxable payroll to GDP. HI taxable payroll is about 25 percent larger than the OASDI taxable payroll throughout the long-range period; see section 1 of this appendix for a detailed description of the difference. The cost as a percentage of GDP is equal to the cost as a percentage of taxable payroll multiplied by the ratio of taxable payroll to GDP.

Table VI.G5.—Ratio of OASDI Taxable Payroll to GDP, Calendar Years 2014-90

Calendar year	Intermediate	Low-cost	High-cost
2014	0.352	0.353	0.352
2015	.353	.354	.352
2016	.356	.357	.354
2017	.359	.361	.355
2018	.361	.365	.357
2019	.363	.367	.358
2020	.364	.369	.358
2021	.365	.370	.358
2022	.365	.372	.359
2023	.365	.373	.358
2025	.364	.373	.357
2030	.362	.372	.353
2035	.360	.372	.350
2040	.358	.371	.347
2045	.356	.371	.343
2050	.354	.370	.338
2055	.351	.369	.334
2060	.348	.368	.330
2065	.346	.367	.326
2070	.343	.367	.322
2075	.341	.366	.318
2080	.339	.366	.314
2085	.337	.366	.311
2090	.336	.367	.308

Projections of GDP reflect projected increases in U.S. employment, labor productivity, average hours worked, and the GDP deflator. Projections of taxable payroll reflect the components of growth in GDP along with assumed changes in the ratio of worker compensation to GDP, the ratio of earnings to worker compensation, the ratio of OASDI covered earnings to total earnings, and the ratio of taxable to total covered earnings.

Over the long-range period, the Trustees project that the ratio of OASDI taxable payroll to GDP will decline mostly due to a projected decline in the ratio of wages to employee compensation. Over the last five complete economic cycles, the ratio of wages to employee compensation declined at an average annual rate of 0.25 percent. The Trustees project that the ratio of wages to employee compensation will continue to decline, over the 65-year period ending in 2088, at an average annual rate of 0.03, 0.13, and 0.23 percent for the low-cost, intermediate, and high-cost assumptions, respectively.

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OASDI And HI Annual Income, Cost, And Balance As A Percentage Of GDP — 2014 OASDI Trustees Report

Single-Year Tables | Historical Data | Intermediate Assumptions | Low-Cost Assumptions | High-Cost Assumptions

Table VI.G4.- OASDI and HI Annual Income, Cost, and Balance as a Percentage of GDP, Calendar Years 1970-2090

	Percentage of GDP									
	OASDI			HI			Combined			
Calendar year	Income [a]	Cost	Balance	Income [a]	Cost	Balance	Income [a]	Cost	Balance	GDP in dollars (billions)
Historical:										
1970	3.27	3.08	0.19	0.46	0.50	-0.04	3.73	3.58	0.15	1,076
1971	3.33	3.30	.03	.43	.52	-.09	3.76	3.82	-.07	1,168
1972	3.39	3.37	.01	.45	.52	-.07	3.84	3.90	-.06	1,282
1973	3.67	3.72	-.05	.70	.52	.18	4.37	4.24	.13	1,429
1974	3.84	3.91	-.08	.71	.62	.09	4.54	4.53	.01	1,549
1975	3.84	4.10	-.26	.69	.71	-.02	4.52	4.80	-.28	1,689
1976	3.85	4.17	-.32	.69	.73	-.04	4.54	4.90	-.36	1,878
1977	3.81	4.18	-.37	.68	.76	-.08	4.49	4.94	-.46	2,086
1978	3.80	4.07	-.27	.74	.76	-.02	4.55	4.84	-.29	2,357
1979	3.94	4.08	-.14	.80	.79	b	4.74	4.87	-.13	2,632
1980	4.10	4.32	-.22	.84	.88	-.04	4.94	5.20	-.26	2,862
1981	4.37	4.50	-.13	1.04	.95	.09	5.40	5.44	-.04	3,211
1982	4.38	4.79	-.41	1.04	1.06	-.02	5.42	5.85	-.42	3,345

	Percentage of GDP									
	OASDI			HI			Combined			
Calendar year	Income [a]	Cost	Balance	Income [a]	Cost	Balance	Income [a]	Cost	Balance	GDP in dollars (billions)
1983	4.48	4.71	-.23	1.03	1.09	-.06	5.51	5.80	-.28	3,638
1984	4.53	4.47	.07	1.06	1.10	-.05	5.59	5.57	.02	4,041
1985	4.62	4.39	.23	1.10	1.09	.01	5.72	5.47	.25	4,347
1986	4.64	4.39	.25	1.20	1.06	.13	5.84	5.45	.38	4,590
1987	4.64	4.29	.34	1.21	1.05	.16	5.85	5.34	.50	4,870
1988	4.86	4.24	.62	1.20	1.00	.20	6.06	5.23	.82	5,253
1989	4.89	4.18	.72	1.22	1.08	.14	6.11	5.25	.85	5,658
1990	4.99	4.23	.75	1.21	1.11	.10	6.20	5.34	.86	5,980
1991	4.99	4.44	.54	1.27	1.17	.10	6.25	5.61	.64	6,174
1992	4.85	4.46	.39	1.26	1.28	-.02	6.11	5.74	.36	6,539
1993	4.76	4.49	.28	1.23	1.34	-.11	5.99	5.83	.17	6,879
1994	4.79	4.42	.37	1.37	1.44	-.07	6.16	5.86	.30	7,309
1995	4.76	4.43	.32	1.38	1.52	-.14	6.14	5.96	.18	7,664
1996	4.76	4.36	.40	1.38	1.57	-.18	6.15	5.93	.21	8,100
1997	4.81	4.29	.52	1.40	1.57	-.17	6.21	5.86	.35	8,608
1998	4.84	4.21	.63	1.45	1.43	.02	6.29	5.64	.65	9,089
1999	4.87	4.06	.81	1.46	1.33	.13	6.34	5.40	.94	9,666
2000	4.90	4.03	.86	1.49	1.27	.22	6.39	5.31	1.08	10,290
2001	4.98	4.13	.85	1.47	1.34	.13	6.45	5.47	.98	10,625
2002	4.98	4.20	.77	1.43	1.38	.05	6.41	5.59	.82	10,980
2003	4.75	4.16	.59	1.41	1.37	.04	6.16	5.53	.63	11,512
2004	4.63	4.09	.55	1.40	1.39	.01	6.03	5.47	.56	12,277
2005	4.64	4.05	.59	1.38	1.41	-.03	6.02	5.46	.57	13,095
2006	4.64	4.01	.63	1.39	1.41	-.02	6.03	5.42	.61	13,858
2007	4.66	4.11	.55	1.41	1.43	-.02	6.07	5.53	.54	14,480
2008	4.68	4.25	.43	1.40	1.51	-.11	6.08	5.76	.32	14,720
2009	4.78	4.76	.02	1.39	1.64	-.25	6.17	6.40	-.22	14,418
2010	4.44	4.76	-.33	1.38	1.62	-.24	5.82	6.38	-.57	14,958
2011	4.45	4.74	-.29	1.39	1.62	-.24	5.83	6.36	-.53	15,534
2012	4.50	4.84	-.34	1.40	1.58	-.19	5.90	6.42	-.52	16,245
2013	4.48	4.90	-.42	1.44	1.56	-.12	5.92	6.46	-.54	16,790

Calendar year	OASDI Income [a]	OASDI Cost	OASDI Balance	HI Income [a]	HI Cost	HI Balance	Combined Income [a]	Combined Cost	Combined Balance	GDP in dollars (billions)
	Percentage of GDP									
Intermediate:										
2014	4.46	4.92	-0.45	1.45	1.50	-0.05	5.92	6.42	-0.50	17,557
2015	4.57	4.94	-.37	1.47	1.44	.03	6.04	6.38	-.34	18,426
2016	4.59	4.97	-.38	1.49	1.44	.05	6.08	6.41	-.33	19,377
2017	4.63	5.01	-.38	1.51	1.45	.06	6.14	6.46	-.32	20,400
2018	4.67	5.06	-.39	1.53	1.48	.05	6.20	6.55	-.34	21,475
2019	4.70	5.13	-.44	1.54	1.50	.04	6.24	6.63	-.39	22,578
2020	4.71	5.21	-.50	1.55	1.53	.02	6.27	6.74	-.47	23,694
2021	4.73	5.29	-.55	1.56	1.56	b	6.30	6.85	-.55	24,815
2022	4.75	5.38	-.63	1.57	1.60	-.03	6.32	6.98	-.66	25,935
2023	4.76	5.48	-.72	1.58	1.63	-.05	6.34	7.11	-.77	27,091
2024	4.76	5.57	-.81	1.59	1.67	-.08	6.35	7.24	-.89	28,304
2025	4.76	5.66	-.90	1.60	1.74	-.15	6.36	7.41	-1.05	29,575
2026	4.76	5.74	-.98	1.60	1.77	-.17	6.36	7.51	-1.15	30,900
2027	4.76	5.82	-1.06	1.61	1.81	-.20	6.37	7.63	-1.26	32,275
2028	4.76	5.89	-1.13	1.62	1.84	-.22	6.38	7.73	-1.35	33,704
2029	4.76	5.96	-1.20	1.62	1.87	-.25	6.38	7.83	-1.45	35,196
2030	4.76	6.01	-1.25	1.63	1.91	-.28	6.39	7.92	-1.53	36,750
2031	4.76	6.06	-1.30	1.64	1.94	-.30	6.39	8.00	-1.60	38,369
2032	4.76	6.09	-1.34	1.64	1.97	-.33	6.40	8.06	-1.67	40,063
2033	4.76	6.12	-1.36	1.65	2.00	-.35	6.40	8.12	-1.72	41,843
2034	4.75	6.14	-1.39	1.65	2.03	-.38	6.40	8.17	-1.77	43,703
2035	4.75	6.16	-1.41	1.66	2.06	-.40	6.41	8.21	-1.81	45,659
2036	4.75	6.16	-1.42	1.66	2.08	-.42	6.41	8.25	-1.84	47,710
2037	4.74	6.16	-1.42	1.66	2.11	-.44	6.41	8.27	-1.86	49,863
2038	4.74	6.16	-1.42	1.67	2.13	-.46	6.41	8.28	-1.88	52,130
2039	4.74	6.14	-1.41	1.67	2.15	-.48	6.41	8.29	-1.88	54,510
2040	4.73	6.12	-1.39	1.67	2.17	-.50	6.40	8.29	-1.89	57,003
2041	4.72	6.10	-1.38	1.68	2.19	-.51	6.40	8.29	-1.89	59,614
2042	4.72	6.08	-1.36	1.68	2.20	-.52	6.40	8.28	-1.89	62,337
2043	4.71	6.06	-1.35	1.68	2.22	-.53	6.40	8.28	-1.88	65,182

	Percentage of GDP									
	OASDI			HI			Combined			
Calendar year	Income [a]	Cost	Balance	Income [a]	Cost	Balance	Income [a]	Cost	Balance	GDP in dollars (billions)
2044	4.71	6.05	-1.34	1.68	2.23	-.54	6.39	8.27	-1.88	68,158
2045	4.70	6.03	-1.33	1.69	2.24	-.55	6.39	8.27	-1.88	71,254
2046	4.69	6.02	-1.33	1.69	2.25	-.56	6.38	8.27	-1.88	74,484
2047	4.69	6.01	-1.32	1.69	2.25	-.56	6.38	8.26	-1.88	77,852
2048	4.68	5.99	-1.31	1.70	2.26	-.56	6.38	8.25	-1.88	81,364
2049	4.67	5.98	-1.31	1.70	2.26	-.56	6.37	8.24	-1.87	85,024
2050	4.67	5.97	-1.30	1.70	2.26	-.56	6.37	8.24	-1.87	88,833
2051	4.66	5.97	-1.30	1.71	2.27	-.56	6.37	8.23	-1.86	92,806
2052	4.66	5.96	-1.31	1.71	2.27	-.56	6.37	8.23	-1.86	96,939
2053	4.65	5.96	-1.31	1.71	2.26	-.55	6.36	8.23	-1.86	101,241
2054	4.64	5.97	-1.32	1.72	2.26	-.55	6.36	8.23	-1.87	105,723
2055	4.64	5.97	-1.33	1.72	2.27	-.54	6.36	8.24	-1.88	110,392
2056	4.63	5.98	-1.35	1.73	2.27	-.54	6.36	8.25	-1.89	115,257
2057	4.63	5.99	-1.36	1.73	2.27	-.54	6.36	8.26	-1.90	120,330
2058	4.62	6.00	-1.38	1.73	2.27	-.54	6.35	8.27	-1.92	125,625
2059	4.62	6.00	-1.39	1.74	2.27	-.54	6.35	8.28	-1.93	131,153
2060	4.61	6.01	-1.40	1.74	2.28	-.54	6.35	8.29	-1.94	136,921
2061	4.60	6.02	-1.42	1.74	2.28	-.54	6.35	8.30	-1.95	142,948
2062	4.60	6.03	-1.43	1.75	2.29	-.54	6.35	8.31	-1.97	149,250
2063	4.59	6.04	-1.44	1.75	2.29	-.54	6.34	8.33	-1.98	155,831
2064	4.59	6.04	-1.46	1.75	2.30	-.54	6.34	8.34	-2.00	162,707
2065	4.58	6.05	-1.47	1.76	2.31	-.55	6.34	8.36	-2.02	169,890
2066	4.57	6.06	-1.48	1.76	2.32	-.55	6.33	8.37	-2.04	177,398
2067	4.57	6.07	-1.50	1.76	2.32	-.56	6.33	8.39	-2.06	185,248
2068	4.56	6.07	-1.51	1.77	2.33	-.56	6.33	8.40	-2.08	193,456
2069	4.56	6.08	-1.52	1.77	2.34	-.57	6.33	8.42	-2.09	202,037
2070	4.55	6.09	-1.54	1.77	2.35	-.57	6.32	8.44	-2.11	211,004
2071	4.55	6.10	-1.55	1.77	2.35	-.58	6.32	8.45	-2.13	220,364
2072	4.54	6.10	-1.56	1.78	2.36	-.58	6.32	8.46	-2.14	230,149
2073	4.54	6.10	-1.56	1.78	2.37	-.59	6.32	8.47	-2.15	240,368
2074	4.53	6.10	-1.57	1.78	2.37	-.59	6.31	8.47	-2.16	251,038
2075	4.52	6.10	-1.57	1.78	2.38	-.59	6.31	8.47	-2.16	262,181

Calendar year	Percentage of GDP									
	OASDI			HI			Combined			
	Income [a]	Cost	Balance	Income [a]	Cost	Balance	Income [a]	Cost	Balance	GDP in dollars (billions)
2076	4.52	6.09	-1.57	1.79	2.38	-.59	6.31	8.47	-2.16	273,817
2077	4.51	6.09	-1.57	1.79	2.38	-.59	6.30	8.46	-2.16	285,964
2078	4.51	6.08	-1.57	1.79	2.38	-.59	6.30	8.45	-2.16	298,640
2079	4.50	6.07	-1.57	1.79	2.38	-.58	6.29	8.45	-2.15	311,860
2080	4.50	6.07	-1.57	1.79	2.37	-.58	6.29	8.44	-2.15	325,644
2081	4.49	6.07	-1.57	1.80	2.37	-.57	6.29	8.44	-2.15	340,008
2082	4.49	6.07	-1.58	1.80	2.37	-.57	6.29	8.43	-2.15	354,980
2083	4.49	6.07	-1.58	1.80	2.36	-.56	6.29	8.43	-2.15	370,581
2084	4.48	6.08	-1.59	1.80	2.36	-.56	6.28	8.44	-2.15	386,832
2085	4.48	6.08	-1.61	1.80	2.36	-.55	6.28	8.44	-2.16	403,770
2086	4.48	6.09	-1.62	1.81	2.35	-.55	6.28	8.45	-2.17	421,428
2087	4.47	6.11	-1.63	1.81	2.35	-.54	6.28	8.46	-2.18	439,833
2088	4.47	6.12	-1.65	1.81	2.35	-.54	6.28	8.46	-2.18	459,020
2089	4.47	6.13	-1.66	1.81	2.34	-.53	6.28	8.47	-2.19	479,029
2090	4.46	6.14	-1.68	1.82	2.34	-.52	6.28	8.48	-2.20	499,900
Low-cost:										
2014	4.44	4.85	-.40	1.45	1.45	b	5.90	6.29	-.40	17,771
2015	4.58	4.77	-.18	1.47	1.35	.12	6.06	6.12	-.06	19,032
2016	4.59	4.73	-.14	1.49	1.32	.17	6.08	6.05	.03	20,464
2017	4.65	4.73	-.08	1.51	1.30	.21	6.16	6.04	.12	21,918
2018	4.71	4.76	-.06	1.53	1.31	.22	6.23	6.07	.16	23,335
2019	4.74	4.80	-.06	1.54	1.29	.24	6.28	6.09	.18	24,843
2020	4.76	4.84	-.08	1.55	1.29	.25	6.31	6.13	.18	26,401
2021	4.79	4.88	-.09	1.56	1.30	.26	6.34	6.18	.17	27,969
2022	4.82	4.93	-.12	1.57	1.30	.26	6.38	6.24	.15	29,611
2023	4.84	4.99	-.16	1.57	1.31	.27	6.41	6.30	.11	31,324
2024	4.84	5.05	-.21	1.58	1.31	.27	6.43	6.36	.07	33,134
2025	4.84	5.10	-.26	1.59	1.34	.25	6.44	6.44	-.01	35,064
2026	4.84	5.14	-.30	1.60	1.34	.26	6.45	6.48	-.04	37,100
2027	4.84	5.19	-.34	1.61	1.34	.27	6.46	6.53	-.07	39,242
2028	4.85	5.23	-.38	1.62	1.34	.28	6.47	6.56	-.10	41,498

	Percentage of GDP									
	OASDI			HI			Combined			
Calendar year	Income [a]	Cost	Balance	Income [a]	Cost	Balance	Income [a]	Cost	Balance	GDP in dollars (billions)
2029	4.85	5.26	-.41	1.63	1.34	.29	6.48	6.59	-.12	43,882
2030	4.85	5.28	-.43	1.64	1.34	.30	6.49	6.62	-.13	46,398
2031	4.85	5.30	-.45	1.64	1.33	.31	6.50	6.63	-.14	49,057
2032	4.85	5.31	-.46	1.65	1.33	.32	6.51	6.64	-.13	51,873
2033	4.85	5.31	-.46	1.66	1.32	.34	6.51	6.63	-.12	54,868
2034	4.85	5.31	-.46	1.67	1.32	.35	6.52	6.63	-.11	58,042
2035	4.85	5.31	-.45	1.68	1.31	.37	6.53	6.61	-.08	61,419
2036	4.85	5.29	-.44	1.68	1.30	.38	6.54	6.59	-.06	65,008
2037	4.85	5.28	-.42	1.69	1.29	.40	6.54	6.56	-.02	68,826
2038	4.85	5.25	-.40	1.70	1.28	.42	6.55	6.53	.02	72,897
2039	4.85	5.23	-.38	1.70	1.24	.46	6.55	6.47	.09	77,229
2040	4.85	5.20	-.35	1.71	1.23	.48	6.56	6.43	.13	81,834
2041	4.85	5.17	-.32	1.72	1.22	.50	6.56	6.38	.18	86,728
2042	4.84	5.13	-.29	1.72	1.21	.52	6.57	6.34	.23	91,915
2043	4.84	5.11	-.27	1.73	1.19	.54	6.57	6.30	.27	97,420
2044	4.84	5.08	-.24	1.74	1.18	.55	6.57	6.26	.31	103,268
2045	4.84	5.06	-.22	1.74	1.17	.57	6.58	6.23	.35	109,456
2046	4.83	5.04	-.21	1.75	1.16	.59	6.58	6.20	.38	116,010
2047	4.83	5.02	-.19	1.75	1.15	.60	6.58	6.17	.41	122,953
2048	4.83	5.00	-.17	1.76	1.14	.62	6.59	6.14	.45	130,309
2049	4.82	4.98	-.16	1.76	1.13	.64	6.59	6.11	.48	138,100
2050	4.82	4.97	-.14	1.77	1.12	.65	6.59	6.08	.51	146,344
2051	4.82	4.95	-.13	1.78	1.11	.67	6.60	6.06	.53	155,082
2052	4.82	4.94	-.13	1.78	1.10	.68	6.60	6.04	.56	164,327
2053	4.82	4.94	-.12	1.79	1.09	.70	6.60	6.03	.57	174,111
2054	4.81	4.93	-.12	1.79	1.08	.71	6.61	6.02	.59	184,480
2055	4.81	4.93	-.12	1.80	1.08	.72	6.61	6.01	.60	195,464
2056	4.81	4.93	-.12	1.81	1.07	.73	6.61	6.01	.61	207,101
2057	4.81	4.93	-.13	1.81	1.07	.74	6.62	6.00	.61	219,437
2058	4.81	4.93	-.13	1.82	1.07	.75	6.62	6.00	.62	232,518
2059	4.80	4.93	-.13	1.82	1.07	.75	6.62	6.00	.63	246,392
2060	4.80	4.93	-.13	1.83	1.07	.76	6.63	6.00	.63	261,102

	Percentage of GDP									
	OASDI			HI			Combined			
Calendar year	Income [a]	Cost	Balance	Income [a]	Cost	Balance	Income [a]	Cost	Balance	GDP in dollars (billions)
2061	4.80	4.93	-.12	1.83	1.07	.76	6.63	5.99	.64	276,709
2062	4.80	4.92	-.12	1.84	1.07	.76	6.63	5.99	.64	293,281
2063	4.80	4.92	-.12	1.84	1.07	.77	6.64	5.99	.64	310,865
2064	4.79	4.91	-.12	1.84	1.08	.76	6.64	5.99	.65	329,531
2065	4.79	4.91	-.11	1.85	1.08	.76	6.64	5.99	.65	349,338
2066	4.79	4.90	-.11	1.85	1.09	.76	6.64	5.99	.65	370,368
2067	4.79	4.89	-.11	1.86	1.10	.76	6.64	5.99	.65	392,712
2068	4.79	4.89	-.10	1.86	1.10	.76	6.64	5.99	.66	416,450
2069	4.78	4.88	-.10	1.86	1.11	.76	6.65	5.99	.66	441,663
2070	4.78	4.87	-.09	1.87	1.11	.76	6.65	5.98	.66	468,439
2071	4.78	4.86	-.08	1.87	1.12	.75	6.65	5.98	.67	496,860
2072	4.78	4.85	-.07	1.87	1.12	.75	6.65	5.97	.68	527,052
2073	4.78	4.84	-.06	1.87	1.12	.75	6.65	5.96	.69	559,108
2074	4.77	4.82	-.05	1.88	1.13	.75	6.65	5.95	.70	593,144
2075	4.77	4.80	-.03	1.88	1.13	.75	6.65	5.94	.72	629,283
2076	4.77	4.79	-.01	1.88	1.13	.75	6.65	5.92	.73	667,641
2077	4.77	4.76	[b]	1.88	1.14	.75	6.65	5.90	.75	708,355
2078	4.77	4.74	.02	1.89	1.14	.75	6.65	5.88	.77	751,545
2079	4.77	4.73	.04	1.89	1.14	.75	6.66	5.86	.79	797,329
2080	4.77	4.71	.06	1.89	1.14	.75	6.66	5.85	.81	845,859
2081	4.77	4.70	.07	1.90	1.14	.76	6.66	5.83	.83	897,285
2082	4.76	4.69	.08	1.90	1.14	.76	6.66	5.82	.84	951,771
2083	4.77	4.68	.08	1.90	1.14	.76	6.67	5.82	.85	1,009,475
2084	4.77	4.68	.09	1.90	1.14	.77	6.67	5.82	.85	1,070,587
2085	4.77	4.68	.09	1.91	1.14	.77	6.67	5.82	.86	1,135,314
2086	4.77	4.68	.08	1.91	1.14	.77	6.68	5.82	.86	1,203,867
2087	4.77	4.69	.08	1.92	1.14	.78	6.68	5.83	.86	1,276,481
2088	4.77	4.70	.07	1.92	1.14	.78	6.69	5.83	.85	1,353,413
2089	4.77	4.71	.06	1.92	1.14	.79	6.69	5.84	.85	1,434,924
2090	4.77	4.72	.06	1.93	1.15	.78	6.70	5.86	.84	1,521,298

High-cost:

Calendar year	Percentage of GDP									GDP in dollars (billions)
	OASDI			HI			Combined			
	Income [a]	Cost	Balance	Income [a]	Cost	Balance	Income [a]	Cost	Balance	
2014	4.49	5.01	-.52	1.45	1.56	-.11	5.94	6.57	-.63	17,268
2015	4.54	5.14	-.61	1.47	1.54	-.08	6.01	6.69	-.68	17,750
2016	4.57	5.26	-.68	1.49	1.57	-.08	6.06	6.83	-.77	18,332
2017	4.60	5.35	-.75	1.51	1.61	-.10	6.11	6.97	-.85	19,002
2018	4.64	5.46	-.82	1.53	1.68	-.15	6.17	7.15	-.98	19,710
2019	4.65	5.58	-.92	1.54	1.74	-.19	6.20	7.32	-1.12	20,442
2020	4.67	5.70	-1.03	1.56	1.81	-.25	6.23	7.51	-1.29	21,200
2021	4.68	5.80	-1.12	1.57	1.89	-.32	6.25	7.69	-1.44	21,983
2022	4.69	5.92	-1.23	1.59	1.98	-.39	6.28	7.90	-1.62	22,758
2023	4.70	6.05	-1.36	1.60	2.06	-.46	6.29	8.11	-1.82	23,522
2024	4.70	6.18	-1.49	1.60	2.15	-.55	6.30	8.33	-2.03	24,283
2025	4.70	6.31	-1.62	1.61	2.29	-.68	6.30	8.60	-2.30	25,060
2026	4.69	6.44	-1.74	1.61	2.37	-.76	6.31	8.80	-2.50	25,860
2027	4.69	6.55	-1.86	1.62	2.46	-.85	6.31	9.02	-2.71	26,680
2028	4.69	6.66	-1.98	1.62	2.55	-.93	6.31	9.22	-2.91	27,520
2029	4.69	6.76	-2.08	1.63	2.66	-1.03	6.31	9.42	-3.11	28,385
2030	4.68	6.85	-2.17	1.63	2.76	-1.12	6.32	9.61	-3.30	29,275
2031	4.68	6.93	-2.25	1.64	2.86	-1.22	6.32	9.79	-3.47	30,188
2032	4.68	7.00	-2.33	1.64	2.96	-1.32	6.32	9.97	-3.65	31,131
2033	4.67	7.06	-2.39	1.64	3.07	-1.42	6.32	10.13	-3.81	32,110
2034	4.67	7.12	-2.45	1.65	3.17	-1.53	6.32	10.29	-3.97	33,120
2035	4.66	7.16	-2.49	1.65	3.28	-1.63	6.31	10.44	-4.12	34,167
2036	4.66	7.19	-2.53	1.65	3.39	-1.74	6.31	10.58	-4.27	35,249
2037	4.65	7.22	-2.56	1.65	3.50	-1.84	6.31	10.72	-4.41	36,369
2038	4.65	7.23	-2.59	1.66	3.61	-1.95	6.30	10.84	-4.54	37,534
2039	4.64	7.24	-2.60	1.66	3.67	-2.01	6.30	10.91	-4.61	38,738
2040	4.63	7.25	-2.61	1.66	3.77	-2.11	6.29	11.01	-4.72	39,978
2041	4.62	7.25	-2.62	1.66	3.86	-2.21	6.28	11.11	-4.83	41,255
2042	4.62	7.24	-2.63	1.66	3.96	-2.30	6.27	11.20	-4.93	42,561
2043	4.61	7.24	-2.64	1.66	4.05	-2.39	6.27	11.29	-5.02	43,900
2044	4.60	7.24	-2.65	1.66	4.13	-2.47	6.26	11.37	-5.12	45,278
2045	4.59	7.25	-2.66	1.66	4.21	-2.55	6.25	11.46	-5.21	46,683

Calendar year	Percentage of GDP: OASDI Income [a]	OASDI Cost	OASDI Balance	HI Income [a]	HI Cost	HI Balance	Combined Income [a]	Combined Cost	Combined Balance	GDP in dollars (billions)
2046	4.58	7.25	-2.67	1.66	4.28	-2.62	6.24	11.53	-5.30	48,121
2047	4.57	7.25	-2.69	1.66	4.35	-2.69	6.23	11.60	-5.37	49,593
2048	4.56	7.25	-2.70	1.66	4.41	-2.75	6.22	11.66	-5.44	51,098
2049	4.55	7.26	-2.71	1.66	4.46	-2.80	6.21	11.72	-5.51	52,639
2050	4.54	7.26	-2.72	1.66	4.51	-2.85	6.20	11.77	-5.57	54,209
2051	4.53	7.27	-2.74	1.66	4.55	-2.89	6.19	11.82	-5.63	55,818
2052	4.52	7.28	-2.76	1.66	4.59	-2.93	6.18	11.87	-5.69	57,459
2053	4.51	7.30	-2.79	1.66	4.62	-2.96	6.17	11.91	-5.74	59,131
2054	4.50	7.32	-2.81	1.66	4.65	-2.99	6.16	11.97	-5.80	60,840
2055	4.49	7.34	-2.84	1.66	4.68	-3.02	6.16	12.02	-5.86	62,586
2056	4.48	7.36	-2.88	1.66	4.71	-3.05	6.15	12.07	-5.92	64,370
2057	4.48	7.38	-2.91	1.66	4.73	-3.07	6.14	12.12	-5.98	66,195
2058	4.47	7.41	-2.94	1.67	4.75	-3.08	6.13	12.16	-6.03	68,065
2059	4.46	7.44	-2.98	1.67	4.76	-3.09	6.13	12.20	-6.07	69,983
2060	4.45	7.46	-3.01	1.67	4.77	-3.11	6.12	12.24	-6.12	71,948
2061	4.44	7.49	-3.05	1.67	4.79	-3.12	6.11	12.28	-6.17	73,967
2062	4.43	7.52	-3.09	1.67	4.80	-3.12	6.10	12.32	-6.21	76,044
2063	4.42	7.55	-3.12	1.67	4.80	-3.13	6.10	12.35	-6.25	78,174
2064	4.42	7.58	-3.16	1.67	4.81	-3.14	6.09	12.39	-6.30	80,358
2065	4.41	7.61	-3.20	1.67	4.82	-3.14	6.08	12.43	-6.34	82,599
2066	4.40	7.64	-3.24	1.68	4.83	-3.15	6.08	12.47	-6.39	84,901
2067	4.39	7.67	-3.28	1.68	4.84	-3.16	6.07	12.51	-6.44	87,266
2068	4.38	7.70	-3.32	1.68	4.85	-3.17	6.06	12.56	-6.49	89,697
2069	4.37	7.74	-3.36	1.68	4.86	-3.18	6.06	12.60	-6.54	92,194
2070	4.37	7.77	-3.41	1.68	4.87	-3.19	6.05	12.64	-6.59	94,757
2071	4.36	7.81	-3.45	1.69	4.88	-3.19	6.04	12.68	-6.64	97,384
2072	4.35	7.84	-3.49	1.69	4.89	-3.20	6.04	12.72	-6.68	100,083
2073	4.34	7.86	-3.52	1.69	4.89	-3.20	6.03	12.76	-6.72	102,850
2074	4.33	7.89	-3.56	1.69	4.89	-3.20	6.02	12.79	-6.76	105,686
2075	4.33	7.92	-3.59	1.69	4.90	-3.20	6.02	12.81	-6.79	108,592
2076	4.32	7.94	-3.62	1.69	4.89	-3.20	6.01	12.83	-6.82	111,569
2077	4.31	7.96	-3.65	1.69	4.89	-3.19	6.01	12.85	-6.84	114,619

	Percentage of GDP									
	OASDI			HI			Combined			
Calendar year	Income [a]	Cost	Balance	Income [a]	Cost	Balance	Income [a]	Cost	Balance	GDP in dollars (billions)
2078	4.30	7.98	-3.68	1.70	4.88	-3.18	6.00	12.86	-6.86	117,742
2079	4.30	8.00	-3.70	1.70	4.87	-3.17	5.99	12.87	-6.88	120,935
2080	4.29	8.02	-3.73	1.70	4.86	-3.16	5.99	12.88	-6.89	124,200
2081	4.28	8.04	-3.76	1.70	4.84	-3.14	5.98	12.89	-6.90	127,543
2082	4.27	8.07	-3.79	1.70	4.83	-3.13	5.98	12.90	-6.92	130,965
2083	4.27	8.09	-3.82	1.70	4.82	-3.11	5.97	12.91	-6.94	134,467
2084	4.26	8.11	-3.85	1.71	4.80	-3.10	5.97	12.92	-6.95	138,049
2085	4.25	8.14	-3.88	1.71	4.79	-3.08	5.96	12.93	-6.97	141,718
2086	4.25	8.16	-3.92	1.71	4.78	-3.07	5.96	12.94	-6.98	145,478
2087	4.24	8.19	-3.95	1.71	4.76	-3.05	5.95	12.95	-7.00	149,330
2088	4.24	8.21	-3.98	1.71	4.75	-3.03	5.95	12.96	-7.01	153,280
2089	4.23	8.23	-4.00	1.72	4.73	-3.02	5.95	12.97	-7.02	157,331
2090	4.22	8.25	-4.03	1.72	4.83	-3.12	5.94	13.09	-7.15	161,487

[a] Income for individual years excludes interest on the trust funds.

[b] Between 0 and 0.005 percent of GDP.

Notes: Totals do not necessarily equal the sums of rounded components.

Quantitative Structuring
vs
the Equity Premium Puzzle

Andrei N. Soklakov*

25 July 2015

Quantitative Structuring is a rational framework for manufacturing financial products. It shares many of its components with mainstream economics. The Equity Premium Puzzle is a well known quantitative challenge which has been defying mainstream economics for the last 30 years. Does Quantitative Structuring face a similar challenge? We find Quantitative Structuring to be in remarkable harmony with the observed equity premium. Observed values for the equity premium (both expected and realized) appear to be a real and transparent phenomenon which should persist for as long as equities continue to make sense as an investment asset. Encouraged by this finding, we suggest a certain modification of mainstream economics.

1 Quantitative Structuring

Each and every financial product is completely defined by its payoff function F which states how the benefits (usually cash flows) depend on the underlying variables. In order to price a product, defined by its payoff F, we compute a quantity of the form

$$\text{Price}(F) \propto \sum_x F(x)Q(x)\,, \tag{1}$$

where the summation is taken over all possible values of the underlying variables and where Q is given by a mathematical model for the variables. Equation (1) is probably the most famous formula in the whole of mathematical finance. It shows, among other things, that the value of a product is determined by its payoff structure F and the model Q in a nearly symmetric way.

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The views expressed herein should not be considered as investment advice or promotion. They represent personal research of the author and do not necessarily reflect the view of his employers, or their associates or affiliates. Andrei.Soklakov@(db.com, gmail.com).

Product design clearly deserves as much technical attention and respect as modeling. In fact, one can argue that products are much more important than modeling for they define the very nature of a business. Quantitative Structuring recognizes the importance of financial products and provides a technical framework for their design [1].

Within Quantitative Structuring all investments begin with research. Ahead of any proposals, a minimum of two learning steps must happen. The investor needs to form an opinion on the market and to learn their own preferences (risk aversion). Mathematically these two steps are described by two equations:

$$b = f\, m \tag{2}$$

$$\frac{d\,\ln F}{d\,\ln f} = \frac{1}{R}\,. \tag{3}$$

These equations can be introduced by making just a couple of observations. Firstly, we observe that each and every investment is an exercise in optimization. Secondly, we note that the above equations are obeyed by a payoff function $F(x)$ which solves the following optimization problem [2]

$$\max_F \int b(x)\, U(F(x))\, dx \quad \text{subject to budget constraint} \quad \int F(x)\, m(x)\, dx = 1\,. \tag{4}$$

The risk aversion coefficient R is connected to the utility U through the standard Arrow-Pratt formula: $R = -FU''_{FF}/U'_F$. The economic meaning of the market-implied and investor-believed distributions $m(x)$ and $b(x)$ follows from the above optimization.

For further explanations of these equations, including motivation, derivations, intuitive illustrations as well as concrete numerical examples, we refer the reader to [1], [2], [3], [4] and [5].

2 Confronting the Equity Premium Puzzle

In 1985 Mehra and Prescott investigated historical data on the excess returns achieved by equities over government bonds [6]. These excess returns, known as the equity premium, appeared to be surprisingly high. Mehra and Prescott concluded that the equity premium was an order of magnitude greater than could be rationalized within the standard utility-based theories of asset prices.

Given the importance of the challenge, proposals to resolve the puzzle quickly snowballed. More than two decades later Mehra and Prescott revisited the progress on the problem only to reinforce their original conclusions [7]. They estimated the equity premium to be 2-8% in arithmetic terms or up to 6% in terms of geometric (compound) returns and reiterated the Equity Premium Puzzle as a standing challenge to explain these values.

The work on understanding the equity premium continues. Many insightful observations have been made. The scope of proposals has widened enormously. It now ranges from plausible denials of the puzzle to behavioral explanations. The complexity of individual proposals also increased. With some proposals still awaiting adequate independent analysis, it would be fair to say that no single explanation of the puzzle has yet received general acceptance and the search for a clear dominant explanation continues.

A balanced review of the 30 year history of the puzzle is a major task in its own right which would lead us away from the main focus of this paper. For our purposes we need to know only one historical fact. We need to note that the puzzle has posed a major challenge to utility-based economic models. This makes the Equity Premium Puzzle a perfect challenge to Quantitative Structuring which, as we can see from the optimization (4), heavily relies on the expected utility theory.

How would we know if Quantitative Structuring survived the challenge? Of course, it would have to explain the numerical premium of 6% annualized compounded returns. Mehra and Prescott set additional guidelines in their most recent review [7]. They urge clear differentiation between expected and realized returns. They emphasize long-time historical horizons. Furthermore, they set an expectation that any theory which takes on the puzzle must be able to say something about the future of the puzzle. In other words, are the equity returns real and likely to persist or were they a statistical fluke with no material probability of re-occurring?

We accept the challenge with all of the above conditions. We investigate separately the expected and the realized returns. We use long-time horizons when talking about realized returns. Within Quantitative Structuring the observed numerical values of the equity premium appear to be absolutely real and natural. In fact, if these numerical values were somehow not known, Quantitative Structuring would have predicted them.

3 Expected premiums

Using the notation of (4), we can write the investor-expected continuously-compounded rate of return as

$$\mathrm{ER} = \int b(x) \ln F(x)\, dx\,. \tag{5}$$

This quantity is determined by two things – the structure of the investment $F(x)$, and the investor-believed distribution $b(x)$.

As we focus on equity investments, we describe the investment structure as:

$$F(x) = x, \tag{6}$$

where x is a total return on one unit of wealth invested in the equity.

To get the believed distribution we need to know the investor's risk aversion. For example, in the case of a growth-optimizing investor $R = 1$, equation (3) becomes redundant, i.e. $F(x) = f(x)$, and Eq. (2) gives us the believed distribution

$$b_{\mathrm{GO}}(x) = F(x)\, m(x) = x\, m(x)\,. \tag{7}$$

The corresponding expected return becomes

$$\mathrm{ER} \to \mathrm{ER}_{\mathrm{GO}} = \int \big(x \ln x \,\big)\, m(x)\, dx\,. \tag{8}$$

As an example, consider a log-normal market-implied distribution

$$\frac{m(x)}{\mathrm{DF}} = \frac{1}{x\sigma\sqrt{2\pi}} \exp\Big\{ -\frac{(\ln x - \mu)^2}{2\sigma^2} \Big\}, \quad \mu = r - \sigma^2/2\,, \tag{9}$$

where DF is the discount factor, r is the risk free return and σ is the volatility. In this case the integral in Eq. (8) can be computed analytically with the result:

$$\mathrm{ER}_{\mathrm{GO}} \to \mathrm{ER}_{\mathrm{GO}}^{\mathrm{LN}} = r + \sigma^2/2\,. \tag{10}$$

Mehra and Prescott considered an investor with arbitrary constant relative risk aversion. Generalization of the above calculations to this case is very easy. All we have to do is to bring into play Eq. (3) with a constant value of R. Equation (10) is then replaced by a slightly more general quantity (see Eq. (33) in the Appendix):

$$\mathrm{ER}_{\mathrm{R}}^{\mathrm{LN}} = r + (R - 1/2)\sigma^2\,. \tag{11}$$

This gives us the expected premium of

$$\mathrm{EP}_{\mathrm{R}}^{\mathrm{LN}} \stackrel{\mathrm{def}}{=} \mathrm{ER}_{\mathrm{R}}^{\mathrm{LN}} - r = (R - 1/2)\sigma^2\,. \tag{12}$$

In their pioneering paper [6], Mehra and Prescott argue that the acceptable values for R must be below 10. In fact, all of the actual estimates of R which they cite to support their argument were below 3. Even staying within this tight range below 3 and making the standard assumption of 20% for typical equity volatility we can easily explain premia as high as 10% in terms of continuously compounded annual returns. This ball-park range is in remarkable agreement with the values observed by Mehra and Prescott.

In the remainder of this section we are going to examine independent quotes for the expected risk premia and see what values of R they imply. Before we do that, let us restore the generality of our arguments by removing the above made assumption of log-normality. In the case of arbitrary market-implied distributions, Eq. (12) is replaced by the expression (see Eq. (30) in the Appendix):

$$\mathrm{EP}_{\mathrm{R}} \stackrel{\mathrm{def}}{=} \mathrm{ER}_{R} - r = \frac{1}{\mathrm{Price}(x^R)} \frac{\partial \mathrm{Price}\big(x^R\big)}{\partial R} - r\,. \tag{13}$$

Implying the value of R from this expression is considerably less convenient than using Eq. (12). Nevertheless, it is a simple root-finding problem which can be solved. In terms of technology, we just need the ability to price power payoffs, x^R, which can be done by replication with vanillas.

In terms of independent quotes for the equity premium we reach out to the field of equity valuations where the expected premium is a very important factor. On Fig. 1 we display expected equity premia as reported by Damodaran [8] using SPX data. It is important to note that these values are just as large as noted by Mehra and Prescott – at least an order of magnitude above 0.35%.

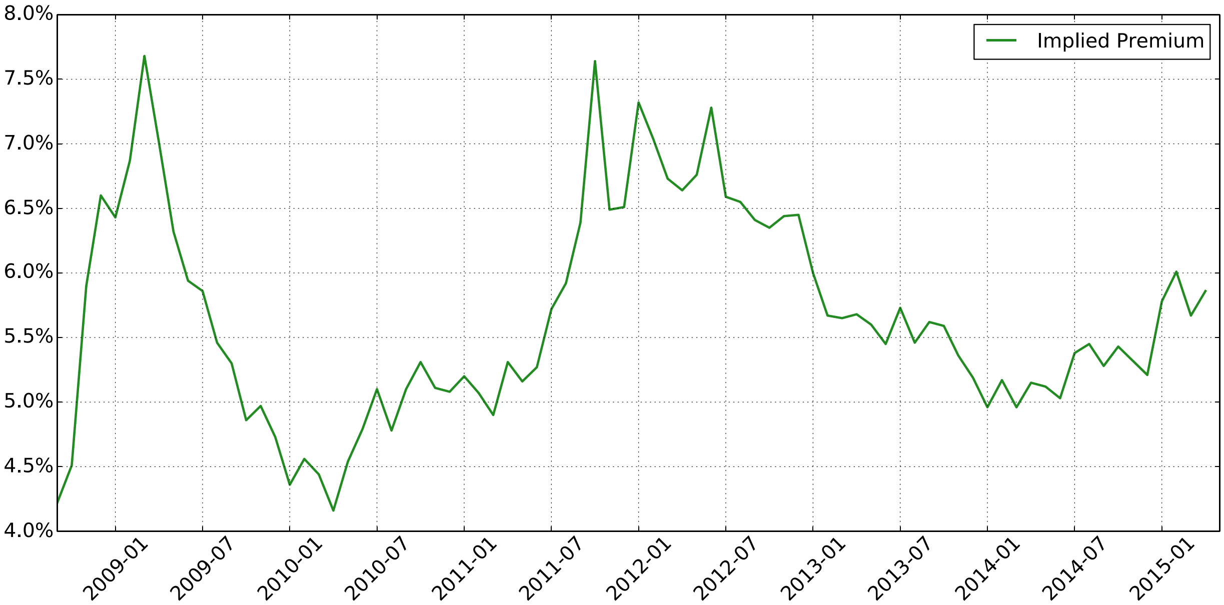

Figure 1: Implied Equity Premia as reported by Damodaran [8]. The records are updated on a monthly basis starting from September 2008. The quoted values refer to the beginning of each month. In our calculations we interpreted this as the first business day of each month.

There are always limits to how far in the future one can look using available market data. According to Damodaran [8], his quotes for the premia accurately reflect detailed market information (such as market-implied dividends) of up to five years into the future.

At five year horizons, equity skew is quite flat. This makes Eq. (12) useful as a test calculation which requires very little access to market data. On Fig. 2 we compute relative risk aversion from the quoted premia using both the exact Eq. (13) and the test Eq. (12).

In the former case we made no simplifying assumptions and used complete historical records of 5-year volatility curves. In the latter case we used 5-year at-the-money-forward implied volatilities (displayed for convenience on Fig. 3). The graphs for the two cases show good agreement.

All computed values of risk aversion are comfortably within the realistic range. We conclude that, in terms of investors' expectations, Quantitative Structuring is consistent with the observed equity premia.

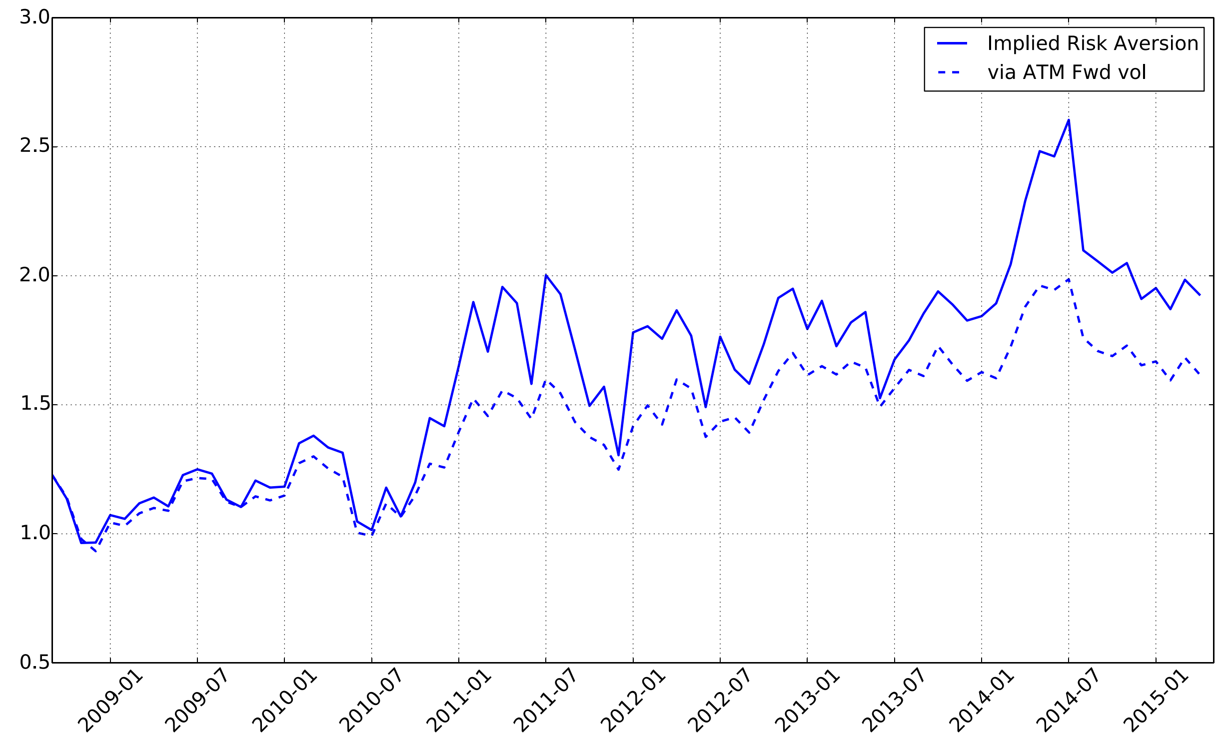

Figure 2: Implied risk aversion. Solid and dashed lines correspond to Eqs. (13) and (12) respectively. In both cases the timing of investments is chosen consistently with the quoted values of implied risk premia, i.e. they are assumed to mature in five years starting on the first business day of each month.

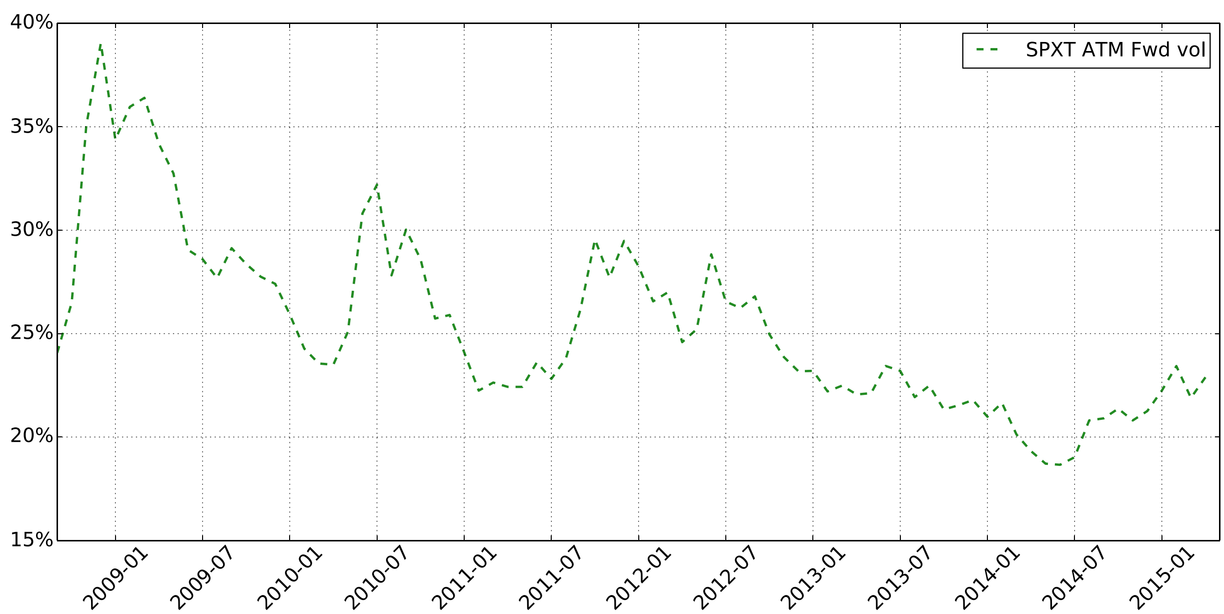

Figure 3: SPXT 5-year at-the-money-forward values of implied volatility.

4 Realized premiums

In the above section we managed to reconcile rational expectations of equity premiums. In terms of numerical values, these expectations were just as high as reported by Mehra and Prescott [6]. In this section we would like to understand how such expectations materialize, with investors doing no more than just keeping their money in the equity.

Let S_t be the value of the total return version of some equity index at time t. The return on the equity investment can be partitioned arbitrarily into N imaginary reinvestment steps:

$$S_N = S_0 \cdot \frac{S_1}{S_0} \cdot \frac{S_2}{S_1} \cdots \frac{S_N}{S_{N-1}} \,. \tag{14}$$

Defining $x_i = S_i/S_{i-1}$ we compute

$$S_N = S_0 \prod_{i=1}^{N} x_i = S_0 e^{\sum_{i=1}^{N} \ln x_i} = S_0 e^{N \cdot \mathrm{Rate}} \,, \tag{15}$$

where

$$\mathrm{Rate} = \frac{1}{N} \sum_{i=1}^{N} \ln x_i \,. \tag{16}$$

Let us now look at the time series $x_1, \ldots, x_N$ using the standard statistical approach. In this approach the individual elements $\{x_i\}$ are viewed as realizations of a random variable X with some (possibly unknown) distribution $P(X)$. For the basic statistical concepts, like the average, to make practical sense, the law of large numbers is assumed to hold.[1] In this framework, as N increases, the average (16) converges almost surely to the expectation

$$\mathrm{Rate} \xrightarrow{\text{a.s.}} \int P(x) \ln x \, dx \,. \tag{17}$$

Let us compare this equation with Eq. (5) (remember $F(x) = x$ for equity investments). We see that the investor-expected returns can be achieved provided that the time series is long enough (i.e. N is sufficiently large) and, crucially, that the investor correctly determines the probabilities, i.e. $b(x) \approx P(x)$. This gives us some information about equity investors. Our task now is to understand enough detail to see if it is realistic.

Mehra and Prescott describe the Equity Premium Puzzle as a long-term phenomenon. This discourages us from considering very short reinvestment periods. Ideally, we want to consider the case of smallest possible N that is large enough to ensure noticeable convergence (17). The standard deviation of the sum (16) from its mean (17) scales as $N^{-1/2}$. For the first significant digit of the sum (16) to emerge with some reasonable probability, the convergence must reduce the standard deviation by an order of magnitude ($N^{-1/2} \sim 0.1$). This means that we must choose N which is not much lower than 100.

We managed to find full market data, including volatility surfaces, for SPXT (total return version of SPX) going back to 17 May 2000. At the time of writing, this was about 15 years worth of data (daily records). Some researchers might argue the need for longer historical records. However, 15-year investments are already at the limit of what many

[1] This can be ensured if the individual values are sufficiently independent.

people would consider practical, so we choose to accept it. Viewing 15 years of the entire investment history (14) as if it was a sequence of bi-monthly reinvestments we get $N = 90$ reinvestment periods.

We need access to the distribution $P(x)$. One way of defining a probability distribution is to imagine a source of numbers distributed according to this distribution. Given such a source one can estimate expectations using the Monte-Carlo method. In terms of such a definition for the distribution of the actual realized returns, $P(x)$, all we have is a set of $N = 90$ values $\{x_i\}_{i=1}^N$. As discussed above, this is just enough to talk about expectations like (16).

Consider an investor whose original belief happened to coincide with the actual realized distribution, $b(x) = P(x)$. For this investor, the expected return is given by equation (16) which, by construction, evaluates to the actual realized returns exactly. The analysis of the realized equity premium boils down to the analysis of whether such an investor is realistic. Following Mehra and Prescott, this means computing and examining the investor's risk aversion.

Using Eqs. (2 - 3) and recalling that for the simple equity investment $F(x) = x$ we compute

$$R = \frac{d\ln f}{d\ln F} = \frac{d\ln(b/m)}{d\ln x} = \frac{m}{b}\left(\frac{b}{m}\right)'_x x\,. \tag{18}$$

Theoretically, this gives us the complete risk-aversion profile for the investor in question. Right now, however, we have a bare minimum of statistical information regarding b. So, as many other researchers before us have done, we choose to focus on the overall level of risk aversion and defer the very interesting topic of the shape of risk-aversion profiles to further research. As a measure of the overall risk aversion we consider the investor's own expectation of it

$$\langle R\rangle_b \stackrel{\text{def}}{=} \int R(x)\, b(x)\, dx\,. \tag{19}$$

Put together, the above two equations give

$$\langle R\rangle_b \;=\; \int m\left(\frac{b}{m}\right)'_x x\, dx \;=\; \int xm\, d\left(\frac{b}{m}\right). \tag{20}$$

Integrating by parts and noticing that $xb\,\big|_0^\infty = 0$, we obtain

$$\langle R\rangle_b \;=\; -\int \frac{b}{m}\, d\,(xm) \;=\; -\int \frac{b}{m}\,(m\,dx + x\,dm) \;=\; -1 - \int b\,x\,\frac{dm}{m}\,. \tag{21}$$

Finally, using the notation of (19) we derive

$$\langle R\rangle_b = -1 - \langle\, x(\ln m)'_x \,\rangle_b\,. \tag{22}$$

This formula does not look very intuitive so, before using it, let us spend a few lines understanding it. To this end, let us see what it implies for a log-normal market-implied distribution. From Eq. (9) we derive

$$(\ln m)'_x \;\stackrel{\text{LN}}{=}\; \left(-\ln x - \frac{(\ln x-\mu)^2}{2\sigma^2} + \text{const}\right)'_x \;=\; -\frac{1}{x} - \frac{\ln x - \mu}{\sigma^2 x}\,. \tag{23}$$

Substitution into Eq. (22) gives

$$\langle R \rangle_b \overset{\text{LN}}{=} \frac{\langle \ln x \rangle_b - \mu}{\sigma^2} = \frac{1}{2} + \frac{\langle \ln x \rangle_b - r}{\sigma^2} \,. \tag{24}$$

Compare this to Eq. (12) which we studied above. We recognize Eq. (22) as a generalized analog of Eq. (12). The extent of generalization is very substantial: the market can have any implied distribution, and the investor can have an arbitrary profile of risk-aversion.

As discussed above, we now substitute $b(x) = P(x)$ into Eq. (22) and obtain the formula for the expected risk aversion for the equity investor who correctly expressed an accurate long-term view on the market

$$\langle R \rangle_P = -1 - \frac{1}{N} \sum_{i=1}^{N} x_i \Big(\ln m(x_i) \Big)'_{x_i} \,. \tag{25}$$

We are now in a position to compute $\langle R \rangle_P$ as of any day for which we have market information, m. We should remember, however, that our investor took a 15-year view and is completely ignoring all intermediate updates from the markets. The level of risk aversion for such an investor should be measured in a way that represents most of the actual investment period and is not sensitive to daily market fluctuations. Below we report two kinds of experiments which achieve this. In the first kind we look at the averaged value of $\langle R \rangle_P$ across the entire 15-year investment period. In the second type we get a glimpse of the term structure of risk aversion by looking at a 10-year moving average.

Above we explained our choice to partition historical investments into bi-monthly reinvestment periods. This choice has a useful side effect. A single experiment would skip most of the available market data using only what it needs at bi-monthly intervals. The skipped market data can be used to repeat the experiment (42 times in total) – we just need to start the bi-monthly sequence on a different business day within the first two months for which we have data.

The horizontal green lines on Fig. 4 report the levels of $\langle R \rangle_P$ averaged across the entire (∼15-year) investment period. Different lines correspond to the 42 different runs of the experiment. The red line on Fig. 4 is a bi-monthly report of the 10-year moving average of $\langle R \rangle_P$ for the investment which started on the 17th of May 2000 – the first day for which we have market data. The 42 runs of this experiment are plotted by faint hashed lines across the same graph.

As in the case of the expected equity premia considered in the previous section, we see completely normal levels of risk aversion. Even our attempt to glimpse the term structure, which misaligned investment horizon with the measurement of risk aversion, returned reasonable values.

Speaking about historical premia, we must mention that the performance of equities over the last 15 years has been rather patchy. This has reduced the magnitude of the relevant historical equity premia.[2] However, the reduction was not strong or persistent enough to remove large equity premia across the entire data set used in this paper. Out of the 42

[2] This might be partially responsible for the slight dip of risk aversion below zero on Fig. 4, although the confidently positive values for the averages (represented by the green lines) indicate that this is probably just noise.

investments represented by the green lines on Fig. 4, the worst and the best-performing ones delivered around 2% and 2.6% per annum in terms of the annualized equity premium. All of these values are well above the threshold of 0.35% reported by Mehra and Presott [6].

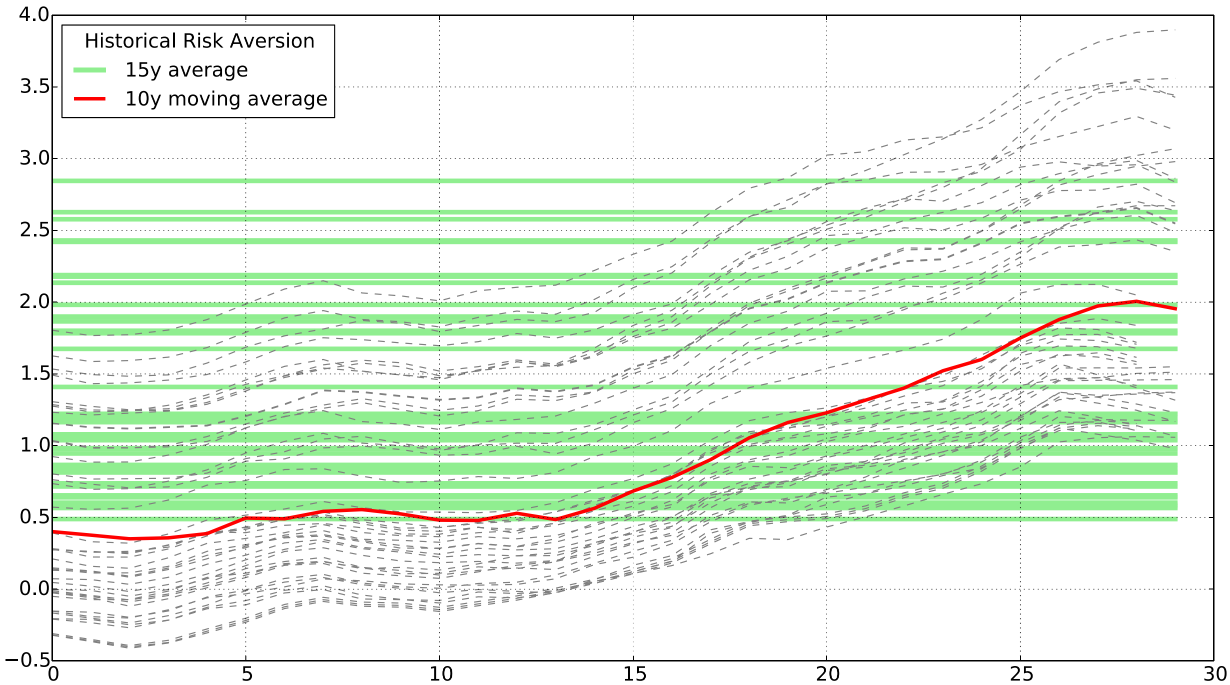

Figure 4: Historical risk aversion. 10-year moving averages are computed on the bi-monthly grid as described in the main text. Within the 15-years of history this produces sequences of 30 (or 29) values (depending on the availability of data for the last period).

As a final remark, we would like to point the reader back to the discussion around Eqs. (22-24) which brings together the separate investigations of the expected and the realized premia. The two types of premia are different in terms of their precise interpretations. They also come with their own inherent challenges such as high levels of statistical noise in the case of realized premia. Yet, whether we talk about expected or realized equity premia, it is important to note that the underlying mathematics addressing the equity premium puzzle is basically identical.

5 Epilogue

Quantitative Structuring successfully survives the challenge from the Equity Premium Puzzle. In fact, it shows how the puzzle can be resolved. Indeed, given realistic values of risk aversion, Quantitative Structuring predicts the correct expected premia and shows how such expectations materialize over long time horizons. We expect the equity premia to stay at the levels given by our formulae (Eq. (12), or more generally, Eq. (13)) for as long as investing in equities makes rational sense.

Our analysis is highly generalizable. In this paper we focused on equity investments, which happened to have a linear payoff function $F(x) = x$, but just as easily we could have examined any other investment strategy with a very different payoff function.

This is interesting because economic environments emerge from the successes and failures of individual strategies. It is not unreasonable to think that we might understand an economy by understanding the performance of its key strategies. Due to the potential importance of this line of thinking, let us conclude this paper with a few paragraphs articulating what our approach can offer to the wider subject of economics.

Detailed economics
Investments thrive on information. The information content of an investment is compressed into its economic structure – the payoff function. In the field of economics it has been a popular custom to replace the detailed payoff structure of an investment by simpler ad-hoc representations such as a point on a mean-variance diagram. The resulting loss of information is hard to quantify and even harder to compensate for, even with the most reasonable of assumptions.

Ideally, economic theories should mirror the reality and consider investors as individuals: each one with their own views and goals. Every attempt to get closer to this ideal inevitably faces the formidable challenge of practicality. More detailed models need more detailed information. Quantitative Structuring fulfills this need by providing access to the deep information content of payoff functions.

This is how we escaped the Equity Premium Puzzle. We consider investors as individuals which are allowed to hold any views they want. At the same time we leave no room for speculation about what these views actually are. It is crucial that the views are not assumed, they are derived using the knowledge of payoff functions (see Eqs. (7) and (28)).

Equity investors express strong directional views. Investment premia of over 6% per annum are not unusual in such circumstances. Similar premia can be seen in much more subtle investment strategies [5]. The expected premia are achieved in the long term, provided, of course, that the views are correct.

6 Appendix

Equation (3) can be rewritten as

$$d \ln f = R \, d \ln F \, . \tag{26}$$

For the case of constant but otherwise arbitrary R the above equation is immediately integrated to obtain

$$f(x) \propto e^{R \ln F(x)} = F^R(x) \, . \tag{27}$$

This result together with Eq. (2) give us the investor-believed distribution

$$\begin{aligned} b(x) &= f(x)\, m(x) \\ &= \frac{e^{R\, \ln F(x)} m(x)}{\int e^{R\, \ln F(y)} m(y)\, dy}\,, \end{aligned} \tag{28}$$

where we used the fact that $b(x)$ is normalized. For the expected logarithmic return we compute

$$\mathrm{ER}_R = \int b(x)\, \ln F(x)\, dx \tag{29}$$

$$= \frac{1}{Z}\frac{\partial Z}{\partial R}\,, \tag{30}$$

where

$$Z = \int F^R(x)\, m(x)\, dx\,. \tag{31}$$

In this paper we focus on the straightforward equity investment. In this case $F(x) = x$, and Z becomes essentially the Rth moment of m. In the special case of log-normal market-implied distribution, this can be computed analytically (see Eq. (9) for notation)

$$Z = \int x^R\, m(x)\, dx = \mathrm{DF} \cdot \exp\left\{ R\mu + \frac{1}{2}\, R^2\sigma^2 \right\}, \tag{32}$$

and therefore

$$\mathrm{ER}_R \to \mathrm{ER}_R^{\mathrm{LN}} = \mu + R\sigma^2\,. \tag{33}$$

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Predicting Individual Analyst Earnings Forecasts

SCOTT E. STICKEL*

1. *Introduction*

In this study I propose and test a model that predicts individual analyst forecasts of corporate earnings per share (*EPS*) using the change in the mean consensus forecast of other analysts since the date of the analyst's current outstanding forecast; the deviation of the analyst's current forecast from the consensus forecast; and cumulative stock returns since the date of the analyst's current forecast. I find that these three variables explain about 38% of the variability in analyst forecast revisions. While there is evidence of a relation between changes in earnings expectations and price changes, virtually all of the explanatory power of my model arises from *other* analyst forecasts.

Section 2 describes the data bases used and the sample selection process. Section 3 presents the model and method for predicting individual analyst forecasts. Section 4 reports the bias and accuracy of the predicted forecasts. Conclusions are in section 5.

2. *Data Bases and Sample Selection Process*

Individual analyst forecasts of annual *EPS* are supplied by Zacks Investment Research (Zacks). Daily returns data for firms listed on the New York Stock Exchange or American Stock Exchange are provided by the Center for Research in Security Prices (*CRSP*) at the University of Chicago.

* University of Pennsylvania. I received helpful comments from Larry Brown, Nick Gonedes, Prem Jain, Rick Lambert, Dave Larcker, Don Lewin, Jody Magliolo, participants at the 1989 International Symposium on Forecasting, and an anonymous referee. I appreciate the financial support of the KPMG Peat Marwick Foundation, Deloitte Haskins & Sells, and the Institute for Quantitative Research in Finance. I am also grateful to Zacks Investment Research, Inc. for supplying the analyst forecasts.

Individual analyst forecast revisions included in the sample meet these four criteria: (1) the forecast revision and the fiscal year-end of the firm are within 1980–85; (2) stock return data are available on the *CRSP Daily Returns File* of NYSE and ASE firms; (3) the forecast revision date is within 200 trading days of the date of the analyst's prior forecast and within the current fiscal year of the firm; (4) there are at least two analysts with an outstanding forecast for the firm on the dates of the original forecast and the revision.

Table 1 summarizes the sample selection process. Of the approximately 3,600 firms on the Zacks data base for fiscal year-ends within 1980–85, about 1,500 have revisions that meet the sample selection criteria. No industry appears to be missing from the final sample, which includes many banks and utilities as well as industrial companies. However, excluded firms are, on average, smaller than sample firms. Thus, the inferences made from the final sample may not be applicable to very small firms with analyst following.

3. Predicting Individual Analyst Earnings Forecasts

3.1 THE MODEL AND METHOD FOR PREDICTING FORECASTS

I use publicly available information released since the date of an analyst's current forecast to predict his next forecast. Assume the current day is day $t - 1$. Define $FRCST_{i,a,t}$ as a revised forecast of *EPS* for company i to be issued by analyst a on day t and define $FRCST_{i,a,t-v}$ as the current outstanding forecast dated v days prior to day t. A positive relation is hypothesized between each of the following three pieces of information and the change in investors' expectations of $FRCST_{i,a,t}$ between day $t - v$ and $t - 1$:

1. The change in the mean consensus forecast of other analysts

TABLE 1

Summary of Sample Selection Process for Individual Forecast Revisions

	Revisions
Total revisions on Zacks files dated within the 1980–85 calendar period and within the current fiscal year of the firm for firms with fiscal year-ends within the 1980–85 period	263,962
Revisions excluded:	
Firm not on *CRSP* file of NYSE and ASE firms	(59,810)
Date of the forecast is more than 200 trading days after the date of the analyst's prior forecast	(6,843)
Only one analyst with an outstanding forecast	(5,996)
Remaining revisions included in forecast prediction regressions (table 2)	191,313
Revisions within the 1980 calendar year	(16,613)
Remaining revisions included in measures of forecast predictability (table 3)	174,700

following firm i between days $t - v$ and $t - 1$. This change proxies for new information released after date $t - v$.

2. The difference between the mean consensus forecast of other analysts following firm i on day $t - v$ and analyst a's forecast on day $t - v$. Zacks supplies brokerage houses with a "deviation report," which officials at Zacks believe pressures analysts to issue forecasts closer to the consensus.
3. The cumulative return to firm i from days $t - v$ to $t - 1$, multiplied by the forecast by analyst a on day $t - v$. This return also proxies for new information released after date $t - v$.

To mitigate potential problems from calendar clustering, the sample is segregated into 144 subsamples on the basis of the semimonthly period in which day t falls, and tests are performed on the data by *subsample*. This design subsumes any cross-sectional temporal dependence *within* subsamples and reduces any cross-sectional temporal dependence *between* subsamples. The significance of mean results from these 144 subsamples is determined by dividing the mean by its standard error, which is the estimated standard deviation of the 144 observations divided by the square root of 144 (see Fama and MacBeth [1973]).

I estimate the following ordinary least squares regression for each of the 144 subsamples:

$$(FRCST_{i,a,t} - FRCST_{i,a,t-v}) = \beta_0 + \beta_1\,(CONS_{i,t-1} - CONS_{i,t-v}) + \beta_2\,(CONS_{i,t-v} - FRCST_{i,a,t-v}) + \beta_3\,(FRCST_{i,a,t-v} * CR_{i,(t-v,t-1)}) + \epsilon_{i,a,t}.$$

$CONS_{i,t-1}$ is the mean consensus forecast, excluding analyst a, of EPS for company i on day $t - 1$ and is calculated as the equally weighted average of all other individual forecasts.[1] $CR_{i,(t-v,t-1)}$ is the cumulative stock return for firm i from day $t - v$ to day $t - 1$.

3.2 EMPIRICAL RESULTS FOR PREDICTING INDIVIDUAL ANALYST FORECASTS

Table 2 reports the mean results of the 144 regressions. The mean coefficient on each explanatory variable is significantly different from zero.[2] The mean-adjusted R-square is .38.[3] The results suggest that an individual analyst's next forecast is a positive function of all three proxy

[1] Because there can be up to 200 days between forecasts, cross-sectional dependence of error terms between subsamples is a concern. The sensitivity of the results to this source of dependence is examined in section 3.3.

[2] The mean Pearson correlation between the first two independent variables is −.47; between the first and third independent variables, .14; and between the last two independent variables, −.04.

[3] The regression results are sensitive to the use of weighted least squares regression. Weighting the variables by the inverse of the current outstanding forecast, the inverse of price per share, and the inverse of the cross-sectional standard deviation of forecasts results in mean-adjusted R-squares of .28, .32, and .38, respectively. A divisor less than \$.20 is arbitrarily set equal to \$.20, and the variables are truncated by setting any measure less than −3 or greater than +3 to be equal to −3 and +3, respectively.

TABLE 2

Relation Between Changes in Analyst Forecasts and Other Information

	Mean Regression Results from Temporally Independent Regressions						
	Mean Coefficients				Mean-Adjusted R-square	Total Number of Revisions	Number of Regressions
	β_0	β_1	β_2	β_3			
All revisions	−.07[b]	.90[b]	.44[b]	.11[b]	.38	191,313	144
(t-statistic)[a]	(−21.44)	(48.69)	(35.62)	(15.86)			
By analyst reputation							
"All-Americans"	−.08[b]	.88[b]	.40[b]	.11[b]	.35	63,055	144
"Non-All-Americans"	−.07[b]	.92[b]	.48[b]	.10[b]	.40	128,258	144
Two independent variables	−.06[b]	.92[b]	.45[b]		.37	191,313	144
	−.07[b]	.63[b]		.12[b]	.26	191,313	144
	−.17[b]		.10[b]	.21[b]	.04	191,313	144
Using only forecast revisions from every 15th semimonthly period and restricting v to be less than 125	−.07[b]	.86[b]	.36[b]	.09[c]	.30	10,306	10

By number of analysts following the firm							
2–7 analysts	−.08[b]	.76[b]	.38[b]	.11[b]	.27	55,410	144
8–11 analysts	−.07[b]	.99[b]	.46[b]	.10[b]	.41	41,205	144
12–17 analysts	−.06[b]	1.02[b]	.52[b]	.09[b]	.47	51,180	144
18–39 analysts	−.07[b]	.96[b]	.57[b]	.09[b]	.51	43,518	144

Mean regression results for the relation between changes in analyst a's forecast of EPS and other publicly available information released since analyst a's current forecast and before analyst a's next forecast. Regressions use a sample of individual analyst forecast revisions from the 1980–85 period. The form of the estimated relation is:

$$(FRCST_{i,a,t} - FRCST_{i,a,t-v}) = \beta_0 + \beta_1(CONS_{i,t-1} - CONS_{i,t-v}) + \beta_2(CONS_{i,t-v} - FRCST_{i,a,t-v}) + \beta_3(FRCST_{i,a,t-v} * CR_{i,(t-v,t-1)}) + \epsilon_{i,a,t}$$

where $FRCST_{i,a,t-v}$ = the current outstanding forecast of EPS for firm i by analyst a, a forecast which is dated v days prior to day t.

$FRCST_{i,a,t}$ = forecasted EPS for firm i by analyst a on day t, a day on which the forecast is revised.

$CONS_{i,t-1}$ = mean consensus estimate of EPS for firm i on day $t-1$, excluding analyst a.

$CR_{i,(t-v,t-1)}$ = cumulative common stock return for firm i from day $t-v$ to day $t-1$.

[a] The t-statistics are calculated by using the estimated standard deviation of the estimated coefficients.
[b] The estimated coefficient is significantly different from zero at less than the .01 level.
[c] The estimated coefficient is significantly different from zero at less than the .05 level.

variables. The estimated coefficients imply that a $1.00 change in the mean forecast of other analysts since the date of an analyst's current forecast changes the expectation of the analyst's next forecast by $.90; an analyst's next forecast is expected to close the deviation between the mean forecast of other analysts and the analyst's forecast by approximately 44%; and cumulative share price gains or losses of 10% since an analyst's current forecast changes the expectation of the analyst's next forecast by 1.1%. The negative intercept suggests that analysts initially overestimate earnings, at least during 1980–85, and subsequently revise those forecasts downward by $.07 per revision, ceteris paribus.[4]

Table 2 also reports a comparison of the predictability of forecasts made by analysts on the *Institutional Investor* annual "All-American Research Team" with that of other analysts. Forecast revisions by analysts who are first-, second-, and third-team "All-Americans" in any year within 1981–85 are segregated from those of other analysts, and regressions are performed. Based on paired comparisons t-tests, where differences are computed semimonthly, the mean difference in β_1 is .037 (t-statistic = 1.48), the mean difference in β_2 is .081 (t-statistic = 3.68), and the mean difference in R-square is .049 (t-statistic = 3.26). Thus, ceteris paribus, the forecasts of "All-Americans" are less likely to "follow the crowd" and are less predictable than forecasts by other analysts.[5]

3.3 SENSITIVITY ANALYSES

The estimated coefficients are not sensitive to performing one regression with all 191,313 observations, although the significance levels of the t-statistics are higher. Using a single regression, the coefficients (t-statistics) for β_0, β_1, β_2, and β_3 are −.08 (−75.04), .86 (326.46), .41 (190.10), and .11 (54.24), respectively.

The regression results are sensitive to the exclusion of single independent variables. The results reported on table 2 suggest that most of the explanatory power of my model arises from the change in the consensus and the deviation of the forecast from the consensus forecast. The marginal explanatory power of price changes is very small.

Table 2 also reports regression results for subsamples restricted to be 14 semimonthly periods apart and revisions that are dated within 125 trading days of the date of the prior forecast. The semimonthly periods used end on the following dates: 1/15/80, 8/31/80, 4/15/81, 11/30/81, 7/

[4] A similar upward bias over the same period has been documented for *Value Line Investment Survey* forecasts by Abarbanell [1989] and in my own unpublished analysis of *IBES* mean consensus forecasts.

[5] The mean and median number of analysts following (1) firms followed by "All-Americans" and (2) firms followed by others are (1) 12.2 and 11 and (2) 12.3 and 11, respectively. Thus, the differences in model fit between "All-Americans" and other analysts are not associated with the differences in model fit reported in section 3.3 for analyst following.

15/82, 2/28/83, 10/15/83, 5/31/84, 1/15/85, and 8/31/85. Restricting the sample to these ten semimonthly periods ensures that any portion of the change in *FRCST* cannot be in more than one semimonthly period. The estimated coefficients are again significantly different from zero.

The results are somewhat sensitive to grouping revisions by the number of analysts with an outstanding forecast. As reported in table 2, the mean-adjusted R-square for the quartile of firms with the least analyst following is .27. The mean-adjusted R-squares for the remaining three quartiles are .41, .47, and .51, respectively.

The mean coefficients are relatively insensitive to performing regressions on a firm-by-firm basis before averaging. Regressions are performed for firms with at least 30 forecast revisions over the 1980–85 period. This procedure allows the intercept to vary across firms (see Murphy [1985]). There are 1,047 firms meeting this requirement, for which the mean coefficients for β_0, β_1, β_2, and β_3 are −.09, .80, .54, and .08, respectively. The individual firm coefficients are unbiased, but not independent; thus, t-statistics are not calculated. The mean-adjusted R-square for a random sample of 50 of these firms is .39. Thus, there is no apparent advantage to allowing the intercept to vary on a firm-by-firm basis.

The mean coefficient for $CR_{i,(t-v,t-1)}$ declines somewhat when cumulative abnormal returns, measured as market model residuals (e.g., Fama [1976]) and mean-adjusted returns (see Masulis [1978]), are substituted.[6] Using market model residuals and mean-adjusted returns results in estimated coefficients (t-statistics) for β_3 of 0.05 (8.62) and 0.05 (9.93), respectively. However, for both definitions, the explanatory power of abnormal returns is negligible, and the mean-adjusted R-square is again .38.

4. *The Bias and Accuracy of Predicted Individual Analyst Forecasts*

This section evaluates the predictive ability of the model using the following measure:

$$\text{“Updated” } PFE_{i,a,t} = (FRCST_{i,a,t} - E_{t-1}(FRCST_{i,a,t}))/FRCST_{i,a,t},$$

where $PFE_{i,a,t}$ is defined as the percentage forecast error[7] and:

$$E_{t-1}(FRCST_{i,a,t}) = FRCST_{i,a,t-v} + \hat{\beta}_0 + \hat{\beta}_1\ (CONS_{i,t-1} - CONS_{i,t-v})$$
$$+ \hat{\beta}_2\ (CONS_{i,t-v} - FRCST_{i,a,t-v}).$$

[6] For both definitions, parameters are estimated over event days +251 to +350, with at least 30 days of returns required for sample inclusion.

[7] The results discussed below are not sensitive to scaling the forecast error by price per share or the cross-sectional standard deviation of analyst forecasts at day $t - 1$. I used the procedures described in n. 3 for mitigating the small-denominator problem.

TABLE 3

Bias and Accuracy of Predicted Individual Analyst Forecasts

Percentage Forecast Error	Distribution of Percentage Forecast Error					
	Mean	Percentiles				
		10%	25%	50%	75%	90%
Using current outstanding forecast: $(FRCST_{i,a,t} - FRCST_{i,a,t-v})/FRCST_{i,a,t}$	−.160	−.364	−.119	−.036	.020	.074
Using "updated" forecast: $(FRCST_{i,a,t} - E_{t-1}(FRCST_{i,a,t})^*)/FRCST_{i,a,t}$	−.045	−.161	−.038	.011	.054	.122
Absolute Percentage Forecast Error	**Distribution of Absolute Percentage Forecase Error**					
	Mean	Percentiles				
		10%	25%	50%	75%	90%
Using current outstanding forecast: $\lvert FRCST_{i,a,t} - FRCST_{i,a,t-v}\rvert/FRCST_{i,a,t}$	.235	.015	.029	.063	.150	.429
Using "updated" forecast: $\lvert FRCST_{i,a,t} - E_{t-1}(FRCST_{i,a,t})\rvert/FRCST_{i,a,t}$	.181	.008	.020	.048	.109	.289

Distribution of measures of the bias and accuracy in predicted individual analyst forecasts. Percentage forecast error, a measure of bias, and absolute percentage forecast error, a measure of accuracy, are calculated from forecast revisions dated within the 1981–85 period. The number of revisions is 174,700.

* $E_{t-1}(FRCST_{i,a,t})$ = the expected next forecast of *EPS* for firm *i* by analyst *a* as of day $t - 1$. This expectation uses publicly available information released since day $t - v$, the date of the analyst's current forecast. See table 2 for definitions of other variables.

The parameters β_0, β_1, and β_2 are estimated using data from the prior year.[8] Because of the low marginal explanatory power of past price changes noted on table 2, β_3 is not estimated or used.

As a benchmark, I use the following measure of the predictability of individual analyst forecast revisions.

$$\text{"Naive" } PFE_{i,a,t} = (FRCST_{i,a,t} - FRCST_{i,a,t-v})/FRCST_{i,a,t}.$$

"Naive" *PFE* conditions expectations of the next forecast on only the current outstanding forecast and is analogous to a random walk model.

Table 3 reports signed percentage forecast errors (measures of bias) and unsigned (absolute) percentage forecast errors (measures of accuracy). The distribution of "updated" *PFE* is more symmetrically distributed around zero and has smaller absolute values than "naive" *PFE*.[9]

[8] The regression results of the prior section are also relatively insensitive to the forecast year. Because prior year data are used for parameter estimation, there are no 1980 "updated" forecasts. This leaves 5 years or 120 semimonthly periods.

[9] Subtracting the regression intercept from each outstanding forecast and using the resulting number as the expected forecast results in a mean percentage forecast error of −12.0% and a mean absolute forecast error of 22.2%. Thus, the improvement in predictive ability from using "updated" forecasts is not simply due to the intercept term.

I used paired comparisons t-tests to evaluate the significance of the differences in bias and accuracy. The differences in bias ("naive" *PFE* minus "updated" *PFE*) and accuracy (absolute "naive" *PFE* minus absolute "updated" *PFE*) are computed at the individual analyst level, and a mean difference is computed by semimonthly period. Significance is determined by dividing the mean of the semimonthly mean differences by its standard error. Aggregated in this manner, the mean difference in bias is −11.3% (t-statistic = −32.17) and the mean difference in accuracy is 5.2% (t-statistic = 31.55). Thus, "updated" forecasts are less biased and more accurate predictors of future forecasts than the analyst's current forecast.

5. *Conclusions*

My model predicts an individual analyst's next *EPS* forecast by updating his current forecast for subsequent information. "Updated" forecasts from this model are less biased and more accurate predictors of future forecasts than the analyst's current forecast. Possible extensions of this line of research include examining whether or not "updated" forecasts are better predictors of future reported earnings; using "updated" forecasts as measures of market expectations; and using the dispersion of "updated" forecasts as measures of earnings uncertainty.

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UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Joseph T. Kelliher, Chairman;
Suedeen G. Kelly, Marc Spitzer,
Philip D. Moeller, and Jon Wellinghoff.

Composition of Proxy Groups for Determining Gas and Oil Pipeline Return on Equity — Docket No. PL07-2-000

PROPOSED POLICY STATEMENT

(Issued July 19, 2007)

1. In this proposed Policy Statement, the Commission is proposing to update its standards concerning the composition of the proxy groups used to decide the return on equity (ROE) of natural gas and oil pipelines. Firms engaged in the pipeline business are increasingly organized as master limited partnerships (MLPs). Therefore, the Commission proposes to modify its current policy regarding the composition of proxy groups to allow MLPs to be included in the proxy group. This proposed Policy Statement explains the standards that the Commission would require to be met in order for an MLP to be included in the proxy group. The Commission proposes to apply its final Policy Statement to all gas and oil pipeline rate cases that have not completed the hearing phase as of the date the Commission issues its final Policy Statement. The Commission intends to decide on a case-by-case basis whether to apply the final Policy Statement in cases that have completed the hearing phase. Finally, the Commission is requesting comments on this proposed Policy Statement. Initial comments are due 30 days after publication of this order in the *Federal Register*, with reply comments due 50 days after publication in the *Federal Register*.

I. Background

2. Since the 1980s, the Commission has used a Discounted Cash Flow (DCF) model to develop a range of returns earned on investments in companies with corresponding risks for determining the ROE for natural gas and oil pipelines. The DCF model was originally developed as a method for investors to estimate the value of securities, including common stocks. It is based on "the premise that a stock is worth the present value of its future cash flows, discounted at a market rate commensurate with the stock's risk."[1] Unlike investors, the Commission uses the DCF model to determine the ROE to be included in the pipeline's rates, rather than to estimate a stock's value. Therefore, the Commission solves the DCF formula for the discount rate, which represents the rate of

[1] *Ozark Gas Transmission System*, 68 FERC ¶ 61,032 at 61,104, n. 16 (1994).

return that an investor requires in order to invest in a firm. Under the resulting DCF formula, ROE equals current dividend yield (dividends divided by share price) plus the projected future growth rate of dividends.

3. The Commission uses a two-step procedure for determining the constant growth of dividends: averaging short-term and long-term growth estimates.[2] Security analysts' five-year forecasts for each company in the proxy group, as published by Institutional Brokers Estimate System (IBES), are used for determining growth for the short term; long-term growth is based on forecasts of long-term growth of the economy as a whole, as reflected in the Gross Domestic Product. The short-term forecast receives a 2/3 weighting and the long-term forecast receives a 1/3 weighting in calculating the growth rate in the DCF model.[3]

4. Most gas pipelines are wholly-owned subsidiaries and their common stock is not publicly traded, and this is also true for some jurisdictional oil pipelines. Therefore, the Commission uses a proxy group of firms with corresponding risks to set a range of reasonable returns for both natural gas and oil pipelines. The Commission then assigns the pipeline a rate within that range or zone, to reflect specific risks of that pipeline as compared to the proxy group companies.[4]

5. The Commission historically required that each company included in the proxy group satisfy the following three standards.[5] First, the company's stock must be publicly traded. Second, the company must be recognized as a natural gas or oil pipeline company and its stock must be recognized and tracked by an investment information service such as Value Line. Third, pipeline operations must constitute a high proportion of the company's business. Until the Commission's 2003 decision in *Williston Basin*

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[2] *Northwest Pipeline Co.*, 71 FERC ¶ 61,309 at 61,989-92 (1995) (Opinion No. 396), 76 FERC ¶ 61,068 (1996) (Opinion No. 396-A), 79 FERC ¶ 61,309 (1997) (Opinion No. 396-B), *reh'g denied*, 81 FERC ¶ 61,036 (1997) (Opinion No. 396-C); *Williston Basin Interstate Pipeline Co.*, 79 FERC ¶ 61,311, *order on reh'g*, 81 FERC ¶ 61,033 (1997), *aff'd in relevant part, Williston Basin Interstate Pipeline Co.,* 165 F.3d 54 (D.C. Cir. 1999)(*Williston Basin*).

[3] The Commission presumes that existing pipelines fall within a broad range of average risk, and thus generally sets pipelines' return at the median of the range. *Transcontinental Gas Pipe Line Corp.*, 84 FERC ¶ 61,084 at 61,423-4 (1998) Opinion No. 414-A, *reh'g*, 85 FERC ¶ 61,323 (1998) (Opinion No. 414-B), *aff'd North Carolina Utilities Commission v. FERC*, 340 U.S. App. D.C. 183 (D.C. Cir) (unpublished opinion).

[4] *Williston Basin* at 57 (*citation omitted*).

[5] *Transcontinental Gas Pipe Line Corp.*, 90 FERC ¶ 61,279 at 61,933 (2000).

Interstate Pipeline Co.,[6] the third standard could only be satisfied if a company's pipeline business accounted for, on average, at least 50 percent of a company's assets or operating income over the most recent three-year period.

6. As a result of mergers, acquisitions, and other changes in the natural gas industry, fewer and fewer interstate natural gas companies have satisfied the third requirement. Thus, in *Williston*, the Commission relaxed this requirement for the natural gas proxy group. Instead, the Commission approved a pipeline's proposal to use a proxy group based on the corporations listed in the Value Line Investment Survey's list of diversified natural gas firms that own Commission-regulated natural gas pipelines, without regard to what portion of the company's business comprises pipeline operations.

7. In *HIOS*[7] and *Kern River*, the only fully litigated section 4 rate cases decided since *Williston*, the Commission again drew the proxy group companies from the same Value Line list. When those cases were litigated, there were six such companies: Kinder Morgan Inc., the Williams Companies (Williams), El Paso Natural Gas Company (El Paso), Equitable Resources, Inc., Questar Corporation, and National Fuel Gas Corporation. The Commission excluded Williams and El Paso on the ground that their financial difficulties had lowered their ROEs to a level only slightly above the level of public utility debt, and the Commission stated that investors cannot be expected to purchase stock if lower risk debt has essentially the same return. This left a four-company proxy group, three of whose members derived more revenue from the distribution business, rather than the pipeline business. In *Kern River*, the Commission adjusted the pipeline's return on equity 50 basis points above the median in order to account for the generally higher risk profile of natural gas pipeline operations as compared to distribution operations.

8. In both *Kern River* and *HIOS*, the Commission rejected pipeline proposals to include MLPs in the proxy group. The pipelines contended that MLPs have a much higher percentage of their business devoted to pipeline operations, than most of the corporations that the Commission currently includes in the proxy group.

9. Unlike corporations, MLPs generally distribute most available cash flow to the general and limited partners in the form of quarterly distributions. Most MLP agreements define "available cash flow" as (1) net income (gross revenues minus operating expenses) plus (2) depreciation and amortization, minus (3) capital investments the partnership must

[6] *Williston Basin Interstate Pipeline Company*, 104 FERC ¶ 61,036 at P 35, n. 46 (2003).

[7] *High Island Offshore System, L.L.C.*, 110 FERC ¶ 61,043, *reh'g denied*, 112 FERC ¶ 61,050 (2005), *appeal pending*.

make to maintain its current asset base and cash flow stream.[8] Depreciation and amortization may be considered a part of "available cash flow," because depreciation is an accounting charge against current income, rather than an actual cash expense. As a result, the MLP's cash distributions normally include not only the net income component of "available cash flow," but also the depreciation component. This means that, in contrast to a corporation's dividends, an MLP's cash distributions generally exceed the MLP's reported earnings. Moreover, because of their high cash distributions, MLPs usually finance capital investments required to significantly expand operations or to make acquisitions through debt or by issuing additional units rather than through retained cash, although the general partner has the discretion to do so.

10. In rejecting the pipelines' proposals in *HIOS* and *Kern River* to include MLPs in the proxy group, the Commission made clear that it was not making a generic finding that MLPs cannot be considered for inclusion in the proxy group if a proper evidentiary showing is made.[9] However, the Commission pointed out that data concerning dividends paid by the proxy group members is a key component in any DCF analysis, and expressed concern that an MLP's cash distributions to its unit holders may not be comparable to the corporate dividends the Commission uses in its DCF analysis. In *Kern River*, the Commission explained its concern as follows:

> Corporations pay dividends in order to distribute a share of their earnings to stockholders. As such, dividends do not include any return *of* invested capital to the stockholders. Rather, dividends represent solely a return *on* invested capital. Put another way, dividends represent profit that the stockholder is making on its investment. Moreover, corporations typically reinvest some earnings to provide for future growth of earnings and thus dividends. Since the return on equity which the Commission awards in a rate case is intended to permit the pipeline's investors to earn a profit on their investment and provides funds to finance future growth, the use of dividends in the DCF analysis is entirely consistent with the purpose for which the Commission uses that analysis. By contrast, as Kern River concedes, the cash distributions of the MLPs it seeks to add to the proxy group in this case include a return *of* invested capital through an allocation of the partnership's net income. While the level of an MLP's cash distributions may be a significant factor in the unit holder's decision to invest in the MLP, the Commission uses the DCF analysis solely to determine the pipeline's return on equity. The Commission provides for the return of invested capital through a separate depreciation allowance.

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[8] The definition of available cash may also net out short term working capital borrowings, the repayment of capital expenditures, and other internal items.

[9] *Kern River Gas Transmission Company*, 117 FERC ¶ 61,077 (2006) (Opinion No. 486) at P 147, *reh'g pending.*

> For this reason, to the extent an MLP's distributions include a significant return of invested capital, a DCF analysis based on those distributions, without any adjustment, will tend to overstate the estimated return on equity, because the 'dividend' would be inflated by cash flow representing return of equity, thereby overstating the earnings the dividend stream purports to reflect.[10]

11. The Commission stated that it could nevertheless consider including MLPs in the proxy group in a future case, if the pipeline presented evidence addressing these concerns. The order suggested that such evidence might include some method of adjusting the MLPs' distributions to make them comparable to dividends, a showing that the higher "dividend" yield of the MLP was offset by a lower long-term growth projection, or some other explanation why distributions in excess of earnings do not distort the DCF results for the MLP in question. However, the Commission concluded that Kern River had not presented sufficient evidence to address these issues, and that the record in that case did not support including MLPs in the proxy group.

12. In addition, *Kern River* pointed out that the traditional DCF model only incorporates growth resulting from the reinvestment of earnings, not growth arising from external sources of capital.[11] Therefore, the Commission stated that if growth forecasted for an MLP comes from external capital, it is necessary either (1) to explain why the external sources of capital do not distort the DCF results for that MLP or (2) propose an adjustment to the DCF analysis to eliminate any distortion. The Commission's orders in *HIOS* reached the same conclusions.

13. In some oil pipeline rate cases decided before *HIOS* and *Kern River*, the Commission included MLPs in the proxy group used to determine oil pipeline return on equity on the ground that there were no corporations available for use in the oil proxy group.[12] In those cases, no party raised any issue concerning the comparability of an MLP's cash distribution to a corporation's dividend. However, that issue did arise in the first oil pipeline case decided after *HIOS* and *Kern River*, involving SFPP's Sepulveda Line.[13] The Commission approved inclusion of MLPs in the proxy group in that case on the grounds that the MLPs in question had not made distributions in excess of earnings. The Sepulveda Line order therefore analyzed the five MLPs that have been used to determine SFPP's ROE: Buckeye Partners, L.P., Enbridge Energy Partners, L.P., Enron

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[10] *Id.* at P 149-50.

[11] *Id.* at P 152.

[12] *SFPP, L .P.*, 86 FERC ¶ 61,022 at 61,099 (1999).

[13] *SFPP, L.P.*, 117 FERC ¶ 61,285 (2006) (SFPP Sepulveda order), *rehearing pending*.

Gas Liquids (Enron),[14] TEPPCO Partners, L.P., and Kaneb Partners, L.P. (later Valero Partners), now NuStar Energy, L.P**.** The order reviewed each entity for the year 1996 and the previous four years, and held that four of the firms had had income (earnings) in excess of distributions and that their incomes (earnings) were stable over that period with minor exceptions. The order found these facts sufficient to address the concerns expressed in *HIOS* and *Kern River*. The fifth firm, Enron, had distributions in excess of income (earnings) in four of the five years. While the Commission did not preclude use of such MLPs, Enron did not meet the *HIOS* test and was excluded as unrepresentative.

II. **Discussion**

14. As discussed below, the Commission proposes to permit inclusion of MLPs in a proxy group. However, the Commission proposes to cap the "dividend" used in the DCF analysis at the pipeline's reported earnings, thus adjusting the amount of the distribution to be included in the DCF model. The Commission would leave to individual cases the determination of which MLPs and corporations should actually be included in the natural gas or oil proxy group. However, participants in these cases should include as much information as possible regarding the business profile of the firms they propose to include in the proxy group, for example, based on gross income, net income, or assets.

15. The Supreme Court has stated that "the return to the equity owner should be commensurate with the return on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital."[15] The Commission is concerned that its current approach to determining the composition of the proxy group for determining gas and oil pipeline return on equity is, or will, require the use of firms which are less and less representative of either natural gas or oil pipeline business risk.

16. As has been discussed, there are fewer and fewer publicly traded diversified natural gas corporations that have interstate gas pipelines as their predominant business line, whether this is measured on a revenue, income, or asset basis. As such, there are fewer diversified natural gas companies available for inclusion in a natural gas pipeline proxy group which may reasonably be considered representative of the risk profile of a natural gas pipeline firm. Moreover, at this point the only publicly traded oil pipeline firms are controlled by MLPs, which makes the issue of a representative proxy group more acute.

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[14] Enron Gas Liquids was not affiliated with Enron, Inc. at that time, but was a former affiliate that was spun off in the early 1990's.

[15] *FPC v. Hope Natural Gas Co.*, 320 U.S. 591 (1944); *Bluefield Water Works & Improvement Co. v. Public Service Comm'n*, 262 U.S. 679 (1923).

17. Cost of service ratemaking requires that the firms in the proxy group be of comparable risk to the firm whose equity cost of capital is at issue in a particular rate proceeding. If the proxy group is less than clearly representative, this may require the Commission to adjust for the difference in risk by adjusting the equity cost-of-capital, a difficult undertaking requiring detailed support from the contending parties and detailed case-by-case analysis by the Commission. Expanding a proxy group to include MLPs whose business is more narrowly focused on pipeline activities would help ameliorate this problem. Thus, including MLP natural gas pipelines in the equity proxy group should reduce the need to make adjustments since the proxy group is more likely to contain firms that are representative of the regulated firm whose rates are at issue. Including MLPs will also recognize the trend to greater use of MLPs in the natural gas pipeline industry and address the reality of the oil pipeline industry structure.

18. The Commission's primary concern about including MLPs in the proxy group has arisen from the interaction between use of the DCF analysis to determine return on capital while relying on a depreciation allowance for return of capital. The Commission permits a pipeline to recover through its rates both a return *on* equity and a return *of* invested capital. The Commission uses the DCF analysis solely to determine the return *on* equity component of the cost-of-service. The Commission provides for the return *of* invested capital through a separate depreciation allowance. Given the purpose for which the Commission uses the DCF analysis, the cash flows included in that analysis must be limited to cash flows which may reasonably be considered to reflect a return *on* equity. Such cash flows include that portion of an MLP's cash distribution derived from net income, or earnings.

19. To the extent an MLP makes distributions in excess of earnings, it is able to do so because partnership agreements define "cash available for distribution" to include depreciation. This enables the MLP to make cash distributions that include return *of* equity, in addition to return *on* equity. However, because the Commission includes a separate depreciation allowance in the pipeline's cost-of-service, a DCF analysis including cash flows attributable to depreciation would permit the pipeline to double recover its depreciation expense, once through the depreciation allowance and once through an inflated ROE. Adjusting an MLP's cash distribution to exclude that portion of the distribution in excess of earnings addresses this problem.

20. The Commission recognizes that it raised several concerns in *Kern River* as to whether adjusting the MLP's cash distribution down to the level of its earnings would be sufficient to eliminate the distorting effects of including MLPs in the proxy group. The Commission pointed out that corporations generally do not pay out all of their earnings in dividends, but retain some earnings in order to generate future growth. The Commission also suggested that the DCF model is premised on growth in dividends deriving from reinvestment of current earnings, and does not incorporate growth from external sources, such as issuing debt or additional stock.

21. The Commission believes that these concerns should not render unreliable a DCF analysis using the adjusted MLP results. The market data for the MLPs used in the DCF analysis should itself correct for any distortions remaining after the adjustment to the cash distribution described above. For example, the IBES growth projections represent an average of the growth projections by professionals whose business is to advise investors.[16] The level of an MLP's cash distributions as compared to its earnings is a matter of public record and thus known to the security analysts making the growth forecasts used by IBES. Therefore, the security analysts must be presumed to take those distributions into account in making their growth forecasts for the MLP. To the extent an MLP's relatively high cash distributions reduce its growth prospects that should be reflected in a lower growth forecast, which would offset the MLP's higher "dividend" yield.

22. In order to test the validity of this assumption, the Commission reviewed the most recent IBES growth forecasts for five diversified energy companies and six MLPs in the natural gas business. The average IBES forecast for the corporations is 9 percent, while the average IBES forecast for the MLPs is 6.17 percent, or nearly 300 basis points lower.[17] Thus, the security analysts do project lower growth rates for the MLPs than for the corporations.

23. In addition, the fact MLPs may rely upon external borrowings and/or equity issuances to generate growth is not a reason to exclude them from the proxy group. Most pipelines organized as corporations also use external borrowings and to some extent equity issuances. To the extent that gas or oil pipelines are controlled by diversified energy companies with unregulated assets (either federal or state), the financial practices may be the same, although perhaps not as highly leveraged, and the results are likewise reflected in the IBES projections. A prudent investor deciding whether to invest in a security will reasonably consider all factors relevant to assessing the value of that security. The potential effect of future borrowings or equity issuances on share values of either MLPs or corporations is one such factor. Since a DCF analysis is a method for investors to estimate the value of securities, it follows that such an analysis may reasonably take into account potential growth from external capital.

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[16] Opinion No. 414-B, 85 FERC at 62,268-70.

[17] The IBES forecasts were prepared as of May 31, 2007 applying the current DCF model for the corporate sample and using distributions capped at earnings for the MLPs. Thus the short term growth rates for the five diversified gas corporations were: (1) National Fuel Gas Corporation, 5 percent; (2) Questar Corporation, 9 percent; (3) Oneok, Inc., 9 percent; (4) Equitable Resources Inc., 10 percent; and (5) Williams Companies, 12 percent. The short term growth rates for the six gas MLPs were: (1) Oneok Partners, L.P., 5 percent; (2) TEPPCO Partners, L.P., 5 percent; (3) TC Pipelines, L.P., 5 percent; (4) Boardwalk Pipeline Partners, L.P., 7 percent, (5) Kinder Morgan Energy Partners, L.P., 7 percent, and (6) Enterprise Products Partners, L.P., 8 percent.

24. The Commission does, however, recognize that an MLP's lack of retained earnings may render cash distributions at their current level unsustainable, and thus still unsuitable for inclusion in the DCF analysis. Therefore, the Commission intends to require participants proposing to include MLPs in the proxy group to provide a multi-year analysis of past earnings. An analysis showing that the MLP does have stable earnings would support a finding that the cash to be included in the DCF calculation is likely to be available for distribution, thus replicating the requirement of the corporate model of a stable dividend.

III. <u>Procedure for Comments</u>

25. The Commission invites interested persons to submit written comments on its proposed policy to permit the inclusion of MLPs in the proxy group to be used to determine the equity cost of capital of natural gas and oil pipelines. The comments may include alternative proposals for determining a representative proxy group given that (1) few natural gas companies meet the Commission's traditional standards for inclusion in the proxy group, and (2) the only publicly traded oil pipeline firms available for inclusion in the proxy group are controlled by MLPs. Comments may also address the analysis advanced in this proposed policy statement, alternative methods for adjusting the amount of the MLP's distribution to be included the DCF analysis, and the relevance of the stability of MLP earnings.

26. Comments are due 30 days from the date of publication in the *Federal Register* and reply comments are due 50 days from the date of publication in the *Federal Register*. Comments must refer to Docket No. PL07-2-000, and must include the commentor's name, the organization it represents, if applicable, and its address. To facilitate the Commission's review of the comments, commentors are requested to provide an executive summary of their position. Additional issues the commentors wish to raise should be identified separately. The commentors should double space their comments.

27. Comments may be filed on paper or electronically via the eFiling link on the Commission's web site at http://www.ferc.gov. The Commission accepts most standard word processing formats and commentors may attach additional files with supporting information in certain other file formats. Commentors filing electronically do not need to make a paper filing. Commentors that are not able to file comments electronically must send an original and 14 copies of their comments to: Federal Energy Regulatory Commission, Office of the Secretary, 888 First Street N.E., Washington, D.C. 20426.

28. All comments will be placed in the Commission's public files and may be viewed, printed, or downloaded remotely as described in the Document Availability section below. Commentors are not required to serve copies of their comments on other commentors.

IV. Document Availability

29. In addition to publishing the full text of this document in the *Federal Register*, the Commission provides all interested persons an opportunity to view and/or print the contents of this document via the Internet through the Commission's Home Page (http://www.ferc.gov) and in the Commission's Public Reference Room during normal business hours (8:30 a.m. to 5:00 p.m. Eastern time) at 888 First Street, N.E., Room 2A, Washington D.C. 20426.

30. From the Commission's Home Page on the Internet, this information is available in the Commission's document management system, eLibrary. The full text of this document is available on eLibrary in PDF and Microsoft Word format for viewing, printing, and/or downloading. To access this document in eLibrary, type the docket number (excluding the last three digits) in the docket number field.

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By the Commission.

(S E A L)

Kimberly D. Bose,
Secretary.

The Earnings Numbers Game: Rewards to Walk Down and Penalties to Walk Up Of Analysts' Forecasts of Earnings

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The Earnings Numbers Game: Rewards to Walk Down and Penalties to Walk Up Of Analysts' Forecasts of Earnings

Abstract

We provide a comprehensive study of the valuation consequences to meeting/beating analysts' forecasts (*MBE*) versus missing expectations conditioned on the forecast revision path prior to the earnings announcement. We find that investors reward firms that walk down forecasts to achieve a positive earnings surprise and penalize firms that walk up forecasts to achieve a negative earnings surprise. The reward and penalty are not justified by subsequent cash flow performance and the post-event return reversal suggests that investors were partially misled by strategic motives belying the forecast revisions. There is higher insider net selling and more new issues for walk down firms, and higher insider net buying and more repurchases for walk up firms. The capital market incentives for selling and *MBE* reward disappear in recent periods, suggesting that investors learn to discount a walk down. However, the walk up penalty and capital market incentives to depress prices for buying by insiders and the firm remain even in recent years.

1. Introduction

Prior studies have documented that the equity market rewards firms that meet or beat analysts' earnings expectations (hereafter *MBE*) and penalize those that do not.[1] The immediate price reaction to an *MBE* event at the earnings announcement date is generally positive whereas firms that miss forecasts generally experience a negative price reaction. The stock returns in the fiscal period (quarterly or annual) of the earnings are also higher for *MBE* firms than miss firms, even when they have the same initial analysts' forecast at the start of the period and the same actual reported earnings at the end of the period. We refer to the higher period returns for *MBE* firms over miss firms after controlling for the size of the forecast revision if any and the surprise as the *MBE* reward.

Two forecast paths lead to an *MBE* event. The first, which has received attention in the literature, is the walk down revision path *OP* where the initial optimistic forecasts are guided down to pessimistic levels prior to the earnings announcement date. The second path *PP* begins and ends with pessimistic earnings forecasts during the quarter. Similarly, two different forecast revision paths lead to a miss event. The initial pessimistic forecast is guided up to become optimistic before the earnings announcement date in the walk up *PO* path whereas the initial and final forecasts remain optimistic in the *OO* path. Figure 1 summarizes the trajectory of these four analysts' forecast revision paths.

When the underlying economic fundamentals fail to deliver earnings that meet or beat analysts' expectations, managers can avoid negative earnings surprises by managing reported earnings upward (Cheng and Warfield, 2005) or guiding analysts' expectations

[1] See Bartov, Givoly, and Hayn (2002), Kasznik and McNichols (2002), Richardson, Teoh, and Wysocki (2004), Brown and Caylor (2005), Skinner and Sloan (2002), and Vickers (1999). Jiang (2008) shows that beating benchmarks is also rewarded in the debt market.

downwards (Soffer, Thiagarajan, and Walther, 2000). This phenomenon is often referred to as the "earnings numbers game" and is viewed unfavorably by regulators (Levitt, 1998) and the media (Cohen, 1991). Bartov and Cohen (2008) report that forecast guidance is more widespread than earnings management to achieve *MBE*, and so the former is the focus in this paper that considers analysts' revision paths.

Our first objective is to study the incentives of the firm and managers to play the numbers game by managers guiding analysts' forecasts either downwards to a beatable level or upwards for a deliberate miss outcome. While the walk down phenomenon has been studied in the literature, the incentives to a walk up for a miss event have not. For incentives, we consider new equity issues or repurchases by the firm, and insider net selling by the managers in the months after the earnings' announcement.

Our second objective is to investigate the extent to which investors are cognizant of the strategic incentives that belie the earnings numbers game. We compare the period return to the future operating performance between firms with a walk down (*OP*) of analysts' forecasts to an *MBE* event versus firms that did not walk down and so miss expectations (*OO*) to study whether the *MBE* reward is justified. Similarly, we also compare the period return and future operating performance between firms with a walk up (*PO*) of analysts' forecasts to a deliberate miss event versus those that did not and so achieve an *MBE* (*PP*) to study whether the miss penalty is justified.

If investors only partially discount for strategic motives associated with a walk down, they will reward a walk down to an *MBE* firm (*OP*) when compared with *OO*. Similarly, investors will penalize firms that walk up to a miss (*PO*) compared to *PP*. If the subsequent true underlying performance for either the strategically motivated walk down or walk up firms, however, is not much different from their corresponding benchmark firms, then the reward and penalty are not justified.

We also examine whether investors' response to the earnings surprise is contingent on the revision path prior to the earnings announcement. If investors are somewhat skeptical of the positive earnings surprise from a walk down *OP* firm relative to a *PP* firm, their stock price reaction will be more muted. Similarly, investors' reaction to a negative earnings surprise from a walk up *PO* firm would also be more muted relative to the *OO* firm. However, the positive reaction for *OP* and negative reaction for *PO* are overreactions relative to full discounting by fully attentive investors. Therefore, walk down *OP* firms and walk up *PO* firms will experience a post-event return reversal. Since an *MBE* event is good news and a miss bad news, we need to adjust the post-event returns for the effects of the well-known post-earnings announcement drift anomaly (PEAD).[2]

The general sample period spans from the first quarter of 1984 to the last quarter of 2006.[3] There were dramatic changes in the regulatory regime governing the communication between analysts and management after 2000. Regulation Fair Disclosure (Reg FD) was instituted October 23, 2000, the Sarbanes-Oxley Act (SOX) was enacted on July 30, 2002, and Regulation Analyst Certification (Reg AC) became effective April 14, 2003. Prior research and anecdotal evidence also suggest a substantial increase in the use of analysts' estimates as a benchmark for firm performance, and increased prevalence of the expectations game in the 1990s (e.g. Richardson et al., 2004).[4] The widespread

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[2] See Bernard and Thomas (1989).

[3] We choose to study quarterly periods over annual periods to increase the number of observations and so maximize the power of our tests.

[4] Several financial information sources began providing earnings benchmarks based on analysts' forecasts on the Internet in the mid-1990s. One of the best known, First Call, introduced its service to the web in 1994.

publicity and regulatory crack-down on the earnings numbers game in recent years likely have raised investor awareness of the *MBE* phenomenon. (Jain and Rezaee, 2006; Bartov and Cohen, 2008; Koh et al., 2008). Therefore, as a third objective, we examine whether the path-dependant return reactions are also time period specific. Given the likely regime change at the dates noted above, we partition the sample period into three sub-periods, 1984-1994, 1995-2000, and 2001-2006.

For firms with initial optimistic forecasts, we find that the market rewards firms that walk down the forecasts to an *MBE* event (*OP*) compared to the miss firms (*OO*), consistent with Richardson et al. (2004). However, the walk down reward disappears after 1995, consistent with increased investor awareness of the earnings numbers game from the popular press and academics. In contrast, we find that firms that walk up forecasts to a miss event (*PO*) are penalized relative to firms that beat forecasts from the start (*PP*) in all three sub-periods.

For the short-window market reaction to earnings surprises following different forecast revision paths, we find that the market's reaction is significantly smaller for surprises achieved through switching of expectations with walk down *OP* or walk up *PO* revision paths, as compared to their counterparts with consistent optimism (*OO*) or consistent pessimism (*PP*) respectively throughout the quarter. This evidence suggests that investors do discount somewhat for such earnings games. Whether they discount appropriately and sufficiently or not can only be determined by evaluating post-event operating performance and post-event return reversals.

For the walk down *OP* firms relative to the *OO* firms, the subsequent quarter ROA increases only in the two earlier sub-periods. Moreover, the increase is not from an increase in cash flows from operations. If accruals are more easily managed than cash flows from operations, the results suggest that *OP* firms are in effect no better performers than *OO* firms. The *MBE* reward of *OP* firms over *OO* firms in the early period is therefore not justified, implying that investors are misled by the walk down. The disappearance of the *MBE* reward in later periods, however, suggests that investors learn to discount the walk down.

Similarly, the poorer next quarter earnings performance of walk up *PO* firms relative to *PP* firms occurs only in the early periods, and is not supported by worse cash flows. In other periods, neither the earnings nor cash flow performances are all that different. However, investors continue to punish walk up *PO* firms relative to *PP* firms in later sub-periods, suggesting that investors may not be sufficiently attentive to the strategic incentives of *PO* firms to obtain a miss event.

If investors do not fully discount the information in the *positive* earnings surprises achieved through a walk down path, *OP* firms will be temporarily overvalued and a stock return reversal is likely to follow. However, given the existence of the post-earnings announcement drift, which we consider to be driven by a different source, the reversal will dampen the magnitude of the upward-return drift related to PEAD and may not be strong enough to dominate it. A similar argument about temporary undervaluation can be applied to the *PO* path, in which case we expect that the future return reversal for a walk up will offset part of the downward PEAD drift. Consistent with this conjecture, we find that the PEAD effect is dampened among the switching *OP* and *PO* firms than among the consistent *OO* and *PP* firms, controlling for the magnitude of earnings surprises. We find that over time the magnitude of PEAD for *OP* and *PO* firms converges to that of *OO* and

PP firms, which is again consistent with investors' increased awareness of the numbers game.

Turning to incentives, consistent with Richardson et al. (2004), we find that *OP* firms engage in more stock selling activities (insider net sales and equity issuance) than *OO* firms following earnings announcements, but not in the latest sub-period. The disappearance of these incentives in 2001-2006 is consistent with the earlier returns results that investors no longer reward the numbers game and that the managers are aware of the change in investor reaction.

The new finding is that walk up (*PO)* firms engage in more stock purchase activities (insider net purchases and equity repurchases) than *PP* firms following earnings announcements, which supports the interpretation that the walk up *PO* path is a strategy managers employ to depress the firm's short-term stock price to facilitate buying at a cheap price.

We contribute to the literature in several ways. We provide a comprehensive study of the valuation consequences for the four expectations revision patterns. The four-way comparison of the future stock return and operating performance tests allow us to investigate more fully whether the market reward to *MBE* or penalty to a miss is justified. We also contribute to the earnings surprise literature by documenting that the market's reaction to earnings surprises is dependent on the expectations revision path. We extend Richardson et al.'s (2004) analysis on firm and managerial capital market incentives to the walk up sample and demonstrate that managers also have incentives to deliberately miss benchmarks. Overall, our findings have implications for regulators, capital market participants, and researchers who wish to better understand the causes and consequences of earnings expectations guidance.

2. Related Literature and Research Questions

2.1. Market Reward to Meeting or Beating Earnings Expectations (MBE)

The capital markets penalize severely those firms whose reported earnings fail to meet market expectations (Skinner and Sloan, 2002). Not surprisingly, therefore, anecdotal and academic evidence suggests that firms seek to avoid reporting negative earnings surprises (Degeorge, Patel, and Zeckhauser, 1999; Dechow, Richardson, and Tuna 2003; Brown and Caylor, 2005) either by upward earnings management (Cheng and Warfield, 2005) and/or downward forecast guidance (Matsumoto, 2002; Bartov, Givoly, and Hayn, 2002) to attain *MBE*, with the latter mechanism being more prevalent (Bartov and Cohen, 2008). In addition to the event stock price reactions, Bartov et al. (2002) also document that firms with non-negative earnings surprises have higher stock returns over the whole fiscal period compared to firms with negative earnings surprises controlling for the magnitude of forecast errors.

In interpreting these findings, the literature implicitly assumes that the walk down expectations management strategy (*OP*) is rewarded by the capital markets. However, there has been no systematic study of how and whether the period returns and the event reactions are related to the analyst forecast revision paths leading up to the earnings surprise. Both walk down *OP* and *PP* paths result in *MBE*. Similarly, firms with negative surprises are either walk up *PO* or *OO* firms. To evaluate whether there is an *MBE* reward to a walk down requires conditioning on an initial optimistic forecast and then comparing period returns between final pessimistic forecast firms to firms where the forecasts are not walked down but stayed optimistic. In other words, the comparison of the period returns should be between *OP* and *OO* firms. Similarly, to evaluate the penalty to a walk up leading to a miss forecast, the comparison should be between *PO* and *PP* firms. To summarize, we evaluate the following:

1a**.** *Ceteris paribus, are stock returns over the quarter higher for OP firms than for OO firms?*

1b. *Ceteris paribus, are the stock returns over the quarter higher for PP firms than for PO firms?*

Our next question relates to the fact that there is no consensus in the literature on whether the reward to *MBE* is rational. On the one hand, Malmendier and Shanthikumar (2007) find that small investors do not account for the bias in analyst forecasts, and that their trading behavior induces negative abnormal returns. On the other hand, Bartov et al. (2002) suggest that the premium to *MBE* is a leading indicator of future performance and is not associated with any subsequent stock return reversal, consistent with a rational explanation for the documented reward. To investigate whether the reward to *MBE* is rational, we conduct three analyses that specifically takes into account path-dependency.

First, we compare the future operating performance between *OP* and *OO* firms, and between *PP* and *PO* firms. If the walk down to achieve *MBE* was strategic to game the market, then the future performance of *OP* firms should not differ much from *OO* firms. Similarly, if the walk up to miss expectations was strategic to game the market, there should also be little difference between the future performance between *PO* and *PP* firms.

2a: *Ceteris paribus, does OP have better future operating performance than OO?*

2b: *Ceteris paribus, does PP have better future operating performance than PO?*

Next, we examine whether the earnings surprise event reaction is also path-dependent. Since both *OP* and *PP* firms achieve *MBE*, it would be useful to know if investors adjust for how *MBE* is achieved. Given the more likely strategic nature of *OP* in achieving *MBE*, if the market is at least partially rational, it would discount the positive earnings surprise of *OP* relative to *PP*. Similarly, when comparing walk up *PO* with *OO*, investors may discount for the strategic motive of the miss event through a walk up.

3a: *Ceteris paribus, is the positive market reaction to an earnings surprise from OP smaller than to an earnings surprise from PP?*

3b: *Ceteris paribus, is the negative market reaction to an earnings surprise from PO smaller than to an earnings surprise from OO?*

Even if the reaction to earnings surprise is path-dependant, the differential reaction does not reveal whether investors are able to see through the expectations guidance game fully. To investigate this question, we need to examine whether subsequent price reversals, if any, are path-dependant. The test here is complicated by the presence of PEAD, which may be driven by other causes. To tease out the effects of PEAD, we use the returns conditioned on the size of SUE from the relatively non-strategic groups *OO* and *PP* groups as estimates of PEAD for the strategic revision path groups *OP* and *PO*. Therefore, we test the following:

4. Is the post-earnings-announcement drift weaker for the OP and PO revision paths than for the PP and OO revision paths?

2.2 Guidance to Drive Down the Firm's Short-term Price

The extant literature on expectations guidance focuses almost exclusively on managers' incentives to achieve *MBE* targets. Richardson et al. (2004) report increased new issues and net insider selling associated with a walk down *OP* path as compared with the *OO* path. On the flip side, managers may also have incentives to miss forecasts so as to benefit from the temporarily depressed stock prices, as when they intend to purchase the firm's stock either on their firm's behalf (via stock repurchases or a management buyout) or on their own personal account (via insider purchases or options grants). Similar incentives have been documented using the earnings management mechanism (Gong et al. (2008) for stock repurchases, McAnally et al. (2008) for stock option grants). To the best of our knowledge, no study to date has examined the incentives for a walk up revision path as an expectations guidance mechanism to depress price. We test this hypothesis:

H5. *For a firm with an initial pessimistic forecast, the likelihood of observing a walk up forecast revision path prior to the earnings announcement increases in managers' incentives to purchase its firm's stock after the earnings announcement, either via insider net buying on personal account or via a repurchase of the firm's stock.*

3. Data and Descriptive Statistics

3.1 Data

Individual analysts' forecasts of quarterly earnings are from Thompson Financial I/B/E/S for the period spanning 1984 to 2006. Following the literature (Bartov et al., 2002; Kasznik and McNichols, 2002), we require firm quarter observations to satisfy the following criteria: (1) there are at least two individual earnings forecasts in the quarter (not necessarily by the same analyst) at least 20 trading days apart; (2) the release date of the earliest forecast is on the same day of or after the previous quarter's earnings announcement;[5] and (3) the release date of the latest forecast precedes the current quarter's earnings release date by at least three days.

Actual earnings numbers are from I/B/E/S for comparability with the earnings forecasts. Other financial accounting data are from COMPUSTAT and stock returns data from CRSP. The total number of firm-quarter observations in the full sample is 122,053, covering the period from January 1984 to December 2006.

Insider-trading data are from the Thompson Financial insider trading database (TFN). We follow Richardson et al. (2004) and examine only open market sales and purchases. In addition, we only include trades by directors or officers to ensure that we capture the trading activities of those individuals who most likely have an impact on the reporting process of the firm. The variable *INSIDERSALE* combines the information of insider sales and purchases and denotes the net percentage of shares sold by officers or directors within one-month after the earnings announcement date. It is positive if insiders taken together are net sellers and negative when insiders are net purchasers.

We study a firm's trading incentives by considering two types of securities transactions: equity issuance and equity repurchases. The equity issuance and repurchase variables are derived from the statement of cash flows (COMPUSTAT data item 84 and item 93, respectively) and are scaled by the market capitalization at the beginning of the quarter.[6] To be consistent with the construction of *INSIDERSALE*, we combine the scaled equity issuances and repurchases to create the variable *FIRMSALE*, with a positive value

[5] Bartov et al. (2002) require that all the forecasts be made at least three trading days after the release date of the previous quarter's earnings. However, we find that a significant portion (3% for day 0, 16% for day 1, and 5% for day 2 relative to the preceding earnings announcement day) of all the forecasts for the next quarter is made within three days of the preceding earnings announcement. Following Bartov et al.'s (2002) criteria does not qualitatively change our reported results.

[6] As a robustness check, we combine the COMPUSTAT information with equity issuances or repurchases data extracted from the SDC to ensure data accuracy. The results are similar.

denoting net equity issuance and a negative value denoting net equity repurchases.

3.2 Time-series Patterns of the Four Expectations Revision Paths

Table 1 reports the time-series distribution of the four forecast revision paths. We find that the walk down *OP* path is not the most frequent revision path, accounting for only 17% of the total paths in sub-period 1984-1994, increasing to over 25% in sub-period 1995-2000, and declining back to below 15% in the post-scandal sub-period 2001-2006. This observed pattern is consistent with Richardson et al.'s (2004) finding that walk down is most prevalent in the second half of the 1990s. It is also consistent with Bartov and Cohen (2008) and Koh et al. (2008), who argue that managers' financial disclosure and guidance behaviors change following the Sarbanes- Oxley Act of 2002.

The relative frequency of the *PP* path increases dramatically from around 30% in the mid-1980s to about 55% in the mid-2000s, consistent with prior findings of an increased number of *MBE* firms in more recent years. Our evidence indicates that *MBE* firms are not primarily driven by walk down firms especially in more recent years.

In stark contrast to the *PP* path, the relative frequency of *OO* decreases from more than 40% in the mid-1980s to about 20% in our latest sub-period. This may explain why studies in the 1980s tend to document that analysts are on average optimistic, while studies using more recent data find that analysts are on average pessimistic. The walk up *PO* path accounts for less than 10% of the sample in most years and shows a slight decline from 9% in the earliest sub-period to about 6% in the two later sub-periods.

3.3 Descriptive Statistics

Table 2 provides descriptive statistics for our sample partitioned into the four forecast revision paths. *OP* firms are on average larger and have higher market-to-book than *OO* firms. They also outperform *OO* firms both in the current and next quarters, when measured using both return on assets (ROA) and cash flow from operations (CFO).[7] The quarterly returns (CAR_ERROR) and event day returns (CAR_SURP) are also better for *OP* than those for *OO*, whereas the post-quarter return reversals (CAR_PEAD) are larger for *OO* than *OP*. When comparing *PP* to *PO*, we find very similar results in that *PP* firms outperform *PO* firms. These univariate results are consistent with Bartov et al.'s (2002) proposition that *MBE* is a leading indicator of future performance, even for the walk down *OP* firms.

Comparing the two paths *OP* and *PP* that lead to *MBE*, *PP* firms outperform *OP* firms in all dimensions, both current and future ROA and CFO, and stock returns, which suggests that the positive earnings surprises of *PP* firms convey more reliable good news than those of *OP* firms. For the two revision paths leading to a negative surprise or miss event, we find that *OO* firms perform significantly worse than *PO* firms, suggesting that *OO* firms are more reliably bad news firms than *PO* firms.

In the next section, we perform multivariate analyses to control for the magnitude of the earnings surprise, size of the analyst revisions and other confounding factors in the above comparisons that will allow for more definitive inferences. We test for whether the analyst revision path preceding the earnings announcement has implications for firms' future performance, and whether investors understand these implications.

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[7] Untabulated t-test results show that all these differences, except for Δ_CFO and CAR_PEAD, are statistically significant.

4. Investor Reactions to the Four Analysts' Revision Paths

4.1 Reward to walk down and penalty to walk up (Q1a and Q1b)

We first examine whether the prior finding of a reward to the *MBE* event itself extends to the more recent periods. As in past studies, the valuation reward is measured as the incremental market-adjusted quarterly return for *MBE* firms (*OP* and *PP*) relative to miss firms (*OO* and *PO*) after controlling for the magnitude of the forecast error and earnings surprise. Specifically, we run the following regression:

$$CAR\_ERROR_{j,q} = \beta_0 + \beta_1 ERROR_{j,q} + \beta_2 SURP_{j,q} + \beta_3 DMBE_{j,q} + \varepsilon_{j,q}, \qquad (1)$$

$CAR\_ERROR_{j,q}$ is firm *j*'s market-adjusted stock return cumulated from three days after the release date of the earliest forecast for quarter *q* ($FEARLIEST_{j,q}$) to one day after quarter *q*'s earnings announcement.

$ERROR_{j,q} = (EPS_{j,q}-FEARLIEST_{j,q})/PRICE_{j,q-1}$ is the forecast error for quarter *q*, calculated as quarter *q*'s I/B/E/S actual earnings minus quarter *q*'s earliest forecast, scaled by the beginning-of-quarter stock price.[8]

$SURP_{j,q} = (EPS_{j,q}-FLATEST_{j,q})/PRICE_{j,q-1}$ is firm *j*'s earnings surprise for quarter *q*, calculated as quarter *q*'s actual earnings minus quarter *q*'s latest forecast ($FLATEST_{j,q}$), scaled by the beginning-of-quarter stock price.

$DMBE_{j,q}$ is the indicator variable set to one if $SURP_{j,q}>=0$, and zero otherwise. If there are multiple forecasts on the earliest or latest forecast day of the quarter, we take the mean forecast of that day to calculate *ERROR* or *SURP*.

To capture the possible nonlinear relation between earnings surprise and returns we split *SURP* into two variables, $SURP^+$ and $SURP^-$ and include an indicator variable

[8] As in Richardson et al. (2004) we also use an alternative specification by identifying *FLATEST* (*FEARLIEST*) as the latest (earliest) consensus analyst forecast using two-week windows. The results are qualitatively similar.

DSMALLSURP in an alternative specification below as:

$$CAR\_ERROR_{j,q} = \beta_0 + \beta_1 ERROR_{j,q} + \beta_2 SURP^{+}{}_{j,q} + \beta_3 SURP^{-}{}_{j,q} + \beta_4 DMBE_{j,q} + \beta_5 DSMALLSURP_{j,q} + \varepsilon_{j,q} \quad \text{(1a)}$$

$SURP^{+}$ ($SURP^{-}$) takes the value of *SURP* when *SURP* is greater (smaller) than zero, and zero otherwise. *DSMALLSURP* equals one if the absolute value of *SURP* is smaller than 0.02% (Koh et al., 2008).[9]

The empirical results for these regressions are in Table 3. Panel A exhibits that, even after controlling for the forecast error (*ERROR*) and earnings surprise, *MBE* firms still observe a higher market-adjusted stock return for the entire quarter in both the earlier Bartov's (2002) sample and more recent sample (1998-2006).[10]

MBE firms include *PP* and *OP* firms. The walk down *MBE* firms (*OP*) are more likely to have behaved strategically and, if investors discount for the greater likelihood of *MBE* gaming, they may not reward *OP* firms with a valuation premium. Therefore, we estimate regression (1) with only *OP* and *OO* firms to test Q1a for each year in our sample.[11] Column I of Table 4 reports only the *DMBE* coefficients and associated *t*-statistics for brevity. For the sub-period before 1995, *DMBE* is significantly positive in nine out of eleven years. During the 1995 to 2000 period, when the financial press and academics focused extensively on the earnings guidance game, the documented reward exists only in one out of the six years. Between 2001 and 2006 period when high profile accounting scandals occurred, the reward completely disappears. The premium average a highly significant 2.5% in the 1984-1994 period but actually reverse sign to an

[9] Other cut-off points are also used; however, the main results are similar.

[10] Bartov et al. (2002) require the firms in their sample to have a December fiscal year-end, while we do not impose this restriction. Untabulated results show that this has little impact on the results.

[11] Untabulated results for each sub-period yield very similar conclusions to the yearly regressions.

insignificant -0.34% in this latest period. Overall, results indicate that investors reward *MBE* regardless of how it is achieved in the early periods but learn to question the credibility of reported good earnings news after a walk down of the analysts' forecast.

To investigate whether investors punish a walk up *PO* path, we present the comparison between *PP* and *PO* in Column II of Table 4. The penalty to *PO* firms relative to *PP* firms (equivalently the reward to *PP* firms relative to *PO* firms), remains high throughout the entire sample period, averaging about 2.4%. Investors therefore do not seem to be aware of potential strategic motives for a walk up to a deliberate miss through time.

Recent evidence suggests that the reward to *MBE* diminishes after the Sarbanes-Oxley Act (Koh et al., 2008). Our analysis implies that this result is driven by the disappearance of the reward in the walk down group.

4.2 Rationality in the Market's Reward to Walk Down and Penalty to Walk Up

We demonstrate that investors penalize walk up *PO* throughout our sample period, and a reward to walk down *OP* in the early sample period. The next question is whether these valuation effects are justified by the underlying performance of the firm. In this sub-section, we conduct three tests to examine this issue.

4.2.1 MBE and Future Operating Performance (Q2a and Q2b)

If the reward to walk down (*OP)* and penalty to walk up (*PO)* are justified, we would like to see that *OP* firms perform better in future relative to *OO* firms, and vice versa between *PP* firms and *PO* firms. We run the following regressions to investigate the issue:

$$\Delta\_ROA_{j,q} = \phi_0 + \phi_1 ERROR_{j,q} + \phi_2 SURP^{+}{}_{j,q} + \phi_3 SURP^{-}{}_{j,q} + \phi_4 DSMALLSURP_{j,q} + \phi_5 DMBE_{j,q} + + \phi_6 MV_{j,q} + \phi_7 MTB_{j,q} + \varepsilon_{j,q} \quad (2)$$

$$\Delta\_CFO_{j,q} = \phi_0 + \phi_1 ERROR_{j,q} + \phi_2 SURP^{+}{}_{j,q} + \phi_3 SURP^{-}{}_{j,q} + \phi_4 DSMALLSURP_{j,q} + \phi_5 DMBE_{j,q} + \phi_6 MV_{j,q} + \phi_7 MTB_{j,q} + \varepsilon_{j,q}, \quad (3)$$

Δ_ROA is the change in return on assets (*ROA*) one quarter ahead.

Δ_CFO is the change in cash flow from operations (*CFO*) one quarter ahead.

MV is the logarithm of the market value of equity.

MTB is the market-to-book ratio.

The results are reported in Table 5. We correct for the time-series dependence of the performance measures by clustering at the firm level to obtain White standard errors to compute *t*-statistics (Petersen, 2009). In Panel A, ROA increase is larger for *OP* than *OO* during 1984 to 2000, but the CFO change between these firms is not significantly different in any of the sub-periods. If managers have more discretion in reporting ROA than CFO using accruals management, these findings suggest that, in the earlier years of the sample, investors reward good news surprises even when the firms do not deliver higher future CFO but they catch on to the walk down game over time.

We use one-quarter-ahead performance measures for the above tests because learning is more likely when the underlying economic fundamentals (i.e., future performance) are revealed within a short period of the gaming event. The results are similar when we use one-year-ahead change in ROA and CFO.

Panel B of Table 5 reports the next-quarter performance of *PP* versus *PO*. The *PP* valuation premium over *PO* does not seem to be justified. *PP* does not deliver consistently higher future operating performance in the three sub-periods. The only significant difference in performance measure is the increase in ROA over the next quarter for the first sub-period. The change in CFO in the next quarter is no different between the two groups of firms in all three sub-periods, and the change in CFO is actually smaller for *PP* than *PO* firms using annual data in the 1995-2000 sub-period. The evidence therefore suggests that valuation penalty for "walk up to miss" firms is not justified.

4.2.2 Short-window Price Reaction to Earnings Surprises (Q3a and Q3b)

If investors understand the underlying gaming nature of walk down or walk up revision paths, they would consider the forecast revision path leading up to the earnings announcement when responding to the earnings surprise. We test whether they do so using the following regressions in equation (4) for the good news firms *PP* and *OP* and in equation (5) for the bad news firms *OO* and *PO*:[12]

$$CAR\_SURP_{j,q} = \delta_0 + \delta_1 SURP_{j,q} + \delta_2 DSMALLSURP_{j,q} + \delta_3 OP_{j,q} + \varepsilon_{j,q} \qquad (4)$$

$$CAR\_SURP_{j,q} = \gamma_0 + \gamma_1 SURP_{j,q} + \gamma_2 DSMALLSURP_{j,q} + \gamma_3 PO_{j,q} + \varepsilon_{j,q}, \qquad (5)$$

where $CAR\_SURP_{j,q}$ is the market-adjusted return for firm *j* in quarter *q* cumulated from two days after the latest forecast date for the quarter to one day after the earnings release date.[13] *OP* indicator variable is set to one for *OP* firms, and zero for *PP* firms in regression (4). Similarly, *PO* indicator variable is set to one for *PO* firms, and zero for *OO* firms. If investors discount the information in earnings surprises resulting from a walk down *PO* or a walk up *OP*, we predict that $\delta_3<0$ and $\gamma_3>0$.

The results are reported in Table 6 for each year. For brevity, we only report the

[12] Splitting *SURP* into $SURP^+$ and $SURP^-$ in the regression does not qualitatively change the main results. We use this simplified version for brevity.
[13] The results are similar if we use a three-day window around the earnings announcement date.

coefficients and associated *t*-statistics on *OP* and *PO* indicator variables. Consistent with our prediction for Q3a, δ_3 in Column I is significantly negative in all 23 years, indicating that investors do pay attention to the revision path. They are skeptical about the positive earnings surprises achieved through a walk down and hence apply some discounting of the good news. The coefficient is much more negative in the latest 3 years, consistent with heavier discounting in recent years.

Column II also confirms that negative earnings surprises attained through a walk up are perceived by the capital markets to be less credible (*Q3b*). The estimated coefficient on *PO* indicator variable, γ_3, is significantly positive in all 23 years, consistent with investors discounting bad news that is achieved through a walk up.

In summary, investors do seem to realize the strategic nature of the positive earnings news achieved through a walk down and the negative earnings news achieved through a walk up and adjust their price reaction accordingly.

4.2.3 Stock Return Reversal Analyses (Q4)

The above analysis on the short-window price reaction only reveals that investors realize, at least to some degree, the strategic nature associated with both a walk down and a walk up. However, it does not answer the question of whether investors adjust *fully* in their price response. To address this issue, we check for future stock return reversals for the two strategic revision paths, *OP* and *PO*.

For each calendar quarter, we form five equal-sized portfolios based on the magnitude of SURP across all the sample firms. Then, within each quintile we separate firms into two groups, one containing the strategic firms *OP* and *PO* and the other containing the non-strategic (or at least less strategic) firms *OO* and *PP*. For each group, we calculate the average return in the subsequent quarter (CAR_PEAD) for each quintile for all three sub-periods. The hedge portfolios for the SUE strategy are constructed by buying the highest SURP quintile and shorting the lowest SUE quintile for the strategic *OP* and *PO* sub-group and for the non-strategic *PP* and *OO* sub-group. By ranking all firms on SURP first, we use the same cut-offs for the SUE quintile, and therefore control for the magnitude of earnings surprises between the strategic and non-strategic subgroups. The average CAR_PEAD and the hedge returns are reported in Table 7 for the two sub-groups for each of the sub-periods.

The hedge returns in the *PP* and *OO sub*-group average 4.87%, 6.20%, and 5.0% respectively for the three sub-periods, which are comparable to the magnitudes reported in the literature (Bernard and Thomas, 1989; Livnat and Mendenhall, 2006). In contrast, the hedge return in the *OP* and *PO* sub-group which comprises the walk down and walk up sample is not significant in 1984-1995 sub-period, increases to 2.22% in the second sub-period and to 4.04% during 2001 to 2006.

We interpret the above results as follows. The post-quarter returns are largely driven by the effect of PEAD in the non-strategic sample. For the strategic sample, however, the post-quarter returns will depend on how the PEAD effect offsets the return reversals from insufficient discounting of preceding quarter earnings surprises from strategic walk down or walk up activities. Note that the return reversals operate in the opposite direction from the PEAD effect. In the earliest period, investors did not discount sufficiently for these strategic motives so the return reversals tend to be large and of sufficient magnitude to completely offset the PEAD effect, resulting in no hedge returns. If one uses the hedge return from PEAD in the non-strategic sample of -4.87% as an estimate of the PEAD effect for this sub-period, then the return reversal from the correction of the overreaction to the earnings surprise in the strategic sample is actually about 4.61%, which is statistically significant.

In contrast, in the latest sub-period when there is much less overreaction to the earnings surprise for the strategic sample (as reported in the previous sub-section), the small return reversals are insufficient to dampen the PEAD effect. Therefore the hedge returns from the SUE strategy show a net significant 4.04% for the strategic sample, which is almost as large as the PEAD effect for the less strategic sample of 5.03%.

Summarizing the results in this section, we find that before 1994, compared to firms with consistent optimistic forecasts *OO*, initial optimistic forecast firms that walked down their forecasts to a positive earnings surprise enjoy a stock return premium that is not justified by later operating performance. This premium is diminished after the mid-1990s. In contrast, firms with consistent pessimistic forecasts *PP* continue to enjoy a premium over those with initial pessimistic forecasts that walk up their forecasts to miss expectations, and this premium is not justified by later operating performance. So while investors have learned to discount *MBE* from a strategic walk down of forecasts, they remain overly pessimistic about walk up firms. A walk up motive seems less intuitive than a walk down motive and has not been of as much focus of attention from the regulators and the media. We consider explicitly the incentives to both a walk down and a walk up by managers and firm next.

5. Equity Trading Incentives

In this section we examine how net selling behavior of insiders and new issues or repurchases by firms may affect incentives to walk down or walk up forecasts.

5.1 The Walk Down Revision Path and Equity Transaction Incentives (H5)

Richardson et al. (2004) find that firms that issue more equity and whose managers are net sellers of the firm's stock after an earnings announcement are more likely to walk down forecasts. They hypothesize that these incentives are induced by the market reward to *MBE*. Since our previous section results show that the *MBE* reward from a walk down is much diminished in later periods, we test whether these incentives have diminished in the more recent periods. Following Richardson et al., we estimate the following logistic regression for the *OP* and *OO* sample:

$$\begin{aligned} OP_{j,q} = {} & \beta_0 + \beta_1 INSIDERSALE_{j,q} + \beta_2 FIRMSALENOW_{j,q} + \beta_3 FIRMSALESNEXT_{j,q} \\ & + \beta_4 MTB_{j,q} + \beta_5 SIZE_{j,q} + \beta_6 ROA_{j,q} + \beta_7 RD_{j,q} + \beta_8 LITG_{j,q} + \beta_9 CHEARN_{j,q} + \varepsilon_{j,q} \end{aligned}, \qquad (6)$$

INSIDERSALE is the net percentage of shares traded within one month after the earnings announcement; it is positive when insiders are net sellers and negative when insiders are net purchasers.

FIRMSALENOW is the issuance or repurchase of common and preferred equity during the quarter; a positive amount denotes equity issuance (COMPUSTAT data item 8 deflated by beginning-of-quarter market value) and a negative amount denotes stock repurchases (COMPUSTAT data item 93 deflated by beginning-of-quarter market value).

FIRMSALENEXT is the *FIRMSALENOW* value in the subsequent quarter.

RD is the research and development expenditure scaled by average total assets.

LITIG is an indicator variable equal to one for high litigation risk industries as defined in Matsumoto (2002), and zero otherwise.

CHEARN is an indicator variable equal to one for a positive change in earnings from the same quarter in the prior year, and zero otherwise.

The results of regression (6) are in Panel A of Table 8. Consistent with Richardson et al. (2004), we find that *OP* revision path is more frequent in firms with subsequent net insider sales and equity issuance in the early sub-period. Interestingly, net insider sales is statistically insignificant and equity issuance even reverses its sign in the post-scandal period (2001-2006), which suggests that these incentives disappear once investors stop rewarding a walk down to *MBE*.

5.2 Walk Up and Equity Transaction Incentives (H5)

We observe in our sample period a relatively small and somewhat stable proportion (9% in earliest period and 6% in later sub-periods) of walk up *PO* firms. Are these *PO* paths merely a random outcome or are they also driven by capital market-related incentives? To test our hypothesis *H5*, that *PO* is a strategic move by managers to walk up forecasts to elicit a temporarily dampening of the stock price and thereby facilitate equity buying, we re-estimate regression (6) by contrasting *PO* and *PP* firms with the indicator variable set to one for *PO*. We expect that $\beta_1<0$ and $\beta_3<0$.

Panel B of Table 8 reports our findings. The coefficient estimate on INSIDERSALE, β_1, is significantly negative for each of the three sub-periods, consistent with the prediction that insiders buy more following a walk up of forecasts to a deliberate miss. FIRMSALENEXT is significantly negative, indicating firm repurchase of stock, in the earliest period 1984-1994. In sum, the walk down and walk up paths are related to managerial incentives to sell equity for the former and to buy equity for the latter either on personal account or on behalf of the firm. The insignificant coefficients on *FIRMSALENEXT* in periods after 1995, in contrast to the persistent significance of *INSIDERSALE* suggest that managers have stronger incentives to trade on their own account than for the firms' benefit when playing the numbers game.

We also consider analysts' incentives to cooperate in this earnings numbers game. We find that analysts of walk down firms and those of walk up firms are rewarded with greater accuracy in the subsequent quarter or year. We do not tabulate these results as they are similar to Ke and Yu (2006) though they did not interpret their results for the walk up case and their period ends in 2000. As Ke and Yu suggests, the results imply that cooperative analysts are rewarded with greater access to management, and so are able to be more accurate (though more biased). Past literature also note that investment banks that employ analysts with favorable forecasts are more likely to be selected to underwrite new equity issuances and tender offer repurchases.

7. Conclusions

In this paper we find evidence of a coherent relation between managers' incentives and investors' response to the *MBE* event via a walk down of analysts' forecasts and a miss event via a walk up of analysts' forecasts, and how the relation evolved over time. The past literature suggests that managers walk down analyst forecasts to report positive earnings surprises so as to boost firms' stock prices and facilitate stock selling.

Consistent with this view, we find that investors do reward a walk down with a valuation premium over the quarter that the phenomenon occurs, and that managers take advantage of the temporary valuation premium to sell equity on personal account or on behalf of the firm. However, the valuation premium is erased once investors become aware of the strategic motive underlying a walk down of analysts' forecasts to achieve a positive earnings surprise in recent years. Once the valuation premium is erased, managers have less incentive to sell stock.

On the flip-side, we find that managers have incentives to depress stock prices to facilitate their buying shares on personal account or firm repurchases with a walk up of forecasts to deliberately miss analysts' expectations. Our evidence shows that walk up firms are indeed punished by investors relative to those that experience consistent pessimistic forecasts in the quarter and so meet or beat expectations. In response, managers are more likely to buy shares on personal account or the firm to repurchase stocks in walk up firms. Investors do not appear to have learned to discount for these strategic motives even in recent years.

When they exist, the valuation premium for a walk down to *MBE* and the penalty of a walk up to a miss are not warranted by future operating performance. In general, the future cash flows are no different for walk down firms and walk up firms when compared to consistent optimistic forecast firms and consistent pessimistic forecast firms respectively. In more careful tests, we find that the valuation premium or penalty is the result of insufficient discounting for potential strategic motives behind walk down or walk up gaming. Instead, investors overreact to earnings surprises following walk down or walk up, and their subsequent return reversals offset the well-known PEAD effect.

In sum, we find evidence that there are rewards to the earnings numbers game for firms and managers at investors' expense. In more recent years, the rewards to a walk down have largely disappeared when investors have become aware of the phenomenon.

However, the rewards to a walk up, a phenomenon that has been largely ignored in the literature and by regulators and the press, continue to exist. Investors therefore need to be more skeptical of intentional bad news surprises from a walk up revision of analysts' forecasts.

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TABLE 1: Annual Distribution of the Four Expectations Revision Paths

Year	OP	OP(%)	OO	OO(%)	PP	PP(%)	PO	PO(%)	Total	OP(%)	OO(%)	PP(%)	PO(%)
1984	258	16.0	689	42.8	506	31.4	158	9.8	1,611				
1985	358	15.8	1,024	45.2	654	28.9	228	10.1	2,264				
1986	447	17.2	1,024	39.4	855	32.9	273	10.5	2,599				
1987	400	15.4	927	35.7	998	38.4	273	10.5	2,598				
1988	487	15.6	1,080	34.5	1,270	40.6	292	9.3	3,129				
1989	557	15.2	1,464	40.1	1,284	35.1	349	9.6	3,654				
1990	680	17.7	1,533	39.9	1,285	33.4	344	9.0	3,842				
1991	766	19.0	1,519	37.6	1,436	35.5	321	7.9	4,042				
1992	836	18.1	1,584	34.2	1,834	39.6	376	8.1	4,630				
1993	804	19.5	1,245	30.3	1,740	42.3	325	7.9	4,114				
1994	1,228	18.6	1,769	26.8	3,107	47.1	492	7.5	6,596	0.17	0.35	0.38	0.09
1995	1,416	20.6	1,763	25.7	3,216	46.8	470	6.8	6,865				
1996	1,519	21.1	1,571	21.8	3,582	49.8	527	7.3	7,199				
1997	1,567	20.4	1,588	20.6	4,069	52.9	467	6.1	7,691				
1998	1,848	25.1	1,536	20.9	3,629	49.3	346	4.7	7,359				
1999	1,572	22.8	1,210	17.5	3,811	55.2	315	4.6	6,908				
2000	1,271	21.9	1,015	17.5	3,247	55.9	278	4.8	5,811	0.22	0.21	0.52	0.06
2001	1,892	29.8	1,161	18.3	3,029	47.6	276	4.3	6,358				
2002	1,326	20.6	1,092	16.9	3,689	57.3	336	5.2	6,443				
2003	1,156	17.2	1,318	19.6	3,835	57.0	421	6.3	6,730				
2004	1,178	16.2	1,452	20.0	4,141	57.0	500	6.9	7,271				
2005	1,246	15.9	1,724	21.9	4,330	55.1	555	7.1	7,855				
2006	942	14.5	1,510	23.3	3,583	55.3	449	6.9	6,484	0.19	0.20	0.55	0.06
Total	23,754	0.19	30,798	0.25	59,130	0.48	8,371	0.07	122,053				

In the denotation of each of the paths (*OP*, *OO*, *PP*, and *PO*), the first letter refers to the optimistic(O)/pessimistic(P) status of the first forecast of the quarter, and the second letter refers to the optimistic(O)/pessimistic(P) status of the last forecast of the quarter. A forecast is labeled as O (P) if it is higher than (lower than or equal to) the actual earnings of the quarter. *OP* corresponds to walk down and *PO* corresponds to walk up.

TABLE 2: Descriptive Statistics by Earnings Expectation Revision Path

Panel A: Firm-Level Variables

	OP (Walk Down)		OO		PP		PO (Walk Up)	
Variable	Mean	Median	Mean	Median	Mean	Median	Mean	Median
ERROR	-0.004	-0.002	-0.008	-0.004	0.003	0.001	0.002	0.001
SURP	0.001	0.001	-0.005	-0.002	0.002	0.001	-0.002	-0.001
ROA	0.006	0.009	0.001	0.007	0.015	0.015	0.010	0.012
Δ_ROA	-0.007	-0.002	-0.009	-0.002	0.002	0.001	0.000	0.000
CFO	0.019	0.021	0.015	0.018	0.027	0.027	0.023	0.025
Δ_CFO	-0.002	-0.002	-0.003	-0.002	0.001	0.001	0.000	-0.000
CAR_ERROR	-0.056	-0.047	-0.061	-0.053	0.049	0.034	0.021	0.010
CAR_SURP	0.001	-0.003	-0.030	-0.024	0.025	0.016	-0.001	-0.004
CAR_PEAD	-0.005	-0.008	-0.020	-0.021	0.015	0.010	-0.011	-0.010
MV	4337	812	3346	707	5566	1116	5219	1050
MTB	2.627	2.025	2.438	1.865	3.263	2.454	2.927	2.205
INSIDERSALE	0.001	0.000	0.004	0.000	0.002	0.000	0.001	0.000
FIRMSALENOW	0.005	0.000	0.005	0.000	0.006	0.000	0.005	0.000
FIRMSALENEXT	0.004	0.000	0.003	0.000	0.005	0.000	0.005	0.000
RD	0.004	0.000	0.004	0.000	0.004	0.000	0.004	0.000
CHEARN	-0.034	-0.002	-0.033	-0.003	-0.028	0.001	-0.023	0.000
LITIG	0.230	0.000	0.191	0.000	0.236	0.000	0.183	0.000

OP, PP, OO and PP refer to patterns of forecast revision paths for each firm-quarter. The first letter refers to the optimistic(O)/pessimistic(P) status of the first forecast of the quarter, and the second letter refers to the optimistic(O)/pessimistic(P) status of the last forecast of the quarter. A forecast is labeled as O (P) if it is higher than (lower than or equal to) the actual earnings of the quarter. *ERROR* is the difference between the actual EPS from I/B/E/S and the earliest EPS forecast made for the quarter, deflated by the beginning-of-quarter stock price. *SURP* is the difference between the actual EPS from I/B/E/S and the latest EPS forecast made for the quarter, deflated by the beginning-of-quarter stock price. *ROA* is return on assets. *CFO* is cash flow from operations deflated by assets. The quarterly change of ROA or CFO is measured relative to the same quarter in the previous year, namely, $\Delta\_ROA_q=ROA_{q+1}-ROA_{q-3}$; $\Delta\_CFO_q=CFO_{q+1}-CFO_{q-3}$.

CAR_ERROR is cumulative market-adjusted returns over the period from three trading days after the first forecast to one trading day after the current-quarter earnings announcement. *CAR_SURP* is cumulative market-adjusted returns for the period from the last forecast for the quarter to one day after the current-quarter earnings announcement. *CAR_PEAD* is cumulative market-adjusted returns over the period from one day after the current-quarter earnings announcement to the next earnings announcement. *MV* is the logarithm of the market value of equity. *MTB* is the market-to-book ratio.

INSIDERSALE is the net percentage shares sold/purchased by the top management or directors of the firm within the one-month period after the earnings announcement. It is positive for net insider sales, and negative for net insider purchases. *FIRMSALENOW* is the issuance/repurchase of common and preferred equity during the quarter. It represents equity issuance (COMPUSTAT*#8* deflated by beginning-of-quarter market value) when positive; and stock repurchase (COMPUSTAT*#93* deflated by beginning-of-quarter market value) when negative. *FIRMSALENEXT* is the issuance/repurchase of common and preferred equity in the quarter subsequent to the quarter concerned. *RD* denotes R&D expenditures scaled by average total assets. *LITIG i*s an indicator variable equal to one for high litigation risk industries as defined in Matsumoto (2002), and zero otherwise. *CHEARN* is an indicator variable equal to one for a positive change in earnings from the same quarter in the prior year, zero otherwise.

TABLE 3: The Existence of MBE Reward

	ERROR	SURP	D*MBE*	$SURP^+$	$SURP^-$	DSMALLSURP	Adjusted R^2	Nobs
Panel A: 1984-1997 sample period								
MODEL1	5.292	-0.464					6.8%	60834
	51.39	***-3.32***						
MODEL2	5.220	-2.135	0.042				7.8%	60834
	50.94	***-13.91***	***25.48***					
MODEL3	5.559			3.125	-2.157	-0.008	7.5%	60834
	53.68			***12.90***	***-12.83***	***-4.21***		
MODEL4	5.437		0.047	0.396	-3.583	-0.026	8.5%	60834
	52.77		***26.86***	*1.51*	***-20.43***	***-12.54***		
Panel B: 1998-2006 sample period								
MODEL1	7.609	-0.826					6.7%	61219
	55.78	***-3.93***						
MODEL2	7.519	-2.304	0.033				7.0%	61219
	55.17	***-9.94***	***15.04***					
MODEL3	7.828			2.376	-3.389	-0.021	7.2%	61219
	57.21			***7.38***	***-12.30***	***-9.29***		
MODEL4	7.710		0.045	0.306	-5.434	-0.033	7.8%	61219
	56.48		***19.69***	*0.91*	***-18.50***	***-14.22***		

The dependent variable CAR_ERROR is defined as the cumulative market-adjusted returns over the period from three trading days after the first forecast to one trading day after the current-quarter earnings announcement.

ERROR is defined as actual EPS from I/B/E/S minus the earliest EPS forecast made for the quarter, deflated by the beginning-of-quarter stock price. SURP is actual EPS from I/B/E/S minus the latest EPS forecast made for the quarter, deflated by the beginning-of-quarter stock price. DMBE equals one if SURP>=0, and zero if SURP<0. $SURP^+$ equals SURP when SURP>=0, and zero otherwise. $SURP^-$ is set to SURP when SURP<0, and zero otherwise. DSMALLSURP equals one if the absolute value of SURP is smaller than 0.02%, and zero otherwise.

Bold numbers indicate significance at the 5% level (two-tailed *t*-test).

TABLE 4: Time Series Pattern of the Rewards to MBE

Dependant Variable: CAR_ERROR

	I		II	
Year	OP vs. OO	*t-stat*	PP vs. PO	*t-stat*
1984	0.0391	***3.08***	0.0105	*0.77*
1985	0.0364	***3.39***	0.0122	*1.08*
1986	0.022	***1.96***	0.0379	***3.36***
1987	0.0346	***3.16***	0.0249	***2.28***
1988	0.0294	***2.90***	0.0277	***2.99***
1989	0.0128	*1.40*	0.0268	***2.98***
1990	0.0229	***2.15***	0.0053	*0.42*
1991	0.0316	***3.36***	0.0265	***2.29***
1992	0.0201	***2.14***	0.0321	***3.00***
1993	0.0052	*0.50*	0.0318	***2.88***
1994	0.0209	***2.59***	0.0105	*1.16*
1984-1994	0.0250	***7.98***	0.0224	***6.85***
1995	0.0096	*1.11*	0.0407	***4.18***
1996	-0.0059	*-0.63*	0.0185	***1.97***
1997	0.0204	***2.27***	0.0351	***3.29***
1998	-0.0073	*-0.80*	0.0141	*1.07*
1999	0.0117	*0.94*	0.0514	***3.31***
2000	0.0019	*0.13*	0.0278	*1.42*
1995-2000	0.0051	*1.15*	0.0313	***5.47***
2001	0.0132	*1.30*	0.0152	*0.93*
2002	-0.0236	***-2.06***	0.027	***2.15***
2003	-0.0093	*-0.93*	0.0144	*1.37*
2004	-0.0034	*-0.38*	0.0243	***3.01***
2005	0.0072	*0.92*	0.0192	***2.35***
2006	-0.0042	*-0.48*	0.0277	***3.02***
2001-2006	-0.0034	*-0.64*	0.0213	***8.90***
1984-2006	0.0124	***3.59***	0.0244	***10.55***

For Column I and II, we report β_4 and its *t*-statistics for the regression:

$$CAR\_ERROR_{j,q} = \beta_0 + \beta_1 ERROR_{j,q} + \beta_2 SURP^{+}{}_{j,q} + \beta_3 SURP^{-}{}_{j,q} + \beta_4 DMBE_{j,q} + \beta_5 DSMALLSURP_{j,q} + \varepsilon_{j,q} \quad (1a)$$

CAR_ERROR is cumulative market-adjusted returns over the period from three trading days after the first forecast to one trading day after the current quarter earnings announcement. CAR_SURP is cumulative market-adjusted returns for the period from the last forecast for the quarter to one day after the current-quarter earnings announcement.

ERROR is defined as actual EPS from I/B/E/S minus the earliest EPS forecast made for the quarter, deflated by the beginning-of-quarter stock price. SURP is actual EPS from IBES minus the latest EPS forecast made for the quarter, deflated by the beginning-of-quarter stock price. DMBE equals one if SURP>=0, and zero if SURP<0. $SURP^{+}$ equals SURP when SURP>=0, and zero otherwise. $SURP^{-}$ is set to SURP when SURP<0, and zero otherwise. DSMALLSURP equals one if the absolute value of SURP is smaller than 0.02%, and zero otherwise.

Bold numbers indicate significance at the 5% level (two-tailed *t*-test).

TABLE 5: Comparison of Future Performance between MBE vs. non-MBE firms

Panel A OP (Walk Down) vs. OO

		INTERCEPT	ERROR	SURP+	SURP-	DSMALL SURP	DMBE (OP)	SIZE	MTB	Adjusted R^2
	Sub 1: 1984-1994	-0.012	0.403	0.049	-0.134	-0.002	0.003	0.002	-0.001	
		-4.28	***7.81***	*0.20*	***-1.83***	***-1.88***	***4.03***	***7.99***	***-2.09***	*2.2%*
Δ_ROA	Sub 2: 1995-2000	-0.013	0.823	-0.077	0.020	-0.003	0.003	0.002	0.000	
		-5.12	***6.83***	*-0.14*	*0.11*	***-2.04***	***2.06***	***6.63***	*-0.76*	*3.2%*
	Sub 3: 2001-2006	-0.046	0.540	0.336	0.077	-0.001	0.000	0.002	0.001	
		-7.61	***4.05***	*0.74*	*0.30*	*-0.40*	*-0.20*	***5.77***	***4.00***	*2.7%*

		INTERCEPT	ERROR	SURP+	SURP-	DSMALLSURP	DMBE (OP)	SIZE	MTB	Adjusted R^2
	Sub 1: 1984-1994	0.004	0.160	0.164	-0.141	-0.001	0.001	0.000	-0.001	
		1.16	***1.77***	*0.42*	*-0.90*	*-0.60*	*0.85*	*-1.20*	***-2.78***	*0.4%*
Δ_CFO	Sub 2: 1995-2000	-0.004	0.294	0.249	-0.268	-0.001	0.000	0.000	-0.001	
		-1.22	***3.08***	*0.60*	***-1.93***	*-0.81*	*-0.13*	*0.36*	*-1.29*	*0.5%*
	Sub 3: 2001-2006	-0.006	0.105	-0.153	-0.184	0.000	0.001	0.000	0.000	
		-1.64	*0.78*	*-0.49*	*-1.05*	*0.04*	*1.19*	*1.41*	*0.61*	*0.3%*

TABLE 5: Comparison of Future Performance between MBE vs. non-MBE firms (Cont')

Panel B: PP vs PO (Walk Up)

		INTERCEPT	ERROR	SURP+	SURP-	DSMALLSURP	DMBE (PP)	SIZE	MTB	Adjusted R^2
Δ_ROA	Sub 1: 1984-1994	-0.004	0.347	-0.115	-0.334	-0.001	0.002	0.000	0.000	
		-1.68	***3.09***	*-0.95*	*-1.07*	*-1.77*	***2.49***	***3.24***	***2.78***	*0.9%*
	Sub 2: 1995-2000	-0.002	0.700	-0.130	0.270	-0.003	0.001	0.000	0.001	
		-0.96	***4.36***	*-0.52*	*0.46*	***-4.18***	*0.90*	*-0.10*	***5.61***	*1.2%*
	Sub 3: 2001-2006	-0.014	1.020	-0.628	0.639	-0.001	0.001	0.000	0.001	
		-4.11	***6.51***	***-2.28***	*1.31*	*-1.34*	*1.04*	*0.84*	***5.31***	*1.3%*

		INTERCEPT	ERROR	SURP+	SURP-	DSMALLSURP	DMBE (PP)	SIZE	MTB	Adjusted R^2
Δ_CFO	Sub 1: 1984-1994	0.001	0.207	-0.041	0.545	-0.002	0.001	0.000	0.000	
		0.36	*1.21*	*-0.19*	*1.06*	***-1.84***	*0.79*	*-0.08*	*-1.76*	*0.4%*
	Sub 2: 1995-2000	-0.003	0.467	0.093	-0.742	0.000	-0.001	0.000	0.000	
		-1.14	***2.24***	*0.39*	***-1.93***	*0.35*	*-0.61*	*-0.84*	*1.59*	*0.4%*
	Sub 3: 2001-2006	0.005	0.521	0.159	0.189	0.000	0.001	-0.001	0.001	
		1.54	***3.64***	*0.72*	*0.64*	*0.49*	*0.69*	***-2.79***	***3.75***	*0.6%*

ROA is return on assets. CFO is cash flow from operations deflated by total assets. The quarterly change of ROA or CFO is measured relative to the same quarter in the previous year, namely, $\Delta\_ROA_q=ROA_{q+1}-ROA_{q-3}$; $\Delta\_CFO_q=CFO_{q+1}-CFO_{q-3}$. SIZE is the logarithm of the market value of equity. MTB is the market-to-book ratio. All ROA- and CFO-related variables are restricted to be within 100% of total assets.
ERROR is defined as actual EPS from I/B/E/S minus the earliest EPS forecast made for the quarter, deflated by the beginning-of-quarter stock price. SURP is actual EPS from I/B/E/S minus the latest EPS forecast made for the quarter, deflated by the beginning-of-quarter stock price. DMBE equals one if SURP>=0, and zero if SURP<0. $SURP^+$ equals SURP when SURP>=0, and zero otherwise. $SURP^-$ is set to SURP when SURP<0, and zero otherwise. DSMALLSURP equals one if the absolute value of SURP is smaller than 0.002%, and zero otherwise.
All regressions include quarter dummies and the errors are clustered by firm. Bold numbers indicate significance at the 5% level (two-tailed *t*-test).

TABLE 6: Short Window Price Reaction to Earnings Surprises of Different Paths Leading to MBE vs. non-MBE

	Dependant Variable: CAR_SURP			
	I (MBE)		II (non-MBE)	
Year	OP. vs. PP	t-stat	PO. vs. OO	t-stat
1984	-0.0103	*-1.35*	0.0213	***2.30***
1985	-0.0130	***-2.05***	0.0282	***4.23***
1986	-0.0203	***-3.14***	0.0131	***2.05***
1987	-0.0209	***-3.08***	0.0243	***3.07***
1988	-0.0134	***-2.83***	0.0084	*1.34*
1989	-0.0157	***-3.08***	0.0158	***3.00***
1990	-0.0197	***-3.45***	0.0239	***3.22***
1991	-0.0167	***-3.04***	0.0220	***3.1***
1992	-0.0121	***-2.44***	0.0185	***2.61***
1993	-0.0082	*-1.72*	0.0159	***2.42***
1994	-0.0095	***-2.66***	0.0204	***3.86***
1984-1994	-0.0145	***-10.79***	0.0193	***11.30***
1995	-0.0139	***-3.70***	0.0231	***3.98***
1996	-0.0105	***-2.70***	0.0274	***4.37***
1997	-0.0160	***-4.23***	0.0268	***4.12***
1998	-0.0106	***-2.27***	0.0321	***3.56***
1999	-0.0076	*-1.53*	0.0125	*1.21*
2000	-0.0138	***-2.00***	0.0215	*1.48*
1995-2000	-0.0121	***-9.70***	0.0239	***8.74***
2001	-0.0058	*-1.05*	0.0370	***3.21***
2002	-0.0158	***-3.17***	0.0149	*1.45*
2003	-0.0131	***-3.18***	0.0250	***3.99***
2004	-0.0163	***-4.28***	0.0248	***4.17***
2005	-0.0237	***-6.67***	0.0317	***6.23***
2006	-0.0248	***-6.01***	0.0252	***4.29***
2001-2006	-0.0166	***-5.78***	0.0264	***8.67***
1984-2006	-0.0144	***-13.78***	0.0223	***15.56***

For Column I , we report δ_3 and its *t*-statistics for the regression:

$$CAR\_SURP_{j,q} = \delta_0 + \delta_1 SURP_{j,q} + \delta_2 DSMALLSURP_{j,q} + \delta_3 OP_{j,q} + \varepsilon_{j,q} \quad (4)$$

For Column II, we report γ_3 and its *t*-statistics for the regression:

$$CAR\_SURP_{j,q} = \gamma_0 + \gamma_1 SURP_{j,q} + \gamma_2 DSMALLSURP_{j,q} + \gamma_3 PO_{j,q} + \varepsilon_{j,q} \quad (5)$$

CAR_ERROR is cumulative market-adjusted returns over the period from three trading days after the first forecast to one trading day after the current-quarter earnings announcement. CAR_SURP is cumulative market-adjusted returns for the period from the last forecast for the quarter to one day after the current-quarter earnings announcement.

SURP is actual EPS from I/B/E/S minus the latest EPS forecast made for the quarter, deflated by the beginning-of-quarter stock price. DSMALLSURP equals one if the absolute value of SURP is smaller than 0.02%, and zero otherwise.

Bold numbers indicate significance at the 5% level (two-tailed *t*-test).

Table 7 Comparison of Trading Profits of the PEAD Strategy

Panel A: 1984-1994 period

SURP	OP and PO		PP and OO		Difference	
Rank	CAR_PEAD	t-stat	CAR_PEAD	t-stat	CAR_PEAD	t-stat
1	0.0029	*0.33*	-0.0225	***-5.18***	-0.0258	***-2.72***
2	-0.0094	***-2.47***	-0.0200	***-6.74***	-0.0098	***-2.49***
3	-0.0092	***-2.15***	0.0021	*0.6*	0.0113	***1.99***
4	-0.0024	*-0.61*	0.0213	***8.02***	0.0237	***5.54***
5	0.0055	*1.09*	0.0262	***7.71***	0.0207	***3.77***
Hedge	0.0026	*0.32*	0.0487	***11.47***	-0.0471	***-4.59***

Panel B: 1995-2000 period

SURP	OP and PO		PP and OO		Difference	
Rank	CAR_PEAD	t-stat	CAR_PEAD	t-stat	CAR_PEAD	t-stat
1	-0.0287	***-2.07***	-0.0404	***-3.95***	-0.0232	*-1.42*
2	-0.0349	***-2.98***	-0.0192	*-1.77*	0.0034	*0.25*
3	-0.0196	*-1.56*	-0.0094	*-1.83*	0.0010	*0.08*
4	-0.0024	*-0.16*	0.0086	*1.25*	-0.0087	*-0.52*
5	-0.0065	*-0.35*	0.0216	***2.47***	0.0119	*0.61*
Hedge	0.0222	***2.07***	0.06200	***8.68***	-0.0399	***-2.62***

Panel C: 2001-2006 period

SURP	OP and PO		PP and OO		Difference	
Rank	CAR_PEAD	t-stat	CAR_PEAD	t-stat	CAR_PEAD	t-stat
1	-0.0080	*-1.02*	-0.0060	*-0.63*	0.0020	*0.24*
2	-0.0003	*-0.04*	-0.0032	*-0.45*	-0.0030	*-0.51*
3	0.0047	*0.66*	0.0037	*0.86*	-0.0010	*-0.15*
4	0.0118	*1.14*	0.0232	***3.15***	0.0114	***2.02***
5	0.0324	***2.50***	0.0443	***5.20***	0.0119	*1.36*
Hedge	0.0404	***3.37***	0.0503	***10.41***	-0.0100	*-0.75*

For each calendar quarter, we form five equal-sized portfolios based on the magnitude of SURP. Then we construct two hedge portfolios by buying the highest SURP quintile and shorting the lowest SURP quintile within the OP-PO group and PP-OO group, respectively. The average hedging returns over the subsequent quarter (CAR_PEAD) and its associated t-statistics are reported for each group and sub-period.

Bold numbers indicate significance at the 5% level (two-tailed *t*-test).

TABLE 8: Incentives and Alternative Analysts' Forecast Revision Paths

Panel A: Insider Sales/ Stock Issuance and Walk Down

OP vs. OO (PATH=1 for OP, 0 for OO)

	1984-1994		1995-2000		2001-2006	
Variable	Estimate	P-value	Estimate	P-value	Estimate	P-value
INTERCEPT	-0.945	**0.000**	-0.071	**0.005**	-0.130	**0.000**
INSIDERSALE	42.582	**0.000**	27.299	**0.001**	10.982	0.155
FIRMSALENOW	1.372	0.070	1.153	0.118	-2.900	**0.000**
FIRMSALENEXT	3.226	**0.000**	2.276	**0.018**	-1.328	0.160
MTB	0.008	0.445	0.013	0.097	-0.018	**0.037**
SIZE	0.000	**0.009**	0.000	**0.015**	0.000	**0.018**
ROA	13.486	**0.000**	7.484	**0.000**	4.866	**0.000**
RD	4.107	**0.040**	2.438	0.112	5.185	**0.006**
CHEARN	-0.170	0.069	-0.245	**0.005**	0.159	0.213
LITIG	0.047	0.234	0.112	**0.004**	0.432	**0.000**
-2 Log L	25133.27		23165.07		21019.60	
Likelihood	354.34	0.00	251.34	0.00	227.88	0.00
1	6637		8724		7459	
0	13448		8180		7876	

Panel B: Insider Purchase/ Stock Repurchase and Walk Up

PO vs. PP (PATH=1 for PO, 0 for PP)

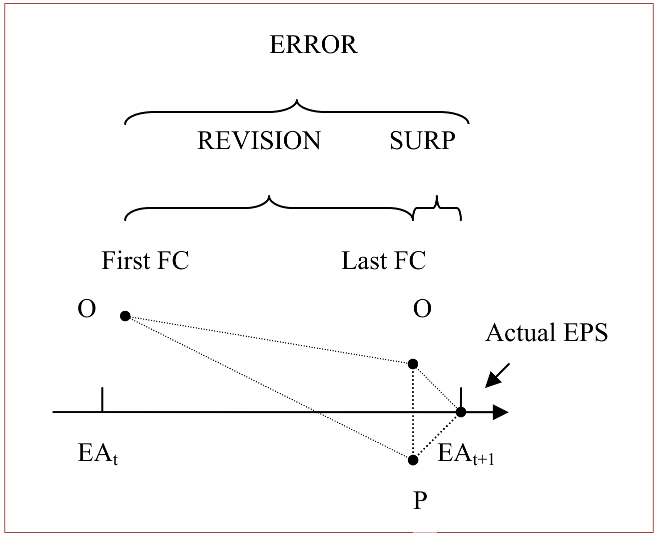
	1984-1994		1995-2000		2001-2006	
Variable	Estimate	P-value	Estimate	P-value	Estimate	P-value
INTERCEPT	-1.287	**0.000**	-1.892	**0.000**	-2.057	**0.000**
INSIDERSALE	-46.641	**0.000**	-39.977	**0.000**	-47.513	**0.000**
FIRMSALE	-0.398	0.664	-1.447	0.122	2.017	**0.026**
FIRMSALENEXT	-2.383	**0.046**	-0.579	0.616	0.211	0.855
MTB	-0.002	0.845	-0.045	**0.000**	0.010	0.324
SIZE	0.000	0.705	0.000	**0.009**	0.000	0.163
ROA	-7.855	**0.000**	-6.717	**0.000**	-4.730	**0.000**
RD	-1.756	0.442	0.505	0.782	-4.545	0.090
CHEARN	0.370	**0.004**	0.195	0.100	-0.023	0.888
LITIG	-0.012	0.815	-0.201	**0.001**	-0.362	**0.000**
-2 Log L	17154.185		14512.371		15586.838	
Likelihood	110.532	0.000	185.562	0.000	139.164	0.000
1	3345		2261		2420	
0	14607		20338		21742	

INSIDERSALE is the net percentage of shares traded in the one-month period after the earnings announcement, and it is positive when insiders are net sellers and negative when insiders are net purchasers. FIRMSALENOW is issuance/repurchase of common and preferred equity during the current quarter. It represents net equity issuance (COMPUSTAT data item 8 deflated by beginning-of-quarter market value) when positive; and net stock repurchase (COMPUSTAT data item 93 deflated by beginning-of-quarter market value) when negative. FIRMSALENEXT is the issuance/repurchase of common and preferred equity in the quarter subsequent to the quarter concerned. RD denotes research and development expenditures scaled by average total assets. LITIG is an indicator variable equal to one for high litigation risk industries as defined in Matsumoto (2002), and zero otherwise. CHEARN is an indicator variable equal to one for a positive change in earnings from the same quarter in the prior year, zero otherwise. SIZE is the logarithm of market value of equity. MTB is the market-to-book ratio. ROA is return on assets.

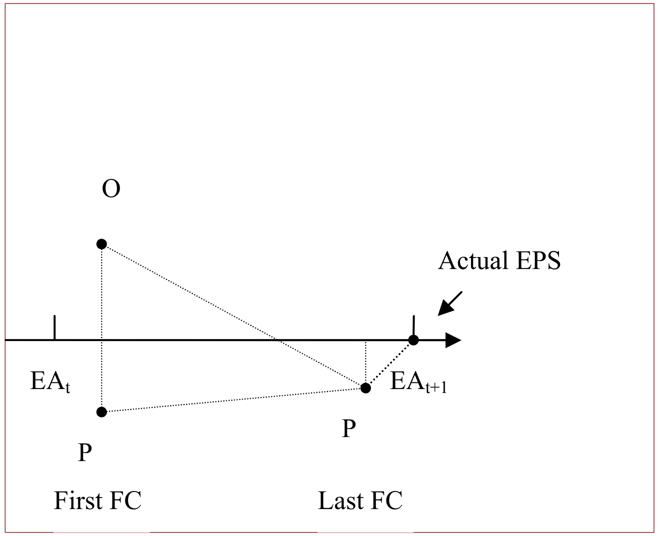
Bold numbers indicate significance at less than the 5% level (chi-square test).

Figure 1: Four-way comparison

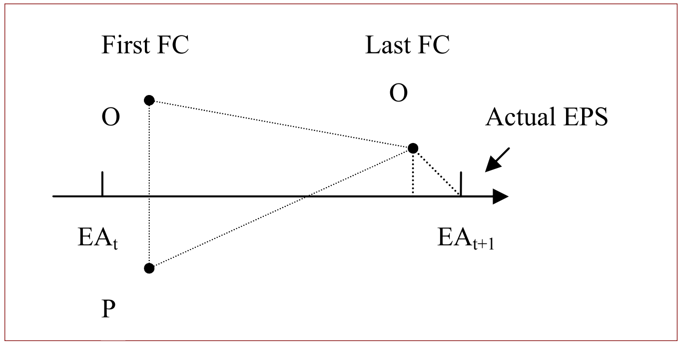
OP vs. OO



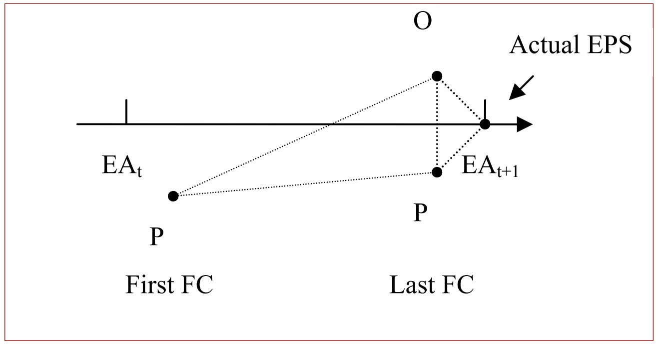
OP vs. PP



OO vs. PO



PO vs. PP



Equity Risk Premiums And Stocks Today

Marek Mscichowski | March 11, 2014

Stocks may appear to be at expensive levels. Looking at Price to Earnings (P/E) multiples of equities and comparing them to their historical averages, however, some commentators (namely, former Federal Reserve Chairman Alan Greenspan and NYU professor Aswath Damodaran) have recently pointed to equity risk premiums as another useful metric for valuing stocks. Unlike P/E multiples, equity premiums take interest rates, some currently at historically low levels historically, into account.

The equity premium is the total expected return (including capital growth and dividends) minus the risk-free rate. The total expected return is currently around 8.5%. The ten-year Treasury yield, an estimate of the risk-free rate, is about 3%. Hence, by our rough arithmetic, the equity premium that compensates investors for the added risk of holding corporate equity over theoretically risk-free U.S. government interest payments is currently about 5.5%.

Historically, the equity premium required by investors has averaged in the range of 3% to 7%. So this premium is about average, while interest rates, in some cases, are at historic lows.

The main reason that interest rates are so low is the Federal Reserve's massive asset-buyback program and abnormally low inflation. Through this lens, the elevated high P/E ratios make more sense, as investors search for returns in a low interest-rate environment. However, the Fed lowered the amount of monthly buybacks by $10 billion, from $85 billion to $75 billion, as 2013 came to a close. It then pared another $10 billion assets in January of this year. The Fed's efforts should eventually increase interest rates, though the timeframe appears to depend on the depth and breadth of an economic recovery. This has lent more urgency to speculation on Fed moves.

If interest rates go up and the required premium stays the same, this will decrease equity prices, all else being equal, as future cash flows are discounted by greater expected total returns. However, Professor Damodaran, who periodically posts his own equity risk premium estimate, argues that over the past decade, estimated returns have circled around the same mean, with equity risk premiums have largely compensated for falling interest rates, which have been in the hands of the Federal Reserve. Still, there are historical precedents for shifts in the total expected return because of either changes in the risk-free rate or equity premiums.

Besides interest rates and required equity premiums, another variable that can affect returns is earnings growth, which ultimately supplies money for returns in the form of dividends and buybacks. In recent years, corporations have been doing well, and the global economy seems to be firming up. Future earnings figures will also affect valuations. Damodaran provides a model (similar to a dividend discount model for a stock) for one to determine the intrinsic value of the S&P 500 Index by providing estimates for the risk-free rate, equity premium, as well as cash returns in the form of buybacks and their assumed growth rates.

What are some possible scenarios and how would they affect investors? Our previous discussion should shed some light. In the worst case scenario, interest rates will grow sharply, while the pace of earnings slow (compared to expectations, at least). This may mean equities are relatively overvalued now. For investors, the best case would be if earnings continue to grow nicely, while interest rates remain subdued. This may mean that the intrinsic value of equities is above the current price. With markets recently reaching all-time highs in some indexes and many stocks trading at premium P/E multiples compared to recent years, looking at the equity risk premium may provide investors with new insights into equity valuation and where stocks can go from here.

Value Line subscribers can compare our total return estimates with current bond yields for an idea of equity risk premium as they differ for each individual stock (In general, riskier stocks require higher premiums). Investors should also focus on our earnings and dividend estimates and projections, when considering if an investment is right for them on a fundamental basis.

Investor growth expectations: Analysts vs. history

Analysts' growth forecasts dominate past trends in predicting stock prices.

James H. Vander Weide and Willard T. Carleton

For the purposes of implementing the Discounted Cash Flow (DCF) cost of equity model, the analyst must know which growth estimate is embodied in the firm's stock price. A study by Cragg and Malkiel (1982) suggests that the stock valuation process embodies analysts' forecasts rather than historically based growth figures such as the ten-year historical growth in dividends per share or the five-year growth in book value per share. The Cragg and Malkiel study is based on data for the 1960s, however, a decade that was considerably more stable than the recent past.

As the issue of which growth rate to use in implementing the DCF model is so important to applications of the model, we decided to investigate whether the Cragg and Malkiel conclusions continue to hold in more recent periods. This paper describes the results of our study.

STATISTICAL MODEL

The DCF model suggests that the firm's stock price is equal to the present value of the stream of dividends that investors expect to receive from owning the firm's shares. Under the assumption that investors expect dividends to grow at a constant rate, g, in perpetuity, the stock price is given by the following simple expression:

$$P_s = \frac{D(1+g)}{k-g} \qquad (1)$$

where:

P_s = current price per share of the firm's stock;

D = current annual dividend per share;

g = expected constant dividend growth rate; and

k = required return on the firm's stock.

Dividing both sides of Equation (1) by the firm's current earnings, E, we obtain:

$$\frac{P_s}{E} = \frac{D}{E} \cdot \frac{(1+g)}{k-g} \qquad (2)$$

Thus, the firm's price/earnings (P/E) ratio is a nonlinear function of the firm's dividend payout ratio (D/E), the expected growth in dividends (g), and the required rate of return.

To investigate what growth expectation is embodied in the firm's current stock price, it is more convenient to work with a linear approximation to Equation (2). Thus, we will assume that:

$$P/E = a_0(D/E) + a_1 g + a_2 k. \qquad (3)$$

(Cragg and Malkiel found this assumption to be reasonable throughout their investigation.)

Furthermore, we will assume that the required

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rate of return, k, in Equation (3) depends on the values of the risk variables B, Cov, Rsq, and Sa, where B is the firm's Value Line beta; Cov is the firm's pretax interest coverage ratio; Rsq is a measure of the stability of the firm's five-year historical EPS; and Sa is the standard deviation of the consensus analysts' five-year EPS growth forecast for the firm. Finally, as the linear form of the P/E equation is only an approximation to the true P/E equation, and B, Cov, Rsq, and Sa are only proxies for k, we will add an error term, e, that represents the degree of approximation to the true relationship.

With these assumptions, the final form of our P/E equation is as follows:

$$P/E = a_0(D/E) + a_1g + a_2B + a_3Cov + a_4Rsq + a_5Sa + e. \quad (4)$$

The purpose of our study is to use more recent data to determine which of the popular approaches for estimating future growth in the Discounted Cash Flow model is embodied in the market price of the firm's shares.

We estimated Equation (4) to determine which estimate of future growth, g, when combined with the payout ratio, D/E, and risk variables B, Cov, Rsq, and Sa, provides the best predictor of the firm's P/E ratio. To paraphrase Cragg and Malkiel, we would expect that growth estimates found in the best-fitting equation more closely approximate the expectation used by investors than those found in poorer-fitting equations.

DESCRIPTION OF DATA

Our data sets include both historically based measures of future growth and the consensus analysts' forecasts of five-year earnings growth supplied by the Institutional Brokers Estimate System of Lynch, Jones & Ryan (IBES). The data also include the firm's dividend payout ratio and various measures of the firm's risk. We include the latter items in the regression, along with earnings growth, to account for other variables that may affect the firm's stock price.

The data include:

Earnings Per Share. Because our goal is to determine which earnings variable is embodied in the firm's market price, we need to define this variable with care. Financial analysts who study a firm's financial results in detail generally prefer to "normalize" the firm's reported earnings for the effect of extraordinary items, such as write-offs of discontinued operations, or mergers and acquisitions. They also attempt, to the extent possible, to state earnings for different firms using a common set of accounting conventions.

We have defined "earnings" as the consensus analyst estimate (as reported by IBES) of the firm's earnings for the forthcoming year.[1] This definition approximates the normalized earnings that investors most likely have in mind when they make stock purchase and sell decisions. It implicitly incorporates the analysts' adjustments for differences in accounting treatment among firms and the effects of the business cycle on each firm's results of operations. Although we thought at first that this earnings estimate might be highly correlated with the analysts' five-year earnings growth forecasts, that was not the case. Thus, we avoided a potential spurious correlation problem.

Price/Earnings Ratio. Corresponding to our definition of "earnings," the price/earnings ratio (P/E) is calculated as the closing stock price for the year divided by the consensus analyst earnings forecast for the forthcoming fiscal year.

Dividends. Dividends per share represent the common dividends declared per share during the calendar year, after adjustment for all stock splits and stock dividends). The firm's dividend payout ratio is then defined as common dividends per share divided by the consensus analyst estimate of the earnings per share for the forthcoming calendar year (D/E). Although this definition has the deficiency that it is obviously biased downward — it divides this year's dividend by next year's earnings — it has the advantage that it implicitly uses a "normalized" figure for earnings. We believe that this advantage outweighs the deficiency, especially when one considers the flaws of the apparent alternatives. Furthermore, we have verified that the results are insensitive to reasonable alternative definitions (see footnote 1).

Growth. In comparing historically based and consensus analysts' forecasts, we calculated forty-one different historical growth measures. These included the following: 1) the past growth rate in EPS as determined by a log-linear least squares regression for the latest year,[2] two years, three years, . . ., and ten years; 2) the past growth rate in DPS for the latest year, two years, three years, . . ., and ten years; 3) the past growth rate in book value per share (computed as the ratio of common equity to the outstanding common equity shares) for the latest year, two years, three years, . . ., and ten years; 4) the past growth rate in cash flow per share (computed as the ratio of pretax income, depreciation, and deferred taxes to the outstanding common equity shares) for the latest year, two years, three years, . . ., and ten years; and 5) plowback growth (computed as the firm's retention ratio for the current year times the firm's latest annual return on common equity).

We also used the five-year forecast of earnings per share growth compiled by IBES and reported in mid-January of each year. This number represents the consensus (i.e., mean) forecast produced by analysts from the research departments of leading Wall Street and regional brokerage firms over the preceding three months. IBES selects the contributing brokers "because of the superior quality of their research, professional reputation, and client demand" (IBES *Monthly Summary Book*).

Risk Variables. Although many risk factors could potentially affect the firm's stock price, most of these factors are highly correlated with one another. As shown above in Equation (4), we decided to restrict our attention to four risk measures that have intuitive appeal and are followed by many financial analysts: 1) B, the firm's beta as published by Value Line; 2) Cov, the firm's pretax interest coverage ratio (obtained from Standard & Poor's Compustat); 3) Rsq, the stability of the firm's five-year historical EPS (measured by the R^2 from a log-linear least squares regression); and 4) Sa, the standard deviation of the consensus analysts' five-year EPS growth forecast (mean forecast) as computed by IBES.

After careful analysis of the data used in our study, we felt that we could obtain more meaningful results by imposing six restrictions on the companies included in our study:

1. Because of the need to calculate ten-year historical growth rates, and because we studied three different time periods, 1981, 1982, and 1983, our study requires data for the thirteen-year period 1971-1983. We included only companies with at least a thirteen-year operating history in our study.
2. As our historical growth rate calculations were based on log-linear regressions, and the logarithm of a negative number is not defined, we excluded all companies that experienced negative EPS during any of the years 1971-1983.
3. For similar reasons, we also eliminated companies that did not pay a dividend during any one of the years 1971-1983.
4. To insure comparability of time periods covered by each consensus earnings figure in the P/E ratios, we eliminated all companies that did not have a December 31 fiscal year-end.
5. To eliminate distortions caused by highly unusual events that distort current earnings but not expected future earnings, and thus the firm's price/earnings ratio, we eliminated any firm with a price/earnings ratio greater than 50.
6. As the evaluation of analysts' forecasts is a major part of this study, we eliminated all firms that IBES did not follow.

Our final sample consisted of approximately sixty-five utility firms.[3]

RESULTS

To keep the number of calculations in our study to a reasonable level, we performed the study in two stages. In Stage 1, all forty-one historically oriented approaches for estimating future growth were correlated with each firm's P/E ratio. In Stage 2, the historical growth rate with the highest correlation to the P/E ratio was compared to the consensus analyst growth rate in the multiple regression model described by Equation (4) above. We performed our regressions for each of three recent time periods, because we felt the results of our study might vary over time.

First-Stage Correlation Study

Table 1 gives the results of our first-stage correlation study for each group of companies in each of the years 1981, 1982, and 1983. The values in this table measure the correlation between the historically oriented growth rates for the various time periods and the firm's end-of-year P/E ratio.

The four variables for which historical growth rates were calculated are shown in the left-hand column: EPS indicates historical earnings per share growth, DPS indicates historical dividend per share growth, BVPS indicates historical book value per share growth, and CFPS indicates historical cash flow per share growth. The term "plowback" refers to the product of the firm's retention ratio in the currennt year and its return on book equity for that year. In all, we calculated forty-one historically oriented growth rates for each group of firms in each study period.

The goal of the first-stage correlation analysis was to determine which historically oriented growth rate is most highly correlated with each group's year-end P/E ratio. Eight-year growth in CFPS has the highest correlation with P/E in 1981 and 1982, and ten-year growth in CFPS has the highest correlation with year-end P/E in 1983. In all cases, the plowback estimate of future growth performed poorly, indicating that — contrary to generally held views — plowback is not a factor in investor expectations of future growth.

Second-Stage Regression Study

In the second stage of our regression study, we ran the regression in Equation (4) using two different measures of future growth, g: 1) the best historically oriented growth rate (g_h) from the first-stage correlation study, and 2) the consensus analysts' forecast (g_a) of five-year EPS growth. The regression results, which are shown in Table 2, support at least

TABLE 1

Correlation Coefficients of All Historically Based Growth Estimates by Group and by Year with P/E

Historical Growth Rate Period in Years

Current Year	1	2	3	4	5	6	7	8	9	10
1981										
EPS	−0.02	0.07	0.03	0.01	0.03	0.12	0.08	0.09	0.09	0.09
DPS	0.05	0.18	0.14	0.15	0.14	0.15	0.19	0.23	0.23	0.23
BVPS	0.01	0.11	0.13	0.13	0.16	0.18	0.15	0.15	0.15	0.15
CFPS	−0.05	0.04	0.13	0.22	0.28	0.31	0.30	0.31	−0.57	−0.54
Plowback	0.19									
1982										
EPS	−0.10	−0.13	−0.06	−0.02	−0.02	−0.01	−0.03	−0.03	0.00	0.00
DPS	−0.19	−0.10	0.03	0.05	0.07	0.08	0.09	0.11	0.13	0.13
BVPS	0.07	0.08	0.11	0.11	0.09	0.10	0.11	0.11	0.09	0.09
CFPS	−0.02	−0.08	0.00	0.10	0.16	0.19	0.23	0.25	0.24	0.07
Plowback	0.04									
1983										
EPS	−0.06	−0.25	−0.25	−0.24	−0.16	−0.11	−0.05	0.00	0.02	0.02
DPS	0.03	−0.10	−0.03	0.08	0.15	0.21	0.21	0.21	0.22	0.24
BVPS	0.03	0.10	0.04	0.09	0.15	0.16	0.19	0.21	0.22	0.21
CFPS	−0.08	0.01	0.02	0.08	0.20	0.29	0.35	0.38	0.40	0.42
Plowback	−0.08									

two general conclusions regarding the pricing of equity securities.

First, we found overwhelming evidence that the consensus analysts' forecast of future growth is superior to historically oriented growth measures in predicting the firm's stock price. In every case, the R^2 in the regression containing the consensus analysts' forecast is higher than the R^2 in the regression containing the historical growth measure. The regression coefficients in the equation containing the consensus analysts' forecast also are considerably more significant than they are in the alternative regression. These results are consistent with those found by Cragg and Malkiel for data covering the period 1961-1968. Our results also are consistent with the hypothesis that investors use analysts' forecasts, rather than historically oriented growth calculations, in making stock buy-and-sell decisions.

TABLE 2

Regression Results
Model I

Part A: *Historical*

$$P/E = a_0 + a_1 D/E + a_2 g_h + a_3 B + a_4 Cov + a_5 Rsq + a_6 Sa$$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	$\hat{a}_3$	$\hat{a}_4$	$\hat{a}_5$	$\hat{a}_6$	R^2	F Ratio
1981	−6.42*	10.31*	7.67*	3.24	0.54*	1.42*	57.43	0.83	46.49
	(5.50)	(14.79)	(2.20)	(2.86)	(2.50)	(2.85)	(4.07)		
1982	−2.90*	9.32*	8.49*	2.85	0.45*	−0.42	3.63	0.86	65.53
	(2.75)	(18.52)	(4.18)	(2.83)	(2.60)	(0.05)	(0.26)		
1983	−5.96*	10.20*	19.78*	4.85	0.44*	0.33	32.49	0.82	45.26
	(3.70)	(12.20)	(4.83)	(2.95)	(1.89)	(0.50)	(1.29)		

Part B: *Analysis*

$$P/E = a_0 + a_1 D/E + a_2 g_a + a_3 B + a_4 Cov + a_5 Rsq + a_6 Sa$$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	$\hat{a}_3$	$\hat{a}_4$	$\hat{a}_5$	$\hat{a}_6$	R^2	F Ratio
1981	−4.97*	10.62*	54.85*	−0.61	0.33*	0.63*	4.34	0.91	103.10
	(6.23)	(21.57)	(8.56)	(0.68)	(2.28)	(1.74)	(0.37)		
1982	−2.16*	9.47*	50.71*	−1.07	0.36*	−0.31	119.05*	0.90	97.62
	(2.59)	(22.46)	(9.31)	(1.14)	(2.53)	(1.09)	(1.60)		
1983	−8.47*	11.96*	79.05*	2.16	0.56*	0.20	−34.43	0.87	69.81
	(7.07)	(16.48)	(7.84)	(1.55)	(3.08)	(0.38)	(1.44)		

Notes:

* Coefficient is significant at the 5% level (using a one-tailed test) and has the correct sign. T-statistic in parentheses.

Second, there is some evidence that investors tend to view risk in traditional terms. The interest coverage variable is statistically significant in all but one of our samples, and the stability of the operating income variable is statistically significant in six of the twelve samples we studied. On the other hand, the beta is never statistically significant, and the standard deviation of the analysts' five-year growth forecasts is statistically significant in only two of our twelve samples. This evidence is far from conclusive, however, because, as we demonstrate later, a significant degree of cross-correlation among our four risk variables makes any general inference about risk extremely hazardous.

Possible Misspecification of Risk

The stock valuation theory says nothing about which risk variables are most important to investors. Therefore, we need to consider the possibility that the risk variables of our study are only proxies for the "true" risk variables used by investors. The inclusion of proxy variables may increase the variance of the parameters of most concern, which in this case are the coefficients of the growth variables.[4]

To allow for the possibility that the use of risk proxies has caused us to draw incorrect conclusions concerning the relative importance of analysts' growth forecasts and historical growth extrapolations, we have also estimated Equation (4) with the risk variables excluded. The results of these regressions are shown in Table 3.

Again, there is overwhelming evidence that the consensus analysts' growth forecast is superior to the historically oriented growth measures in predicting the firm's stock price. The R^2 and t-statistics are higher in every case.

CONCLUSION

The relationship between growth expectations and share prices is important in several major areas of finance. The data base of analysts' growth forecasts collected by Lynch, Jones & Ryan provides a unique opportunity to test the hypothesis that investors rely more heavily on analysts' growth forecasts than on historical growth extrapolations in making security buy–and–sell decisions. With the help of this data base, our studies affirm the superiority of analysts' forecasts over simple historical growth extrapolations in the stock price formation process. Indirectly, this finding lends support to the use of valuation models whose input includes expected growth rates.

TABLE 3

Regression Results
Model II

Part A: *Historical*

$P/E = a_0 + a_1 D/E + a_2 g_h$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	R^2	F Ratio
1981	−1.05	9.59	21.20	0.73	82.95
	(1.61)	(12.13)	(7.05)		
1982	0.54	8.92	12.18	0.83	167.97
	(1.38)	(17.73)	(6.95)		
1983	−0.75	8.92	12.18	0.77	107.82
	(1.13)	(12.38)	(7.94)		

Part B: *Analysis*

$P/E + a_0 + a_1 D/E + a_2 g_a$

Year	$\hat{a}_0$	$\hat{a}_1$	$\hat{a}_2$	R^2	F Ratio
1981	3.96	10.07	60.53	0.90	274.16
	(8.31)	(8.31)	(20.91)	(15.79)	
1982	−1.75	9.19	44.92	0.88	246.36
	(4.00)	(4.00)	(21.35)	(11.06)	
1983	−4.97	10.95	82.02	0.83	168.28
	(6.93)	(6.93)	(15.93)	(11.02)	

Notes:
* Coefficient is significant at the 5% level (using a one-tailed test) and has the correct sign. T-statistic in parentheses.

[1] We also tried several other definitions of "earnings," including the firm's most recent primary earnings per share prior to any extraordinary items or discontinued operations. As our results were insensitive to reasonable alternative definitions of "earnings " we report only the results for the IBES consensus.

[2] For the latest year, we actually employed a point-to-point growth calculation because there were only two available observations.

[3] We use the word "approximately," because the set of available firms varied each year. In any case, the number varied only from zero to three firms on either side of the figures cited here.

[4] See Maddala (1977).

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Bloomberg

Unstoppable $100 Trillion Bond Market Renders Models Useless

By Susanne Walker and Liz Capo McCormick - Jun 2, 2014

If the insatiable demand for bonds has upended the models you use to value them, you're not alone.

Just last month, researchers at the Federal Reserve Bank of New York retooled a gauge of relative yields on Treasuries, casting aside three decades of data that incorporated estimates for market rates from professional forecasters. Priya Misra, the head of U.S. rates strategy at Bank of America Corp., says a risk metric she's relied on hasn't worked since March.

After unprecedented stimulus by the Fed and other central banks made many traditional models useless, investors and analysts alike are having to reshape their understanding of cheap and expensive as the global market for bonds balloons to $100 trillion. With the world's biggest economies struggling to grow and inflation nowhere in sight, catchphrases such as "new neutral" and "no normal" are gaining currency to describe a reality where bonds are rallying the most in a decade.

"The world's gotten more complicated and it's a little different," James Evans, a New York-based money manager at Brown Brothers Harriman & Co., which oversees $30 billion, said in a telephone interview on May 30. "As far as predicting direction up and down, I don't think they have much value,"referring to bond-market models used by forecasters.

Flawed Consensus

With the Fed paring its $85 billion-a-month bond buying program this year and economists calling for the five-year-long U.S. expansion to finally take off, Wall Street prognosticators said at the start of the year that yields were bound to rise as central banks began employing tighter monetary policies.

Instead, investors poured into bonds of all types as global growth weakened, disinflation emerged in Europe and tensions between Ukraine and Russia intensified.

Globally, bonds have returned an average 3.89 percent this year for the biggest year-to-date gain since 2003, index data compiled by Bank of America Merrill Lynch show. The advance decreased yields on 10-year Treasuries by more than a half percentage point to 2.48 percent, the fastest pace over the same span since 1995, while borrowing costs for the riskiest U.S. companies tumbled to a record 5.94 percent last week.

Benchmark Treasury 10-year note yields rose six basis points, or 0.06 percentage point, to 2.53 percent as of 3:36 p.m. New York time.

In developed countries, benchmark yields in 24 of 25 nations tracked by Bloomberg have fallen this year, with those in Italy and Spain closing below 3 percent for the first time.

‘How Wrong’

“I don’t expect the consensus to be right, I’m just surprised by how wrong it has been,” Jim Bianco, president of Chicago-based Bianco Research LLC, said by telephone on May 28.

The seemingly unstoppable rally has caused bond-market professionals to reassess whether they’re using the right tools.

At the New York Fed, researchers Tobias Adrian, Richard Crump, Benjamin Mills and Emanuel Moench on May 12 released an updated methodology for a metric known as the term premium, which can be used to determine whether 10-year Treasuries are cheap or expensive relative to short -term rates.

After stripping out all human predictions and using only market prices to calculate future expectations, the researchers found the extra yield longer-term Treasuries offered has been“considerably higher since the onset of the financial crisis”than previous models, according to their blog post that included the data. That may be because the metric now suggests the Fed’s short -term interest rate may not rise as high as survey-based results predicted, wrote the economists.

Old Model

Based on the old model, last updated on March 31, the term premium on 10-year notes was 0.25 percentage point, versus 0.96 percentage point on the same day using the current methodology. The reading was at 0.67 percentage point last week.

The researchers declined to comment beyond the blog post, according to Eric Pajonk, a spokesman at the New York Fed.

Bank of America's Misra says she stopped looking at the gap between the rate on 10-year interest-rate swaps and yields on benchmark government debt as a measure of risk.

The gauge, which usually widens as investors seek out haven assets in times of stress, is being distorted as those betting on losses in Treasuries have unwound their trades, she said.

Hedge funds and other large speculators cut their net short positions in 10-year note futures by the most since February as of May 27, according to data from the U.S. Commodity Futures Trading Commission. Primary dealers, which had net shortpositions in March for the first time since 2011, have since reversed those wagers, data compiled by Bloomberg show.

Forced Buying

"Everyone is short and they are forced to cover," Misra said by telephone on May 28.

While economists and strategists have reduced their yield forecasts, they're still sticking to the view borrowing costs will end the year higher as the economy gains momentum.

They now see yields on 10-year Treasuries rising to 3.25 percent by year-end as the economy accelerates 3.1 percent in 2015, estimates compiled by Bloomberg show. At the start of the year, the median yield forecast was 3.44 percent.

Investors risk becoming lulled into complacency by six years of near-zero U.S. interest rates at a time when yields are so low, according to Zach Pandl, the Minneapolis-based senior interest-rate strategist at Columbia Management Investment Advisers, which oversees $340 billion.

Pandl, who developed his own version of the term premium, maintains that U.S. government bonds are too expensive.

"The Treasury market is overvalued," he said by telephone on May 28. "The funds rate has been at zero for so long so it becomes difficult to envision it being higher at all. Monetary policy is closer to exit."

Biggest Mistake

Traditional models are failing to explain the resilience of fixed-income assets as central banks led by the Fed pumptrillions of dollars into their economies and suppress short-term rates at historical lows, according to Bianco.

The Fed, Bank of Japan and Bank of England all have quantitative-easing programs in place, while at least two dozen nations have dropped benchmark rates to 1 percent or less.

“The biggest mistake for people is they think interest rates are merely a projection of where the economy is supposed to go,” Bianco said. “It’s the Fed and the way they have changed the marketplace.” He foresees that yields on 10-year notes will end the year at 2 percent to 2.5 percent.

Fed Chair Janet Yellen said on May 7 there will be“considerable time” before the central bank raises its benchmark rate as slack in the jobs market keeps inflation below its 2 percent target.

Household spending declined in April, while the world’s largest economy contracted in the first quarter for the first time since 2011, government reports showed last week.

“Given the outlook for the global economy and inflation, bonds are not a bad place to be,” Gary Pollack, the New York-based head of fixed-income trading at Deutsche Bank AG’s private-wealth management unit, which oversees $12 billion, said in a telephone interview on May 28.

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BUSINESS INSIDER

CHART OF THE DAY: Tepper, Birinyi, Damodaran, O'Neill, Ritholtz All Love This Bullish Stock Market Metric

Sam Ro
May 14, 2013, 12:36 PM

With the S&P 500 at an all-time high, many stock market pundits have grown increasingly cautious.

However, the savviest experts are reiterating their bullishness, and they are all pointing to one metric: the equity risk premium.

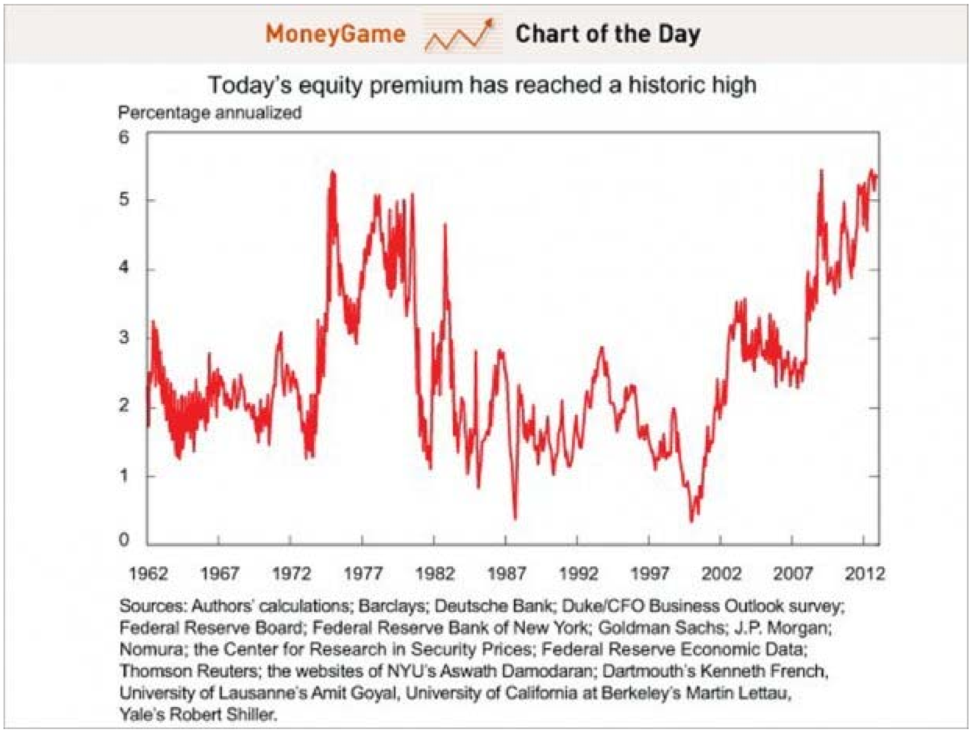
"The equity risk premium is the key to investing and valuation," says legendary NYU finance professor Aswath Damodaran,

The equity risk premium can be defined simply as the expected return on a broad stock market index in excess of the long-term risk-free rate, which is often measured by a government bond yield.

Markets spiked this morning when influential hedge fund manager David Tepper held up a chart of the equity risk premium as he presented his uber-bullish case for stocks during a CNBC appearance.

Blogger extraordinaire Barry Ritholtz and stock market legend Laszlo Birinyi each pointed us to Tepper's exact chart last week. Birinyi confident we'll see the S&P 500 pass 1,700 this year, and 1,900 relatively soon.

Jim O'Neill, the now retired economist from Goldman Sachs, has long been bullish on stocks thanks to the equity risk premium. In the final slide of his final presentation, O'Neill argued, "Current ERP levels continue to indicate that equity markets are still quite attractive in many parts of the world."



Liberty Street Economics

Why do Analysts Issue Long-term Earnings Growth Forecasts?

An Empirical Analysis

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ABSTRACT

We examine analysts' motives to issue long-term earning growth (LTG) forecasts. We find that analysts are more likely to issue LTG forecasts when their incentive to please managers is strong. In addition, analysts are more likely to choose firms that they are more optimistic about for LTG coverage. We find mixed evidence regarding whether analysts issue LTG forecasts to signal their ability or to meet investors' informational needs. Augmenting Ljungqvist et al (2006), we show that LTG forecasts are issued less likely to please managers, but more likely to meet investors' information needs in the presence of high institutional ownership.

1. Introduction

While the extant literature (e.g., Chan, Karceski and Lakonishok (2003)) yields overwhelming evidence on the over-optimism and inaccuracy of long-term earnings growth (LTG) forecasts, it remains silent on why analysts issue these forecasts, a question that becomes even more intriguing given the more voluntary nature of LTG forecasts compared with their near-term counterparts. That is, why do some analysts issue for some companies LTG forecasts, which are often deemed as extremely inaccurate and overly optimistic, when they can choose not to? This study offers insights into this question by empirically examining four non-exclusive hypotheses: analysts issue LTG forecasts to signal their ability, to reveal their optimism, to please the management (since these forecasts are overly optimistic), and to satisfy investors' informational needs.

With one-year-ahead annual earnings forecasts as the benchmark sample, we test our hypotheses jointly in a fixed-effect framework with analyst-year (or analyst) effect fixed to ensure that our results are not driven by unobserved analyst-level heterogeneity such as analyst peculiarities.

We document evidence for the manager pleasing and optimism revealing hypothesis, but mixed results for the analyst ability signaling and investor informational needs satisfying motives. Augmenting Ljungqvist et al (2006)'s finding about institutional investors' moderating role in analyst research, we find that analysts are less (more) likely to issue long-term forecasts for companies with large institutional ownership to please managers (to meet investors' information needs).

Our paper contributes to the literature in several ways. First, our results suggest that LTG forecasts may serve as a manipulative tool for analysts to please managers. Therefore, conflicts of interest may affect not only the quality of analyst research, such as the biases of analyst recommendations as examined by previous literature, but also the type of information included in the analyst reports. This motive may partly explain the documented over-optimism in LTG forecasts.

An examination of the providence of LTG forecasts offers several advantages in the investigation of interest conflicts. For example, due to reputation concerns, analysts are less likely to bias their near-term forecasts or recommendations. However, with accuracy, and thus reputation loss, not a primary concern, the voluntarily provided LTG forecasts provide a cleaner setting to study motives related to conflict of interest. Furthermore, the quality of analyst earnings forecasts and recommendations may depend not only on analyst incentives but also on analyst ability and even factors beyond analysts' control. For example, less able or less fortunate analysts may appear to issue biased recommendation in absence of incentives to please managers. The decision to provide LTG forecasts, however, is not affected by so many complicating influences. Instead, it is totally in analysts' control and involves little analyst ability.

Furthermore, our results augment Ljungqvist et al (2006)'s finding about the role of institutional investors in analyst research. We find evidence that higher institutional ownership reduces the likelihood of analysts issuing LTG forecasts to please mangers. Furthermore, we show that the presence of higher institutional ownership makes analysts more responsive to investors' information needs.

The remainder of the paper proceeds as follows. Section 2 develops hypotheses. Section 3 discusses our data, sample, variables, and summary statistics. Section 4 presents the main results. Section 5 examines the role of institutional investors in analysts' motives of LTG forecast issuance. Section 6 concludes.

2. Hypotheses development

2.1 Characteristics of LTG forecasts

There is a growing body of literature on LTG forecasts. La Porta (1996) finds that investment strategies seeking to exploit errors in analysts' forecasts earn superior returns because expectations about future growth in earnings are too extreme. Dechow and Sloan (1997) also document that naive reliance on analysts' forecasts of future earnings growth can explain over half of the higher returns to contrarian investment strategies. Harris (1999) reports three characteristics of LTG forecasts: (1) they are extremely low in accuracy; (2) they are inferior to the forecasts of a naïve model in which earnings are assumed to follow a martingale, and (3) they are significantly over-optimistic, exceeding the actual growth rate by an average of seven percent per annum. Chan, Karceski and Lakonishok (2003) analyze historical long-term growth rates across a broad cross section of stocks and show that I/B/E/S growth forecasts are overly optimistic and add little predictive power.

In the setting of IPOs, prior literature suggests that conflict of interests plays an important role in the optimism of LTG forecasts. For example, Rajan and Servaes (1997) examine data on analyst following for a sample of initial public offerings completed between 1975 and 1987, and find that analysts are overoptimistic about the earnings potential and long-term growth prospects of recent IPOs. They further document that, in the long run, IPOs have better stock performance when analysts ascribe low growth potential rather than high growth potential. Lin and McNichols (1998) find that lead and co-underwriter analysts' growth forecasts and recommendations are significantly more favorable than those made by unaffiliated analysts, although their earnings forecasts are not generally greater. Purnanandam and Swaminathan (2004) also document that, ex post, the projected high growth of overvalued IPOs fails to materialize, while their profitability declines from pre-IPO levels. Their results suggest that IPO investors are deceived by optimistic growth forecasts and pay insufficient attention to profitability in valuing IPOs.

2.2 Why do analysts issue LTG forecasts?

In this section, we develop four non-exclusive testable hypotheses about the supply of long-term forecasts, which are analyst ability signaling, optimism revealing, management pleasing, and investor information needs satisfying. We also discuss the role of analyst peculiarity in LTG forecast issuance.

A) Analyst ability signaling

At first sight, it may seem reasonable that the highly inaccurate and optimistic LTG forecasts are associated with low-quality analysts. However, while LTG forecasts are highly inaccurate and overly optimistic ex post, they may provide useful information to investors when they are published. The huge errors we observe ex post might just reflect the difficulty in projecting earnings growth far into the future.

Besides, analysts don't have to provide LTG forecasts. Since it is a challenging job to forecast the far future, only high-ability analysts are confident enough to issue LTG forecasts. Therefore, we argue that analysts are more likely to issue LTG forecasts when they are of higher ability, or at least, they perceive themselves as of higher ability.

H1: Analysts of higher ability are more likely to issue LTG forecasts.

B) Analyst optimism revealing

McNichols and O'Brien (1997) find evidence of self-selection bias in analyst coverage. Specifically, they show that analysts tend to add firms they view favorably and drop firms they view unfavorably. Along the same line of thinking, we argue that there is a self-selection bias in the providing of LTG forecasts as well. After all, analysts should have stronger incentives to collect long-term company-specific information when they are confident in the company's future.

The documented optimistic nature of LTG forecasts also appears to suggest that analysts who are more optimistic about the company are more likely to issue long-term forecasts. Thus, we expect analysts to be more likely to issue LTG forecasts when they are more optimistic about the company's future.

H2: Analysts are more likely to issue LTG forecasts for companies they are more optimistic about.

C) Management Pleasing

In practice, sell-side analysts often find themselves serving two masters. On the one hand, they serve investors, and thus aim at providing accurate and reliable research. On the other hand, their incentives to please the managers often obscure their goal of "objectivity", making the company they cover their other master. At the very least, analysts are often afraid to offend managers by providing unfavorable opinions partially because managers may withhold information from those analysts they are unhappy with (e.g., Lim (2001)).

In addition to informational concerns, analysts face an even higher stake when the company they cover is also an investment banking customer of the investment bank the analysts are affiliated with. There is a growing body of literature examining the role interest conflict plays in various aspects of analyst research. Dugar and Nathan (1995) show that analysts whose employers have an investment banking relationship with a company issue more favorable recommendations. Lin and McNichols (1998) find that lead and co-underwriter analysts' growth forecasts and recommendations are significantly more favorable than those made by unaffiliated analysts, although their earnings forecasts are not generally greater. Michaely and Womack (1999) document that stocks that underwriter analysts recommend perform more poorly than 'buy' recommendations by unaffiliated brokers prior to, at the time of, and subsequent to the recommendation date, and further show that the market does not recognize the full extent of this bias. Agrawal and Chen (2005a) find that potential investment banking relationship has no effect on quarterly earnings forecasts, but is positively associated with more optimistic long-term growth forecasts. Agrawal and Chen (2005b) show that analyst recommendation levels are positively associated with the magnitude of conflicts they face, but investors recognize analysts' conflicts and properly discount analysts' opinions. O'Brien, McNichols and Lin (2005) find that affiliated analysts are slower to downgrade from the "Buy" and "Hold" recommendations and significantly faster to upgrade from the "Hold" recommendations. James and Karceski (2006) document that underwriter-affiliated analysts provide protection in the form of "booster shots" of stronger coverage if the IPO firm experiences poor aftermarket stock performance. Ljungqvist et al (2006) confirm the positive relation between investment banking and brokerage pressure and analyst recommendations, and further show that both bank reputation and institutional investors serve as moderating forces that temper analyst optimism.

Regarding LTG forecasts, prior literature also finds substantial evidence that investment banking relationship contributes to the extreme optimism in long-term earnings growth forecasts (e.g., Rajan and Servaes (1997) and Purnanandam and Swaminathan (2004)). Agrawal and Chen (2005a) suggest that analysts do not respond to conflicts by biasing short-term (quarterly EPS) forecasts, but appear to succumb to conflicts when making LTG forecasts. After all, in the case of LTG forecasts, which are often neglected by investors who put heavy weight on analyst near-term forecasts and recommendations, there is only one master left: the company they cover. Furthermore, given that LTG forecast are relatively difficult to verify ex post, the reputation loss associated with an inaccurate LTG forecast is minimal.

One may argue that analysts should be indifferent to LTG forecast issuance because these forecasts are generally ignored by investors and thus do not benefit managers at the cost of investors. However, conflict of interest, although behavior-altering, does not necessarily affect the interest of the third party. Instead, it is rational for analysts to respond to conflict of interest in a way less harmful to investors. The voting behavior of mutual fund managers documented by Davis and Kim (2006) may lend support to this view. Specifically, Davis and Kim (2006) find that mutual fund managers appear to side with management especially when there is no clear evidence that the measure being voted on have an impact on shareholder wealth. Therefore, we argue that, due to the general ignorance by investors, LTG forecasts may be subject to analyst manipulation to please the companies they cover.

H3: The supply of (optimistic) LTG forecasts is positively related to analysts' incentive to please managers.

D) Investor Information Need Satisfying

Defond and Hung (2003) document that financial analysts respond to market-based incentives to provide investors with value-relevant information. In particular, they find that analysts tend to forecast cash flows for firms whose accounting, operating and financing characteristics suggest that cash flows are useful in interpreting earnings and assessing firm viability. Along the same line, we expect that analysts provide LTG forecasts for firms whose long-term prospects are especially important for the valuation of their stocks. Therefore, we expect companies with large growth options to be more likely to receive LTG forecasts.

H4.1: Companies with larger growth options are more likely to receive LTG forecasts.

Meanwhile, Ljungqvist et al (2006) suggest that institutional investors serve as the ultimate arbiters of an analyst's reputation. Furthermore, institutional investors tend to be sophisticated users of the information analysts provide, who are therefore more likely to demand long-term information in their decision process. Consequently, analysts should be more likely to supply detailed research including a firm's long-term prospects when they know that the report is more likely to be read by institutional investors. Therefore, we expect companies with higher institutional investor ownership to be more likely to receive LTG forecasts.

H4.2: Companies with higher institutional investor ownership are more likely to receive LTG forecasts.

E) Analyst peculiarity

In addition to the four hypotheses we develop above, it is possible that the issuance of LTG forecasts depends on the peculiarities of analysts, such as their working habits and tastes. If this is true, we should find no systematic pattern in the issuance of LTG forecasts. In addition, we should find little variation in the issuance decision of a particular analyst covering several companies.

2.3 Institutional investors' role in analysts' motives to issue LTG forecasts

Ljungqvist et al (2006) document the role of institutional investors in moderating conflicts of interest in analyst research. They argue that driven by their career concerns, analysts are less likely to succumb to investment banking pressure in stocks that are highly visible to their institutional investor constituency.

In addition, underlying our hypotheses, we assume that long-term forecasts can be manipulated because the little attention they receive from investors. However, unlike individual investors, who may be more focused on analyst recommendations and near-term earnings forecasts while totally neglecting long-term forecasts, institutional investors read analyst reports thoroughly and put more weights on the contents instead. Consistently, Mikhail, Walther, and Willis (2006) find evidence that large investors are more sophisticated processors of information, while small investors are more easily misled by analyst research. Therefore, we expect analysts less likely to issue LTG forecasts to please managers for companies heavily owned by institutional investors. For the same reason, we also expect the presence of institutional investors to enhance analysts' incentives to issue LTG forecasts when long-term information is valuable to investors.

Overall, we hypothesize that the presence of institutional investors is negatively (positively) relate to analysts' manager-pleasing (investor information needs satisfying) motives to issue LTG forecasts.

H5: Analysts are less (more) likely to issue LTG forecasts to companies with large institutional ownership to please managers (to meet investors' information needs).

3. Data, sample, variables, and summary statistics

3.1 Data and sample

As in Defond and Hung (2003), we collect one-year-ahead annual earnings forecasts (FY1) as our benchmark sample to control for other factors that affect the availability of LTG forecasts.[1] We collect the one-year-ahead annual earnings forecasts in the I/B/E/S detail history file from year 1991 to 2003. We identify each analyst-firm-(forecast) year combination[2] and check whether there is any LTG forecast associated with these analyst-firm-year combinations. LTG forecasts are the long-term earnings growth forecasts as collected by I/B/E/S, which usually covers a five-year period that begins on the first day of the current fiscal year.

Panel A of Table 1 reports the number and proportion of firm-analyst pairs, analysts,

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[1] The LTG forecasts, as collected by I/B/E/S, usually cover a five-year period that begins on the first day of the current fiscal year.

[2] Instead of using the year for which a forecast is made, we use the year during which a forecast is made. For example, the time stamp for a one-year-ahead forecast that is made in 2000 but for the Dec. 2001 fiscal quarter will be 2000 instead of 2001. We do so because we expect the decision to supply the forecasts are more economically related to the factors prevalent during the time the estimations are made

and firms associated with LTG forecasts by year. We observe significant variations in the size of the benchmark sample over the sample period. However, the proportions of analyst-firm associated with LTG forecasts demonstrate only small variations over years except for year 2003, which is associated with the lowest proportion of LTG forecast coverage. Specifically, the proportion of firm-analyst pairs that are associated with LTG forecasts is in the 42-47 percent range over period 1991-2002. Analysts who issue LTG forecasts account for around 58 percent of all the analysts who issue one-year-ahead earnings forecasts each year. The number of firms receiving analyst one-year-ahead forecasts peaked in 1996 with 1,149 firms covered, but dropped dramatically thereafter. In 2003, only 280 firms receive one-year-ahead forecasts from any analysts. The proportion of firms receiving LTG forecasts also seems to decrease over time.

3.2 Variables

(a) LTG Issuance

LTG is a dummy variable that equals one if the observation is associated with long-term earnings growth forecasts (LTG) as reported in I/B/E/S, and zero otherwise.

(b) Analyst Ability

We adopt three sets of analyst ability measures. The first is analyst experience, which is adopted by many prior studies as proxies for analyst ability and skill. For example, Clement (1999) finds that forecast accuracy is positively associated with analysts' experience. Mikhail, Walther and Willis (2003) find that analysts underreact to prior earnings information less as their experience increases, suggesting one reason why analysts become more accurate with experience. Following prior literature, we introduce two experience measures. The general experience of the analysts (Exp1) is defined as the number of years the analysts have issued earnings forecasts of any type for any company since 1983, when the sample period of I/B/E/S starts. Analysts' firm-specific experience (Exp2) equals the number of years the analysts have issued earnings forecasts of any type for the company since 1983.

Second, we use the accuracy of the analyst's previous near-term forecasts as a proxy for analyst ability. Prior studies generally suggest persistence in analysts' stock picking and earnings forecasting ability. For example, Sinha, Brown and Das (1997) document persistence in earnings forecast accuracy, that is, superior earnings forecasters in one period tends to be superior the next period. Mikhail, Walther and Willis (2004) find that analysts whose recommendation revisions earned the most (least) excess returns in the past continue to outperform (underperform) in the future. Therefore, we adopt the accuracy of the analysts' past near term earnings forecasts for the same company to proxy for analyst quality. We define net forecast error (NFE) as 100 times the absolute value of the difference between the actual earnings and the analyst forecasts divided by the company's stock price the company's stock price at the end of the previous fiscal year. Past_NFE equals NFE_{t-1}, that is, the net forecast error of the most recent near-term earnings forecasts made during the previous year.[3] We expect a positive (negative) relation between the experience variables (Past_NFE) with the likelihood of long-term forecast issuance.

Finally, analysts affiliated with prestigious brokers tend to be of higher quality, as suggested by prior studies (e.g., Clement (1999)). We use the analysts' brokerage house affiliation as the other proxy for analyst ability. We collect the broker names that appear as top 15 in "the leader list" of the Institutional Investor magazine (II) from year 1990 to year 2002. If a broker appears as top 15 on "the leader list" of Institutional Investor in year t, the broker is defined as high status broker for year t+1. The dummy variable *Top15* takes on value one for analysts affiliated with the high status brokers and zero otherwise.

(c) Analyst Optimism

We adopt the optimism in analysts' near-term forecasts to measure analyst optimism about the company. Given the management's incentive to manage market expectations and to beat analyst forecasts, analysts who are optimistic to please managers should be forced to restrict or even discontinue their optimism in near-term forecasts, and therefore, we argue that the optimism in near-term forecasts should mostly capture the analysts' genuine optimism. Specifically, we use the forecast bias the analysts reveal in their past near-term forecasts to measure the analysts' optimism towards the company. Forecast Bias (FB) is 100 times the difference between the actual earnings and the analyst

[3] When we use the average NFE over the three-year period prior to the year under consideration as an alternative measure, the sample size is reduced, but the main results remain largely unchanged .

forecasts divided by the company's stock price at the end of the previous fiscal year. A negative (positive) FB indicates that the forecast overestimate (underestimate) the actual earnings, and that it is optimistic (pessimistic). We define FB_{t-1} as the past near-term forecast accuracy (Past_FB).[4] We expect the estimated coefficient to be negative. That is, increased analyst optimism, as measured by a more negative value of forecast bias, is associated with higher likelihood of long-term forecast issuance.

(d) Management Pleasing Incentives

We adopt the existence of equity underwriting relationship as a proxy for analysts' incentive to please the managers, and hypothesize that analysts are more likely to issue long-term forecasts for firms who are also their investment banking customers.

We extract all the new common stock issues in the U.S. market from 1989 to 2004 from the Securities Data Company (SDC) new issues database. We hand match the underwriters in the SDC database with the brokers in the I/B/E/S database. To enhance the quality of our match, we obtain the starting and ending dates of the appearance of the underwriter in the SDC database, and compare them with the starting and ending dates of the appearance of the broker in the IBES database. We also check the merger and acquisition history of the investment banks from the investment bank's website as well as by Google searching.[5] We are able to get a one-to-one match for most of the SDC

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[4] When we use the average FB over the three-year period prior to the year under consideration as an alternative measure, the sample size is reduced, but the main results remain largely unchanged

[5] We also double check the matching with the investment bank M&A and name changes data complied by Cheolwoo Lee, who generously provides us with the data.

underwriters. For underwriters/brokers that have experienced mergers or acquisitions, we assume that the surviving investment banks/brokers inherit the investment banking business and research coverage from both the acquirer and the target to assure continuity if the target broker coverage stops at the year of the merger.

We assume that there is an investment banking relationship between the broker and the firm from one year before the issuing of the new common stock to one year after. We define IB as a dummy variable that equals one if the analyst is affiliated with the investment bank that serves as a book runner for the company's new common stock issues, and zero otherwise. Considering that it is possible for analysts to issue LTG forecasts for IPO firms because investors are in greater needs for long-term information of these companies, we introduce an IPO dummy. Specifically, IPO equals one for company i in year t if the company has an initial public offering as indicated by the IPO flag in SDC for year t and t-1, and zero otherwise.

(e) Firm Growth Options

We adopt a firm's capital expenditure and R&D expenditure to measure the firm's growth options. Specifically, *GrowthExp* equals the sum of the company's R&D (Compustat item 46) expenditure and capital expenditure (Compustat item 30) scaled by the company's total assets (Compustat annual item 6) of the most recent fiscal year. That is, *GrowthExp* measures how much the company invests for the future. We expect *GrowthExp* to be positively associated with the issuance of LTG forecasts.

We also include three control variables relating to a company's growth options.

Hitech is a dummy variable that equals one for firms with Compustat SIC code 3570-3577 (computer hardware), or 7371-7379 (computer software), or 2833-2836 (pharmaceutical), and zero otherwise. B/M is the ratio of the company's book value to market value at the end of the most recent fiscal year. We obtain a company's book value (Compustat item 60) and market value (Compustat annual item 199*25) from the Compustat database. Log(size) is the natural log of market value of equity (Compustat annual item 199*25) in millions of dollars for the most recent fiscal year.

(f) Institutional Ownership

We collect the institution ownership information from the Thomson Financial Ownership database. *Institution* equals the total number of shares held by institutions who report their equity ownership in the quarterly 13f filings to the SEC divided by the total number of shares outstanding at the end of the previous calendar year. For firms with the institutional investor holdings data missing, we assume that these firms are 100% individually-owned and set *Institution* to zero.[6]

3.3 Summary statistics

To be included in our sample, an observation needs to have all the above-mentioned variables available. We also delete 2,417 observations with negative book value and 69 observations with institutional holdings available but number of shares outstanding missing. Our final sample includes 170,139 one-year-ahead analyst-firm-year

[6] Ljungqvist et al (2005) suggest that it is possible that these companies are randomly missing. As a robustness check, we delete observations with missing institutional ownership and our results are similar.

combinations.

Table 2 presents summary statistics. For the combined sample, 30.7 percent of the firm-analyst-year combinations are associated with LTG forecasts. On average, the analysts have issued forecasts for any company for approximately seven and a half years, and issued forecasts for a particular company for more than four years. 35.2 percent of the sample is associated with analysts hired by brokers who appear as top 15 in “the leader list” of the Institutional Investor magazine (II) from year 1990 to year 2002. The net forecast error of the most recent one-year-ahead forecasts the previous year is 67 cents for a stock priced at 100 dollars. The mean past forecast bias is negative, indicating that the forecasts are optimistic, but the median is positive. On average, R&D and capital expenditures account for 10.1 percent of total assets. 13.8 percent of sample is associated with high technology companies. The mean percentage of institutional ownership is 52.6 percent.

4. Why do analysts issue LTG forecasts?

4.1 Univariate tests

We first conduct a series of univariate tests and report our results in Table 3. We find that high-status broker affiliated analysts with more experience who issue more accurate near-term forecasts in the past for the company are more likely to issue LTG forecasts. We also find that analysts who are less optimistic about the company are more likely to issue LTG forecasts. In addition, *IB* is significantly higher for the group with LTG forecasts. Firms with more growth options (only median) and more stocks held by institutional investors are more likely to receive LTG forecasts.

Overall, our univariate results largely support the analyst ability signaling, management pleasing, and investor informational need satisfying hypotheses, but contradict the analyst optimism revealing hypothesis.

4.2 Multivariate tests

We expect LTG issuance decisions to be partly driven by analyst peculiarities such as their working habits or tastes, and thus focus on the controlling of analyst-level heterogeneities. We estimate a fixed-effect model with analyst-year effect fixed.[7] That is, we focus on analysts' decision to issue long-term forecasts among all the companies they cover in a given year. As a robustness check, we re-estimate a fixed-effect and a random effect model with only analyst effect, which allow us to include independent variables that are within analyst-year groups such as Exp1 and Top15. To account for yearly variations, we also include year dummies.

In column 1 of Table 4, we report the estimation results with analyst-year effect fixed. 16,197 analyst-year pairs (80,224 observations) are dropped due to all positive or all negative outcomes, but still 11,300 analyst-year pairs (89,915 observations) remain,

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[7] We also estimate a random-effect model including analyst effect as in Ljungqvist et al (2006). The results are similar.

indicating that a given analyst may issue LTG forecasts for only a subset of companies she covers in a given year. Therefore, the issuance decision of LTG forecasts goes beyond analyst peculiarity.

Although LTG forecasts are documented as extremely inaccurate and overly optimistic, analysts are more likely to choose the companies they had more accurate past near-term forecasts for LTG coverage. However, analysts are less likely to issue LTG forecasts as they gain more firm-specific experience for the company. This result may be driven by analyst picking firms newly added to coverage for LTG forecasts.

We also find the estimated coefficient of Past_FB to be significantly negative, indicating that analysts may be more likely to issue LTG forecasts for companies they are more optimistic about.

We document strong support for the manager pleasing hypothesis. Investment banking tie (IB) is significantly positive at the one percent level. The evidence regarding the investor informational need satisfying hypothesis is, however, mixed. Analysts are more likely to pick companies with higher institutional ownership. However, companies with larger growth expenditures are less likely chosen for LTG coverage after controlling for other firm characteristics such as size and B/M.

In Column 2 and 3, we report the estimation results from a fixed-effect model with analyst effect fixed, and a random effect model including analyst effect. For both models, we include year dummies, but do not report the estimated coefficients to conserve space. Overall, the results are similar. We find support for the management pleasing and optimism revealing motives, but mixed evidence regarding the analyst ability signaling and investor informational needs satisfying motives. For example, we find that analysts who have more general experience (only according to the random-effect model), who are able to issue more accurate near-term forecasts in the past, and who are affiliated with high status brokers are more likely to issue LTG forecasts, but again analysts seem to drop LTG coverage as they gain more firm-specific experience. Regarding the investor information needs satisfying hypothesis, we find that the coefficient of *Institution* is significantly positive as expected, but the coefficient of *Growth_Exp* is insignificant.

Taken together, we find evidence for the manger pleasing and analyst optimism revealing motives, but mixed evidence for investor informational needs satisfying and analyst ability signaling motives.

4.3 Bubble period evidence

It is likely that analyst motives change depending upon market factors such as the competitiveness in the underwriting market and the power of institutional investors. Therefore, analysts may have extra incentives to please managers during the bubble period. However, providing optimistic LTG forecasts is an implicit form of pleasing, and analysts may go to the extreme of providing optimistic recommendations when they are under extra pressure in the late nineties. Therefore, it is eventually an empirical question whether analysts are more likely to provide LTG forecasts to please managers during the bubble period. We introduce the dummy variables, *Bubble*, and its interactive terms with

IB. Following Bradley, Jordan, and Ritter (2006), we define the bubble period as year 1999 and 2000. Table 5 contains our results. We find no evidence indicating that LTG forecasts are more motivated by the manager pleasing incentives during the bubble period.

5. Institutional investors' role in analysts' motives to issue LTG forecasts

We introduce two explanatory variables: the interactive term between *Institution* and *GrowthExp,* and the interactive term between *Institution* and *IB*. We expect the estimated coefficient of *Institution*GrowthExp* to be positive and the estimated coefficient of *Institution*IB* to be negative.

In Table 6, we find that companies with higher institutional ownership are less likely to be chosen for LTG forecast coverage because of investment banking ties. In addition, we show that institutional investors' role goes beyond that. The coefficient of the interactive term between institutional ownership and growth expenditure is significantly positive, indicating that analysts are more likely to issue LTG forecasts for companies with higher R&D and capital expenditures given the presence of higher institutional ownership.

To summarize, our results confirm the important role institutional investors play in analyst research. We find that institutional ownership is positively associated with LTG issuance for the right reason (investor informational needs satisfying), but negatively associated with LTG issuance for the wrong reason (manager pleasing).

6. Conclusion

This paper examines analysts' motives to issue LTG forecasts. We develop four non-exclusive hypotheses, which are that analysts issue early forecasts to signal their ability, to reveal their optimism, to please the management (since these forecasts are overly optimistic), and to satisfy investors' informational needs. With one-year-ahead annual earnings forecasts as our benchmark sample, we test our hypotheses using a fixed-effect logit model with the analyst-year effect fixed, which ensures that our results are not driven by analyst peculiarities such as their working habits that equally affect analysts' decision to issue long-term forecasts for all the companies they cover.

We find support for the manager pleasing and analyst optimism revealing hypothesis, but mixed results for the ability signaling and investor informational needs satisfying motives. In addition, we examine institutional investors' role in determining analysts' motives to issue long-term forecasts. We find that analysts are less (more) likely to issue long-term forecasts to companies with large institutional ownership to please managers (to meet investors' information needs).

This paper contributes to the literature in several ways. First, an examination of the providence of long-term forecasts offers several advantages in investigating conflicts of interests, and we show that long-term forecasts may serve as a manipulative tool for analysts to please managers. In addition, our results augment Ljungqvist et al (2006)'s finding about the role of institutional investors in analyst research.

Table 1. The Distribution of Long-term Forecasts by Calendar Year

Panel A, B, and C present the distribution of analyst-firm pairs that are associated with LTG forecasts, analysts who issue LTG forecasts, and firms who receive LTG forecasts by calendar year, respectively. We collect the one-year-ahead annual earnings forecasts (FY1) in the I/B/E/S detail history file from year 1991 to 2003. We identify each analyst-firm-year combination and check whether there are long horizon earnings growth forecasts (LTG), as reported in I/B/E/S, associated with these analyst-firm-year combinations.

	Analyst-firm pairs			Analysts			Firms		
	FY1	LTG	Proportion (%)	FY1	LTG	Proportion (%)	FY1	LTG	Proportion (%)
	(1)	(2)	(3)=(2)/(1)	(4)	(5)	(6)=(5)/(4)	(7)	(8)	(9)=(8)/(7)
1991	7572	3278	43.29	350	189	54.00	480	393	81.88
1992	6940	3072	44.27	287	181	63.07	651	551	84.64
1993	10546	4394	41.67	431	250	58.00	663	535	80.69
1994	11366	4930	43.37	536	335	62.50	795	650	81.76
1995	13109	5498	41.94	600	364	60.67	928	684	73.71
1996	14567	6730	46.20	795	479	60.25	1163	867	74.55
1997	15312	7207	47.07	826	497	60.17	1057	705	66.70
1998	15482	6579	42.49	971	527	54.27	952	605	63.55
1999	15086	6686	44.32	947	531	56.07	692	500	72.25
2000	14985	6359	42.44	1081	648	59.94	686	471	68.66
2001	13274	6243	47.03	1132	684	60.42	280	206	73.57
2002	14331	6486	45.26	1575	926	58.79	329	220	66.87
2003	13285	4714	35.48	1758	879	50.00	391	166	42.46
Mean	12758	5552	43	868	499	58	697	504	72
Median	13285	6243	43	826	497	60	686	535	74

Table 2. Summary Statistics

Table 2 reports the summary statistics of our sample, which includes 170,139 analyst-firm-year observations over the period 1991-2003. LTG is a dummy variable that equals one if the observation is associated with long-term earnings growth forecasts (LTG) as reported in I/B/E/S, and zero otherwise. The general experience of the analysts (Exp1) is defined as the number of years the analysts have issued earnings forecasts of any type for any company since 1983, when the sample period of I/B/E/S starts. Analysts' firm-specific experience (Exp2) equals the number of years the analysts have issued earnings forecasts of any type for the company since 1983. We define net forecast error (NFE) as 100 times the absolute value of the difference between the actual earnings and the analyst forecasts divided by the company's stock price the company's stock price at the end of the previous fiscal year. Past_NFE equals NFE $^{t-1}$, that is, the net forecast error of the most recent near-term earnings forecasts made during the previous year. Forecast Bias (FB) is 100 times the difference between the actual earnings and the analyst forecasts divided by the company's stock price the company's stock price at the end of the previous fiscal year. We define FB $^{t-1}$ as the past near-term forecast accuracy (Past_FB). We define IB as a dummy variable that equals one if the analyst is affiliated with the investment bank that serves as a book runner for the company's new common stock issues, and zero otherwise. IPO equals one for company i in year t if the company has an initial public offering as indicated by the IPO flag in SDC for year t and t-1, and zero otherwise. Hitech is a dummy variable that equals one for firms with Compustat SIC code 3570-3577 (computer hardware), or 7371-7379 (computer software), or 2833-2836 (pharmaceutical), and zero otherwise. B/M is the ratio of the company's book value to market value at the end of the most recent fiscal year. We obtain a company's book value (Compustat item 60) and market value (Compustat annual item 199*25) from the Compustat database. GrowthExp equals the sum of the company's R&D (Compustat item 46) expenditure and capital expenditure (Compustat item 30) scaled by the company's total assets (Compustat annual item 6) of the most recent fiscal year. Log(size) is the natural log of market value of equity (Compustat annual item 199*25) in millions of dollars of the most recent fiscal year. Institution equals the total number of shares held by institutions who report their equity ownership in quarterly 13f filings to the SEC divided by the total number of shares outstanding at the end of the previous year. For firms with the institutional investors data missing, we assume that these firms are 100% individually-owned and set Institution to zero.

Table 2 (Continue)

Variable	Mean	Std. Dev.	10%	25%	Median	75%	90%
LTG	0.307	0.461	0	0	0	1	1
Exp1	7.46	4.67	2	4	7	11	14
Exp2	4.06	3.29	1	2	3	5	9
Top15	0.352	0.475	0	0	0	1	1
Past_nfe	0.667	3.322	0.008	0.054	0.164	0.485	1.320
Past_fb	-0.082	3.387	-0.625	-0.099	0.036	0.213	0.643
IB	0.009	0.097	0	0	0	0	0
IPO	0.001	0.027	0	0	0	0	0
GrowthExp	0.101	0.010	0	0.032	0.078	0.143	0.220
Hitech	0.138	0.345	0	0	0	0	1
Log(size)	7.407	1.831	5.033	6.127	7.383	8.645	9.794
B/M	22.996	2395.12	0.142	0.253	0.424	0.642	0.909
Institution	0.526	0.227	0.210	0.380	0.551	0.687	0.793
Sample size	170139						

Table 3. Why Do Analysts Issue LTG Forecasts? Univariate tests

Table 3 presents the results from a series of univariate tests. We report the mean and median value for each subsample. Columns labeled as "Dif." contain the difference of mean (medain) between two subsamples. We report the t-statistics for means and an approximate z-statistic for a sum of ranks test under the hypothesis that the distributions are equal. LTG is a dummy variable that equals one if the observation is associated with long-term earnings growth forecasts (LTG) as reported in I/B/E/S, and zero otherwise. The general experience of the analysts (Exp1) is defined as the number of years the analysts have issued earnings forecasts of any type for any company since 1983, when the sample period of I/B/E/S starts. Analysts' firm-specific experience (Exp2) equals the number of years the analysts have issued earnings forecasts of any type for the company since 1983. We define net forecast error (NFE) as 100 times the absolute value of the difference between the actual earnings and the analyst forecasts divided by the company's stock price the company's stock price at the end of the previous fiscal year. Past_NFE equals NFE $^{t-1}$, that is, the net forecast error of the most recent near-term earnings forecasts made during the previous year. The dummy variable Top15 takes on value one for analysts affiliated with the high status brokers who appear as top 15 in "the leader list" of the Institutional Investor magazine (II), and zero otherwise Forecast Bias (FB) is 100 times the difference between the actual earnings and the analyst forecasts divided by the company's stock price the company's stock price at the end of the previous fiscal year. We define FB $^{t-1}$ as the past near-term forecast accuracy (Past_FB). IB is defined as a dummy variable that equals one if the analyst is affiliated with the investment bank that serves as a book runner for the company's new common stock issues, and zero otherwise. IPO equals one for company i in year t if the company has an initial public offering as indicated by the IPO flag in SDC for year t and t-1, and zero otherwise. Hitech is a dummy variable that equals one for firms with Compustat SIC code 3570-3577 (computer hardware), or 7371-7379 (computer software), or 2833-2836 (pharmaceutical), and zero otherwise. B/M is the ratio of the company's book value to market value at the end of the most recent fiscal year. We obtain a company's book value (Compustat item 60) and market value (Compustat annual item 199*25) from the Compustat database. GrowthExp equals the sum of the company's R&D (Compustat item 46) expenditure and capital expenditure (Compustat item 30) scaled by the company's total assets (Compustat annual item 6) of the most recent fiscal year. Log(size) is the natural log of market value of equity (Compustat annual item 199*25) in millions of dollars of the most recent fiscal year. Institution equals the total number of shares held by institutions who report their equity ownership in quarterly 13f filings to the SEC divided by the total number of shares outstanding at the end of the previous year. For firms with the institutional investors data missing, we assume that these firms are 100% individually-owned and set Institution to zero.

Table 3 (Continue)

Variable	LTG=0		LTG=1		Dif	T	Dif	Z
	Mean	Median	Mean	Median				
	(1)	(2)	(3)	(4)	(1)-(3)		(2)-(4)	
LTG	0.000	0	1.000	1				
Exp1	7.389	7	7.618	7	-0.229	-9.34	0	-6.10
Exp2	4.048	3	4.088	3	-0.04	-2.34	0	1.05
Top15	0.328	0	0.406	0	-0.078	-31.55	0	-31.46
Past_nfe	0.744	0.185	0.492	0.127	0.252	14.44	0.058	43.21
Past_fb	-0.101	0.036	-0.039	0.034	-0.062	-3.49	0.002	-1.83
IB	0.008	0	0.012	0	-0.004	-8.05	0	-8.05
IPO	0.001	0	0.001	0	0	-0.64	0	-0.64
GrowthExp	0.101	0.077	0.101	0.081	0	0.25	-0.004	-9.24
Hitech	0.130	0	0.157	0	-0.027	-15.17	0	-15.16
Bm	22.168	0.443	24.863	0.382	-2.695	-0.21	0.061	39.41
Logsize	7.305	7.285	7.635	7.610	-0.33	-34.42	-0.325	-33.11
Institution	0.517	0.544	0.546	0.567	-0.029	-23.81	-0.023	-22.81
Sample size	117882		52257					

Table 4. Why Do Analysts Issue LTG Forecasts? Multivariate Tests

Table 4 present our results with LTG as dependent variable estimated from the fixed-effect model with analyst-year effect fixed (Column 1), the fixed-effect model with analyst effect fixed including yearly dummies (Column 2), and the random effect model including analyst effect with yearly dummies (Column 3). We omit the estimated coefficients for the yearly dummies in Column 2 and 3. LTG is a dummy variable that equals one if the observation is associated with a long-term earnings growth forecast, and zero otherwise. The general experience of the analysts (Exp1) is defined as the number of years the analysts have issued earnings forecasts of any type for any company since 1983, when the sample period of I/B/E/S starts. Analysts' firm-specific experience (Exp2) equals the number of years the analysts have issued earnings forecasts of any type for the company since 1983. We define net forecast error (NFE) as 100 times the absolute value of the difference between the actual earnings and the analyst forecasts divided by the company's stock price the company's stock price at the end of the previous fiscal year. Past_NFE equals NFE $^{t-1}$, that is, the net forecast error of the most recent near-term earnings forecasts made during the previous year. The dummy variable Top15 takes on value one for analysts affiliated with the high status brokers who appear as top 15 in "the leader list" of the Institutional Investor magazine (II), and zero otherwise Forecast Bias (FB) is 100 times the difference between the actual earnings and the analyst forecasts divided by the company's stock price the company's stock price at the end of the previous fiscal year. We define FB $^{t-1}$ as the past near-term forecast accuracy (Past_FB). IB is defined as a dummy variable that equals one if the analyst is affiliated with the investment bank that serves as a book runner for the company's new common stock issues, and zero otherwise. IPO equals one for company i in year t if the company has an initial public offering as indicated by the IPO flag in SDC for year t and t-1, and zero otherwise. Hitech is a dummy variable that equals one for firms with Compustat SIC code 3570-3577 (computer hardware), or 7371-7379 (computer software), or 2833-2836 (pharmaceutical), and zero otherwise. B/M is the ratio of the company's book value to market value at the end of the most recent fiscal year. We obtain a company's book value (Compustat item 60) and market value (Compustat annual item 199*25) from the Compustat database. GrowthExp equals the sum of the company's R&D (Compustat item 46) expenditure and capital expenditure (Compustat item 30) scaled by the company's total assets (Compustat annual item 6) of the most recent fiscal year. Log(size) is the natural log of market value of equity (Compustat annual item 199*25) in millions of dollars of the most recent fiscal year. Institution equals the total number of shares held by institutions who report their equity ownership in quarterly 13f filings to the SEC divided by the total number of shares outstanding at the end of the previous year. For firms with the institutional investors data missing, we assume that these firms are 100% individually-owned and set Institution to zero. For each model, we report the estimated coefficient, the z statistics, the log-likelihood, and the sample size.

	Predicted Sign	1 Coef.	1 Z	2 Coef.	2 Z	3 Coef.	3 Z
Exp1	+			-0.059	-1.44	0.005	1.95
Exp2	+	-0.009	-2.86	-0.011	-4.24	-0.012	-4.44
Top15	+			0.076	2.77	0.114	5.39
Past_nfe	-	-0.024	-4.83	-0.022	-5.48	-0.028	-6.88
Past_fb	-	-0.008	-1.65	-0.012	-3.14	-0.014	-3.62
IB	+	0.376	5.23	0.318	5.29	0.333	5.55
IPO	+	-0.098	-0.34	0.134	0.59	0.185	0.83
Hitech	+	0.053	1.48	0.053	1.82	0.158	6.12
GrowthExp	+	-0.377	-3.47	-0.107	-1.23	-0.055	-0.65
Bm	-	0.000	2.18	0.000	2.26	0.000	2.09
Logsize	+	0.136	23.82	0.104	22.95	0.096	22.13
Institution	+	0.276	6.86	0.217	6.66	0.281	8.88
						-2.160	-41.56
Model		Analyst-year Fixed effect		Analyst fixed effect (with year dummies)		Analyst random effect (with year dummies)	
Log -likelihood		-37060		-70519		-86610	
# of obs.		89915		140689		170139	

Table 5. Bubble Period Evidence

We test whether managers have stronger incentive to issue LTG forecasts to please managers during the bubble period by adding a dummy variable Bubble, which equals one for year 1999 and 2000 and zero otherwise, and its interactive term with *IB*. LTG is a dummy variable that equals one if the observation is associated with a long-term earnings growth forecast, and zero otherwise. The general experience of the analysts (*Exp1*) is defined as the number of years the analysts have issued earnings forecasts of any type for any company since 1983, when the sample period of I/B/E/S starts. Analysts' firm-specific experience (*Exp2*) equals the number of years the analysts have issued earnings forecasts of any type for the company since 1983. We define net forecast error (NFE) as 100 times the absolute value of the difference between the actual earnings and the analyst forecasts divided by the company's stock price the company's stock price at the end of the previous fiscal year. *Past_NFE* equals NFE^{t-1}, that is, the net forecast error of the most recent near-term earnings forecasts made during the previous year. The dummy variable *Top15* takes on value one for analysts affiliated with the high status brokers who appear as top 15 in "the leader list" of the Institutional Investor magazine (II), and zero otherwise Forecast Bias (FB) is 100 times the difference between the actual earnings and the analyst forecasts divided by the company's stock price the company's stock price at the end of the previous fiscal year. We define FB^{t-1} as the past near-term forecast accuracy (Past_FB). IB is defined as a dummy variable that equals one if the analyst is affiliated with the investment bank that serves as a book runner for the company's new common stock issues, and zero otherwise. IPO equals one for company i in year t if the company has an initial public offering as indicated by the IPO flag in SDC for year t and t-1, and zero otherwise. Hitech is a dummy variable that equals one for firms with Compustat SIC code 3570-3577 (computer hardware), or 7371-7379 (computer software), or 2833-2836 (pharmaceutical), and zero otherwise. B/M is the ratio of the company's book value to market value at the end of the most recent fiscal year. We obtain a company's book value (Compustat item 60) and market value (Compustat annual item 199*25) from the Compustat database. *GrowthExp* equals the sum of the company's R&D (Compustat item 46) expenditure and capital expenditure (Compustat item 30) scaled by the company's total assets (Compustat annual item 6) of the most recent fiscal year. Log(size) is the natural log of market value of equity (Compustat annual item 199*25) in millions of dollars of the most recent fiscal year. *Institution* equals the total number of shares held by institutions who report their equity ownership in quarterly 13f filings to the SEC divided by the total number of shares outstanding at the end of the previous year. For firms with the institutional investors data missing, we assume that these firms are 100% individually-owned and set Institution to zero. Bubble is a dummy variable that equals one for year 1999 and 2000, zero otherwise. For each model, we report the estimated coefficient, the z statistics, the log-likelihood, and the sample size.

		1		2		3	
	Predicted	Coef.	Z	Coef.	Z	Coef.	Z

	Sign						
Exp1	+			-0.059	-1.44	0.005	1.95
Exp2	+	-0.009	-2.86	-0.011	-4.23	-0.012	-4.44
Top15	+			0.076	2.76	0.114	5.38
Past_nfe	-	-0.024	-4.82	-0.022	-5.47	-0.028	-6.87
Past_fb	-	-0.008	-1.65	-0.012	-3.13	-0.014	-3.62
IB	+	0.402	5.13	0.351	5.37	0.360	5.52
IPO	+	-0.099	-0.35	0.133	0.59	0.185	0.83
Hitech	+	0.053	1.48	0.053	1.81	0.158	6.13
GrowthExp	+	-0.377	-3.48	-0.107	-1.22	-0.054	-0.64
Bm	-	0.000	2.18	0.000	2.26	0.000	2.09
Logsize	+	0.136	23.82	0.104	22.96	0.096	22.13
Institution	+	0.276	6.86	0.217	6.66	0.281	8.88
Bubble	?			-0.313	-1.9	-0.102	-3.15
*Bubble*IB*	+	-0.165	-0.84	-0.208	-1.29	-0.174	-1.07
Constant						-2.160	-41.56
Model		Analyst-year Fixed effect		Analyst fixed effect (with year dummies)		Analyst random effect (with year dummies)	
Log -likelihood		-37059		-70523		-86616	
# of obs.		89915		140689		170139	

Table 6. The Role of Institutional Investors in Analysts' Motive to Issue Long-term Forecasts

We test the effect of institutional investors on analyst motives. LTG is a dummy variable that equals one if the observation is associated with a long-term earnings growth forecast, and zero otherwise. The general experience of the analysts (*Exp1*) is defined as the number of years the analysts have issued earnings forecasts of any type for any company since 1983, when the sample period of I/B/E/S starts. Analysts' firm-specific experience (*Exp2*) equals the number of years the analysts have issued earnings forecasts of any type for the company since 1983. We define net forecast error (NFE) as 100 times the absolute value of the difference between the actual earnings and the analyst forecasts divided by the company's stock price the company's stock price at the end of the previous fiscal year. *Past_NFE* equals NFE^{t-1}, that is, the net forecast error of the most recent near-term earnings forecasts made during the previous year. The dummy variable *Top15* takes on value one for analysts affiliated with the high status brokers who appear as top 15 in "the leader list" of the Institutional Investor magazine (II), and zero otherwise Forecast Bias (FB) is 100 times the difference between the actual earnings and the analyst forecasts divided by the company's stock price the company's stock price at the end of the previous fiscal year. We define FB^{t-1} as the past near-term forecast accuracy (Past_FB). IB is defined as a dummy variable that equals one if the analyst is affiliated with the investment bank that serves as a book runner for the company's new common stock issues, and zero otherwise. IPO equals one for company i in year t if the company has an initial public offering as indicated by the IPO flag in SDC for year t and t-1, and zero otherwise. Hitech is a dummy variable that equals one for firms with Compustat SIC code 3570-3577 (computer hardware), or 7371-7379 (computer software), or 2833-2836 (pharmaceutical), and zero otherwise. B/M is the ratio of the company's book value to market value at the end of the most recent fiscal year. We obtain a company's book value (Compustat item 60) and market value (Compustat annual item 199*25) from the Compustat database. *GrowthExp* equals the sum of the company's R&D (Compustat item 46) expenditure and capital expenditure (Compustat item 30) scaled by the company's total assets (Compustat annual item 6) of the most recent fiscal year. Log(size) is the natural log of market value of equity (Compustat annual item 199*25) in millions of dollars of the most recent fiscal year. *Institution* equals the total number of shares held by institutions who report their equity ownership in quarterly 13f filings to the SEC divided by the total number of shares outstanding at the end of the previous year. For firms with the institutional investors data missing, we assume that these firms are 100% individually-owned and set *Institution* to zero. For each model, we report the estimated coefficient, the z statistics, the log-likelihood, and the sample size.

	Predicted	1		2		3	
	Sign	Coef.	Z	Coef.	Z	Coef.	Z
Exp1	+			-0.058	-1.43	0.005	1.94
Exp2	+	-0.009	-2.86	-0.011	-4.25	-0.012	-4.45
Top15	+			0.076	2.77	0.114	5.3
Past_nfe	-	-0.024	-4.84	-0.022	-5.5	-0.028	-6.9
Past_fb	-	-0.008	-1.67	-0.012	-3.16	-0.014	-3.65
IB	+	0.702	4.14	0.664	4.77	0.711	5.12
IPO	+	-0.072	-0.25	0.151	0.67	0.202	0.9
Hitech	+	0.052	1.45	0.052	1.79	0.157	6.05
GrowthExp	+	-0.914	-4.41	-0.473	-2.83	-0.335	-2.08
Bm	-	0.000	2.19	0.000	2.28	0.000	2.11
Logsize	+	0.136	23.75	0.104	22.91	0.096	22.08
Institution	+	0.171	3.13	0.148	3.35	0.230	5.33
*Institution*IB*	-	-0.633	-2.11	-0.688	-2.74	-0.757	-3.01
Institution GrowthExp*	+	1.128	3.08	0.765	2.59	0.596	2.07
constant						-2.135	-39.27
Model		Analyst-year Fixed effect		Analyst fixed effect(with year dummies)		Analyst random effect (with year dummies)	
Log-likelihood		-37053		-70512		-86610	
# of obs.		89915		140689		170139	

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9

The Capital Asset Pricing Model

Knowing how risk (market beta) and reward (expected rate of return) are measured, you are now ready to proceed to the punchline: a formula that tells you how much reward your investment projects have to offer to compensate your investors for their risks. If you can judge the risk of new corporate investment projects, you can then determine the appropriate costs of capital that you should use in your project's NPV calculations. Alas, like NPV, the formula may be simple, but the application is hard. The devil is in the details.

We will first briefly review what you already know. Then you will learn all about this new model—the CAPM. Finally, you will get to apply it.

One apology in advance: In this chapter, I do not fully explain where all the formulas come from. This is because it really takes a full investments course to derive them. (The appendix goes into more detail, but if you really want to learn about investments, you need to take a full course on the subject.)

9.1 What You Already Know and What You Want to Know

You are still after an estimate for your opportunity cost of capital.

Let's take stock. First, you already know the right train of thought for capital budgeting purposes: As a corporate manager, your task is to determine whether you should accept or reject a project. You make this decision with the NPV formula. To determine the discount factor in the NPV formula, you need to estimate an appropriate cost of capital—or, more precisely, the *opportunity* cost of capital for your investors. This means that you need to judge what a fair expected rate of return, $\mathcal{E}(r)$, for your project is, given your project's risk characteristics. If your project offers a lower expected return than what your investors can earn elsewhere in similarly risky projects, then you should not put your investors' money into your project but instead return their money to them. If your project offers more expected return, then you should go ahead and invest their money into your project. Put differently, your goal is to learn what your investors, if asked, would have wanted you to invest in on their behalves.

Assume perfect markets, that investors dislike risk and like reward, and more.

Second, the perfect market assumptions are not enough to proceed. We must assume that investors like overall portfolio reward (expected return) and dislike overall portfolio risk (variance or standard deviation of return). We also assume that investors are smart. Presumably, this means that they diversify, hopefully holding many assets and be reasonably close to the market portfolio. Somewhat less appealing, we also must assume that investors all have access to exactly the same set of assets. (This means we are ignoring investments in people's own houses or education, for example.) And finally, mostly for convenience, we assume that they want to maximize their wealth in the market for only one period.

This allows you to figure out how they—and you—should measure project risk and reward.

Third, for investors with these preferences and who are therefore already holding the overall market portfolio, you can follow their trains of thought. You can infer how they should view the risk and reward of your individual projects. Their reward is their expected rate of return. Their risk is their overall portfolio risk, *not* your project's own standard-deviation risk. Your project's contribution to your investors' overall portfolio risk is the market beta of your project—think of it as a measure of your project's "toxicity." A project that decreases in value when the market decreases in value, and increases when the market increases, has a positive market beta. It's toxic—investors don't like it. A project that increases in value when the market decreases in value, and vice versa, has a negative market beta. It's less toxic—investors like it more. That is, a project with a low market beta helps an investor who holds a portfolio similar to the market portfolio to reduce the overall investment risk.

This gives you a trade-off between risk and reward "in equilibrium."

You can also draw some additional conclusions without any math. In our assumed perfect world, you can guess that investors will have already snatched up the best projects—those that have low risk and high expected rates of return. In fact, anyone selling projects with lower risk contributions can sell them for higher prices, which in turn immediately drives down their expected rates of return. Consequently, what is available for purchase in the real world must be subject to some trade-off: Projects that have more market-risk contribution must offer a higher expected rate of return if their sellers want to convince investors to purchase them. But what *exactly* does this relationship between risk and reward look like? This is the subject of this chapter—it is the domain of the capital asset pricing model, the CAPM.

Q 9.1. What are the assumptions underlying the CAPM? Are the perfect market assumptions among them? Are there more?

9.2 Using The Capital Asset Pricing Model (CAPM)

The CAPM gives you the cost of capital if you give it the risk-free rate, the expected rate of return on the market, and your project's market beta.

The **capital asset pricing model** (**CAPM**) is a model that gives you an appropriate expected rate of return (cost of capital) for each project if you give it the project's relevant risk characteristics. The model states that an investment's cost of capital is lower when it offers better diversification benefits for an investor who holds the overall market portfolio—less required reward for less risk contribution. Market beta is its measure of risk contribution. Projects contributing more risk (market beta) require a higher expected rate of return for you to want them; projects contributing less risk require a lower expected rate of return for you to want them. This is the precise relationship that the CAPM gives you.

IMPORTANT

To estimate the required expected rate of return for a project or firm—that is, the cost of capital—according to the CAPM, you need three inputs:

1. The risk-free rate of return, r_F
2. The expected rate of return on the overall market, $\mathcal{E}(r_M)$
3. A firm's or project's beta with respect to the market, β_i

The CAPM formula is

$$\mathcal{E}(r_i) = r_F + [\mathcal{E}(r_M) - r_F] \cdot \beta_i \qquad (9.1)$$

where i is the name of your project and $\mathcal{E}(r_i)$ is your project's expected rate of return.

The difference between the expected rate of return on the risky (stock) market and the risk-free investment, $[\mathcal{E}(r_M) - r_F]$, is called the **equity premium** or **market risk premium**, discussed in more detail later.

You need to memorize the CAPM formula. It is *the* standard model in the finance.

A first quick use of the CAPM formula.

Let's use the formula. If you believe that the risk-free rate is 3% and the expected rate of return on the market is 7%, then the CAPM states that

$$\mathcal{E}(r_i) = 3\% + (7\% - 3\%) \cdot \beta_i = 3\% + 4\% \cdot \beta_i$$
$$\mathcal{E}(r_i) = r_F + [\mathcal{E}(r_M) - r_F] \cdot \beta_i$$

Therefore, a project with a beta of 0.5 should have a cost of capital of $3\% + 4\% \cdot 0.5 = 5\%$, and a project with a beta of 2.0 should have a cost of capital of $3\% + 4\% \cdot 2.0 = 11\%$. The CAPM gives an opportunity cost for your investors' capital: If the project with the beta of 2.0 cannot earn an expected rate of return of 11%, you should not take this project and instead return the money to your investors. Your project would add too much risk for its reward. Your investors have better opportunities elsewhere.

It is easier to work in required returns than in prices.

The CAPM is called an **asset-pricing model**, even though it is most often expressed in terms of a required expected rate of return rather than in terms of an appropriate project price. Fortunately, though messy, the two are equivalent—you can always work with the CAPM return first, and discount the expected cash flow into an appropriate price second. A given expected rate of return implies a given price. (If you do not know the fair price, you will however have to take two aspirins and work with a more difficult version of the CAPM formula. It is called **certainty equivalence** and explained in the chapter appendix.)

➤ *Certainty equivalence CAPM form*, *Sect.* App.9.A (Companion), *Pg.*≈*51*.

The CAPM formula tells you what investors care about: comovement with the market.

The CAPM specifically ignores the standard deviation of individual projects' rates of return. That is, the model posits that investors do not care about it, because they are smart enough to diversify away any idiosyncratic risk. The CAPM posits that investors instead care about the project market betas, because these measure the risk components that investors holding the market portfolio cannot diversify away. (This makes a lot of sense for highly-diversified investors, though not for liquidity-constrained entrepreneurs.)

The CAPM has three inputs. We will cover them in detail.

For the three CAPM inputs, as always, you are really interested in the future: the future expected rate of return on the market and the future beta of your firm/project with respect to the market. You really don't care about the past average rates of return or the past market betas. But, as usual, you often have no choice other than to rely on estimates that are based at least partly on historical data. In Section 9.4, you will learn how to estimate each CAPM input. But let's explore the model itself first, assuming that you know all the inputs.

➤ *Will history repeat itself?*, Sect. 7.1, Pg.175.

The Security Market Line (SML)

Examples of CAPM rates of return that individual securities should offer.

Let's apply the CAPM in a specific example. Assume that the risk-free rate is 3% per year and that the market offers an expected rate of return of 8% per year. The CAPM formula then states that a stock with a beta of 1 should offer an expected rate of return of $3\% + (8\% - 3\%) \cdot 1 = 8\%$ per year; that a stock with a beta of 0 should offer an expected rate of return of $3\% + (8\% - 3\%) \cdot 0 = 3\%$ per year; that a stock with a beta of $1/2$ should offer an expected rate of return of $3\% + (8\% - 3\%) \cdot 0.5 = 5.5\%$ per year; that a stock with a beta of 2 should offer an expected rate of return of $3\% + (8\% - 3\%) \cdot 2 = 13\%$ per year; and so on.

The SML is just a graphical representation of the CAPM formula.

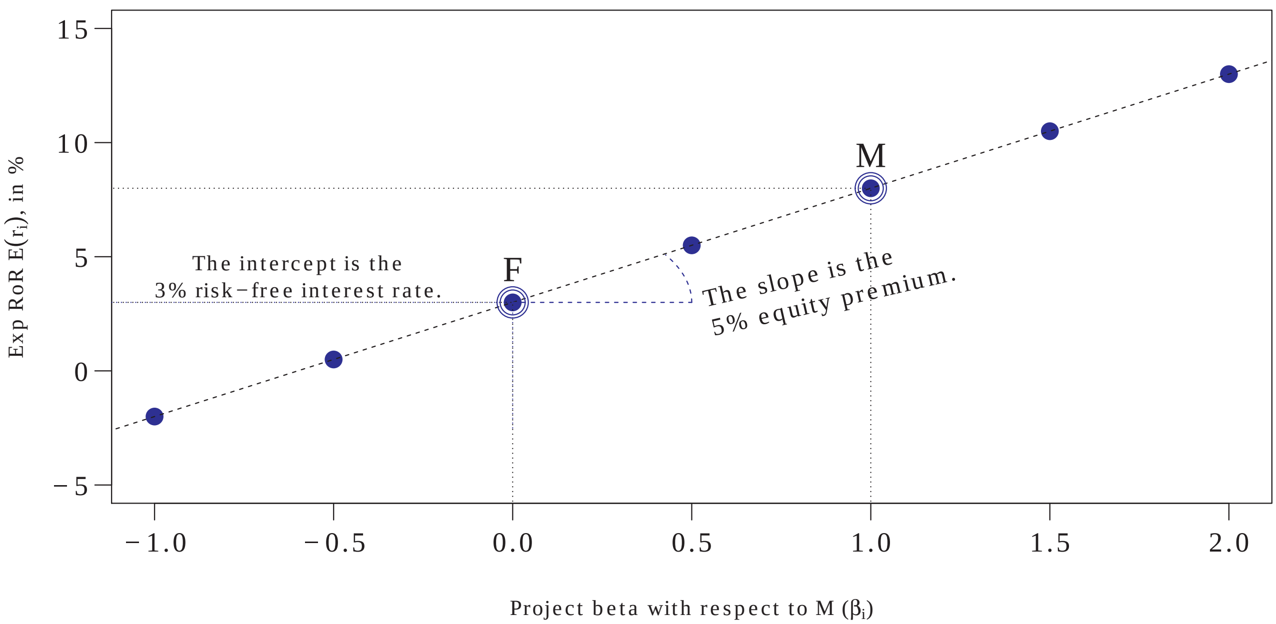
The CAPM formula is often graphed as the **security market line** (**SML**), which shows the relationship between the expected rate of return of a project and its beta. Exhibit 9.1 draws a first security market line for seven assets. Each investment asset (such as a stock or a project) is a point in this coordinate system. Because all assets properly follow the CAPM formula in our example, they must lie on a straight line. In other words, the SML is just a graphical representation of the CAPM formula. The slope of this line is the equity premium, $\mathcal{E}(r_M) - r_F$, and the intercept is the risk-free rate, r_F.

If you know the inputs, the SML is a sharp line; if you estimate them, it is a scatterplot.

Alas, in the real world, even if the CAPM holds, you would not have the data to draw Exhibit 9.1. The reason is that you do not know true expected returns and true market betas. Exhibit 9.2 plots two graphs in a perfect CAPM world. The top graph repeats Exhibit 9.1 and falsely presumes that you know CAPM inputs—the true market betas and true expected rates of return. This line is perfectly straight. In the bottom graph, you have to rely only on observables—estimates of expected returns and betas, presumably based mostly on historical data averages. Now you can only fit an "estimated security market line," not the "true security market line." Of course, you hope that your historical data provides good, unbiased estimates of true market beta and true expected rates of return (and this is a big assumption), so that your fitted line will look at least approximately straight. A workable version of the CAPM thus can only state that there should roughly be a linear relationship between the data-estimated market betas and the data-estimated expected rates of return, just as drawn here.

Q 9.2. The risk-free rate is 4%. The expected rate of return on the market is 7%. What is the appropriate cost of capital for a project that has a beta of 3?

Q 9.3. The risk-free rate is 4%. The expected rate of return on the market is 12%. What is the cost of capital for a project that has a beta of 3?



		Investment Asset						
		A	B	F	C	M	D	E
Market Beta	β_i	–1.0	-0.5	0.0	0.5	1.0	1.5	2.0
Expected Rate of Return	$\mathcal{E}(r_i)$	–2.0%	0.5%	3.0%	5.5%	8.0%	10.5%	13.0%

Exhibit 9.1: *The Security Market Line.* This graph plots the CAPM relation $\mathcal{E}(r_i) = r_F + [\mathcal{E}(r_M) - r_F] \cdot \beta_i = 3\% + (8\% - 3\%) \cdot \beta_i$, where β_i is the beta of an individual asset with respect to the market. In this graph, we assume that the risk-free rate is 3% and the equity premium is 5%. Each point is one asset (such as a stock, a project, or a mutual fund). The point M in this graph could also be any other security with a $\beta_i = 1$. F could be the risk-free asset or any other security with a $\beta_i = 0$.

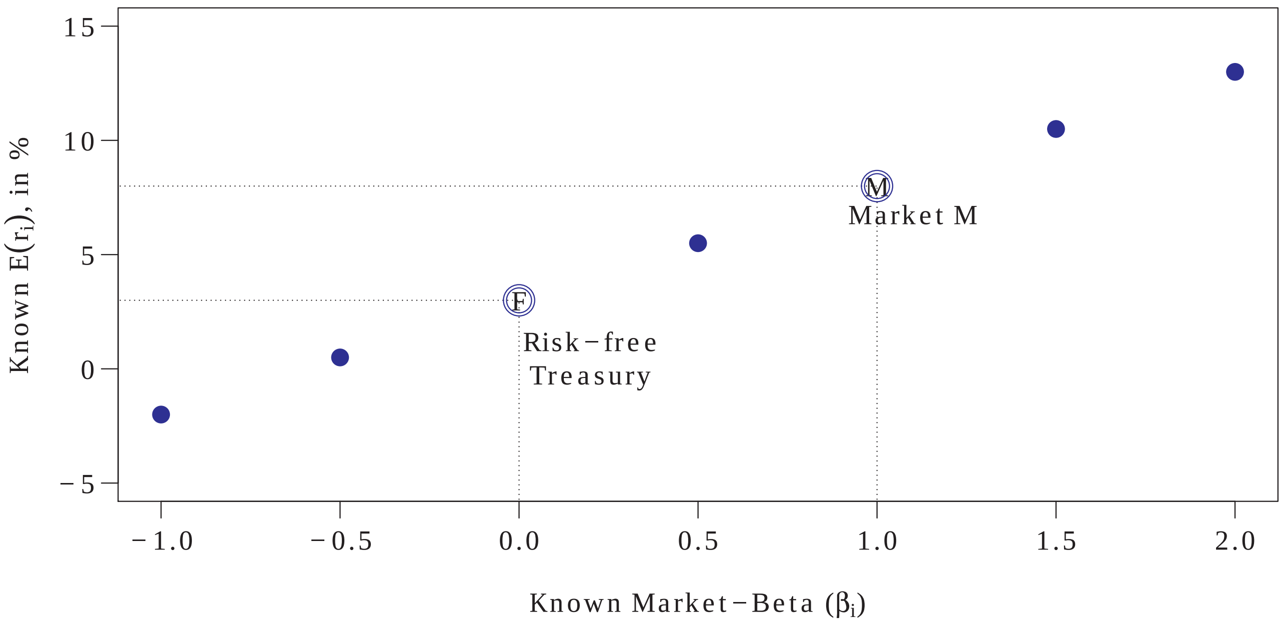
Q 9.4. The risk-free rate is 4%. The expected rate of return on the market is 12%. What is the cost of capital for a project that has a beta of –3? Does this make economic sense?

Q 9.5. Is the real-world SML with historical data a perfect straight line?

Q 9.6. The risk-free rate is 4%. The expected rate of return on the market is 7%. A corporation intends to issue publicly-traded bonds that *promise* a rate of return of 6% and offer an *expected* rate of return of 5%. What is the implicit beta of the bonds?

Q 9.7. Draw the SML if the risk-free rate is 5% and the equity premium is 9%.

Q 9.8. What is the equity premium, both mathematically and intuitively?



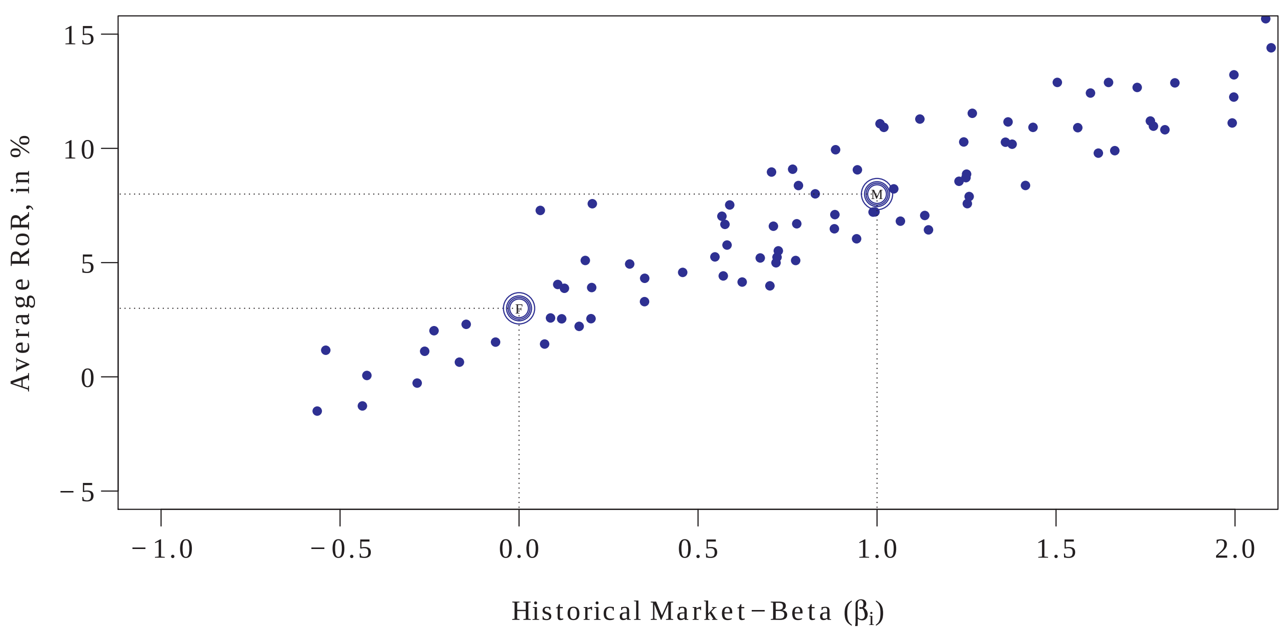


Exhibit 9.2: *The Security Market Line in an Ideal CAPM World.* The lower panel shows what we are usually confronted with: Historical average returns and historical betas are just estimates from the data. We hope that they are representative of the true underlying mean returns and true betas, which in turn would mean that they will also be representative of the future means and betas.

9.3 The CAPM Cost of Capital in the Present Value Formula

We usually use the CAPM output, the expected rate of return, as our discount rate.

For a corporate manager, the CAPM is needed to get the denominator in the NPV formula, the opportunity cost of capital, $\mathcal{E}(r)$:

$$\text{NPV} = C_0 + \frac{\mathcal{E}(C_1)}{1+\mathcal{E}(r_1)} + \frac{\mathcal{E}(C_2)}{1+\mathcal{E}(r_2)} + \cdots$$

Together, the CAPM and the NPV formulas tell you again that cash flows that correlate more with the overall market are of less value to your investors and therefore require higher expected rates of return ($\mathcal{E}(r)$) in order to pass muster (well, the hurdle rate, which is determined by the alternative opportunities that your model presumes your investors have).

Deconstructing Quoted Rates of Return— Risk Premiums

Reminder: Stated bond yields contain time and default premiums.

Let me return to the subject of Section 6.2. You learned that in a perfect and risk-neutral world, stated rates of return consist of a time premium and a default premium. On average, the default premium is zero, so the expected rate of return is just the time premium.

➤ *Time and default premiums, Sect.* 6.2, *Pg.129*.

The CAPM gives you the time and risk premiums.

The CAPM extends the expected rate of return to a world in which investors are risk averse. It gives you an expected rate of return that adds a **risk premium** (as a reward for your willingness to absorb risk) to the time premium.

$$\begin{aligned}
\text{Promised Rate of Return} &= \text{Time Premium} + \text{Default Premium} + \text{Risk Premium} \\
\text{Actual Earned Rate} &= \text{Time Premium} + \text{Default Realization} + \text{Risk Premium} \\
\underbrace{\text{Expected Rate of Return}}_{\text{provided by the CAPM}} &= \text{Time Premium} + \text{Expected Risk Premium}
\end{aligned}$$

In the risk-neutral perfect world, there were no differences in *expected* rates of return across assets. There were only differences in *stated* rates of return. The CAPM changes all this—different assets can now also have different *expected* rates of return.

Important: *The CAPM ignores default risk and, thus, does not provide a default premium. You must take care of it yourself!*

However, the CAPM does *not* take default risk into account, much less give you an appropriate stated rate of return. You should therefore wonder: How do you find the appropriate quoted rate of return in the real world? After all, it is this stated rate of return that is usually publicly posted, not the expected rate of return. Put differently, how do you put the default risk and CAPM risk into one valuation?

A specific bond example: First compute the price necessary to make you "even" relative to the Treasury if you are risk-neutral. This price is based on the time premium and the default premium.

Here is an example. Say you want to determine the PV of a corporate zero-bond that has a beta of 0.25 and promises to deliver \$200 next year. This bond pays off 95% of the time, and 5% of the time it totally defaults. Assume that the risk-free rate of return is 6% per annum and that the expected rate of return on the market is 10%. Therefore, the CAPM states that the expected rate of return on your bond must be

$$\begin{aligned}
\mathcal{E}(r_{\text{Bond}}) &= 6\% + 4\% \cdot 0.25 = 7\% \\
&= r_F + [\mathcal{E}(r_M) - r_F] \cdot \beta_{\text{Bond}}
\end{aligned}$$

This takes care of the time and risk premiums. To take the bond's default risk into account, you must still find the numerator. You cannot use the promised payment. You must adjust it for the probability of default. You expect to receive not $200, but

$$\begin{aligned} \mathcal{E}(C_{\text{Bond}}) &= 95\% \cdot \$200 + 5\% \cdot 0 = \$190 \\ &= \mathcal{P}rob(\text{No Default}) \cdot \text{Promise} + \mathcal{P}rob(\text{Default}) \cdot \text{Nothing} \end{aligned}$$

Therefore, the present value formula states that the value of the bond is

$$PV_{\text{Bond}} = \frac{\mathcal{E}(C_{\text{Bond}})}{1 + \mathcal{E}(r_{\text{Bond}})} = \frac{\$190}{1 + 7\%} \approx \$177.57$$

Given this price, you can now compute the promised (or quoted) rate of return on this bond:

$$\frac{\$200 - \$177.57}{\$177.57} \approx 12.6\%$$

$$\frac{\text{Promised Cash Flow} - \text{PV}}{\text{PV}} = \text{Promised Rate of Return}$$

The risk premium is above and beyond the time and default premiums. On average, risky investments earn more than risk-free investments now.

You can now quantify the three components in this example. For this bond, the time premium of money is 6% per annum—it is the rate of return that an equivalent-term Treasury offers. The time premium plus the risk premium is provided by the CAPM, and it is 7% per annum. Therefore, 1% per annum is your "average" compensation for your willingness to hold this risky bond instead of the risk-free Treasury. The remaining 12.6%−7% = 5.6% per annum is the default premium: You do not expect to earn money from this default premium "on average." You only earn it if the bond does not default.

$$\begin{aligned} 12.6\% &= 6\% + 5.6\% + 1\% \\ \text{Promised Interest Rate} &= \text{Time Premium} + \text{Default Premium} + \text{Risk Premium} \end{aligned}$$

In the real world, most bonds have fairly small market betas (often much smaller than 0.25) and thus fairly low risk premiums. Instead, most of the premium that ordinary corporate bonds quote above equivalent risk-free Treasury rates is not due to the risk premium, but due to the default premium. They simply won't pay as much as they promise, on average. However, for corporate projects and equity shares, the risk premium can be quite large. (Watch out—there are also some important imperfect market premiums that you will only learn in the next chapter.)

IMPORTANT

Never forget:

- The CAPM provides an expected rate of return.
- This return is not a stated (promised, quoted) rate of return, because it does not include a default premium.
- The probability of default must be handled in the NPV numerator (through the expected cash flow), and not in the NPV denominator (through the expected rate of return).

Q 9.9. A corporate bond with a beta of 0.2 will pay off next year with 99% probability. The risk-free rate is 3% per annum, and the equity premium is 5% per annum.

1. What is the price of this bond?
2. What is its promised rate of return?
3. Decompose the bond's quoted rate of return into its components.

Q 9.10. Going to your school has total additional and opportunity costs of $30,000 *this year and up-front*. With 90% probability, you are likely to graduate from your school. If you do not graduate, you have lost the entire sum. Graduating from the school will increase your 40-year lifetime annual salary by roughly $5,000 per year, but more so when the market rate of return is high than when it is low. For argument's sake, assume that your extra-income beta is 1.5. Assume the risk-free rate is 3%, and the equity premium is 5%. What is the value of your education?

9.4 Estimating the CAPM Inputs

How can you obtain reasonable estimates of the three inputs into the CAPM formula $\mathcal{E}(r_i) = r_F + [\mathcal{E}(r_M) - r_F] \cdot \beta_i$?

The Risk-Free Rate and Multi-Year Term-Structure Considerations

Which risk-free rate?

The first input into the CAPM formula is the risk-free rate of return (r_F). First, don't forget to use nominal rates to discount nominal expected cash flows. Now, this nominal risk-free rate is relatively easy to obtain from U.S. Treasuries. There is one small issue, though—which Treasury? What if the yield curve is upward sloping (as it usually does) and Treasuries yield 1% per year over one year, 3% per year over ten years, and 5% per year over thirty years? Which risk-free interest rate should go into the CAPM?

➤ *US Treasuries, Sect.* 5.3, *Pg.97*.

Advice: Pick the interest rate for a Treasury that is "most similar" to your project.

Unfortunately, the CAPM offers no guidance, because it has no concept of more than one single time period and thus no concept of a yield curve. However, from a practical perspective, it makes sense to match projects to similar risk-free bond benchmarks. That is, pick the risk-free zero-bond yield that is closest to each of your project's specific expected cash flows at the same time. For example, to value a machine that operates for three years, use the 1-year T-bond yield to discount the expected cash flow in the first year's NPV term, the 2-year T-bond yield for the second year's NPV term, and the 3-year T-bond yield for the third year's NPV term. If you had to use just one risk-free rate for multiple cash flows (because your pointy-haired boss says so), choose an average of the three rates or simply the 2-year bond. (There are better ways to do this, but the extra precision is rarely worth it.)

➤ *Yield Curve, Chapter* 5, *Pg.85*.

But don't we need formal guidance? Isn't this violating the letter of the law?

You may think this is a pretty loose method to handle an important question, and you would be right. However, it is also a reasonable method. Think about the opportunity cost of capital for a small investment with a market-beta of 0. If your corporation's investors are willing to commit their money for ten years, they could earn the yield on a ten-year risk-free Treasury bond instead. It is this ten-year rate that would then be the opportunity cost of capital on your own project cash flow that will materialize in ten years. If your project's cash flow will occur in three months, your investors could only earn the rate of return on a three-month T-bill instead. Indeed, there is almost universal agreement that companies should use a risk-free rate lined up with the project cash flow timing in the first part of the CAPM formula (where r_F appears by itself).

Q 9.11. What is today's risk-free rate for a 1-year project? For a 10-year project?

Q 9.12. If you can use only one Treasury, which risk-free rate should you use for a project that will yield $5 million each year for 10 years?

The Equity Premium

You want to know the equity premium, regardless of the CAPM

Your second CAPM input, the equity premium ($\mathscr{E}(r_M) - r_F$), is much more difficult to estimate. It is the extra expected rate of return that risky equity projects have to offer above and beyond what risk-free bond projects are offering. (It is a difference, so you can use either two nominal or two real rates.) By the way, regardless of whether the CAPM holds or not, this is a number of first-order importance to *you*—it helps you decide whether you should invest your own money in risky equities or in safer bonds.

You must provide the CAPM with the equity premium. *Good luck!*

The theoretical CAPM model assumes that you already know the *expected* rate of return on the market perfectly, not that you have to estimate it. But in real life, the equity premium is not posted anywhere, and *no one really knows the correct number*. Worse: Not only is it difficult to estimate, but your estimate often has a large influence over the CAPM's estimated cost of capital. C'est la vis.

Do not use a short-term-Treasury based equity premium for benchmarking your far-into-the-future cash flows.

Many other finance text books quote just one equity-premium estimate, and it is often the expected rate of return on stocks relative to the short-term Treasury yield. This choice can be reasonable if your own cash flows (that you want to discount) are also very short-horizon. Stock market investors, who can buy one day and sell the next, can defend this practice. It also means that an investment in a project with a beta of 1 has an expected rate of return equal to that in the stock market, because the risk-free rates in the intercept and slope cancel. Unfortunately, corporate-finance executives can rarely move in and out of projects on a moment's notice. They usually need to use the CAPM to decide on investments that have cash flows expected to materialize only many years into the future. In this case, everyone agrees that your CAPM equity premium should not be expected stock returns above short-term Treasuries. Instead, you should use the same equivalent-term-to-your-project-cash-flows Treasury rate in your estimate of the equity premium that you used as your risk-free Treasury in the constant term in the CAPM formula. (In fact, there is even a second argument to use long-term risk-free rates in the equity premium: equities are long-term investments, so you should always net out the long-term Treasury rate from expected stock returns, regardless of your own cash flows' horizons.)

Should I just give it to you?

There are a number of methods to guesstimate the equity premium. Unfortunately, for many decades, these methods have not tended to agree with one another. It should thus not come as a surprise that practitioners, instructors, finance textbook authors have also been confused and confusing. Exhibit 9.3 shows that each text book seems to have had its own estimate. (Fortunately, both the disagreement and the average recommended estimate seem to be slowly declining.)

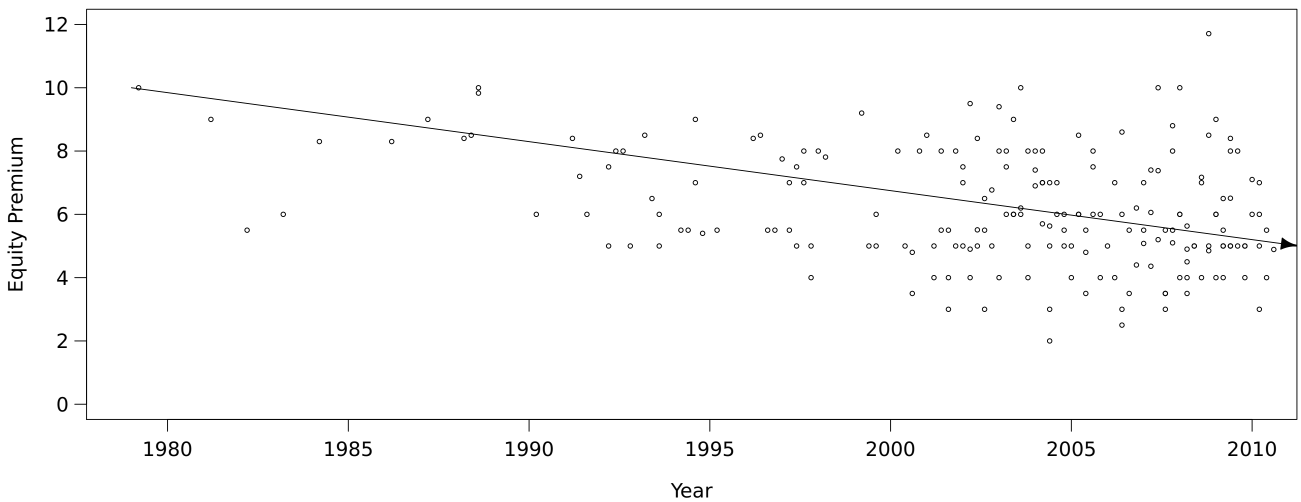


Exhibit 9.3: *Equity Premia from Different Textbooks. Source: Pablo Fernandez, SSRN, 2013..*

Let's show you how people are reasoning.

Ultimately, we finance-textbook authors have two choices: The first is to throw you one estimate, pretend it is the correct one, and hope you forget to ask hard questions. If you like a formulaic painting-by-numbers approach, this would leave you (wrongly) satisfied. The second is to tell you about the different methods that lead to different estimates. This is the route I will take—explaining different reasoning behind different estimates—if only because the first would eventually leave you startled to discover that your boss is using some other equity-premium and therefore has come up with a different cost-of-capital estimate. I will both explain the intuition behind the most-common methods and describe the magnitude that each suggests nowadays. You can make up your own mind what you deem to be the best estimate. (I will tell you my own personal estimate only at the end.)

Historical Averages I

Here are the historical numbers.

The first and most common guesstimation method is to assume that whatever the equity premium was in the past will also be the case in the future. Let's look at the historical performance of stocks vs. bonds in two different time samples, 1926-2012 and 1970-2012:

	1926-2012			1970-2012		
	Ari	Geo	$\mathcal{S}dv$	Ari	Geo	$\mathcal{S}dv$
Value-Weighed Stock Market	11.6%	9.7%	19.8%	11.3%	9.8%	17.3%
net of 1-Year Treasuries	**7.9%**	6.1%	20%	**5.8%**	4.4%	17%
net of 30-Year Treasuries	5.5%	**4.0%**	22%	1.7%	**0.8%**	20%
net of Long-Term Corporates	5.2%	3.6%	20%	1.7%	0.7%	18%

Stocks returned about 11.5% in arithmetic terms with a standard deviation of about 17-20% per year. (The value-weighted stock market is actually the correct portfolio from a CAPM perspective, but it wouldn't be much different if you used the S&P 500 instead.) The geometric return of about 9.5% was in line with the rule-of-thumb formula on Page 162. Although the stock market rate of return was pretty much the same in both samples, the equity premium was not: bond returns were higher after 1970, especially the long-term Treasuries. Thus, the historical equity premium you would want to use depends on the (matched) duration of your own project cash flow, not only for the aforementioned r_F, but also for the $\mathcal{E}(r_M) - r_F$ term.

PS: 30-Year Treasuries had market betas of < 0.1.

➤ *Morningstar Ibbotson Averages, Exhibit* 7.5, *Pg.168*.

We can roughly reconcile the difference between the highest equity-premium figure of 7.9% and the lowest figure of 0.7% in the table as follows:

Arithmetic Equity Premium 1926 to 2012 vs. Short-Term Bonds	≈ 8%
Minus Later Sample Period 1970 to 2012	–2%
Minus Long-Term T-Bonds Instead of Short-Term T-Bills	–2%
Minus Use of Geometric Return	–2%
Minus Cross-Product of Above Three	–1%
Geometric Equity Premium 1970-2012 vs. Long-Term Bonds	≈ 1%

Earlier textbooks touted the equivalent of the 7.9% figure, which thus etched itself into the minds of generations of students, practitioners, and finance professors. (*In fact, many other finance textbooks still etch it, without a second thought!*) But 7.9% is not necessarily the right one to use. Let's go through the three differences one by one:

1. **Sample Period?:** You have to judge what historical sample is appropriate. You probably want to end the sample recently (say 2012). But it is not clear whether you should start, say, in 1926 (when most of our data series become available) or in 1970 (about half-way). Although your estimate can seem statistically more reliable if you use more years, using the long sample means that you are then leaning more heavily on the (heroic) assumption that the world has not changed. Is the world really still the same in 2013 as it was in 1926? (And is the United States really the right country to consider alone? Maybe it just had an unusually lucky streak during (first half of) the "American Century," which is unlikely to

repeat. In this case, the average country's experience may be a better forecast for today's U.S., too.) No one knows the correct choice. I prefer the latter sample, and more so not because (noisier) stocks have performed differently, but because (less noisy) Treasuries have performed better—and continue to perform better.

➤ CAPM Term Structure, Sect. 9.4, Pg.227.

2. **Long-Term or Short-Term Bonds?:** You have to judge whether short-term or long-term bonds are the appropriate benchmark. As already mentioned, the CAPM theory itself does not understand the concept of a term structure (Chapter 5). Thus, it does not understand yield differentials for cash flows over different horizons. And thus, it offers you no easy guidance which one you should use. As with our choice for the risk-free rate in the first term of the CAPM, we have no theory guidance. We need a reasonable approach here, too.

   Again, from the perspective of an investor who can make monthly decisions and shift effortlessly between risk-free bonds and stocks, using short bonds as your benchmark makes sense. From the perspective of a manager who needs to decide on a short-term project, using short T-bills as your benchmark can also make sense. However, from the perspective of a manager who needs to commit funds to a long-term project with cash flows over decades, it does not. If all investors can earn a higher yield in Treasuries if they commit their money for 20 years, and if your own project requires them to commit their money for 20 years, too, then your project should also be benchmarked to this long-term expected rate of return.

   Conveniently, we already know a reasonable approximation of the term premium that your firm has to offer for your own longer-term projects vs. your shorter-term projects: the prevailing yield differential that similar-horizon long-term Treasuries are offering over short-term Treasuries. And, better yet, you can use the yield curve to (simultaneously) reduce your equity premium estimate and raise your risk-free rate. And, more better yet, for projects with betas around 1, this means that risk-free rates cancel and you would expect a rate of return similar to that of the overall stock market. Just don't commit the mistake of using a (high) long-term risk-free rate in the first CAPM term, and a (high) equity premium over the short-term T-bill rate in the second CAPM term.

3. **Geometric or Arithmetic?:** Should you use geometric or arithmetic rates of return in your benchmark cost of capital in the NPV formula? The answer is not clear, as you can may recall from Section 7.1. There was a convention of assuming that past returns represent equally likely future outcomes, many CAPM users compound the annual arithmetic average stock return or equity premium. However, doing so means that you expect the future multi-year stock performance relative to bonds to be better than it was in the past.

➤ Geometric vs. Arithmetic Returns and Extrapolation, Sect. 7.1, Pg.161.

   You should probably compound an equity premium estimate somewhere in between the arithmetic and geometric averages. (The correct value depends on your own cash flow's duration. Besides, your own expected future cash flows are normally geometric, too. If you think in terms of arithmetic expected cash flows compounded over many periods—i.e., if you consider the expected cash flow on a project that first earns +200% and then –100% [for a complete overall loss] to be a positive, then you should use the arithmetic average. Hardly anyone thinks this way.)

My recommendation.

My own preference is to use the later 40 years, to use bonds with similar maturity as the cash flow that are discounted, and to use an average between the arithmetic and geometric historical average stock returns. Thus, to discount expected cash flows that will occur in about 10 years and beyond, my own equity-premium estimate is around 1.5%—which is much lower than the 3-5% that would be touted in other books. Conveniently, my way of estimating means that I can also use the same risk-free rate in both the first and the second term of the CAPM. It also means that **my equity premium estimate is lower for longer-term cash flows, but my cost of capital estimate is usually not**. I still assign higher costs of capital to Longer-term cash flows, but this just manifests itself more through the first term (the risk-free rate) than the second term (the equity premium).

Yet another problem: your margin of error.

We are not done with all the problems. Small (and often seemingly innocuous) variations in how you estimate the CAPM inputs can lead to very different cost-of-capital estimates—think 3% vs 5%. Even if the CAPM were correct under one definition, neither you nor I nor anyone else know exactly which one it is. And besides the problem of assessing the expected equity premium point estimate, there is also the problem of the fairly large margin of error. The standard deviation of annual returns of 20% translates into a standard error of error of about $0.2/\sqrt{86} \approx 2\%$ over 86 years and $0.2/\sqrt{43} \approx 3\%$ over 43 years. If you are willing to assume that nothing has changed over the sample, then you can use some additional statistical artillery: You are then about 95% sure (a confidence range popular in statistics) that the mean geometric stock return over long bonds was between 0% and 8% from 1926 to 2012. From 1970 to 2012, you are about 95% sure that the same number was between –2% and +7%. Frankly, this large a range doesn't tell you much. We already knew, or at least believed, that the equity premium should not have been negative.

Peso Problems

To make matters even more complex, some economists believe that the historical data are not telling the full story. There are tiny probability of desasters that just happened not to happen. (This is sometimes called a **Peso problem**, based on a similar unobserved crash situation first described in an otherwise obscure academic paper about the Mexican Peso.) If you might have lost all your money, it's no wonder that you would have earned more in the scenario in which this big disaster did not occur. We just happened to have lived in this world, and so we now see superior returns when we look back. There is some empirical evidence that investors behave exactly as if they fear such a crash—but we do not know whether such a fear is (or was) rational and we are not sure how much of the historical or future equity premium such fear can explain. A reasonable order of magnitude is that extra compensation for crash risk could account for no more than a 1% equity premium per annum and perhaps for nothing (given that stock investors lost more than a third of their investments from 2000-2002 and in 2008 alone).

A sarcastic view: It ain't great!

If your estimate of the forward-looking equity premium is based on the "historical averages I" method, then you can defend a choice of 1% (for long-term cash flows). If you are aggressive, you can defend even a choice of 8% (for short-term cash flows), and ranges from 0% to beyond 10% if need be (or, more cynically, if you are an expert witness paid to opine so). Are you in awe (or disgust) of the wide possible range here?

Historical averages II

Method 2: Inverse historical averages.

The second method is to look at historical equity premiums in the opposite light. If stocks have become more desirable, perhaps this is because investors have become less risk averse, because more investors thus competed to own stocks, drove up the prices, and thereby lowered their future expected rates of return. High historical rates of return would then be indicative of low future expected rates of return.

An even more extreme version of this argument suggests that high past equity returns could have been not just due to high ex-ante equity premiums, but due to historical "bubbles" in the stock market. The proponents of the bubble view usually cannot quantify the appropriate equity premium, but they do argue that it is lower after recent market run-ups—exactly the opposite of what proponents of the historical averages I method argue.

However, you should be aware that not everyone believes that there were bubbles in the stock-market.

Current predictive ratios

Method 3: Dividend or earnings yields.

The third method is to try to predict the stock market rate of return actively with historical dividend yields (i.e., the dividend payments received by stockholders). Higher dividend yields should make stocks more attractive and therefore predict higher future equity premiums. The equity premium estimation is usually done in two steps: First, you must estimate a statistical regression that predicts next year's equity premium with this year's dividend yield; then, you substitute the currently prevailing dividend yield into your estimated regression to get a prediction. Sometimes, as in 2008, current dividend yields were so low that the predicted equity premium was negative—which would make no sense. Variations of this method have used interest rates or earnings yields, typically with similar results. In any case, the empirical evidence suggests that this method does not yield great predictions—for example, it predicted low equity premiums in the 1990s, which was a period of superb stock market performance.

Philosophical prediction

Method 4: Introspection and philosophy.

The fourth method is to wonder how much rate of return is required to entice reasonable investors to switch from bonds into stocks. Even with an equity premium as low as 3%, over 25 years, an equity investor would end up with more than twice the money of a bond investor. Naturally, in a perfect market, nothing should come for free, and the reward for risk-taking should be just about fair. Therefore, equity premiums of 6-8% just seem too high for the amount of risk observed in the stock market. This philosophical method generally suggests equity premiums of about **1%** to **3%**.

Sidenote: A **bubble** is a runaway market, in which rationality has temporarily disappeared. There is a lot of debate as to whether bubbles in the stock market ever occurred. A strong case can be made that technology stocks experienced a bubble from around 1998 to 2000. It is often called the **dot-com bubble**, the **internet bubble**, or simply the **tech bubble**. There is no convincing explanation based on fundamentals that can explain *both* why the NASDAQ Index climbed from 2,280 in March 1999 to 5,000 by March 2000, *and* why it then dropped back to 1,640 by April 2001.

Consensus survey

Method 5: Just ask!

What to choose? Welcome to the club! No one knows the true equity premium. So, the fifth method is to ask the experts—or anyone else who may *or may not* know. It's the blind leading the blind. The ranges of estimates have varied widely (and they are often also conveniently tilted in the interest of those giving them):

- The Social Security Administration uses an estimate of around 4%.
- The consulting firm McKinsey uses a standard of around 5%.

Analysts' estimates are all over the map, too. Estimates between 2% and 6% per annum seem reasonable.

- Around the turn of the millenium, the most common equity premium estimates recommended by professors of finance were **5%** for a 1-year horizon and **6%** for a 30-year horizon, both with a range from 3% to 8%. The estimates were generally similar in the U.S., Spain, Germany, and the UK.
- On Monday, February 28, 2005, the *Wall Street Journal* reported the following average *after-inflation* forecasts from then to 2050 (per annum):

			Government	Corp.	Equity Premium	
Name	**Organization**	**Stocks**	**Bonds**	Bonds	**Rel Gov**	**Rel Corp**
William Dudley	Goldman Sachs	5.0%	2.0%	2.5%	3.0%	2.5%
Jeremy Siegel	Wharton	6.0%	1.8%	2.3%	4.2%	3.7%
David Rosenberg	Merrill Lynch	4.0%	3.0%	4.0%	1.0%	0.0%
Ethan Harris	Lehman Brothers	4.0%	3.5%	2.5%	0.5%	1.5%
Robert Shiller	Yale	4.6%	2.2%	2.7%	2.4%	1.9%
Robert LaVorgna	Deutsche Bank	6.5%	4.0%	5.0%	2.5%	1.5%
Parul Jain	Nomura	4.5%	3.5%	4.0%	1.0%	0.5%
John Lonski	Moody's	4.0%	2.0%	3.0%	2.0%	1.0%
David Malpass	Bear Stearns	5.5%	3.5%	4.3%	2.0%	1.2%
Jim Glassman	JP Morgan	4.0%	2.5%	3.5%	1.5%	0.5%
				Arithmetic Average (Difference):	2.0%	1.4%
				Volatility-Adjusted Geometric Average ≈ –1% :	1.0%	0.4%

As you already know, it matters (a) whether you quote geometric or arithmetic averages; and (b) whether you quote the equity premium with respect to a short-term or a long-term interest rate. If you want to use the short rate, then you need to add another 1-2% to the equity-premium estimates in this table. (Unrelated, for the equity premium, it does not matter whether equity premium numbers are inflation adjusted. Inflation cancels out, because the equity premium is itself a difference in nominal rates.)

- In 2005, a poll by Graham and Harvey (from Duke) and *CFO Magazine* reported an average equity premium estimate of CFOs of around 3%.
- In mid-2008, Merrill Lynch's survey of 300 institutional investors reported 3%.
- In 2012, Fernandez reported that analysts and companies in the U.S., Spain, Germany and the U.K. all used average estimates between 5% and 6%—just like finance professors, and with the same typical range from about 3% to 8%.

Of course, these estimates are themselves based on the first four methods, they do not take your own cash flow duration into account, and they occur in echo chambers—they are what analysts, companies, consultants, students, and professors have been reading in corporate finance textbooks (like this one) for many years now.

One aspect that does not make sense is that these estimates seem to correlate too strongly with very recent stock market returns. For example, in late 2000, right after a huge run-up in the stock market, surveys by *Fortune* or *Gallup/Paine Webber* had investors expecting equity premiums as high as 15% per year. (They were acutely disappointed: The stock market dropped by as much as 30% over the following two years. Maybe they just got the sign wrong?!)

Internal Cost of Capital (ICC)

Method 6: Ask and Use!

A hybrid method combining survey methods and analysis is the "Internal Cost of Capital." Basically, this uses analysts' consensus projections about S&P 500 earnings over the next few years, and then uses a perpetuity model to back out the cost of capital that makes the price equal to the analysts discounted future earnings. These estimates vary over the business cycle, which is why one usually uses an average ICC over many years. The estimates that come out of these models are about 2.5%-3% per annum relative to 10-year bonds in arithmetic terms, and about 1.5% in geometric terms. (And, as with historical estimates, different variants can give estimates with a much larger range, say from 0% all the way to 7%.)

Conclusion

Remain consistent: Don't use different equity premium estimates for different projects.

You now know that no one can tell you the authoritative number for the equity premium. Such authority does not exist. Everyone is guessing, but there is no way around it—you have to take a stance on the equity premium. I could not shield you from this problem. I could only give you the arguments that you should contemplate when you are picking *your* number. My own take is this: First, I have my doubts that equity premiums will be 8% in the future. (The twentieth century was the "American Century" for a good reason: There were a lot of positive surprises for American investors.) I personally prefer equity premium estimates around **2%**, and this is actually in line with the majority of methods mentioned above. But realize that reasonable expert witnesses can cherry-pick equity premium estimates as low as 1% or as high as 8%. Of course, I personally find their estimates less believable the farther they are from my own personal estimate. And I find anything outside this 1% to 8% range just too tough to swallow. Second, whatever equity premium you do choose, *be consistent*. Do not use 3% for investing in one project and 8% for investing in another similarly-timed project. And do not use a risk-free rate based on long-term bonds as your risk-free rate in the CAPM and an equity premium estimate based on short-term bills. Being consistent can sometimes reduce your relative mistakes in choosing one project over another.

The equity premium is an extremely important number, even without the CAPM.

Yes, the equity premium is difficult to estimate, but there is really no way around your taking a stance. Even if you had never heard of the CAPM, you would still consider the equity premium to be one of the two most important numbers in finance (together with the risk-free rate, the other CAPM input). **If you believe that the equity premium is**

ANECDOTE **Was the 20th Century Really the "American Century?"**

The compound rate of return in the United States was about 8% per year from 1920 to 1995. Adjusted for inflation, it was about 6%. In contrast, an investor who had invested in Romania in 1937 experienced not only the German invasion and Soviet domination, but also a real annual capital appreciation of about –27% per annum over its 4 years of stock market existence (1937–1941). Similar fates befell many other Eastern European countries, but even countries not experiencing political disasters often proved to be less than stellar investments. For example, Argentina had a stock market from 1947 to 1965, even though its only function seems to have been to wipe out its investors. Peru tried three times: From 1941 to 1953 and from 1957 to 1977, its stock market investors lost *all* their money. But the third time was the charm: From 1988 to 1995, its investors earned a whopping 63% real rate of return. India's stock market started in 1940 and offered its investors a real rate of return of just about –1% per annum. Pakistan started in 1960 and offered about –0.1% per annum.

Even European countries with long stock market histories and no political trouble did not perform as well as the United States. For example, Switzerland and Denmark earned nominal rates of return of about 5% per annum from 1920 to 1995, while the United States earned about 8% per annum. A book by Dimson, Marsh, and Staunton looks at 101 years of global investment returns and argue that measurement and hindsight biases can account for much of this superior return.

Nevertheless, the United States stock market was an unusual above-average performer in most of the twentieth century. Will the twenty-first century be the Chinese century? And do Chinese asset prices already reflect this? Or already reflect *too much* of this? *Goetzmann and Jorion (1999)*

high, you would want to allocate a lot of your personal assets to stocks. Otherwise, you would allocate more to bonds. You really do need to know the equity premium even for basic investing purposes, too—no escape possible.

The CAPM is about relative pricing, not absolute pricing.

In a corporate context, like every other corporate manager, you cannot let your limited knowledge of the equity premium stop you from making investment decisions. In order to use the CAPM, you do need to judge the appropriate reward for risky projects relative to risk-free projects. Indeed, you can think of the CAPM as telling you the *relative* expected rate of return for projects, not the *absolute* expected rate of return. Given *your* estimate of how much risky average stock market projects should earn relative to safe projects, the CAPM can tell you the costs of capital for projects of a specific beta. But the basic judgment of the appropriate spread between high-beta and low-beta projects is left up to you.

Q 9.13. What are appropriate equity premium estimates? What are not? What kind of reasoning are you relying on?

Investment Projects' Market Betas

Unlike the risk-free rate and the equity premium, beta is specific to each project.

Your third CAPM input is your project's **market beta** (β_i). It measures how the rate of return of your project fluctuates with that of the overall market. Unlike the previous two inputs, which are the same for every project in the economy, the beta input depends on your specific project characteristics: Different investments have different betas.

The Implications of Beta for a Project's Risk and Reward

Projects with higher betas have more market risk, so their own idiosyncratic variances tend to be higher, too.

You already understand the role of market beta in determining the expected rate of return for an asset. This is the security market line—that is, the CAPM formula itself is an upward-sloping line when the expected rate of return is plotted against beta. But market beta also has implications for the standard deviation of assets. First, note that assets with a low beta are not very exposed to market risk. Thus, assets that have either a very high or a very low market beta tend to have higher standard deviation. Second, note that you can only learn much about an asset's market-beta in months in which the market does not turn in the same performance as the risk-free security. If the market and the risk-free asset turn in the same performance in a given month, then *any* asset's expected rate of return is just the risk-free rate, regardless of its market-beta.

Beta Estimation

Ways to estimate beta.

How do you find good forward-looking market-beta estimates for your own project? As usual, when we do not know the input, we rely on statistical analysis of past data. The mechanics of finding the beta for a stock are easy. You run a **market-model** regression on historical stock returns. The independent variable is the rate of return on the stock-market (the S&P500 percent change, even without dividends, is usually good enough). The dependent variable is the rate of return on your project. Usually, you should run such regressions with daily rather than with monthly returns and you should use about 3-5 years of data. Any statistical package (and common computer spreadsheet programs) readily give you the regression coefficients. The slope is the historical market-beta.

Unfortunately, although estimates of future betas are better than estimates of the future equity premium, they are still not great. The reason is that stock returns are very, very noisy. (And projects are rarely the same as stock, and project and stocks both often change their characteristics over time, too, but let's ignore this for the moment.) Thus, statisticians recommend that you should "shrink" your beta estimates further. **Shrinking** comes in two forms:

- Instead of using your own historical rates of returns, use the historical rates of return on a broader portfolio. For example, if you want to estimate the future market-beta of AMD, do not use the historical rates of return of AMD in your market-model, but those of the "computer hardware sector" instead. In other words, assume that all computer hardware makers have about the same stock market beta, and that AMD's own future beta will look more like that of its sector in the past than like that of its own past.
- Instead of using the coefficient estimate from the regression, use an average between the regression estimate and the number "1" (which is the average of

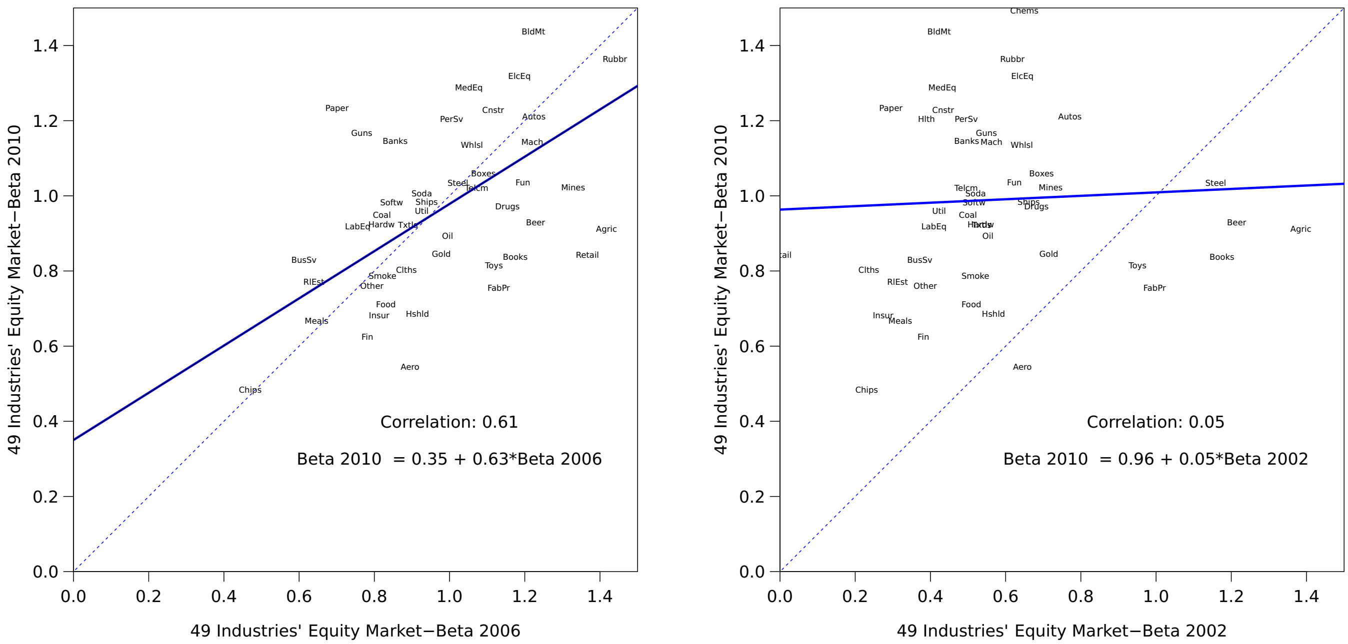


Exhibit 9.4: *Betas For 49 Industries Far Into The Future.* These figures plot industry market betas at the end of 2010 against their own value a few years earlier. Industries that had high market-betas in 2006 still tended to have high market-betas in 2010—although you should have not have used your exact estimates but shrunk them towards 1 to reflect their tendency to mean-revert. In contrast, industries that had high market-betas in 2002 unfortunately did not have high market-betas in 2010. If you had to guess market-betas in 2002 for 2010, you may as well have guessed the same value for every industry, ignoring the prevailing 2002 market-betas. The 0.05 coefficient is unusually low. In other eight-year samples, it was more like 0.3. Data Sources: 49 industries from Fama-French. Betas from 3 years of daily data.

all stock's market-betas). For example, if your market-model coefficient estimate based on past data is 2.6, use $1/2 \cdot 2.6 + 1/2 \cdot 1.0 = 1.8$ for your estimate of the future. Many studies have confirmed that such shrunk market-betas perform better in predicting subsequent market-betas than the unshrunk coefficient estimates themselves. The market-betas that are posted on many websites, such as YAHOO! FINANCE, are also shrunk.

Unfortunately, while these two shrinkages combined work reasonably well for predicting stock market-betas over the next quarter, they do not work so well for predicting stock market betas for cash flows that will occur in many years. Figure 9.4 shows how the stock market-betas for 49 different industries and then shrunk again. These industry betas typically range from about 0.3 to about 1.5, but change over time. The left panel shows that 2006 market-betas were still similar to those in 2010. The right panel shows that 2002 market-betas were not. (The left panel was better than usual, the right panel was worse than usual.) Based on a more detailed statistical study, my advice is to shrink the market-betas for cash flows in more than 2-5 years a second time. In our example of an industry market-beta of 2.6, shrunk once to 1.8 for cash flows that occur within the next year, if you had to assess the market betas of cash flows in about 5 to 15 years, you would shrink your beta a second time, say to $1/2 \cdot 1.8 + 1/2 \cdot 1.0 = 1.4$.

Unfortunately, as a corporate manager, you are rarely interested in the market-beta of an industry or even a stock. Usually, you are interested in the market-beta of a new project that you are considering. Sometimes, your firm is not even publicly traded, so you would not even have historical data if you wanted to. (And, if not publicly traded, then it is quite possible that your investors would not have been fully diversified, which is an essential assumption in the CAPM. If your main investor is undiversified, you may care about idiosyncratic standard deviation more than about the market-beta.) In this case, corporate CAPM users must thus rely more on economic intuition than pure statistics. You can rearrange the CAPM formula to obtain a beta estimate. Now, do you think your project cash flows and its future project value (which is influenced by changes in the economy) is likely to move more or less with the overall stock market (and, possibly, the overall economy)?

$$\mathscr{E}(r_i) = r_F + [\mathscr{E}(r_M) - r_F] \cdot \beta_i \quad \Longleftrightarrow \quad \beta_i = \frac{\mathscr{E}(r_i) - r_F}{\mathscr{E}(r_M) - r_F}$$

The right side of this formula helps translate your intuition into a beta estimate. What rate of return (above the risk-free rate) will your project have if the market were to have +10% or –10% rate of return (above the risk-free rate)? Clearly, such guesswork is difficult and error-prone—but it can provide a beta estimate when no other is available. Or, perhaps you can "start" with an industry market-beta and shrink it appropriately, perhaps adjusting for the fact that some (smaller) firms typically have higher betas?

Equity and Asset Betas Revisited

Don't use the equity beta to estimate your project's hurdle rate. Use the asset beta instead.

No matter how good your estimates of your stock betas are, it is important that you always distinguish between asset betas and equity betas. Let me remind you with an example. Assume that the risk-free rate is 4% and the equity premium is 5%. You own a \$100 million project with an asset beta of 2.0 that you can finance with \$20 million of risk-free debt. By definition, risk-free debt has a beta of 0. To find your equity beta, write down the formula for your asset beta (firm beta):

➤ *Asset and equity betas, Formula 8.7, Pg.212.*

$$\begin{array}{ccccccc} & & 20\% & \cdot\ (0) & + & 80\% & \cdot\ (\beta_{Equity}) = 2.0 \\ \beta_{Firm} & = & \left(\frac{\text{Debt value}}{\text{Firm value}}\right) & \cdot\ \beta_{Debt} & + & \left(\frac{\text{Equity value}}{\text{Firm value}}\right) & \cdot\ \beta_{Equity} \end{array}$$

Solve this to find that your equity beta is 2.5. This is what you would find on YAHOO! FINANCE. You would not want to base your hurdle rate for your firm's typical average project on the equity beta: Such a mistake would recommend you use a hurdle rate of $\mathscr{E}(r_i) = r_F + [\mathscr{E}(r_M) - r_F] \cdot \beta_i = 4\% + 5\% \cdot 2.5 = 16.5\%$. This would be too high. Instead, you should require your average projects to return $\mathscr{E}(r_i) = 4\% + 5\% \cdot 2.0 = 14\%$.

➤ *Typical, average, and marginal betas, Sect. 12.3, Pg.343.*

If you use comparables, first unlever them.

Conversely, if your project is private but the potential future owners are well-diversified, you may have to find its hurdle rate by looking at public comparables. Let's presume you find a similarly-sized firm with a similar business that YAHOO! FINANCE lists with a beta of 4, or perhaps better yet, the firm's industry. Remember that financial websites always list only the equity beta. The CAPM tells you that the expected rate of return on the equity is $4\% + 5\% \cdot 4 = 24\%$. However, this is not necessarily the hurdle rate for your project. When you look further on YAHOO! FINANCE, you may notice that your comparable is financed with 90% debt and 10% equity. (If the comparable had very little debt, a debt beta of 0 might have been a good assumption, but, unfortunately, in this case it is not.) Corporate debt rarely has good historical return data that would allow you to estimate a debt beta. Consequently, practitioners often estimate the expected rate of return on debt via debt comparables based on the credit rating. Say your comparable's debt is rated BB and say that BB bonds have offered *expected* rates of return of 100 basis points above the Treasury. (This might be 200 basis points *quoted* above the Treasury). With the Treasury standing at 4%, you would estimate the comparable's cost of capital on debt to be 5%. The rest is easy. The expected rate of return on your project should be

➤ *Credit ratings, Sect.* 6.2, *Pg.130*.

$$\begin{aligned} \mathscr{E}(r_{\text{Project}}) &= 90\% \cdot 5\% + 10\% \cdot 24\% = 6.9\% \\ &= w_{\text{Debt}} \cdot \mathscr{E}(r_{\text{Debt}}) + w_{\text{Equity}} \cdot \mathscr{E}(r_{\text{Equity}}) \end{aligned}$$

This would make a good hurdle rate estimate for your project.

Q 9.14. According to the CAPM formula, a zero-beta asset should have the same expected rate of return as the risk-free rate. Can a zero-beta asset still have a positive standard deviation? Does it make sense that such a risky asset would not offer a higher rate of return than a risk-free asset in a world in which investors are risk averse?

Q 9.15. A comparable firm (with comparable size and in a comparable business) has a YAHOO! FINANCE–listed equity beta of 2.5 and a debt/asset ratio of 2/3. Assume that the debt is risk free.

1. Estimate the equity beta for your firm if your projects have similar betas, but your firm will carry a debt/asset ratio of 1/3.
2. If the risk-free rate is 3% and the equity premium is 2%, then what should you use as your firm's hurdle rate?
3. What do investors demand as the expected rate of return on the comparable firm's equity and on your own equity?

Q 9.16. You own a stock portfolio that has a market beta of 2.4, but you are getting married to someone who has a portfolio with a market beta of 0.4. You are three times as wealthy as your future significant other. What is the beta of your joint portfolio?

9.5 Is the CAPM the Right Model?

Q: What happens if a stock offers too much or too little expected rate of return? A: Investor stampedes.

Now you know how securities should be priced in a perfect CAPM world, in which investors have good knowledge of the parameters. What would happen if a stock offered more than its appropriate expected rate of return? Investors in the economy would want to buy more of the stock than would be available: Its price would be too low. It would be too good a deal. Investors would immediately flock to it, and because there would not be enough of this stock, investors would bid up its price and thereby lower its expected rate of return. The price of the stock would settle at the correct CAPM expected rate of return. Conversely, what would happen if a stock offered less than its due expected rate of return? Investors would not be willing to hold enough of the stock: The stock's price would be too high, and its price would fall. Neither situation should happen in the real world.

Assets not priced according to the CAPM do not allow you to make money for nothing. However, it could imply good deals.

Is this an arbitrage—a "free money situation"? No. When stocks do not to follow the CAPM formula, buying them is still risky. Yes, some stocks would offer a higher or lower expected rate of return and thus seem to be too good or too bad a deal, attracting too many or too few investors chasing a limited amount of value in this stock—but these stocks would still remain risky investments. No investor could earn risk-free profits. There is no arbitrage here. The market forces working on correcting the (CAPM) mispricing are modest. And remember that there are good reasons why the CAPM may not hold in the first place, too. For example, it relies on many perfect-market assumptions. If investors are taxed or liquidity-constrained (that is, they cannot easily diversify, e.g., because the firm is a startup or family firm) or do not agree on the inputs, then it is quite plausible that some firms or even sectors (such as "value firms" or "growth firms") would offer higher or lower expected rates of return than the CAPM suggests.

What is The Scientific Evidence?

Why use the CAPM?

Unfortunately, in real life, despite its wide use, the evidence in favor of *practical use and application* of the CAPM is either weak or non-existent. If you use the CAPM, you do so based primarily on a belief that it should work, not based on empirical evidence. Say again: the evidence suggests that, even if the CAPM held, input estimates for corporate cash flows that will occur far in the future are usually so imprecise that they render the CAPM practically useless.

Huh? Did you really read me right?

If there is no empirical evidence that CAPM use is justified, then why do we torture you with it? This is a much easier question to answer than how stocks are priced in the real world or what the best estimate of the appropriate hurdle rates for your project is.

The CAPM is based on the important concept of diversification.

Good intuition: The CAPM has impeccable intuition. It is a model that shines through its simplicity and focuses on what *should* matter when owners are many—diversification. It gets executives away from the false notion that many small public investors care about the idiosyncratic risk of projects that the investors can diversify away. It also helps you understand that corporate diversification into a conglomerate is not likely to add value. Your investors can diversify themselves.

They don't need your firm to diversify you for them. And, it explains nicely why stocks should have higher rates of returns than bonds and how to "lever" and "unlever" assets. In general, it is a nice conceptual framework that helps you think about what should matter.

Faith.

Strong Belief: Many instructors and practitioners find the CAPM to be so plausible that they are willing to live with "absence of CAPM evidence." They do not take this absence to mean "evidence of CAPM absence." Thus, they adopt the CAPM based on their prior belief and faith, not based on evidence. Doing this is acceptable as long as you are fully aware that this is really what you are doing. (However, even if you do adopt the CAPM and even if this is not a Rumsfeld-level blunder, you still have to realize that you should greatly shrink your beta and equity-premium inputs for long-term cash flows.)

A crutch

Standin for Expected Cash Flow Default: The CAPM often assigns higher costs of capital to projects that are more likely to fail. If you have not fully adjusted your expected cash flow estimates downwards to adjust for failure (a common human error), the CAPM cost of capital often helps to impose a higher hurdle rate on riskier cash flows.

Important: Everyone expects you to know the CAPM!

Everyone uses it: The CAPM is *the* standard. Exhibit 9.5 shows that 73% of the CFOs reported that they always or almost always use the CAPM. (And use of the CAPM was even more common among large firms and among CFOs with an MBA.) No alternative method was used very often. Consequently, you have no choice but to understand the CAPM model well—*if you will work for a corporation, then the CAPM is the benchmark model that your future employer will likely use and will expect you to understand well*. Again, the CAPM is simply *the* standard. The CAPM is also used as a benchmark by many investors rating their (investment) managers, by government regulatory commissions, by courts in tort cases, and so on. It is literally the dominant, if not the only, widely-used model to estimate the cost of capital. Indeed, there is a whole section on the CFA exam about the CAPM!

There is no generally-used alternative to the CAPM.

Alternatives—please stand up: The famous sociologist Lewin wrote that "there is nothing more practical than a good theory." If not the CAPM, then what else would you use? There are no commonly-accepted alternatives. (A related justification for the CAPM has been that we consider the CAPM like linguists consider Latin—a good language that prepares you well to learn other languages that descended from it. The problem is that the CAPM-descendant models don't work well, either. At best, they are so flexible and slippery that we cannot know whether they work or not. At worst, they or their use has been rejected by the data, too.)

Do you want a bedtime story that "the world is ok" in order to be able to go to sleep?

Be aware that my treatment of the CAPM in an introductory corporate-finance textbook borders on heresy. Most corporate finance text-books make the CAPM their centerpiece. They do this not because the authors believe in it, but because it is dogma that new finance students are too fragile to deserve the hard truth. I am sorry—I wish I could have told you a happy bed-time story about how the world is nice and orderly, too. But it would have been a lie.

Never make the following errors, please.

Now, if you still want to use the CAPM, here is my advice. As a corporate executive, you should always first think hard about when you want to use the CAPM. Think about

Method	Usage Frequency	Usage Recommendation	Explained in
CAPM	(73%)	With Caution	Chapter 9
Historical Average Returns	(39%)	Rarely	Chapter 8
Modified CAPM	(34%)	With Caution	Chapter 9
Backed Out from Gordon Model	(16%)	Occasionally	Chapter 3
Whatever Investors Tell Us	(14%)	Occasionally	Chapter 2

Exhibit 9.5: *CFO Valuation Techniques for the Cost of Capital.* Rarely means "usually no, and often used incorrectly." Not reported, use of the CAPM is more common among managers with an MBA—and in firms who rely on consultants who in turn use the CAPM. Original Source: John Graham and Campbell Harvey, 2001.

ANECDOTE **"Cost of Capital" Expert Witnessing**

When Congress tried to force the "Baby Bells" (the split-up parts of the original AT&T) to open up their local telephone lines to competition, it decreed that the Baby Bells were entitled to a fair return on their infrastructure investment—with fair return to be measured by the CAPM. (The CAPM is either the de facto or legislated standard for measuring the cost of capital in many other regulated industries, too.) The estimated value of the telecommunication infrastructure in the United States is about $10 to $15 billion. A difference in the estimated equity premium of 1% may sound small, but even in as small an industry as local telecommunications, it meant about $100 to $150 million a year—enough to hire hordes of lawyers and valuation consultants opining in court on the appropriate equity premium. Some of my colleagues bought nice houses with the legal fees.

I did not get the call. I lack the ability to keep a straight face while stating that "the equity premium is exactly *x* point *y* percent," which was an important qualification for being such an expert. In an unrelated case in which I did testify, the opposing expert witness even explicitly criticized my statement that my cost-of-capital estimate was an imprecise range—unlike me, he could provide an exact estimate, and it was 11% per year!

Bradford Cornell, UCLA

whether it is useful for your own cost-of-capital estimates, or whether the CAPM errors seem too large to be useful for your particular needs. Here is what I would definitely warn about:

Don't expect accuracy and don't use it for financial investing.

Accuracy: The CAPM is a poor model if you want precision. If you believe that CAPM expected rates of return should be calculated with any digits after the decimal point, then you are deluded. Please realize that, at best, the CAPM can only offer expected rates of return that are of the "right order of magnitude," plus or minus a few percentage points perhaps. Actually, if accuracy and precision are important, you are in trouble. We do not have *any* models that can offer it. (Fortunately, it is often less important to be accurate than it is to be *better* estimating value than your competitors. And always remember that valuation is as much an art as it is a science.)

Avoid using the CAPM for financial investment purposes.

Investment purposes: If you are not a corporate executive looking to determine your project hurdle rate, but a financial investor looking for good investments from the universe of financial instruments, with an ability to shift your money around every day, then please do not use the CAPM. Although the CAPM offers the correct intuition that wide diversification needs to be an important part of *any* good investment strategy, there *are* many better investment strategies than just investing in the market index. Some are explained in Section App.9.C (Companion); more will be discussed in an advanced investments course.

➤ *Mean-variance optimization in detail,* *Sect.* App.8.C (Companion), *Pg.*≈*35*.

Please do not confuse the CAPM with the mean-variance framework discussed in the previous chapter. Mean-variance optimization is an asset-selection technique for your individual portfolio, and it works, regardless of whether or not the CAPM holds.

➤ *Corporate Time-Varying Costs of Capital,* *Sect.* 5.5, *Pg.112*.

Long-Term Differences: If you are a corporate executive, be cautious. Look at your cost of capital more holistically. The CAPM has two terms.

The first term is the risk-free rate which applies to all projects, regardless of beta. Fortunately, there is great evidence what you should use. You should use higher costs of capital for cash flows that will occur in the more distant future. And you have a great estimate of the premium that long-term projects need to offer over short-term projects, based on the Treasury yield-curve. You don't even need historical estimates: you can use the prevailing Treasury yield curve. *Use it! It works!*

It is the second term (the beta multiplied by the risk-premium), i.e., your beta risk-adjustment, that is dubious. If your cash flows will occur in many years, be modest. Do not overstate the risk-inputs in the CAPM. Shrink and shrink again.

- As a corporate manager, compare the cost of capital on *your equity* vs. the cost of capital on *your debt* for your long-term cash flows. With an equity premium based on the performance of stocks vs. long-term Treasuries of about 1-2% from 1970 to today, it may not matter much whether your project A has a beta of 0.8 and your project B has a beta of 1.2. The implied cost-of-capital difference between these two projects of under $(1.2-0.8)\cdot 2\% \approx 1\%$/year is already small.
- For long-term cash flows, your best estimate of your equity market-betas should be tilted much more towards 1 than what you think your market-beta is today. Thus, if you fit your historical market-beta to be 0.5 for A and 1.5 for B today, you may well want to use a market-beta shrunk to around 0.9 for A and 1.1 for B if those equity cash flows will occur in 10-20 years. Think about this: A and B would now have a different implied cost of equity capital of $0.2\cdot 2\% \approx 0.4\%$. This is way below your noise-and-uncertainty threshold.

  Asset betas are often even closer—they often give it time-stability, though.

  But let's continue. Say your projects are partly debt-financed, too. Now you need to calculate asset-betas rather than equity betas. Let's say both projects have 50% debt that is almost risk-free. Then your asset beta would be $0.5\cdot 0.0+0.5\cdot 0.9 = 0.45$ for A and $0.5\cdot 0.0+0.5\cdot 1.1 = 0.55$ for B.

Now you have a project cost of capital difference $(0.55-0.45)\cdot 2\% \approx 0.2\%$ between A and B.

How does this expected rate of return difference between A and B compare to your own uncertainty about your projects' relative expected cash flows? Does the CAPM beta risk-adjustment really matter much in light of your uncertainty?

The estimated CAPM cost of capital for long-term cash flows are fragile.

Alternatives

Let me summarize what I believe the data do tell us that is solid enough a rock to build a house on it:

What is solid empirical evidence?

- There definitely is a time-value of money.
- There definitely is a term structure. Long-term cash flows usually require higher costs of capital than short-term cash flows. Your investors can earn higher expected rates of return elsewhere for longer-term commitments, too.
- There definitely is a credit component. Assets with higher probabilities of default have to make up for it with higher promised yields; that is, higher yields when they succeed.
- As a preview to Chapter 10, market imperfections seem to play a role. There seems to be a liquidity premium. Assets that can be quickly liquidated in a market crash are more expensive, and different asset classes seem to have different degrees of liquidity. Because of their collateral, mortgage debt tend to have lower costs of capital than general bonds. Firms with less access to capital markets, such as startups, seem to pay higher costs of capital, although adjusting for default makes this difficult to measure. Investors pay more in personal income tax for interest receipts than they do for capital gains, which makes equities relatively more desirable and reduces their after-tax income. And sentiment and agency considerations seem to play a role in equity trading that is not unimportant. Many of these market imperfections embody some concept of risk, but it is not the market-beta.

➤ *Market Imperfections*, *Chapter* 10, *Pg.*257.

- After taking into account the premia just mentioned, the remaining equity premium is probably relatively small (1-2%), although we do not know for sure. Our uncertainty is much larger than our certainty about its magnitude. And you need to realize that betas for cash flows far into the future are much closer to 1 than historical regressions would suggest. The "CAPM" beta impact is relatively unimportant.

So what would I do if I was not constrained by my boss? My best alternative cost-of-capital recommendation would start out just like the CAPM: As the first term in a formula, I would recommend that you use the rate of return on bonds of similar maturity as the cash flow that you want to value. Usually, this means that you assign higher costs of capital to cash flows farther in the future. It is only on the second term, the equity risk-adjustment, that I would tinker. Instead of the (shrunk) CAPM market-beta multiplied by the historical equity premium (of 2% or less per annum), I would recommend a more holistic approach.

Use reasonable risk adjustments.

- Take into consideration that projects with high volatility and/or with high leverage are more risky. The equity on these projects probably requires a higher expected rate of return to keep your investors happy. Projects with higher idiosyncratic risk are also the same projects where executives are often the most over-optimistic. (Check again: are you sure your expected cash flows in the NPV numerator are not over-confident?)
- Take into consideration whether you and your owners are well-diversified. If you are not, then you should require higher rates of return on riskier projects. In this case, it is not "beta risk" that matters, but "total risk."
- Take into consideration that your investors may "like" growth firms and are often willing to pay higher prices and thus accept lower average rates of returns for some such projects.

There is little harm if you calculate a (repeatedly-shrunk) CAPM market-beta with a low equity premium (say 2%) to assess whether any other non-CAPM cost-of-capital assessments seems reasonably similar to your CAPM assessment. In this sense, the CAPM can still be a little helpful. Finally, realize that it is in general very difficult to assess over many years whether corporate projects will offer higher or lower average rates of return than the average project in the economy. If you make smart decisions, after your project's initial growth phase is over, would it be reasonable to assume that it will earn similar rates of returns as most other good projects in the economy—not better, not worse?

➤ *Long-Run Excess Profits,* *Sect.* 20.3, *Pg.672*.

What would I do if the boss liked the CAPM?

And if my boss required an approach like the CAPM, what would I do?

- If I ran a large firm with good access to capital markets, I would assume an equity premium of 1-2% per annum and apply this to the equity components of all my long-term cash flows. The exception would be projects for which I would have a strong prior that their market-betas will be very extreme, say, below –1 or greater than 3 (and I would then shrink those betas further to, say, 0 and 1.5, respectively, to account for long-term uncertainty about betas). I would consider long-term corporate debt to have a higher cost of capital than equivalent Treasuries but a lower cost of capital than my own equity—the latter primarily because debt provides a corporate income tax shield (as you will learn in Chapter 17) and not because the equity premium over long-term corporate bonds is high.
- Deviating from the CAPM, if I ran a startup firm, I would assume a cost of capital of 2% to 6% above the *expected* rate of return on my uncollateralized debt. The expected rate of return on my debt could be very high—it could even be in the double digits. (This reflects the fact that more volatile cash flows and firms that struggle with more market imperfections must pay higher costs of capital.) Risk definitely plays a role, but not in the strict CAPM market-beta sense. Alternatively, I would abandon NPV-based models altogether and try to estimate what other similar projects are offering their investors. This is the route we take in Chapter 14.

➤ *Income Taxes and Cost of Capital,* *Chapter* 17, *Pg.545*.

➤ *Comparables,* *Chapter* 14, *Pg.431*.

And I would never use any of my schemes here (or the CAPM) for the pricing of bonds, derivatives, or other extreme kinds of projects.

Am I the only professor who recommends against using the CAPM? No. Eugene Fama, perhaps the most famous active finance professor alive and partly responsible for the original spread of the CAPM, nowadays strongly recommends against the combined use of NPV models with asset-pricing models like the CAPM, where you use the CAPM expected rate of return as your cost of capital in an NPV calculation. Such use means you divide one uncertain number by another. This practice combines your errors and uncertainty about expected cash flows in the numerator with your errors and uncertainty about expected returns in the denominator. Yikes!

NPV or Comparables? Eugene Fama thinks Comparables are better.

Conclusion

IMPORTANT

- The CAPM is the benchmark model in the real world. Most corporations use it.
- Everyone will expect you to understand the CAPM. Regardless of whether the model holds or not, you have to know it.
- The empirical evidence suggests that the CAPM is not a great model for predicting expected rates of return.
- The first CAPM term (that long-term projects have to offer higher expected rates of return) seems to hold better than the second CAPM term (the risk adjustment).
- For cash flows many years into the future, you must realize (a) that market-betas revert back towards 1 and (b) that the equity premium is low.
- The CAPM never offers great accuracy.
- Mean-variance optimization (Section 8.2) works even if the CAPM does not.

Q 9.17. Does the empirical evidence suggest that the CAPM is correct?

Q 9.18. If the CAPM is wrong, why do you need to learn it?

Q 9.19. Is the CAPM likely to be more accurate for a project where the beta is very high, one where it is very low, or one where it is zero?

Q 9.20. To value an ordinarily risky project, that is, a project with a beta in the vicinity of about 1, what is the relative contribution of your personal uncertainty (lack of knowledge) in (a) the risk-free rate, (b) the equity premium, (c) the beta, and (d) the expected cash flows? Consider both long-term and short-term investments. Where are the trouble spots?

Summary

This chapter covered the following major points:

- The CAPM provides an "opportunity cost of capital" for investors, which corporations can use as the cost of capital in the NPV formula. The CAPM formula is

$$\mathcal{E}(r_i) = r_F + [\mathcal{E}(r_M) - r_F] \cdot \beta_i$$

  Thus, there are three inputs: the risk-free rate of return (r_F), the expected rate of return on the market ($\mathcal{E}(r_M)$), and the project's or firm's market beta (β_i). Only the latter is project-specific.

- The line plotting expected rates of return against market beta is called the security market line (SML).

- The CAPM provides an expected rate of return, consisting of the time premium and the risk premium. It ignores the default premium. In the NPV formula, the default risk and default premium work through the expected cash flow in the numerator, not through the expected rate of return (cost of capital) in the denominator.

- For r_F, you should use bonds that match the timing of your project's cash flows. Thus, cash flows farther in the future often require higher opportunity costs of capital. Even if you do not believe the CAPM, term adjustment is important.

- The expected rate of return on the market is a critical CAPM input if market beta is high—but it is difficult to guess. There are many guesstimation methods, but no one really knows which one is best. Reasonable estimates for the equity premium ($\mathcal{E}(r_M) - r_F$) can range from about 1% to 8% per annum, although 2% seems most reasonable to me for cash flows more than a few years into the future.

- There are a number of methods to estimate market beta. Many users rely on industry betas and not on firms' own historical betas as estimates of future market betas, *and* they shrink them towards 1. When your cash flows are farther in the future, you have to shrink your beta estimates even more drastically towards 1.

- Never believe the CAPM blindly. Its estimates are poor. Use it more like a "general direction" estimate than like an "accurate guide" estimate.

- Even though its estimate are poor, understand the CAPM well. Everyone will expect you to.

- The chapter appendix discusses certainty equivalence and CAPM alternatives (such as the APT and the Fama-French-Momentum model). You must use the certainty equivalence form of the CAPM when projects are purchased or sold for prices other than their fair market values. It is also often the only method if only underlying cash flows rather than value estimates are available.

This negative perspective on the CAPM is so uncommon in a textbook (but not among the experts actually studying the models) that it is important that you don't misunderstand it. Let's end this chapter with a FAQ:

- **Q**: Should riskier projects not have to promise higher rates of return?

  A: Riskier projects have to promise a higher rate of return, i.e., offer higher default premiums. This is not the same as higher risk premiums in the CAPM sense. In NPV applications, make sure to reflect the default risk in the expected cash flow numerator. Riskier projects need to pay off a lot more when they succeed, just to make up for the fact that they fail more often.

- **Q**: Should riskier long-term cash flows not require higher expected rates of return?

  A: Long-term projects command term premiums. Thus, in NPV applications, you should usually use higher required costs of capital for more distant cash flows. You can but do not need the CAPM for this. The U.S. Treasury Yield Curve gives you a working first estimate about how much extra premium long-term cash flows should require.

- **Q**: Should riskier stocks and cash flows have higher expected discount rates?

  A: Maybe, but be careful. First, make it modest. Don't be too overconfident in your ability to judge equity risks. If you can judge the risks well, make sure your estimates first flow into your expected cash flows in the NPV numerator. Second, don't be too wedded to the CAPM for an extra "risk-premium kicker." Instead, combine your cost-of-capital estimate with judgment-based and other risk measures, such as volatility (especially if your owners are not fully diversified).

Preview of the Chapter Appendix in the Companion

In the Appendix

The appendix to this chapter explains

- the "certainty equivalence value" (CEV) which allows you to use the CAPM for projects that you are not buying at the appropriate equilibrium price. For example, you need the CEV to work out how to value an inheritance that will be higher if your business fails. (Being free today does not mean that there is no value to such a promise.)
- how to use the CEV formula to estimate the value of a project for which you have historical cash flows, but no market value information.
- how the CAPM is derived from the fact that the optimal portfolio is always the combination of two portfolios, one of which may be the risk-free asset.
- what the CAPM alternatives are and how to use them. The first alternative is the APT (arbitrage pricing theory) and its relative, the Intertemporal CAPM. The

second alternative are Fama-French value and momentum models. These seem to predict better than any alternatives, but are less grounded in theory (or, you may say, reason) than the former.

Keywords

Answers

Q 9.1 Yes, the perfect market is an assumption underlying the CAPM. In addition,

1. Investors are rational utility maximizers.
2. Investors care only about overall portfolio mean rate of return and risk at one given point in time.
3. All parameters are known (not discussed until later in the chapter).
4. All assets are traded. Every investor can purchase every asset.

Q 9.2 With $r_F = 4\%$ and $\mathcal{E}(r_M) = 7\%$, the cost of capital for a project with a beta of 3 is $\mathcal{E}(r) = r_F + [\mathcal{E}(r_M) - r_F] \cdot \beta_i = 4\% + (7\% - 4\%) \cdot 3 = 13\%$.

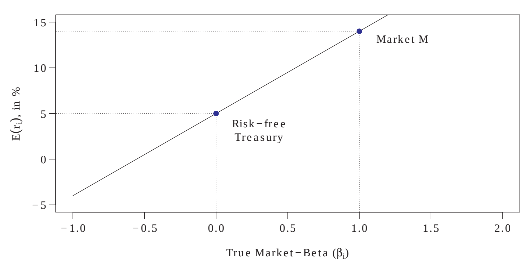
Q 9.3 With $r_F = 4\%$ and $\mathcal{E}(r_M) = 12\%$, the cost of capital for a project with a beta of 3 is $\mathcal{E}(r) = r_F + [\mathcal{E}(r_M) - r_F] \cdot \beta_i = 4\% + (12\% - 4\%) \cdot 3 = 28\%$.

Q 9.4 With $r_F = 4\%$ and $\mathcal{E}(r_M) = 12\%$, the cost of capital for a project with a beta of –3 is $\mathcal{E}(r) = r_F + [\mathcal{E}(r_M) - r_F] \cdot \beta_i = 4\% + (12\% - 4\%) \cdot (-3) = -20\%$. Yes, it does make sense that a project can offer a negative expected rate of return. Such projects are such great investments that you would be willing to expect losses on them, just because of the great insurance that they are offering.

Q 9.5 No—the real-world SML is based on historical data and not true expectations. It would be a scatterplot of historical risk and reward points. If the CAPM holds, a straight, upward-sloping line would fit them best.

Q 9.6 Write down the CAPM formula and solve $\mathcal{E}(r_i) = r_F + [\mathcal{E}(r_M) - r_F] \cdot \beta_i = 4\% + (7\% - 4\%) \cdot \beta_i = 5\%$. Therefore, $\beta_i = 1/3$. Note that we are ignoring the promised rate of return.

Q 9.7 The security market line is



Q 9.8 The equity premium, $\mathcal{E}(r_M) - r_F$, is the premium that the market expects to offer on the risky market above and beyond what it offers on Treasuries.

Q 9.9 It does not matter what you choose as the per-unit payoff of the bond. If you choose $100, you expect it to return $99.

1. Thus, the price of the bond is $PV = \$99/(1 + [3\% + 5\% \cdot 0.2]) \approx \$95.19$.
2. Therefore, the promised rate of return on the bond is $\$100/\$95.19 - 1 \approx 5.05\%$.
3. The risk-free rate is 3%, so this is the time premium (which contains any inflation premium). The (expected) risk premium is 1%. The remaining 1.05% is the default premium.

Q 9.10 The cost needs to be discounted with the current interest rate. Because payment is up-front, this cost is $30,000 now! The appropriate expected rate of return for cash flows (of your earnings) is $3\% + 5\% \cdot 1.5 = 10.5\%$. You can now use the annuity formula to determine the PV if you graduate:

$$\frac{\$5{,}000}{10.5\%} \cdot \left[1 - \left(\frac{1}{1+10.5\%}\right)^{40}\right] \approx \$47{,}619 \cdot 98.2\%$$
$$\approx \$46{,}741.46$$

With 90% probability, you will do so, which means that the appropriate risk-adjusted and discounted cash flow is about \$42,067.32. The NPV of your education is therefore about \$12,067.32.

Q 9.11 Use the 1-year Treasury rate for the 1-year project, especially if the 1-year project produces most of its cash flows at the end of the year. If it produces constant cash flows throughout the year, a 6-month Treasury rate might be more appropriate. Because the 10-year project could have a duration of cash flows much shorter than 10 years, depending on use, you might choose a risk-free Treasury rate that is between 5 and 10 years. Of course, it would be even better if you match the individual project cash flows with individual Treasuries.

Q 9.12 The duration of this cash flow is around, or a little under, 5 years. Thus, a 5-year zero-coupon U.S. Treasury would be a reasonably good guess. You should not be using a 30-day or 30-year Treasury. A 10-year zero-coupon Treasury would be a better match for a project that yields cash only once at the end of 10 years. That is, for our project that has cash flows each year for 10 years, the 10-year Treasury as a benchmark would have too much of its payments as principal repayment at the end of its 10-year term.

Q 9.13 An estimate between 1% and 8% per year is reasonable. Anything below 0% and above 10% would seem unreasonable to me. For reasoning, please see the different methods in the chapter.

Q 9.14 Yes, a zero-beta asset can still have its own idiosyncratic risk. And, yes, it is perfectly kosher for a zero-beta asset to offer the same expected rate of return as the risk-free asset. The reason is that investors hold gazillions of assets, so the idiosyncratic risk of the zero-beta asset will just diversify away.

Q 9.15 This is an asset beta versus equity beta question. Because the debt is almost risk free, we can use $\beta_{Debt} \approx 0$.

1. First, compute an unlevered asset beta for your comparable with its debt-to-asset ratio of 2 to 3. This is $\beta_{Asset} = w_{Debt} \cdot \beta_{Debt} + w_{Equity} \cdot \beta_{Equity} = (2/3) \cdot 0 + (1/3) \cdot 2.5 \approx 0.833$. Next, assume that your project has the same asset beta, but a smaller debt-to-asset ratio of 1 to 3, and compute your own equity beta: $\beta_{Asset} = w_{Debt} \cdot \beta_{Debt} + w_{Equity} \cdot \beta_{Equity} \Rightarrow 0.833 \approx (1/3) \cdot 0 + (2/3) \cdot \beta_{Equity} \Rightarrow \beta_{Equity} = 1.25$.
2. With an asset beta of 0.83, your firm's asset hurdle rate should be $\mathscr{E}(r_i) = 3\% + 2\% \cdot 0.83 \approx 4.7\%$.
3. Your comparable's equity expected rate of return would be $\mathscr{E}(r_{Comps\,Equity}) = 3\% + 2\% \cdot 2.5 = 8\%$. Your own equity's expected rate of return would be $\mathscr{E}(r_{Your\ Equity}) = 3\% + 2\% \cdot 1.25 = 5.5\%$

Q 9.16 Your combined happy-marriage beta would be $\beta_{Combined} = (3/4) \cdot 2.4 + (1/4) \cdot 0.4 = 1.9$.

Q 9.17 No, the empirical evidence suggests that the CAPM does not hold. The most important violation seems to be that value firms had market betas that were low, yet average returns that were high. The opposite was the case for growth firms.

Q 9.18 Even though the CAPM is empirically rejected, it remains the benchmark model that everyone uses in the real world. Moreover, even if you do not trust the CAPM itself, at the very least it suggests that covariance with the market could be an important factor.

Q 9.19 The CAPM should work very well if beta is about 0. The reason is that you do not even need to guess the equity premium if this is so.

Q 9.20 For short-term investments, the expected cash flows are most critical to estimate well (see Section 4.1 on Page 64). In this case, the trouble spot (d) is really all that matters. For long-term projects, the cost of capital becomes relatively more important to get right, too. The market betas and risk-free rates are usually relatively low maintenance (though not trouble free), having only modest degrees of uncertainty. The equity premium will be the most important problem factor in the cost-of-capital estimation. Thus, the trouble spots for long-term projects are (b) and (d).

End of Chapter Problems

Q 9.21. What are the assumptions underlying the CAPM? Are the perfect market assumptions among them? Are there more?

Q 9.22. If the CAPM holds, then what should you do as the manager if you cannot find projects that meet the hurdle rate suggested by the CAPM?

Q 9.23. In a perfect world and in the absence of externalities, should you take only the projects with the highest NPV?

Q 9.24. Write down the CAPM formula. Which are economy-wide inputs, and which are project-specific inputs?

Q 9.25. The risk-free rate is 6%. The expected rate of return on the stock market is 8%. What is the appropriate cost of capital for a project that has a beta of 2?

Q 9.26. The risk-free rate is 6%. The expected rate of return on the stock market is 10%. What is the appropriate cost of capital for a project that has a beta of –2? Does this make economic sense?

Q 9.27. Draw the SML if the true expected rate of return on the market is 6% per annum and the risk-free rate is 2% per annum. How would the figure look if you were not sure about the expected rate of return on the market?

Q 9.28. A junk bond with a beta of 0.4 will default with 20% probability. If it does, investors receive only 60% of what is due to them. The risk-free rate is 3% per annum and the risk premium is 5% per annum. What is the price of this bond, its promised rate of return, and its expected rate of return?

Q 9.29. What would it take for a bond to have a larger risk premium than default premium?

Q 9.30. A corporate zero-bond promises 7% in one year. Its market beta is 0.3. The equity premium is 4%; the equivalent Treasury rate is 3%. What is the appropriate bond price today?

Q 9.31. Explain the basic schools of thought when it comes to equity premium estimation.

Q 9.32. If you do not want to estimate the equity premium, what are your alternatives to finding a cost-of-capital estimate?

Q 9.33. Explain in 200 words or less: What are reasonable guesstimates for the market risk premium and why?

Q 9.34. Should you use the same risk-free rate of return both as the CAPM formula intercept and in the equity premium calculation, or should you assume an equity premium that is independent of investment horizon?

Q 9.35. Should a negative-beta asset offer a higher or a lower expected rate of return than the risk-free asset? Does this make sense?

Q 9.36. An unlevered firm has an asset market beta of 1.5. The risk-free rate is 3%. The equity premium is 4%.

1. What is the firm's cost of capital?
2. The firm refinances itself. It repurchases half of its stock with debt that it issues. Assume that this debt is risk free. What is the equity beta of the levered firm?
3. According to the CAPM, what rate of return does the firm have to offer to its *creditors*?
4. According to the CAPM, what rate of return does the firm have to offer to its *levered equity holders*?
5. Has the firm's weighted average cost of capital changed?

Q 9.37. Consider the following historical rate of return series:

Year	IBM	S&P 500	Year	IBM	S&P 500
1991	–0.175	0.263	2001	0.430	–0.130
1992	–0.400	0.045	2002	–0.355	–0.234
1993	0.156	0.071	2003	0.205	0.264
1994	0.322	–0.015	2004	0.072	0.090
1995	0.257	0.341	2005	–0.158	0.030
1996	0.676	0.203	2006	0.198	0.136
1997	0.393	0.310	2007	0.129	0.035
1998	0.775	0.267	2008	–0.208	–0.385
1999	0.175	0.195	2009	0.586	0.235
2000	–0.208	–0.101	2010	0.143	0.128

Assume that IBM had so little debt that it was practically risk-free.

1. What was IBM's equity beta over this sample period?
2. If IBM had a debt-equity ratio of 70%, what was its asset beta? (Hint: To determine a D/A ratio, make up an example in which a firm has a 70% D/E ratio.)
3. How important is the 1992 observation to your beta estimate?

4. If HP is similar to IBM in its business but has a debt-equity ratio of 10%, what would you expect HP's levered equity beta to be? (Hint: Use the same leverage conversion trick.)

Q 9.38. Look up betas on YAHOO! FINANCE today, and compare them to those in Exhibit 8.6 on Page 209.

1. How does the beta of Intel today compare to its earlier estimate from May 2008? Was its beta stable (over time)?
2. How does the beta of AMD today compare to its earlier estimate from May 2008? Was its beta stable?
3. AMD is a much smaller firm than Intel. How do their betas compare?

Q 9.39. A comparable firm (in a comparable business) has an equity beta of 2.5 and a debt-equity ratio of 2. The debt is almost risk free. Estimate the beta for your equity if projects have constant betas, but your firm will carry a debt-equity ratio of 1/2. (Hint: To translate a debt-equity ratio into a debt-asset ratio, make up an example.)

Q 9.40. A Fortune 100 firm is financed with $15 billion in debt and $5 billion in equity. Its historical equity beta has been 2. If the firm were to increase its leverage from $15 billion to $18 billion and use the cash to repurchase shares, what would you expect its levered equity beta to be?

Q 9.41. The prevailing risk-free rate is 5% per annum. A competitor to your own firm, though publicly traded, has been using an overall project cost of capital of 12% per annum. The competitor is financed by 1/3 debt and 2/3 equity. This firm has had an estimated equity beta of 1.5. What is it using as its equity premium estimate?

Q 9.42. Apply the CAPM. Assume the risk-free rate of return is the current yield on 5-year bonds. Assume that the market's expected rate of return is 3% per year above this. Download 5 years of daily rate of return data on four funds: NAESX, VLACX, VUVLX, and VWUSX.

- What were the historical average rates of return?
- What were the historical market betas?
- What were the historical market betas, adjusted (shrunk) toward 1 by averaging with 1?
- How do these estimates compare to the market beta estimates of the financial website from which you downloaded the data?
- Does it appear as if these funds followed a CAPM-like relationship?

Q 9.43. Draw some possible security markets relations that would not be consistent with the CAPM. The x axis would be the true market beta, the y axis would be the true expected rate of return.

Q 9.44. Does the empirical evidence suggest that the CAPM is correct?

Q 9.45. Why do you need to understand the CAPM?

Q 9.46. Under what circumstances is the CAPM a good model to use? What are the main arguments in favor of using it? When is it not a good model?

Q 9.47. If you use the CAPM, explain for what kinds of projects it is important to get accurate equity-premium estimates.

The Consensus Estimate For The Equity Premium by Academic Financial Economists in December 2007

An Update to Welch (2000)

Ivo Welch
Brown University

January 17, 2008

Abstract

A sample of about 400 finance professors estimates the 1-year equity premium and the 30-year geometric equity premium to be about 5%, as of year-end 2007. The sample interquartile range is 4% to 6%. The typical range recommended in their classes is a little higher (from 4% to 7%, with a mean of 6%). Since 2001, participants have become more bearish (by about 0.5%).

The participants estimate the 30-year arithmetic equity premium estimate to be about 75 basis points higher than its geometric equivalent; and they estimate the 30-year geometric expected rate of return on the stock market to be about 9%.

75% of finance professors recommend using the CAPM for corporate capital budgeting purposes; 10% recommend the Fama-French model; 5% recommend an APT model.

Together with the risk-free rate of return, the equity premium may well be the single-most important number in financial economics. It holds sway not only over asset-allocation choices (whether to invest in equities or fixed-income securities), but also influences the capital budgeting choices of many firms through its critical role in the capital-asset-pricing model. Unfortunately, there is not only no generally accepted equity premium point estimate, there is not even a commonly agreed-upon *method* to estimate it.[1] This is why it is interesting to investigate a meta-estimate obtained from many different methods and/or many individuals.

The opinions of financial economics professors are intriguing for a number of reasons. First, financial economists in academic departments themselves influence the general opinion of practitioners. After all, many practitioners have enrolled in academic finance courses at one point in their careers. Second, academic financial economists have little at stake in a particular estimate—they do not need to convince themselves and others that the equity premium is either high or low. Third, thinking about issues such as the equity premium is their essential job function.

Nevertheless, this survey does not advocate that the academic professorial consensus equity premium estimate should be seen as the best availableestimate. Instead, this consensus estimate should be viewed as the best "common practices" estimate for use in an academic setting.

Surveying academic financial economists about their equity premium opinions has a history. In October 1997 and October 1998, I took a first survey of academic financial economists. Welch (2000) reported that their consensus arithmetic equity premium estimate was about 7% per annum over 10-30 year horizons, and 6-7% over 1- to 5-year horizons. The optimistic/pessimistic range was from 2% to 13% per annum. Respondents claimed that they would revise their forecasts downward when the stock market rose. They believed other professors had a higher consensus estimates than their own.

[1] Section I of Welch (2000) enumerates these methods. (Since then, there have been many interesting variations on these basic methods.) Welch (2007) is a less conventional alternative—possibly for good reason!

In August 2001 (after the end of the Tech rally of the late 1990s), I conducted a shorter version of the original survey. The answers of about 400 individuals were described in Welch (2001). By this point, the 1-year equity premium estimate had falled to 3%, the 30-year equity premium estimate had fallen to about 5% to 5.5%.

In December 2007, I conducted the survey described in this update. Again, just under 400 finance professors participated. Participants estimate the 1-year equity premium and the 30-year geometric equity premium to be about 5%. The sample interquartile range is 4% to 6%. The typical range that these professors recommend in their classes is a little higher (from 4% to 7%, with a mean of 6%), but comfortably encompasses their own estimates. Since 2001, participants have become more bearish (by about 0.5%).

My respondents estimate the 30-year arithmetic equity premium estimate to be about 75 basis points higher than its geometric equivalent; and they estimate the 30-year stock market expected rate of return to be about 9%. The difference suggests an annual standard deviation of about 12-15%. This is also generally in line with their estimates of the probability of a decline in the stock market.

Finally, I asked one question not directly related to the equity premium—what method my survey participants would recommend for corporate capital budgeting purposes. 75% of finance professors recommend the CAPM, 10% recommend the Fama-French model, and 5% recommend an APT model. (The rest recommend a variety of other methods.)

I The Web Survey Form

On December 20, 2007, the American Finance Association kindly posted a note requesting participation in my survey on its web site. I also sent a short email requesting survey participation to about 6,600 email address culled from my own and the Ohio State University list of finance professors. (Many of the addresses were invalid, outdated, or duplicates.) Its text read:

> Most of us are teaching the CAPM, where we have to use some estimate of the equity premium. Clearly, none of us know what the expected equity premium really is. However, many of us find it valuable to know what other finance professors are using. If nothing else, it provides a "standard practice" number.
>
> In 1998, I conducted such a survey, and published it in the Journal of Business (also available from SSRN). Of course, this is now quite dated. It is quite possible that the consensus has changed. Therefore, I would like to take a new survey. I will post the results on my website and on SSRN in a short note for common use.
>
> Of course, we are all just making educated guesses here. So, please don't leave answering this survey only to "other experts." (The survey has a field that allows you to tell me how comfortable or uncomfortable you are in providing your guestimates.)
>
> So, I am begging you to go to
> http://welch.econ.brown.edu/equpdate-form2008.html
> and fill out as much as you deem reasonable. It should not take you more than 5 minutes.
>
> And, of course, I would very much appreciate your help.

[Table 1]

Table 1 reproduces the html form that was used to administer the survey.[2]

By January 7, 2008, I had received 630 responses. Of these, 369 respondents had [a] provided an email address that ended with the string “edu” (or had filled out the survey from a host ending its domain name in “edu”), and [b] answered affirmatively that they were a finance professor.

II The Results

83 of the 543 respondents stated that they had participated in my original survey in 1998-9, 92 had participated in 2001. 235 respondents were not familiar with the resulting paper (Welch (2000)); 214 stated that it had no influence on them. 53 participants stated that the paper had lowered their own estimates; and 10 participants stated that it had raised their original estimates. (Among U.S. finance professors, 32 indicated it had lowered their estimates, 6 that it had raised their estimats.)

[2] Over the course of the week, I made small corrections and improvements to the web survey. None of them was significant enough to influence the results.

A Parametric Estimates

[Table 2]

Table 2 reports the main findings of this December 2007 update. The table distinguishes between my aforementioned core sample 369 U.S. financial economics professors and the 219 other respondents.

- In general, medians are fairly uninformative, because most participants rounded their estimates to integers. Thus, truncated means are better statistics.

- The average and typical equity premium estimate among the sample of U.S. financial economists was around 5%. This applies both to the geometric 30-year estimate and to the 1-year estimate.

- The arithmetic 30-year equity premium estimate was about 0.7% to 0.8% higher than its geometric equivalent. The arithmetic/geometric difference implies an annual volatility estimate of about 12% to 13% per annum.

- Most of the remaining participants identified themselves as foreign finance professors. (Unlike U.S. economists, where an .edu address helps confirm the identity, there was no easy way for me to get a second piece of information confirming identity.) Table 2 shows that foreign finance professors were more conservative. For the 1-year forecast, their average estimate is about 90 basis points lower. For the 30-year forecast, it is about 40-50 basis points lower. [Figure 1]

  Figure 1 plots the density of *all* responses. The non-parametric smoother shows that 4% and 5% were the most common attractors.

The remainder of this paper focuses on the core sample of identified U.S. finance professors.

- In class, survey participants use a 6% estimate, which is higher than their own beliefs—but they also advocate a range from 4% to 7% that comfortably encompasses their own opinion.

- The participants suggest that they have lowered their estimates over the last 6 years by about 0.6% to 0.7%.
- The expected stock market rate of return exceeds the equity premium by about 3%.

B Volatility Estimates

[Table 3]

Table 3 shows the estimates of equity risk perceived by my survey participants. The average and typical probability of a decline in the stock market over the next year is estimated to be about 1/3. This is consistent with the aforecomputed volatility estimate of about 12-13% per annum.

A decline of more than 20% is perceived to have a probability of around 10%. This suggests a fat-tailed distribution. If the return distribution were normal, the probability estimate should be under 2.5%.

On the other hand, the probability of losing 20% or more under the aforementioned normal distribution (mean 5.8%, standard deviation 13%) is about 4%. This is reasonably close to the 5% median estimate provided by the survey participants.

C Heterogeneity

[Table 4]

Table 4 shows that the average participant in the survey (not surprisingly) believes that (s)he has thought more about the relevant issues. There is no clear pattern between the self-assessed expertise of participants and their 1-year forecasts. There were only 12 participants who stated that they had thought a lot less than their peers about the issue. Of the remaining participants, there seems to be a mild relation between having thought more about the issue and believing in a smaller equity premium estimate.

[Table 5]

Table 5 shows that there is no important relationship between perceiving the survey as clear and the answers.

[Table 6]

Table 6 shows that 47 respondents who claimed to have become more bullish since 2004 had 1-year and 30-year arithmetic equity premium estimates about 30-50 basis points higher than the average. Their 30-year geometric estimate was however only 10 basis points higher than average. 122 respondents who had become more bearish were about 30 to 80 basis points more pessimistic than average.

D Method of Capital Budgeting

[Table 7]

I took the opportunity to ask respondents what method they would recommend for corporate capital budgeting. Table 7 shows that the CAPM is recommended by 265 out of 360 respondents. The strong theoretical underpinning of the CAPM seems to outweigh the fact that it has almost no empirical evidence supporting it. In contrast, the Fama-French model, which lacks a strong theoretical underpinning but performs well empirically, can garner only 41 supporters. General APT approaches to capital budgeting are even less prominent.

III Data

The data (sans identifying information) from this survey will be available at

http://welch.econ.brown.edu/academics/.

This paper will not be published and may move. Please cite the original Welch (2000) paper, and refer to this paper as the 2007 update.

References

Welch, I., 2000, "Views of Financial Economists on the Equity Premium and on Professional Controversies," *Journal of Business*, 73(4), 501–537.

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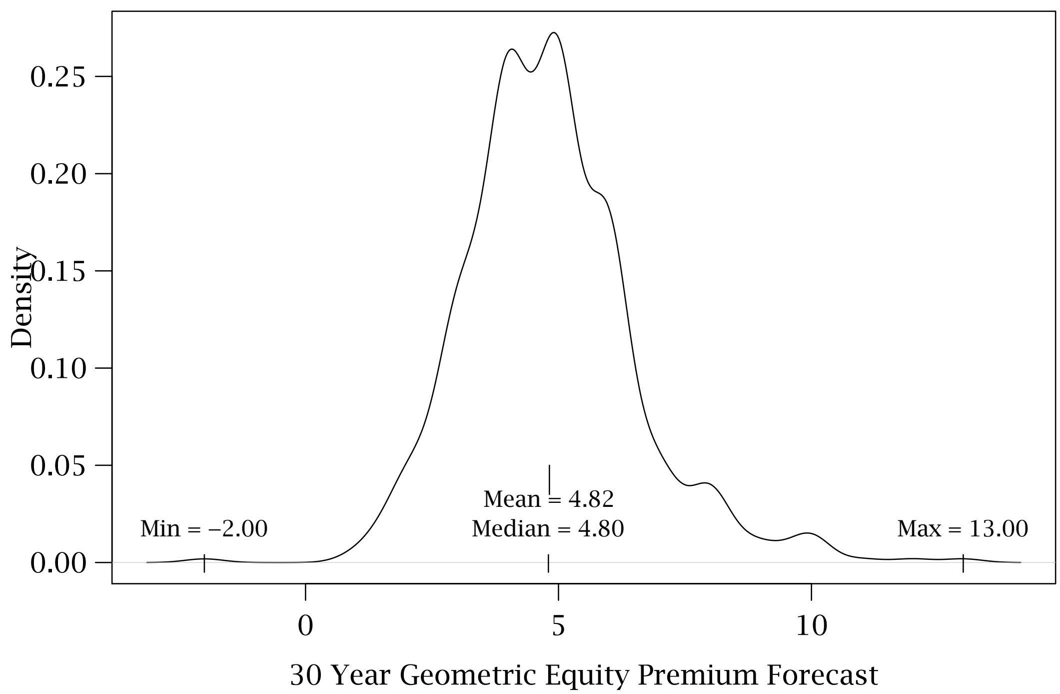
Figure 1: Density Plot of 30-Year Geometric Equity Premium Estimates



Explanation: This plot includes *all* responses. The few extreme non-sensical responses drop out of the subsample of U.S. finance professors.

Table 1: The HTML Survey Form

Short Academic Equity Premium Survey

Your answers to this short survey will be used to update my Journal of Business equity premium survey from 1998 (and its follow-up from 2001). Your answers will be held strictly confidential. If you have difficulties filling out this survey, please send an email to Ivo Welch.

Background Information: For the prevailing yield curve, click [yahoo link]. For the prevailing S&P500, click [yahoo link]

Personal Information

My email address is:	______________
I am a finance or economics professor:	Yes. No. Soon.
Relative to other financial economists, I would guess that I have thought about the equity premium	no answer, a lot more carefully, more carefully, about the same, less carefully, a lot less carefully
I participated in Ivo Welch's previous equity premium survey in 1998/1999:	Yes. No.
I participated in Ivo Welch's update for the equity premium survey in 2001:	Yes. No.
If you read either my original JB survey paper or its update, did it influence you to lower or raise your estimate?	no answer did not read read it, but it had no influence read it, lowered my own estimate read it, raised my own estimate
Relative to my views 6 years ago, my views about the stock market's long term performance are today:	no answer a lot more bullish than in 2001 more bullish about the same more bearish a lot more bearish

(Table 1 continued.)

Parametric Equity Premium Estimates

I expect the average equity premium over the next 1 year to be (define avg equity premium as the expected return on the value-weighted US market net of short-term T-bills)	______ percent per year.
I expect the average arithmetic equity premium over the next 30 years to be (relative to future contemporaneous short-term (3 month) T-Bills*)	______ percent per year.
I expect the average geometric* equity premium over the next 30 years to be (relative to future contemporaneous short-term (3 month) T-Bills)	______ percent per year.
G30-A.1: Same question: In your classes, what is the main number you are recommending for long-term CAPM purposes?	______ percent per year.
G30-A.2: Same question: In your classes, if you give a reasonable range for CAPM use, what is it?	______ to ______ percent per year.
G30-B: Same question: What would you have answered to the main question (30 year geo equity premium forecast) 6 years ago, i.e., in 2001?	______ percent per year.
I expect the average nominal geometric stock return (not equity premium!) over the next 30 years to be	______ percent per year.

(Table 1 continued.)

Non-Parametric and Probability Equity Premium Estimates

Please give me an over/under bet for the S&P500 for December 31, 2008: your level estimate should result in a risk-neutral, fair bet for either side (i.e., not adjusted for hedging/risk premia)	______________
What is the probability that the stock market will go down over the next 12 months? think of the market here as the Vanguard S&P500 fund (level plus dividends) total rate of return, not the equity premium.	______ percent probability
What is the probability that the stock market will decline (lose money) over the next 12 months by 20% or more?	______ percent probability
What is the probability that the stock market will decline (lose money) over the next 10 years?	______ percent probability
Off-hand question: How should non-financial corporations do project capital budgeting? Pick most applicable.	no-answer Use CAPM (or CAPM variant), equity premium 2-3% Use CAPM (or CAPM variant), equity premium 3-5% Use CAPM (or CAPM variant), equity premium 5-6% Use CAPM (or CAPM variant), equity premium 6-7% Use CAPM (or CAPM variant), equity premium 7-8% Use Fama-French-type Model Use APT-type Model Use Statistical Model—Historical Market Model Use Statistical Model—Historical Industry Model Use Equity Premium Estimate, no matter what Use 10 percent, no matter what
(continued:) Is this what you tell your students?	no-answer yes no
Were the questions in this survey clear?	no answer clear muddy unclear
Do you want me to email you with the results when I have them?	no answer yes no

Table 2: The Parametric Predictions

	Percentiles							Moments			
	00	05	25	**50**	75	95	100	mean	|**mean**|	sd	N
1-Year Equity Premium	−10.0	1.0	4.0	**5.0**	6.0	8.0	12.0	4.86	**4.95**	2.53	369
Omitted Self-Id'ed Finance Profs			*3.0*	*4.0*	*6.0*				*4.00*	*3.11*	*183*
Same for All Omitted Individuals			*3.0*	*4.0*	*6.0*				*4.01*	*3.33*	*219*
30-Year Ari Eq Prem	2.0	3.0	4.5	**5.8**	7.0	8.6	12.0	5.74	**5.69**	1.67	370
Omitted Self-Id'ed Finance Profs			*4.0*	*5.0*	*6.0*				*5.20*	*1.65*	*186*
Same for All Omitted Individuals			*4.0*	*5.0*	*6.0*				*5.21*	*1.69*	*218*
30-Year Geo Eq Prem	−2.0	2.8	4.0	**5.0**	6.0	8.0	13.0	5.00	**4.97**	1.68	363
Omitted Self-Id'ed Finance Profs			*3.5*	*4.0*	*5.0*				*4.46*	*1.74*	*172*
Same for All Omitted Individuals			*3.5*	*4.0*	*5.0*				*4.46*	*1.70*	*202*
Used in class	2.0	4.0	5.0	**6.0**	7.0	8.5	20.0	5.96	**5.89**	1.70	360
Min in class	−2.0	2.0	3.0	**4.0**	5.0	7.0	10.0	4.34	**4.35**	1.51	333
Max in class	3.0	5.0	6.0	**7.0**	8.0	11.0	85.0	7.76	**7.50**	4.67	336
30-Year Geo Eq Prem in 2001	−4.0	3.0	4.5	**6.0**	7.0	8.0	12.0	5.69	**5.68**	1.81	325
Change from 2001 (Geo 30)	−4.5	−3.0	−2.0	**−0.6**	0.0	1.6	5.8	−0.77	**−0.81**	1.52	316
Same for All Omitted Individuals			*-2.0*	*−0.5*	*0.0*				*−0.75*	*1.48*	*166*
30-Year Stock Market Return	1.0	6.0	8.0	**9.0**	10.0	12.0	16.0	9.08	**9.11**	1.97	368
Over-under Bet	1,000	1,360	1,500	**1,558**	1,600	1,650		2,900	**1,547**	1,544	245

Explanation: Most numbers are quoted in percent per year, except the over-under bet (and of course the number of observations).

Table 3: Probability of A Stock Market Decline

	Percentiles							Moments			
	00	05	25	**50**	75	95	100	mean	|mean|	sd	N
over next 12 months	1	15	30	**35**	50	60	90	37.79	35.96	16.40	355
20% or more over 12 months	1	2	5	**10**	15	30	80	11.94	11.44	10.94	348
20% or more over 10 years	0	1	2	**5**	10	30	95	7.96	6.86	12.02	318

Explanation: |mean| is the trimmed mean, where answers are winsorized at the 5th and 95th percentiles. The rest should be self-explanatory.

Table 4: Estimates By Expertise, in Percent Per Year

	N	1-Year Equity Premium	30-Year Arithmetic	30-Year Geometric	Difference Ari vs. Geo
Thought Lot Less	12	5.1	5.0	4.7	0.35
Thought Less	57	5.1	6.1	5.5	0.69
Same	172	4.8	5.8	5.1	0.82
Thought More	95	4.7	5.6	4.8	0.85
Thought Lot More	41	5.2	5.3	4.3	0.78
Missing	10+	4.9	5.9	5.6	0.37

Explanation: The reported statistics are trimmed means, quoteed in percent.

Table 5: Estimates By Perception of Clarity, in Percent Per Year

	N	1-Year Equity Premium	30-Year Arithmetic	30-Year Geometric	Difference Ari vs. Geo
Unclear	7	5.0	6.3	5.8	0.53
Muddy	64	4.9	5.5	4.8	0.69
Clear	277	4.8	5.7	5.0	0.80
Missing	30+	5.0	6.1	5.6	0.76

Explanation: The reported statistics are trimmed means, quoteed in percent.

Table 6: By History: More Bearish or Bullish since 2001? (In Percent Per Year)

	N	1-Year Equity Premium	30-Year Arithmetic	30-Year Geometric	Difference Ari vs. Geo
more bearish	122	4.2	5.5	4.7	0.79
same	163	5.2	5.8	5.1	0.80
more bullish	47	5.4	6.1	5.1	0.86
Missing	55+	4.8	5.9	5.4	0.62

Explanation: This combines the categories of bullish with very bullish, and bearish with very bearish. The reported statistics are trimmed means, quoteed in percent.

Table 7: Recommended Model of Capital Budgeting, in Percent Per Year

	N	1-Year Equity Premium	30-Year Arithmetic	30-Year Geometric	Difference Ari vs. Geo
CAPM, 2-3%	23	2.4	3.6	2.7	0.92
CAPM, 3-5%	19	4.1	4.5	3.7	0.87
CAPM, 5-6%	150	5.0	5.7	4.9	0.84
CAPM, 6-7%	24	5.9	6.1	5.4	0.80
CAPM, 7-8%	49	6.1	7.6	6.6	1.00
Fama-French	41	4.7	5.9	5.5	0.48
APT	21	4.0	5.7	4.7	0.69
Industry Model	14	4.7	5.8	5.0	0.92
Market Model	4	4.9	4.9	5.3	0.25
Equity Premium	8	4.3	5.1	5.4	–0.35
10%	7	3.9	4.5	4.0	0.74
Missing	29	4.5	5.1	4.7	0.50

Explanation: The reported statistics are trimmed means, quoteed in percent.

Welcome to bull country

Have investors grown more courageous, or just more foolish? The outlook for the world economy may turn on the answer—and that depends on an elusive measure known as the "equity premium"

EVERY day, it seems, another official joins the throngs who are warning the western world about overvalued stockmarkets. Even cautious central bankers have been speaking out. Alan Greenspan, chairman of America's Federal Reserve, has mostly kept his counsel since the markets rudely ignored his mutters, 18 months ago, about "irrational exuberance". But recently Hans Tietmeyer, president of Germany's Bundesbank, joined the doom merchants, promising that a gathering of central bankers this week would discuss the problem "intensively". And the International Monetary Fund has also declared that stockmarkets should be watched carefully.

Investors seem singularly unimpressed. The lead continues to be set by Wall Street, whose bulls have driven American share prices ever higher into the stratosphere. The Dow Jones Industrial Average hit a new all-time high of 9,246 on July 14th; European markets were not far behind. Triumphant bulls have come up with many different explanations for the markets' exuberance. America's corporations have discovered new, world-beating skills; the computer age has created a wholly different economy; the Asian crisis means money is desperately searching safer havens; or, in a nod to those central bankers, monetary policy has killed inflation and even the business cycle. Yet none of these has converted the doomsters.

So now a new explanation is on offer. The key to Wall Street's continuing miracle, bulls have started arguing, is more enduring even than their other claims: the new courage of small investors. The suggestion is that the rules they have followed in the past may no longer apply. Having overcome a previously irrational fear of the risks of equities, they are now pouring into them. And since their enlightenment is irreversible, the bulls conclude, the trend should continue indefinitely.

Although most popular in America, this argument is starting to be heard elsewhere too. Fund managers in Europe may be impressed by America's low unemployment and high growth. But what they most want to borrow from across the Atlantic is the apparent change in investors' attitudes. If governments would get out of the pension business and investors could be persuaded to buy more equity mutual funds, Europe could enjoy a similar bull run to Wall Street's. Indeed, optimists believe that the recent run-up in European shares—they have mostly outpaced America's this year—shows this is already happening.

Of course, there are still bulls who prefer to justify high share prices in traditional ways, predicting rampant growth in profits far into the future. But as America's expansion starts to stutter, these claims are wearing thin. The total value of American equities is now $12 trillion—double the level of two years ago—but profit growth has been slowing sharply. Thus the new reliance on investors' changed attitudes. The message is: forget the New Economy; say hello to the New Investor.

Returns to go

It is not just giddy portfolio managers who herald the New Investor's arrival. As with most financial fashions, this one claims support from economists as well. They may use different jargon. But their belief in the New Investor is just as strong—perhaps because they have spent so long trying, and failing, to understand the old one.

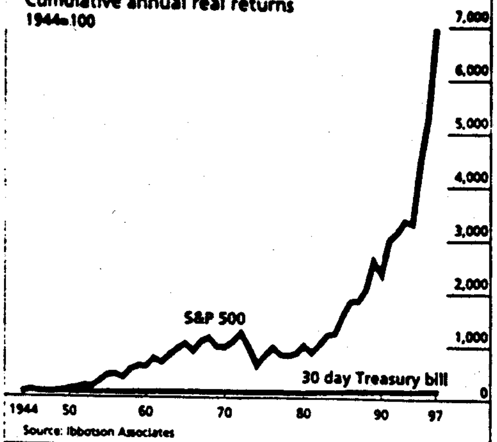
The reason for their confusion is something called the "equity premium". In essence, this is the average extra return (including dividends and capital gains) that investors expect to earn above that on safer investments—such as American Treasury bonds—if they invest in riskier equities instead. This number, which can be thought of as the current price of risk, has a huge influence on share prices.

The equity premium has particularly troubled economists since 1985, when Rajnish Mehra and Edward Prescott published a paper* arguing that it was too big to be consistent with prevailing theories. They assessed this by looking at almost a century of returns for American stocks and bonds. After adjusting for inflation, equities had average real returns of around 7% a year, compared with only 1% for Treasury bonds—a 6% equity premium (see chart 1 on next page).

A small premium seemed justified, since returns on equities had bounced around more than those on bonds—that is, stocks were riskier. But since they found a relatively small difference in risk between bonds and shares, a six-point premium looked ridiculously high. A smaller premium (prevailing theory suggested less than a percentage point) should have been enough to lure investors into shares; six points implied that investors were cowed by even the slightest risk of a loss. If people made daily decisions in the same way they invested money, few would ever cross the street. The economics profession, the authors concluded, had a puzzle on its hands.

* "The Equity Premium: a Puzzle". Journal of Monetary Economics. 1985.

Too risky?
Cumulative annual real returns
1944=100



Source: Ibbotson Associates

Economists have been struggling to solve it ever since. Market watchers are starting to take a keen interest. It is not hard to see why. If the equity premium fell, it should be easier to persuade investors to buy shares. At present, when compared with the six-point premium investors appear to have demanded in the past, potential returns look too low to do that. But a smaller equity premium could make those low returns more than adequate—even with no improvement in the economic (and profit) outlook.

The upper half of chart 2 shows how heavily share prices can be affected by even small changes in investors' expected returns. Suppose, for example, that investors demand a 9% return on equities before they are willing to buy. And suppose that the expected growth in profits—and hence in dividends—is around 7½% for the foreseeable future. With 7½% dividend growth, investors would need only a 1½% dividend "yield" (the ratio of dividends to share prices) to be induced to buy. That is roughly the yield on the S&P 500 at the moment, suggesting that shares are currently priced about right.

Premium prices 2

Required returns and market values

Required investor returns, %	Expected dividend growth, %	Implied S&P 500 dividend yield, %	Implied S&P 500 market capitalisation $trn
9	7.5	1.5	[illegible]
10	7.5	2.5	[illegible]

Equity premiums and dividend growth

Dividend yield, %	Treasury bond yield, %	Equity premium	Required dividend growth, %
(A	– B)	+ (C)	[illegible]
1.5	6	[illegible]	[illegible]
1.5	6	[illegible]	[illegible]
1.5	6	[illegible]	[illegible]
1.5	6	[illegible]	[illegible]

Source: Datastream/ICV

Suppose, however, that investors really wanted a 10%, rather than a 9%, return. That may seem only a small difference. But if dividend growth remained unchanged, this small difference could have a devastating effect on shares. To deliver the extra percentage point in returns—with no change in future dividend growth—the current dividend yield would have to rise from 1½% to 2½%. And since dividends are unchanged, the only way for the yield to rise is for the price of shares to fall—in this case by a heart-stopping 40%. If you doubt whether the equity premium matters, the difference between a Dow above 9,000 and one of 5,400 ought to convince you.

What level of returns are investors in American markets demanding at present? Unfortunately, it is impossible to say. The current value of shares reflects a balance between the returns that investors want and the returns they actually expect. But neither figure can be estimated on its own. The best one can do is to work out combinations of equity premiums and dividend growth that are consistent with the current level of share prices.

The lower part of chart 2 does this. The third column shows different levels of the equity premium, ranging from zero to six percentage points. The fourth column shows different rates of growth in dividends (which over the long term must equal the growth in corporate profits). If the equity premium is still at its historic rate of six points, investors should require returns of 12% a year (the current yield on America's long bond is around 6%) before they buy shares. Since the current dividend yield is around 1½%, that means that profits must grow by around 10½% a year to justify the present price level of American equities.

By contrast, if the equity premium has vanished completely, the required return on shares is only 6%. Current share prices could then be supported by profit growth of only 4½% a year. No wonder America's bulls have discovered the equity premium. A determined optimist needs only to plug a lower risk premium into his trusty equation and—hey presto!—share prices look just right, or even a bit low.

To the uninitiated, this argument may seem circular. It amounts to saying that share prices have soared because investors are more confident, something most people might consider obvious. Yet focusing on the equity premium can still be useful. If it has shrunk, examining why can illuminate what has made investors more confident—and whether their confidence is sustainable.

Has the equity premium really shrunk? That depends on why it was so high in the first place. There is no shortage of explanations on offer. Some economists argue that the premium only seemed to be high because it was not measured properly. Economists can estimate the premium only retrospectively, assuming that over the long run investors have received roughly what they expected. If the American stockmarket has done better than anyone could have hoped, they might argue, using its performance to measure the equity premium may make it seem artificially high.

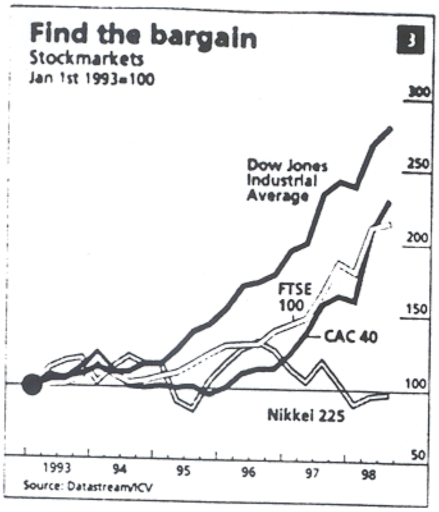
One recent study* argues that this is precisely what the evidence from other stockmarkets shows. Using data from 39 national stockmarkets going back to the 1920s, William Goetzmann of Yale University and Philippe Jorion of the University of California, Irvine, found that investors in America were by far the luckiest, earning an annual real return of 5%, compared with an average of 1½% everywhere else. So measuring the equity premium using only American data could make it appear 3½ percentage points higher than it really is.

Unprofitable future

If this argument is right, it is mixed news for today's investors. It may justify the present level of the market, but it also means that the extra rewards from investing in shares rather than bonds could be lower in future than they have been in the past 70 years. However, in a survey† of academic research on the equity premium, two other economists—Jeremy Siegel of the Wharton School and Richard Thaler of the University of Chicago—suggest that this argument is wrong. They agree that returns on American equities have been high by international standards, but point out that returns on American Treasury bonds have also been relatively high. In countries such as Germany and Japan, which have experienced massive share-price collapses in the 20th century, bond prices have fallen at the same time. They argue that since good and bad luck have extended to bonds as well as shares, the equity premium has not been artificially inflated.

These arguments offer several interesting ways of looking at the equity premium. One lies in a distinction between people's attitudes towards risk and the actual level of risk. Economists find the risk premium puzzling mainly because they do not understand why people are put off by the stockmarket's apparently low risk. But the $12 trillion question is whether, in the long run, the market is really as safe as economists think it is. The past may not be a sure guide to the future. Equally, especially

* "A Century of Global Stockmarkets". NBER Working paper. January 1997.
† "Anomalies: The Equity Premium Puzzle". Journal of Economic Perspectives. Winter 1997.



given the risk of inflation, bonds may not be as safe as markets assume—and equities, a better inflation hedge, may be safer.

Second, it is pointless to evaluate the stockmarket in isolation. The question is whether the market is fairly valued relative to the alternatives. The equity premium measures how the market is priced relative to American Treasury bonds. Since American interest rates are low, and investors no longer seem to fear inflation, shares look attractive relative to other domestic investments. But that says nothing about whether investors have too much money in America. The economies of continental Europe are beginning to grow faster; asset prices in Asia are a lot lower than they were a year ago. If investors have funnelled too large a proportion of their savings into American assets, both bonds and shares could be overvalued, even if the equity premium is about right.

The fact that economists cannot measure risk accurately, or explain why American investors have been so reluctant to diversify abroad, suggests that they have a long way to go before they understand investors' behaviour. They have crunched enough numbers over the years to know that, overall, the stockmarket behaves remarkably efficiently—more so than most investors realise. Yet when they come across a problem they cannot explain, their weak comprehension of investors' behaviour leaves them at a loss.

One example is to be found in the differences between the short and long terms. Young investors should have different priorities from older ones, since some of the risks of stocks balance out over time. Yet economists cannot agree on how to take account of these time horizons. In a recent study with two other co-authors*, Mr Mehra, one of the economists who started it all, argues that the equity premium is so high because there is a fundamental gap between the investment goals of young and middle-aged workers. The stockmarket, he argues, offers a good hedge against uncertain wages: a worker skilled at, say, making cars risks seeing the value of his skills fade over time, but he can partly offset this by investing in different industries that contain future Microsofts as well as future GMs.

Many workers would be far better off if they could borrow lots of money while they are young and invest it in equities. When they are older, they might want to place more of their money in bonds, since uncertainty about their future wages has diminished and they no longer need equities to hedge their bets. However, since job skills do not make good collateral, young and old workers are unable to strike this bargain. This has the effect, Mr Mehra argues, of weakening the demand for equities. So buyers of equities get them cheap, earning a higher premium over time.

If this is right, the equity premium will have fallen permanently only if the constraints on would-be young investors have weakened. It is conceivable that defined-contribution pension accounts and easier access to loans have had this effect. But Mr Mehra argues that it is still almost impossible for young workers to borrow fully against expected future earnings. And according to his model, even small constraints on borrowing are able to generate a hefty premium on equities.

From theory to practice

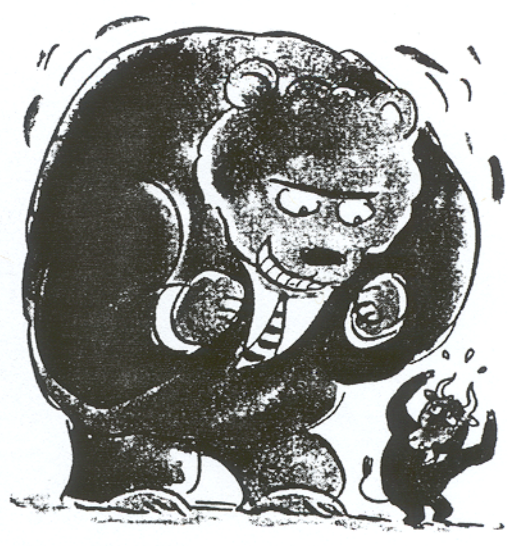
These explanations are far from the only ones that economists have come up with. One of the most intriguing has been put forward by Mr Thaler. He asks what would happen if investors were to deviate from economists' textbook models in two ways: by focusing on the returns they earn, rather than the money they have to spend; and by judging the risk of an investment according to how often they look at their portfolio—even if their plan is never to change it. If investors do behave this way, Mr Thaler argues, a high equity premium becomes easier to understand. That is because the more often investors study their portfolios, the worse they will feel, and the more they will be intimidated by even small risks.

He shows this by inverting the logic of the equity premium debate. Using reasonable estimates of people's risk aversion, and taking into account the historic volatility of bond and share prices, he concludes that an average evaluation period of around 13 months is enough to explain investors' past behaviour. Such a period may seem all too familiar to fund managers dealing with league tables based on annual performance. But it also implies that as more of people's money is given to those fund managers, the equity premium should go up, not down.

The more economists grapple with the puzzle, in other words, the more different images of the stockmarket they come up with. In fact, to get their models to make sense, economists often assume that the equity premium changes over time—hardly a reassuring concept for those who are betting their pensions. Moreover, a recent survey of financial economists suggests that, even after 15 years of pondering the premium, estimates of its level still vary wildly. Ivo Welch, at the University of California, Los Angeles, surveyed over 100 financial economists at top business schools. A quarter of them think the premium is less than three percentage points; but another quarter put it above seven. For those who like to bet the averages, the economists' median estimate for the risk premium over the next 30 years is around six percentage points—suggesting that little has changed.

All of this should remind investors that they face another kind of risk, very different from those that economists and fund managers usually discuss. That is the risk that they have no idea what they are doing. Yes, the equity premium seems to have been inexplicably high in the past. And since investors in America (and, increasingly, Europe) have unprecedented access to mutual funds and to financial information, it is conceivable that their attitudes towards risk have changed fundamentally.

But given the slowdown in corporate profits, and the inflated price of American equities, it would take a massive drop in the equity premium—perhaps to only a percentage point or two—to make Wall Street seem cheap. And even if the premium had indeed fallen by that much, there could be no guarantee it will stay that low for ever. In short, since nobody really knows how big the equity premium is or what influences it, it would seem wise to assume that what goes up will also come down—eventually. ■



* "Junior Can't Borrow: A New Perspective on the Equity Premium Puzzle". Working paper. November 1997.

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UTILITY STOCKS AND THE SIZE EFFECT: AN EMPIRICAL ANALYSIS

Annie Wong*

I. Introduction

The objective of this study is to examine whether the firm size effect exists in the public utility industry. Public utilities are regulated by federal, municipal, and state authorities. Every state has a public service commission with board and varying powers. Often their task is to estimate a fair rate of return to a utility's stockholders in order to determine the rates charged by the utility. The legal principles underlying rate regulation are that "the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks," and that the return to a utility should be sufficient to "attract capital and maintain credit worthiness." However, difficulties arise from the ambiguous interpretation of the legal definition of *fair and reasonable rate of return* to an equity owner.

Some finance researchers have suggested that the Capital Asset Pricing Model (CAPM) should be used in rate regulation because the CAPM beta can serve as a risk measure, thus making risk comparisons possible. This approach is consistent with the spirit of a Supreme Court ruling that equity owners sharing similar level of risk should be compensated by similar rate of return.

The empirical studies of Banz (1981) and Reinganum (1981) showed that small firms tend to earn higher returns than large firms after adjusting for beta. This phenomenon leads to the proposition that firm size is a proxy for omitted risk factors in determining stock returns. Barry and Brown (1984) and Brauer (1986) suggested that the omitted risk factor could be the differential information environment between small and large firms. Their argument is based on the fact that investors often have less publicly available information to assess the future cash flows of small firms than that of large firms. Therefore, an additional risk premium should be included to determine the appropriate rate of return to shareholders of small firms.

The samples used in prior studies are dominated by industrial firms, no one has examined the size effect in public utilities. The objective of this study is to extend the empirical findings of the existing studies by investigating whether the size effect is also present in the utility industry. The findings of this study have important implications for investors, public utility firms, and state regulatory agencies. If the size effect does exist in the utility industry, this would suggest that the size factor should be considered when the CAPM is being used to determine the fair rate of return for public utilities in regulatory proceedings.

II. Information Environment of Public Utilities

In general, utilities differ from industriales in that utilities are heavily regulated and they follow similar accounting procedures. A public utility's financial reporting is mainly regulated by the Securities and Exchange Commission (SEC) and the Federal Energy Regulatory Commission (FERC). Under the Public Utility Holding Company Act of 1935, the SEC is empowered to regulate the holding company systems of electric and gas utilities. The Act requires registration of public utility holding companies with the SEC. Only under strict conditions would the purchase, sale or issuance of securities by these holding companies be permitted. The purpose of the Act is to keep the SEC and investors informed of the financial conditions of these firms. Moreover, the FERC is in charge of the interstate operations of electric and gas companies. It requires utilities to follow the accounting procedures set forth in its Uniform Systems of Accounts. In particular, electric and gas utilities must request their Certified Public Accountants to certify that certain schedules in the financial reports are in conformity with the Commission's accounting requirements. These detailed reports are submitted annually and are open to the public.

*Western Connecticut State University. The author thanks Philip Perry, Robert Hagerman, Eric Press, the anonymous referee, and Clay Singleton for their helpful comments.

The FERC requires public utilities to keep accurate records of revenues, operating costs, depreciation expenses, and investment in plant and equipment. Specific financial accounting standards for these purposes are also issued by the Financial Accounting Standards Board (FASB). Uniformity is required so that utilities are not subject to different accounting regulations in each of the states in which they operate. The ultimate objective is to achieve comparability in financial reporting so that factual matters are not hidden from the public view by accounting flexibility.

Other regulatory reports tend to provide additional financial information about utilities. For example, utilities are required to file the FERC Form No. 1 with the state commission. This form is designed for state commissions to collect financial and operational information about utilities, and serves as a source for statistical reports published by state commissions.

Unlike industriales, a utility's earnings are predetermined to a certain extent. Before allowed earnings requests are approved, a utility's performance is analyzed in depth by the state commission, interest groups, and other witnesses. This process leads to the disclosure of substantial amount of information.

III. Hypothesis and Objective

Due to the Act of 1935, the Uniform Systems of Accounts, the uniform disclosure requirements, and the predetermined earnings, all utilities are reasonably homogeneous with respect to the information available to the public. Barry and Brown (1984) and Brauer (1986) suggested that the difference of risk-adjusted returns between small and large firms is due to their differential information environment. Assuming that the differential information hypothesis is true, then uniformity of information availability among utility firms would suggest that the size effect should not be observed in the public utility industry. The objective of this paper is to provide a test of the size effect in public utilities.

IV. Methodology

1. Sample and Data

To test for the size effect, a sample of public utilities and a sample of industriales matched by equity value are formed so that their results can be compared. Companies in both samples are listed on the Center for Research in Security Prices (CRSP) Daily and Monthly Returns files. The utility sample includes 152 electric and gas companies. For each utility in the sample, two industrial firms with similar firm size (one is slightly larger and the other is slightly smaller than the utility) are selected. Thus, the industrial sample includes 304 non-regulated firms.

The size variable is defined as the natural logarithm of market value of equity at the beginning of each year. Both the equally-weighted and value-weighted CRSP indices are employed as proxies for the market returns. Daily, weekly and monthly returns are used. The Fama-MacBeth (1973) procedure is utilized to examine the relation between risk-adjusted returns and firm size.

2. Research Design

All utilities in the sample are ranked according to the equity size at the beginning of the year, and the distribution is broken down into deciles. Decile one contains the stocks with the lowest market values while decile ten contains those with the highest market values. These portfolios are denoted by MV_1, MV_2, ..., and MV_{10}, respectively.

The combinations of the ten portfolios are updated annually. In the year after a portfolio is formed, equally-weighted portfolio returns are computed by combining the returns of the component stocks within the portfolio. The betas for each portfolio at year t, $\hat{\beta}_{pt}$'s, are estimated by regressing the previous five years of portfolio returns on market returns:

$$\tilde{R}_{pt} = \alpha_p + \hat{\beta}_{pt}\tilde{R}_{mt} + \tilde{U}_{pt} \qquad (1)$$

where

R_{pt} = periodic return in year t on portfolio p

R_{mt} = periodic market return in year t

U_{pt} = disturbance term.

Banz (1981) applied both the ordinary and generalized least squares regressions to estimate β; and concluded that the results are essentially identical (p.8). Since adjusting for heteroscedasticity does not necessarily lead to more efficient estimators, the ordinary least squares procedures are used in this study to estimate β in equation (1).

The following cross-sectional regression is then run for the portfolios to estimate γ_{it}, i = 0, 1, and 2:

$$R_{pt} = \gamma_{0t} + \gamma_{1t}\hat{\beta}_{pt} + \gamma_{2t}\hat{S}_{pt} + U_{pt} \qquad (2)$$

where

$\hat{\beta}_{pt}$ = estimated beta for portfolio p at year t, t=1968, ..., 1987

$\hat{S}_{pt}$ = mean of the logarithm of firm size in portfolio p at the beginning of year t

U_{pt} = disturbance term.

Depending on whether daily, weekly or monthly returns are used, a portfolio's average return changes periodically while its beta and size only change once a year. The γ_1 and γ_2 coefficients are estimated over the following four subperiods: 1968-72, 1973-77, 1978-82 and 1983-1987. If portfolio betas can fully account for the differences in returns, one would expect the average coefficient for the beta variable to be positive and for the size variable to be zero. A t-statistic will be used to test the hypothesis. The coefficients of a matched sample are also examined so that the results between industrial and utility firms can be compared.

V. Analysis of Results

1. Equity Value of the Utility Portfolios

The mean equity values of the ten size-based utility portfolios are reported in Table 1. Panels A and B present the average firm size of these portfolios at the beginning and end of the test period, 1968-1987. The first interesting observation from Table 1 is that the difference in magnitude between the smallest and the largest market value utility portfolios is tremendous. In Panel A, the average size of MV_1 is about \$31 million while that of MV_{10} is over \$1.4 billion. In Panel B, that is twenty years later, they are \$62 million and \$5.2 billion, respectively. Another interesting finding is that there is a substantial increase in average firm size from MV_9 to MV_{10}. Since these two findings are consistent over the entire test period, the average portfolio market values for interim years are not reported. These results are similar to the empirical evidence provided by Reinganum (1981).

The utility sample in this study contains 152 firms whereas Reinganum's sample contains 535 firms that are mainly industrial companies. Two conclusions may be drawn from the results of the Reinganum study and this one. First, utilities and industriales are similar in the sense that their market values vary over a wide spectrum. Second, the fact that there is a huge jump in firm size from MV_9 to MV_{10} indicates that the distribution of firm size is positively skewed. To correct for the skewness problem, the natural logarithm of the mean equity value of each portfolio is calculated. This variable is then used in later regressions instead of the actual mean equity value.

2. Betas of the Utility and Industrial Samples

The betas based on monthly, weekly and daily returns are reported for the utility and industrial samples. For simplicity, they will be referred to as monthly, weekly, and daily betas. In all cases, five years of returns are used to estimate the systematic risk. The betas estimated over the 1963-67 time period are used to proxy for the betas in 1968, which is the beginning of the test period. By the same token, the betas obtained from the time period 1982-86 are used as proxies for the betas in 1987, which is the end of the test period.

The betas from using the equally-weighted and value-weighted indices are calculated in order to check whether the results are affected by the choice of market index. Since the results are similar, only those obtained from the equally-weighted index are reported and analyzed.

Table 2 reports the monthly, weekly and daily betas of the two samples at the beginning and end of the test period. Panel A shows the various betas of the industrial portfolios. Two conclusions may be drawn. First, in the 1960's, smaller market value portfolios tend to have relatively larger betas. This is consistent with the empirical findings by Banz (1981) and Reinganum (1981). Second, this trend seems to vanish in the 1980's, especially when weekly and daily returns are used.

The betas of the utility portfolios are presented in Panel B. The table shows that none of the utility betas are greater than 0.71. A comparison between Panels A and B reveals that utility portfolios are relatively less risky than industrial portfolios after controlling for firm size. The comparison also reveals that, unlike industrial stocks, betas of the utility portfolios are not related to the market values of equity.

The negative correlation between firm size and beta in the industrial sample may introduce a multicolinearity problem in estimating equation (2). Banz (p.11) had addressed this issue and concluded that the test results are not sensitive to the multicolinearity problem. For the utility sample, this problem does not exist.

3. Tests on the Coefficients of Beta and Size

The beta and firm size are used to estimate γ_1 and γ_2 in equation (2). A t-statistic is used to test if the mean values of the gammas are significantly different from zero. The tests were performed for four 5-year periods which are reported in Table 3. The mean of the gammas and their t-statistic are presented in Panel A for the utilities and in Panel B for the industrial firms.

The empirical results for the utility sample are reported in Panel A of Table 3. When monthly returns are used, 60 regressions were run to obtain 60 pairs of gammas for each of the 5-year periods. When daily returns are used, over 1200 regressions were run for each period to obtain the gammas. The results are similar: in all of the time periods tested, none of the average coefficients for beta and size are significantly different from zero. When weekly returns are used, 260 pairs of gammas were obtained. The average coefficients for beta are not significant in any test period, and the average coefficients for size are not significant in three of the test periods. For the test period of 1978-82, the average coefficient for size is significantly negative at a 5% level.

The test results for the industrial sample are reported in Panel B of Table 3. When monthly returns are used, the average coefficient estimates for size and beta are significant and have the expected sign only in the 1983-87 test period. When weekly returns are used, only the size variable is significantly negative in the 1978-82 period. When daily returns are used, the coefficient estimates for betas and size are not significant at any conventional level.

According to the CAPM, beta is the sole determinant of stock returns. It is expected that the coefficient for beta is significantly positive. However, the empirical findings reported in this study and in Fama and French (1992) only provide weak support for beta in explaining stock returns. The empirical findings in this study also suggest that the size effect varies over time. It is not unusual to document the firm size effect at certain time periods but not at others. Banz (1981) found that the size effect is not stable over time with substantial differences in the magnitude of the coefficient of the size factor (p.9, Table 1). Brown, Kleidon and Marsh (1983) not only have shown that size effect is not constant over time but also have reported a reversal of the size anomaly for certain years.

The research design of this study allows us to keep the sample, test period, and methodology the same with the holding-period being the only variable. The size effect is documented for the industrial sample in one of the four test periods when monthly returns are used and in another when weekly returns are used. When daily returns are used, no size effect is observed. For the utility sample, the size effect is significant in only one test period when weekly returns are used. When monthly and daily returns are used, no size effect is found. Therefore, this study concludes that the size effect is not only time-period specific but also holding-period specific.

VI. Concluding Remarks

The fact that the two samples show different, though weak, results indicates that utility and industrial stocks do not share the same characteristics. First, given firm size, utility stocks are consistently less risky than industrial stocks. Second, industrial betas tend to decrease with firm size but utility betas do not. These findings may be attributed to the fact that all public utilities operate in an environment with regional monopolistic power and regulated financial structure. As a result, the business and financial risks are very similar among the utilities regardless of their sizes. Therefore, utility betas would not necessarily be expected to be related to firm size.

The objective of this study is to examine if the size effect exists in the utility industry. After controlling for equity values, there is some weak evidence that firm size is a missing factor from the CAPM for the industrial but not for the utility stocks. This implies that although the size phenomenon has been strongly documented for the industriales, the findings suggest that there is no need to adjust for the firm size in utility rate regulations.

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Table 1

Average Equity Size of the Utility Portfolios at the Beginning and End of the Test Period
(Dollar figures in millions)

	A: Beginning (1968)	B: End (1987)
MV_1	\$31	\$62
MV_2	\$77	\$177
MV_3	\$113	\$334
MV_4	\$161	\$475
MV_5	\$220	\$715
MV_6	\$334	\$957
MV_7	\$437	\$1,279
MV_8	\$505	\$1,805
MV_9	\$791	\$2,665
MV_{10}	\$1,447	\$5,399

Table 2

Betas of the Two Samples at the Beginning and End of the Test Period

	Monthly Betas		Weekly Betas		Daily Betas	
	1963-67	1982-86	1963-67	1982-86	1963-67	1982-86
Panel A: Industrial Firms						
MV_1	0.89	1.00	1.15	0.95	1.11	0.92
MV_2	0.94	0.87	1.07	1.01	1.14	1.01
MV_3	0.88	0.82	1.12	0.86	1.14	1.04
MV_4	0.69	0.74	1.00	0.83	1.03	0.86
MV_5	0.73	0.80	1.05	0.96	1.13	1.01
MV_6	0.66	0.82	1.03	1.01	1.05	1.04
MV_7	0.64	0.81	0.97	1.04	0.98	1.09
MV_8	0.62	0.75	0.97	1.11	1.00	1.20
MV_9	0.52	0.78	0.84	1.06	0.94	1.16
MV_{10}	0.43	0.65	0.78	1.01	0.86	1.22
Panel B: Public Utilities						
MV_1	0.30	0.37	0.31	0.43	0.30	0.40
MV_2	0.28	0.38	0.37	0.47	0.36	0.44
MV_3	0.22	0.42	0.33	0.42	0.31	0.49
MV_4	0.27	0.35	0.36	0.52	0.34	0.54
MV_5	0.25	0.45	0.37	0.61	0.35	0.62
MV_6	0.25	0.41	0.39	0.54	0.40	0.65
MV_7	0.20	0.35	0.34	0.54	0.37	0.63
MV_8	0.17	0.38	0.34	0.65	0.33	0.68
MV_9	0.19	0.34	0.35	0.60	0.34	0.71
MV_{10}	0.18	0.29	0.38	0.59	0.39	0.71

Table 3

Tests on the Mean Coefficients of Beta (γ_1) and Size (γ_2)

$$R_{pt} = \gamma_{ot} + \gamma_{1t}\hat{\beta}_{pt} + \gamma_{2t}\hat{S}_{pt} + U_{pt}$$

Returns Used:		Monthly (t-value)	Weekly (t-value)	Daily (t-value)
Panel A: Utility Sample				
1968-72	γ_1	-0.46% (-0.26)	-0.32% (-0.42)	-0.02% (-0.18)
	γ_2	-0.07% (-0.78)	-0.01% (-0.51)	-0.00% (-0.46)
1973-77	γ_1	-0.28% (-0.13)	0.14% (0.14)	-0.03% (-0.21)
	γ_2	-0.11% (-0.70)	-0.03% (-0.67)	-0.00% (-0.53)
1978-82	γ_1	0.55% (0.36)	0.54% (1.00)	0.05% (0.43)
	γ_2	-0.10% (-0.75)	-0.05% (-1.71)*	-0.01% (-1.60)
1983-87	γ_1	1.74% (1.28)	-0.24% (-0.51)	-0.02% (-0.18)
	γ_2	-0.16% (-1.54)	-0.03% (-0.86)	-0.01% (-0.63)
Panel B: Industrial Sample				
1968-72	γ_1	-0.36% (-0.27)	-0.28% (-0.55)	-0.02% (-0.32)
	γ_2	0.07% (0.43)	-0.01% (-0.19)	0.00% (0.51)
1973-77	γ_1	1.34% (0.64)	-0.23% (-0.31)	0.14% (1.45)
	γ_2	-0.01% (-0.06)	-0.04% (-0.85)	-0.00% (-0.64)
1978-82	γ_1	-0.84% (-0.28)	-0.56% (-0.91)	-0.09% (-0.81)
	γ_2	-0.29% (-0.75)	-0.01% (-1.72)*	-0.00% (-1.33)
1983-87	γ_1	2.51% (1.83)*	0.34% (0.64)	0.11% (1.40)
	γ_2	-0.25% (-1.90)*	-0.01% (-0.43)	0.00% (0.14)

* Significant at the 5% level based on a one-tailed test.

The Accuracy of Analysts' Long-Term Earnings Per Share Growth Rate Forecasts

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ABSTRACT: In this study we examine the accuracy of analyst long-term and one-year earnings per share growth rate forecasts over the last 20 years. We find that analysts' earnings growth rate estimates are consistently overly-optimistic and are about two times the level of GDP growth. Analyst predictions of earnings are better for one-year projections than for long-term projections, but are still overly-optimistic. We find that analyst coverage does not have a significant impact on the optimistic bias in analysts EPS growth rate forecasts. We do find that a contributing factor for the bias in analysts' earnings estimates is the resistance of analysts to project negative earnings growth. Furthermore, we find that earnings estimates have a continued bias after the 2003 Global Analyst Research Settlements.

Introduction

The expected growth rate of long-term earnings plays a critical role in investment management and corporate finance. An essential element in valuation modeling and cost of capital estimation, long-term earnings growth is periodically forecasted by Wall Street analysts to provide investors with a better understanding of the current and future cash flows likely to be generated by a firm's operations. Periods of high earnings growth rates are usually accompanied with bull markets, and periods of low or negative earnings growth rates tend to produce bear markets. In addition, companies with high earnings growth rates usually sell at high price-to-earnings (P/E) ratios, and stocks with low earnings growth rates trade at low P/E ratios.

A number of studies have indicated that analysts' forecasts of earnings are upwardly biased. For example, Barefield and Comiskey (1975), DeBondt and Thaler (1990), Butler and Lang (1991), Abarbanall (1991), and Brown (1997) find an overall optimism in analysts' earnings forecasts. Becchetti, Hasan, Santoro, and Anandarajan (2007) find evidence that an over-optimism bias is highest during bull markets. Hong and Kubik (2003) find that brokerage houses reward optimistic analysts who promote stocks. In addition, the popular press occasionally highlights evidence of analysts forecast bias.[1]

However, these studies assessing the accuracy of analysts' earnings estimates are based on forecasts of quarterly earnings. That is, these studies evaluate the accuracy of analysts' earnings forecasts for periods up to one quarter before a quarterly EPS figure is released. Our study examines analysts' long-term (three- to five- year) and one-year

[1] See for example, Brown (2003) and Smith (2003).

ahead EPS growth rate forecasts. According to financial theory, long-term expected earnings growth drives the valuation of the overall stock market and individual common stocks. As such, long-term EPS growth rate forecasts are an essential component of cash flow valuation models for firms and the market and are used in estimating the cost of capital.

We begin by evaluating historic EPS growth. Many have argued that there is an upward limit on EPS growth as determined by sustainable GDP growth. Bernstein and Arnott (2003) and Arnott (2004) indicate that EPS growth must be below sustainable growth in economic productivity. We show that the historic growth rate in EPS and GDP in the U. S. is in the 7.0% range. As an initial indication of accuracy of analysts' forecasts, we find that analysts' estimates of long-term EPS growth are substantially above this level.

We examine the accuracy of analysts' long-term earnings and one-year ahead EPS growth rate estimates over the last 20 years. We find that analysts' earnings growth rate estimates are consistently overly-optimistic. Analyst predictions of earnings growth are better for one-year growth rate projections than for long-term growth rate projections, but are still significantly overly-optimistic. Analysts only underestimate EPS growth following periods of economic recession which are associated with EPS recovery after large declines in earnings. We also evaluate whether the number of analysts covering a company is associated with the overly-optimistic bias in projected EPS growth rates. We find that analyst coverage does not have a significant impact on the bias in projected EPS growth rates. We do find that a contributing reason for the bias in analysts' long-term and one-year EPS growth rate estimates is the resistance of analysts to project negative earnings growth. We find that analysts rarely project negative EPS growth, despite the fact that companies commonly experience negative earning growth over three- to –five-year time periods. Based on the research of others, we suggest three explanations for the upward bias in analysts' earnings estimates. The first explanation is based on career concerns or conflicts of interest. Analysts are rewarded for biased forecasts by their employers (brokerage houses) who want them to hype stocks so that the brokerage house can garner trading commissions and win underwriting deals. The second explanation is based on selection bias. Analysts only follow stocks that they recommend and do not issue forecasts on those that they do not like. The third explanation is a cognitive or behavioral bias. Analysts become attached to the companies that they cover and lose objectivity. This would imply that analysts are systematically biased. Since they are only projecting the companies they follow, and not the market, the end result is a strong upward bias on earnings projections.

Finally, we assess the optimistic bias in analysts' EPS growth rate estimates for the period after the Global Analyst Research Settlements in 2003. Presumably, any bias in the research of Wall Street investment firms should have been impacted by New York Attorney General (now Governor) Elliot Spitzer's investigation and the $1.5B payment made by nine major brokerage firms. Nonetheless, we find a continued optimistic bias in long-term earnings growth rate estimates after the Settlements.

This study is organized as follows. Initially, the historic growth of earnings on S&P 500 companies is compared to the growth in GDP to establish the historic relationship between corporate earnings growth and economic growth. Then, analysts' forecasts of earnings growth for long-term and one-year time horizons are compared to actual earnings growth. We also evaluate analyst coverage as a possible contributing factor in earnings forecast bias. Next, negative earnings growth projections are examined as a possible explanation for the earnings estimate bias. Finally we investigate analysts' earnings estimates following the Global Research Regulatory Settlement to see if analysts have adjusted their bias.

Data and Methodology

One of the most common approaches to estimating the long-term earnings growth rates for companies is to use the mean estimates of the forecasts of Wall Street securities' analysts as published by such services as Zack's Investment Research, Thomson First Call Research, or the Institutional Brokers' Estimate System (I/B/E/S). I/B/E/S has a more comprehensive coverage of brokerage firms and financial analysts than the other databases. It includes many more analysts from smaller brokerage firms, and also includes important brokerage firms such as Merrill Lynch, Goldman Sachs, and Donaldson, Lufkin & Jenrette that are not included in Zack's Investment Research.

Using the I/B/E/S database, we collect long-term and one-year ahead annual growth rate estimates for all firms from 1984 to 2006, inclusive. We require that companies not only have projected EPS growth rate estimates, but also have EPS figures for the four-year ahead period (for the long-term forecasts) and the one-year ahead period (for the one-year forecasts) so that forecasted and actual EPS growth rates can be compared. Based on projected and actual earnings per share, we calculate implied geometric growth rates. We compare analysts' projected and actual EPS growth rates for long-term EPS growth rate forecasts and one-year EPS growth rate estimates. The data result in an average of 1,383 firms and 1,275 firms per year, for one-year and long-term growth rates, respectively. The descriptive statistics for the data are reported by year in Table 1.

Table 1
Number of Companies and Average Number of Analysts:
One-Year and Long-Term Analyst Forecast Data

	One-Year Forecasts		Long-Term Forecasts	
Year	Number of Companies	Average Number of Analysts	Number of Companies	Average Number of Analysts
1984	1,245	8.61	--	--
1985	1,154	10.30	--	--
1986	1,140	10.44	--	--
1987	1,047	11.02	--	--
1988	1,095	10.70	808	6.09
1989	1,245	10.64	899	6.29
1990	1,260	10.78	892	6.49
1991	1,138	10.01	921	6.34
1992	1,192	9.60	1,003	5.49
1993	1,314	9.55	1,125	5.90
1994	1,475	9.71	1,175	5.69
1995	1,557	9.11	1,148	5.86
1996	1,652	8.74	1,158	5.68
1997	1,489	8.33	1,218	5.51
1998	1,375	7.75	1,466	4.99
1999	1,258	8.54	1,490	4.95
2000	1,176	8.26	1,503	5.08
2001	1,469	7.68	1,467	5.26
2002	1,367	7.13	1,518	5.39
2003	1,464	7.78	1,577	5.56
2004	1,565	8.60	1,663	5.24
2005	1,620	8.73	1,578	5.07
2006	2,502	6.92	1,628	5.59
Mean	1,383	9.08	1,275	5.61
Median	1,314	8.74	1,218	5.56

Source: I/B/E/S. Long-term numbers are based on the average of quarterly numbers for each year.

Analysts Long-Term EPS Growth Rate Forecasts

For the analysts' long-term growth rate estimates, I/B/E/S reports the number of analysts as well as the mean and median EPS growth rate estimates for a 'three-to-five' year period. Given that I/B/E/S projected EPS growth rate is for a 'three-to-five' year period, the projected EPS growth rate is assumed to be four years. For each company in the I/B/E/S database with long-term analysts' EPS growth rate forecasts, as of the end of each quarter we obtain the annual EPS, EPS_t, as the sum of the trailing four quarters' EPS and the mean projected three-to-five year projected EPS growth rate, g. As an example, assume that EPS_t for a particular company as of the end of the fourth quarter of 2000 is $1.00 and g is 10%, as shown in Table 2. The projected EPS in four years, EPS_{t+4}, for this company is calculated as:

$$EPS_{t+4} = (EPS_t)(1+g)^4$$

Table 2
Example: EPS and Projected Growth for a Hypothetical Company

Actual Quarterly EPS					
First Quarter 2000	**Second Quarter 2000**	**Third Quarter 2000**	**Fourth Quarter 2000**	**Actual Annual EPS**	**I/B/E/S Projected EPS Growth**
0.25	0.35	0.25	0.15	1.00	10.0%

In this example, the company's projected EPS is calculated as:

$$\text{EPS}_{t+4} = (1.00)(1.10)^4 = \$1.46.$$

This figure is compared to the company's actual annual EPS growth rate from the end of 2000 to the end of 2004. The actual EPS growth rate is calculated as the compound annual growth rate in earnings over the time period, g_a, as shown below:

$$g_a = 1 - \left(\frac{EPS_{t+4}}{EPS_t} \right)^{.25}$$

As an example, if the company's actual annual EPS as of the fourth quarter of 2004 is $1.25; the company's actual four-year EPS growth rate is calculated as 5.74%. This is shown in Table 3. In this example, analysts projected this company to grow EPS at 10% over the four-year time period, and the company had an actual EPS growth rate of 5.74%. This procedure is repeated on a quarterly basis for each company in the I/B/E/S database.

Table 3
Example: Actual Long-Term EPS
Growth Rate Calculation for a Hypothetical Company

Actual Quarterly EPS					
First Quarter 2004	**Second Quarter 2004**	**Third Quarter 2004**	**Fourth Quarter 2004**	**Actual Annual EPS**	**Actual EPS Growth (2000 – 2004)**
0.30	0.35	0.25	0.35	1.25	5.74%

Analysts' One-Year EPS Growth Rate Estimates

For one-year EPS estimates, I/B/E/S reports the number of analysts as well as the mean and median one-year EPS estimates. We compare the growth rates associated with the one-year projected EPS estimates with the actual EPS as of the end of the calendar year. For this reason, we limit this analysis to firms with December 31st fiscal year-ends.

As an example, using the hypothetical company in Table 4, of the end of the fourth quarter of 2004, the company's EPS_t is $1.00. If the analysts' projected one-year growth in EPS, EPS_{t+1}, is $1.15, the company's projected one-year EPS growth rate is calculated as 15.0%. This figure is compared to the company's actual EPS growth rate based on quarterly earnings in 2005. In the example in Table 4, the company's actual one-year EPS growth rate is 10.0%. This procedure is then repeated on an annual basis for each company in the I/B/E/S database

Table 4
Example: Actual Annual EPS Growth
Rate Calculation for a Hypothetical Company

Actual EPS						
First Quarter 2004	**Second Quarter 2004**	**Third Quarter 2004**	**Fourth Quarter 2004**	**2004 Actual Annual EPS**	**2005 Actual Annual EPS**	**Projected One-Year EPS Growth (2004 – 2005)**
0.30	0.30	0.20	0.20	1.00	1.10	15.0%

We calculate forecast errors, *FE*, based on the ratio of the forecasted and actual estimated growth rates, as follows:

$$FE = \frac{g}{g_a} - 1$$

Based on this calculation, a positive forecast error indicates an upward bias in forecasted earnings and a negative forecast error indicates a downward bias in forecasted earnings.

The tabulated growth rates are based only on firms who survive for the following one or four years, for one-year and long-term growth rates, respectively. The survivorship bias may induce an upward bias in actual earnings growth rates. Moreover, we do not calculate growth rates when the base-year value is negative.

Historic Growth Rate in Earnings

The historic record for EPS and GDP growth provides a benchmark for long term growth estimates. Ibbotson and Cheng (2003) show that growth in earnings is in line with overall growth in economic productivity. Bernstein and Arnott (2003) and Arnott (2004) make the point that corporate earnings growth rates cannot exceed sustainable GDP growth, even though analysts consistently forecast growth rates that indicate the opposite.

We begin by examining the actual five-year earning per share (EPS) growth for the S&P 500 and five-year Gross Domestic Product (GDP) growth from 1960 to 2006. EPS for the S&P 500 has averaged 7.02% with a median of 7.08%. GDP has averaged 7.42% with median of 7.40%. The results are presented in Figure 1.

Historically, EPS growth has been is more volatile than GDP growth. EPS growth rates range from -2.71% to 16.89% with a standard deviation of 4.51%. Growth rates for GDP range from 4.62% to 11.38% with a standard deviation of 2.03%. In addition, average GDP growth has exceeded EPS growth. This result corresponds with previous research.

Figure 1
Five-Year S&P 500 EPS Growth Versus Five-Year GDP Growth

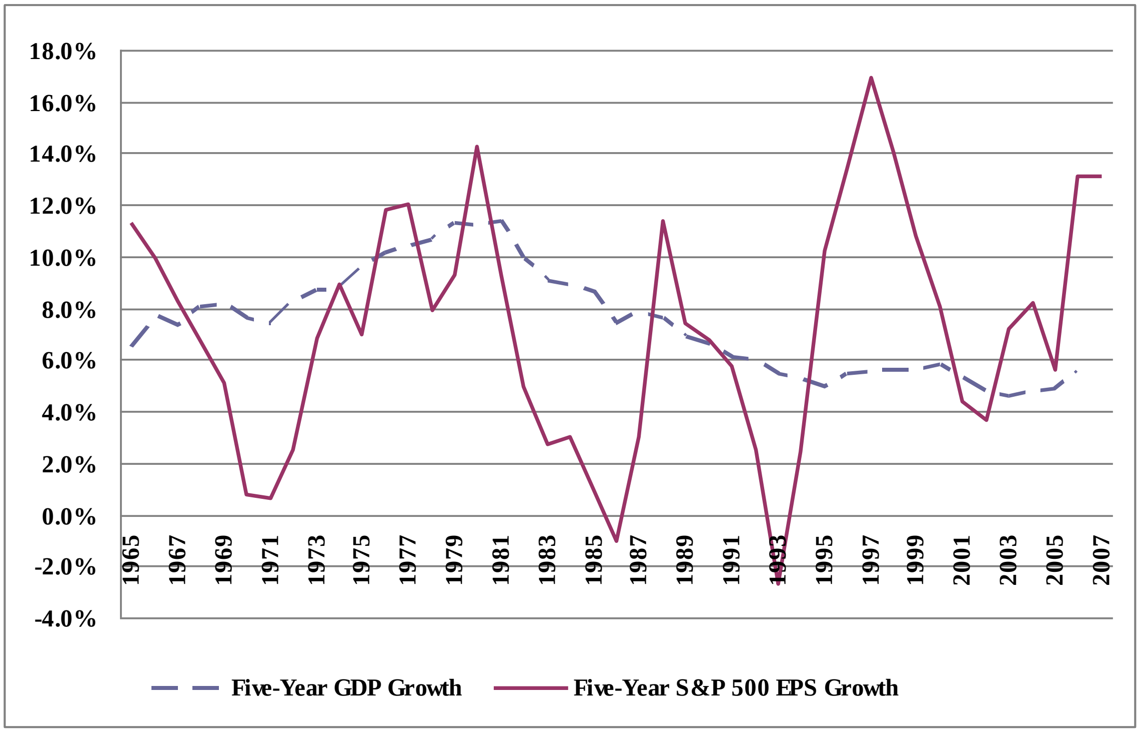
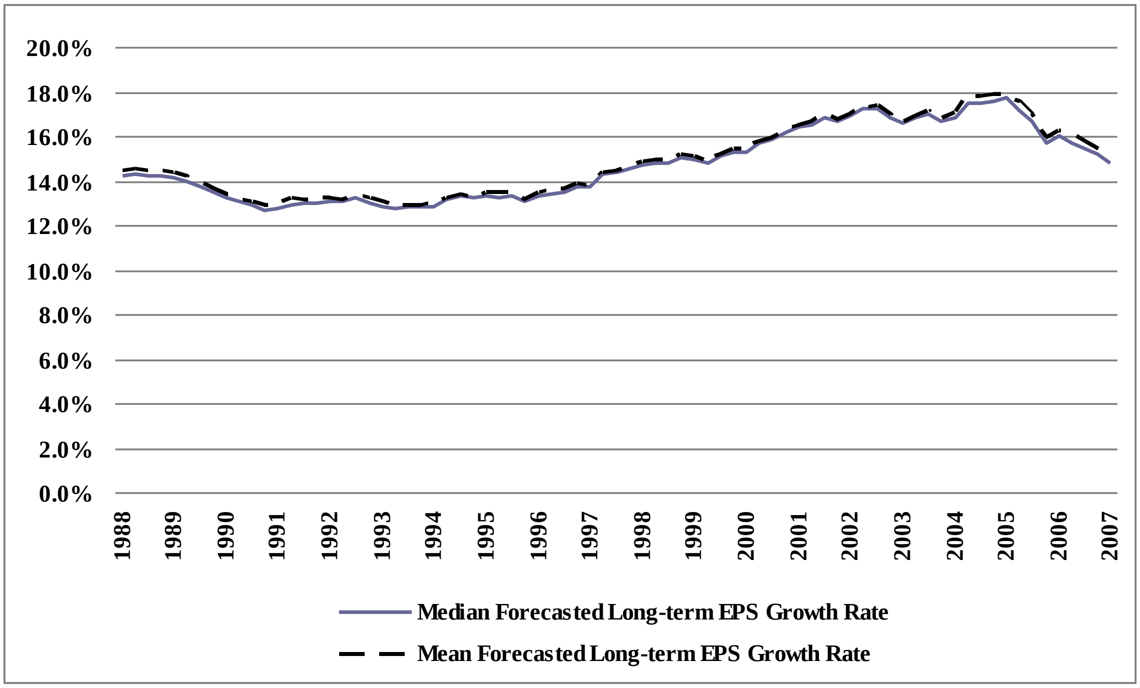


Figure 2 shows the mean and median long-term analysts EPS forecasts from 1988 through the first quarter of 2007. Although GDP growth has averaged 7.42% with median of 7.40% over the last 40 years, analysts over our sample period project long-term growth at an average rate of 14.71%. This suggests that analysts consistently forecast long-term EPS growth at a level that is two times that of historic GDP growth.

Several observations can be made from Figure 2. First, analysts consistently project long-term growth rates in a range of 13% to 18%. Second, mean and median observations are practically identical suggesting that these results are not driven by outliers. Finally, analysts' forecasts have increased over time, even though GDP growth has decreased over time.

In the sections that follow, we examine analysts' long-term and one- year ahead forecasts relative to actual EPS growth rates.

Figure 2
Long-Term IBES Forecasted EPS Growth Rates
1988-2006



Analysts IBES Forecast Versus Actual EPS Growth Rates: Long-Term Projections

We examine forecasted long-term EPS growth versus actual three-to-five-year EPS growth based on IBES data from 1984 to 2006. The results are presented by quarter in Table 5 and Figure 3.

. Over the entire time period, analysts continually forecast long-term EPS growth for the sample between 13% and 18%. Actual EPS growth for the sample ranges between 1.23% and 19.93%. Firm's meet or exceed analysts' expectations in periods around 1996 and 2006, both of which followed a large decline in corporate earnings. This is the most likely scenario for corporations to attain the lofty growth rates projected by analysts. This pattern is seen clearly in Figure 3.

Over the entire period analysts' long-term forecasted EPS growth averaged

14.71% per year, but companies only averaged long-term EPS growth of 9.10%. The analyst bias is obvious and clearly significant. A test for a difference in means--the null hypothesis is the difference in the mean actual EPS growth is equal to the mean projected EPS growth--has a t-stat of -10.68 which is significant at the .005 level (n=77).

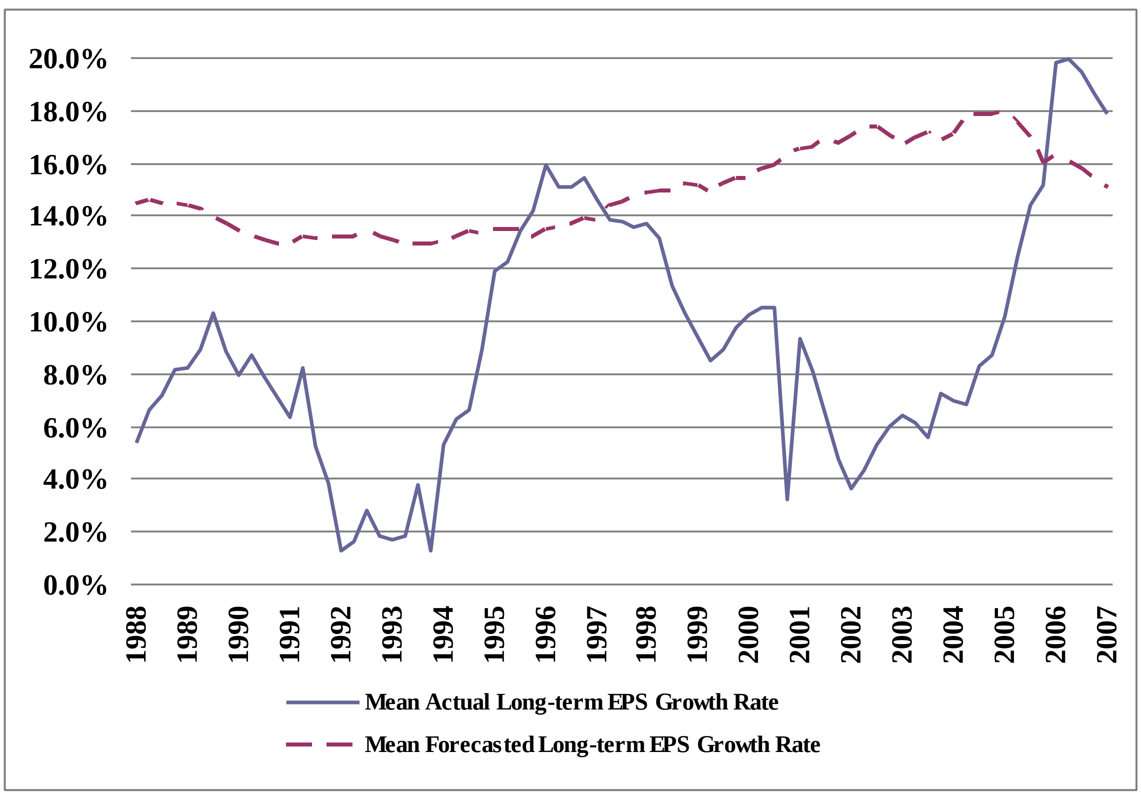
Table 5
Summary of Forecasted and Actual Long-Term EPS Growth Rates by Quarter

Year	Quarter Ended	Mean Actual Long-term EPS Growth Rate	Mean Forecasted Long-term EPS Growth Rate	Forecast Error for Mean (%)	Number of Companies	Average Number of Analyst Estimates
1988	Mar-88	5.36%	14.47%	170.07%	768	6.24
	Jun-88	6.61%	14.55%	120.32%	797	6.26
	Sep-88	7.12%	14.45%	102.96%	817	5.96
	Dec-88	8.12%	14.46%	78.13%	850	5.88
1989	Mar-89	8.20%	14.35%	75.08%	910	6.09
	Jun-89	8.92%	14.21%	59.34%	892	6.36
	Sep-89	10.28%	13.88%	35.03%	889	6.57
	Dec-89	8.81%	13.65%	55.00%	905	6.15
1990	Mar-90	7.94%	13.41%	68.98%	907	6.42
	Jun-90	8.66%	13.23%	52.76%	863	6.46
	Sep-90	7.84%	13.05%	66.44%	880	6.48
	Dec-90	7.10%	12.89%	81.48%	916	6.62
1991	Mar-91	6.35%	12.89%	103.13%	939	6.70
	Jun-91	8.21%	13.19%	60.63%	914	6.68
	Sep-91	5.20%	13.14%	152.80%	897	6.07
	Dec-91	3.84%	13.18%	243.60%	932	5.90
1992	Mar-92	1.25%	13.22%	955.21%	950	5.58
	Jun-92	1.57%	13.18%	737.49%	986	5.41
	Sep-92	2.75%	13.40%	387.75%	1008	5.47
	Dec-92	1.83%	13.22%	621.01%	1068	5.52
1993	Mar-93	1.64%	13.04%	697.33%	1062	5.79
	Jun-93	1.81%	12.90%	612.01%	1183	5.93
	Sep-93	3.76%	12.89%	243.17%	1115	5.98
	Dec-93	1.23%	12.92%	951.11%	1140	5.90
1994	Mar-94	5.31%	12.98%	144.61%	1143	5.66
	Jun-94	6.27%	13.21%	110.79%	1158	5.56
	Sep-94	6.61%	13.42%	103.17%	1207	5.75
	Dec-94	8.89%	13.34%	49.99%	1192	5.81
1995	Mar-95	11.88%	13.47%	13.39%	1166	5.88
	Jun-95	12.20%	13.44%	10.21%	1144	5.84
	Sep-95	13.37%	13.45%	0.61%	1147	5.87

	Dec-95	14.14%	13.18%	-6.78%	1134	5.87
1996	Mar-96	15.88%	13.47%	-15.20%	1115	5.76
	Jun-96	15.05%	13.59%	-9.74%	1154	5.62
	Sep-96	15.07%	13.65%	-9.38%	1177	5.70
	Dec-96	15.42%	13.87%	-10.04%	1185	5.63
1997	Mar-97	14.62%	13.83%	-5.37%	1213	5.55
	Jun-97	13.82%	14.36%	3.92%	1223	5.55
	Sep-97	13.72%	14.49%	5.61%	1260	5.48
	Dec-97	13.52%	14.69%	8.67%	1174	5.45
1998	Mar-98	13.67%	14.88%	8.85%	1477	5.14
	Jun-98	13.13%	14.95%	13.85%	1448	4.92
	Sep-98	11.33%	14.91%	31.68%	1475	4.98
	Dec-98	10.27%	15.22%	48.16%	1462	4.93
1999	Mar-99	9.37%	15.13%	61.49%	1510	4.88
	Jun-99	8.50%	14.90%	75.28%	1480	4.96
	Sep-99	8.89%	15.20%	70.90%	1490	4.89
	Dec-99	9.70%	15.39%	58.64%	1481	5.06
2000	Mar-00	10.21%	15.45%	51.25%	1491	5.00
	Jun-00	10.48%	15.78%	50.53%	1515	4.94
	Sep-00	10.48%	15.93%	51.96%	1503	5.12
	Dec-00	3.19%	16.31%	412.19%	1502	5.25
2001	Mar-01	9.30%	16.53%	77.61%	1502	5.26
	Jun-01	8.09%	16.63%	105.58%	1485	5.26
	Sep-01	6.36%	16.97%	166.79%	1465	5.33
	Dec-01	4.72%	16.76%	255.42%	1414	5.18
2002	Mar-02	3.63%	17.02%	369.17%	1461	5.37
	Jun-02	4.28%	17.35%	305.30%	1517	5.26
	Sep-02	5.27%	17.38%	229.93%	1541	5.45
	Dec-02	5.98%	16.98%	183.88%	1553	5.50
2003	Mar-03	6.37%	16.68%	161.92%	1537	5.55
	Jun-03	6.11%	16.92%	177.12%	1566	5.46
	Sep-03	5.52%	17.15%	210.57%	1598	5.58
	Dec-03	7.25%	16.85%	132.37%	1605	5.65
2004	Mar-04	6.93%	17.08%	146.39%	1629	5.70
	Jun-04	6.80%	17.76%	161.30%	1664	5.18
	Sep-04	8.28%	17.81%	115.12%	1687	5.23
	Dec-04	8.70%	17.84%	104.95%	1670	4.87
2005	Mar-05	10.11%	17.92%	77.23%	1616	4.93
	Jun-05	12.45%	17.53%	40.74%	1578	4.87
	Sep-05	14.39%	16.96%	17.82%	1599	5.16
	Dec-05	15.15%	15.95%	5.32%	1517	5.33
2006	Mar-06	19.82%	16.22%	-18.18%	1563	5.33
	Jun-06	19.93%	16.07%	-19.40%	1580	5.65
	Sep-06	19.45%	15.75%	-19.05%	1644	5.83
	Dec-06	18.60%	15.41%	-17.14%	1723	5.57
2007	Mar-07	17.81%	15.07%	-15.39%	1734	5.25
	Mean	**9.10%**	**14.89%**	**143.06%**	**1,281**	**5.60**
	Median	**8.50%**	**14.55%**	**75.08%**	**1,223**	**5.56**

Also presented in Table 5 are forecast errors. Previous studies based on quarterly estimates (see, for example, Kwag and Shrieves (2006)) find that forecast errors are mixed. Our findings indicate that forecast errors for long-term estimates are predominantly positive, which indicates an upward bias in growth estimates. The mean and median forecast errors over the observation period are 143.06% and 75.08%, respectively. They are only negative for 11 time periods: five consecutive quarters starting at the end of 1995 and six consecutive quarters starting in 2006. As can be seen in Figure 3, the negative forecast errors clearly follow periods of declined earnings growth when higher growth rates can be attained. Overall, there is evidence of a persistent upward bias in long-term EPS growth forecasts.

Figure 3
Long-Term Forecasted Versus Actual EPS Growth Rates
1988-2006



Long-Term EPS Forecasts: Breakdown by Number of Analysts

It is possible that the results from the previous section are affected by the level of analyst coverage. Smaller and newly-traded companies tend to have less analyst coverage. It is possible that companies with fewer analysts would bias the results. Earnings for small or newly-traded companies are more difficult to forecast and would be expected to lead to higher forecasted earnings growth rates. For this reason we divide the sample into two groups: companies with three or fewer analysts and companies with more than three analysts.

While our data averages 5.61 analysts per company, many companies have three or fewer analysts. The two groups evenly divide the data. On average, of 1,273 companies, 628 have three or fewer analysts and 645 have more than three analysts. The data is described in Table 6 and displayed in Figure 4.

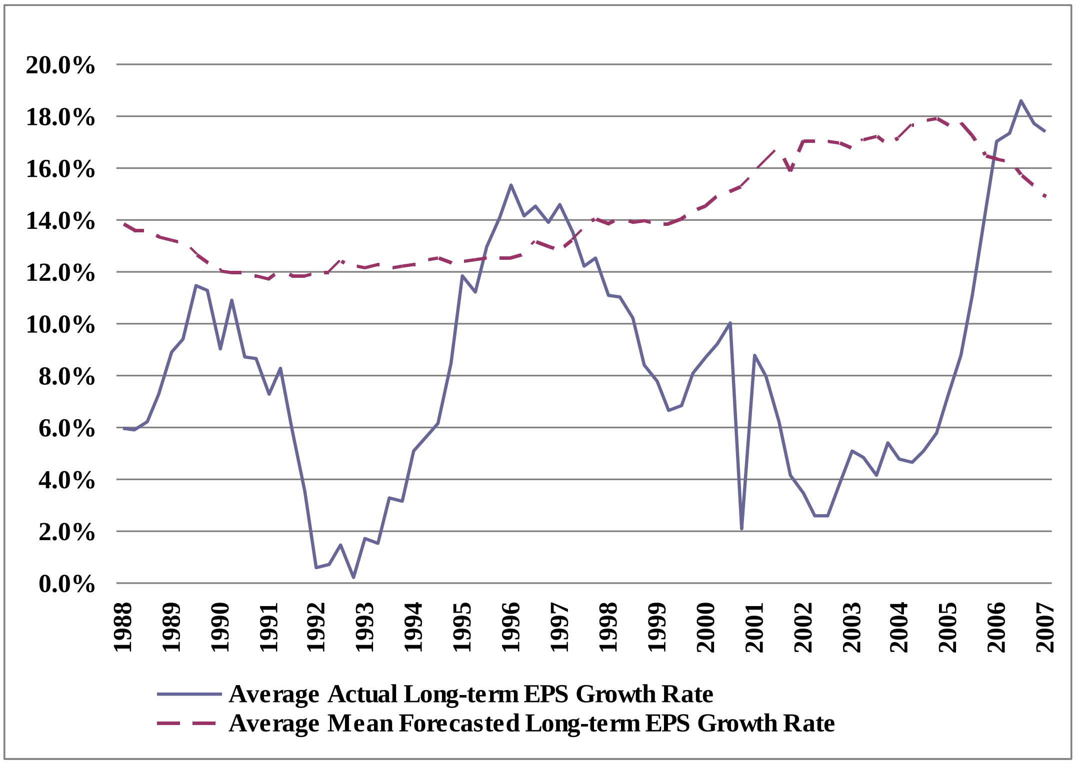
The results indicate that the group of companies with more than three analysts has lower long-term earnings growth rate forecasts. However, that group also has significantly lower actual growth in earnings, as indicated by a difference in means test (t-stat = -5.77, n = 77). Furthermore, while there is no significant difference between the forecasted growth rates by group since 2002, actual earnings continue to be lower for the group with more than three analysts. Overall, the forecast errors by group are very close. The median forecast error for the group with fewer than three analysts is 48.65%. For the group with more than three analysts the median forecast error is 48.68%.

Table 6
Number of Companies by
Analyst Coverage for Long-Term IBES Data

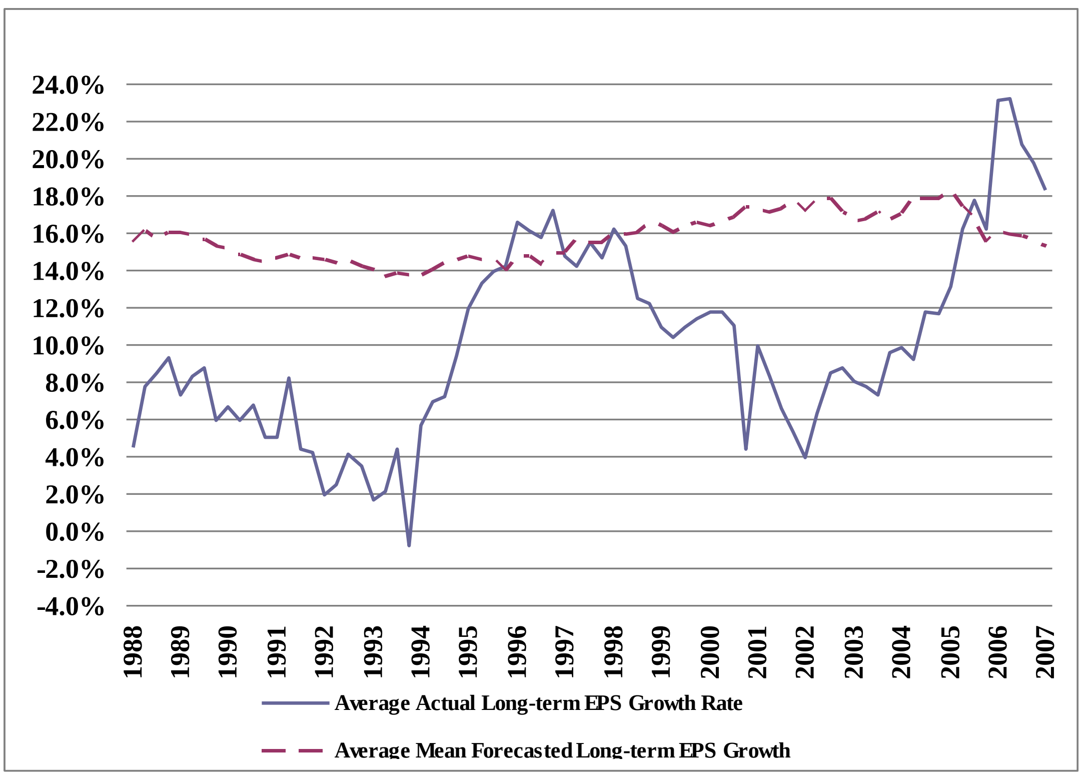
Year	Total Number of Companies	Companies with 3 and fewer Analysts	Companies with more than 3 Analysts
1988	808	325	485
1989	899	379	522
1990	892	389	508
1991	921	410	511
1992	1,003	502	505
1993	1,125	535	577
1994	1,175	561	615
1995	1,148	533	616
1996	1,158	530	633
1997	1,218	576	646
1998	1,466	731	735
1999	1,490	735	756
2000	1,503	747	756
2001	1,467	759	707
2002	1,518	825	693
2003	1,577	871	705
2004	1,663	875	788
2005	1,578	809	769
2006	1,628	898	730
Mean	**1,273**	**628**	**645**
Median	**1,218**	**576**	**646**

Source: I/B/E/S. Based on the average of quarterly numbers for each year.

Figure 4
Long-Term IBES Forecasted EPS Growth Rates by Analysts Coverage
Panel A: Greater Than Three Analysts



Panel B: Three Analysts of Fewer



Analysts IBES Forecast Versus Actual EPS Growth Rates: One-Year Projections

Although we have shown a significant bias in growth rate forecasts, we realize that long-term growth is difficult to forecast. Over longer forecast periods, analysts face a greater probability of unexpected events that will lead to inaccurate estimates. One possible explanation for the persistent bias is that analysts consistently project long-term growth estimates higher than short-term estimates to allow for the possibility of unforeseen events. For this reason, we extend the analysis to one-year EPS growth rate forecasts, expecting that analysts' estimates will be more accurate over a shorter period of time with less event risk.

We collect forecasted and actual one-year EPS growth rate data for firms from 1984 to 2006. We compare the analysts' forecasted EPS growth rates to the actual annual growth rates over the year. The results are presented by year in Table 7.

Analysts consistently project upwardly biased growth rates, even for shorter time horizons. Analysts forecasted one-year EPS growth at an average rate of 13.80% while the actual EPS growth rate over the time period averaged 9.77%. These growth rates are significantly different as indicated by a difference in means test (t-stat = -4.91, n=23).

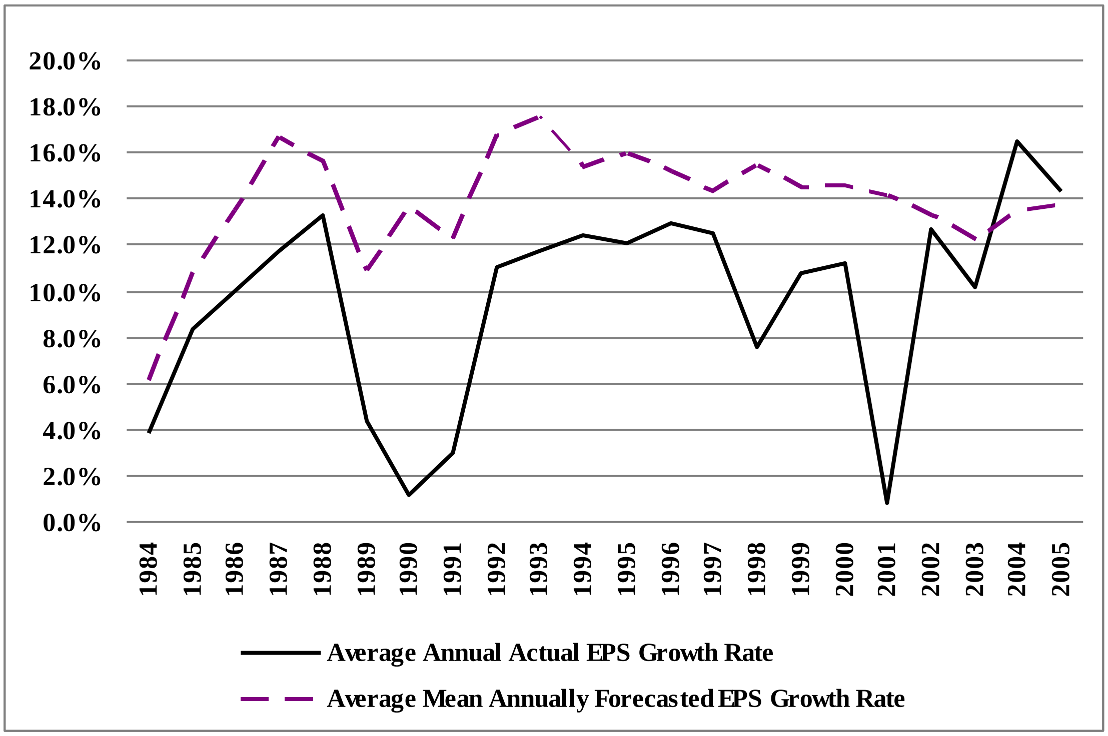
Although the one-year forecast errors are lower, they are still large and predominantly positive. The mean and median forecast errors over the observation period are 165.94% and 32.51%, respectively. Forecast errors are only negative for the last three years, indicating an overall negative bias to earnings estimates.

Table 7
Summary of IBES Forecasted and Actual One-Year Growth Rates by Year

Year	Mean Annual Actual EPS Growth Rate	Mean Annual Forecasted EPS Growth Rate	Forecast Error for Mean Growth Rate	Number of Companies	Average Number of Analyst Estimates
1984	3.79%	6.10%	61.24%	1245	8.61
1985	8.33%	10.77%	29.40%	1154	10.30
1986	9.96%	13.43%	34.84%	1140	10.44
1987	11.68%	16.67%	42.71%	1047	11.02
1988	13.22%	15.62%	18.16%	1095	10.70
1989	4.32%	10.81%	150.19%	1245	10.64
1990	1.15%	13.60%	1082.97%	1260	10.78
1991	2.97%	12.20%	311.26%	1138	10.01
1992	10.98%	16.72%	52.24%	1192	9.60
1993	11.66%	17.49%	50.09%	1314	9.55
1994	12.42%	15.31%	23.34%	1475	9.71
1995	12.05%	15.97%	32.51%	1557	9.11
1996	12.88%	15.15%	17.63%	1652	8.74
1997	12.50%	14.26%	14.11%	1489	8.33
1998	7.52%	15.38%	104.62%	1375	7.75
1999	10.76%	14.46%	34.32%	1258	8.54
2000	11.20%	14.51%	29.55%	1176	8.26
2001	0.77%	14.08%	1730.98%	1469	7.68
2002	12.64%	13.27%	5.04%	1367	7.13
2003	10.16%	12.23%	20.37%	1464	7.78
2004	16.46%	13.40%	-18.62%	1565	8.60
2005	14.25%	13.79%	-3.20%	1620	8.73
2006	13.10%	12.17%	-7.09%	2502	6.92
Mean	**9.77%**	**13.80%**	**165.94%**	**1383**	**9.08**
Median	**11.20%**	**14.08%**	**32.51%**	**1314**	**8.74**

The one-year analysts' forecasts and actual EPS growth rates are presented in Figure 5. The persistent upward bias is evident from the graph. As with long-term analyst forecasts, the only negative forecast errors follow a period of lower actual EPS growth. Higher growth is most likely to be attained after such a period.

Figure 5
One-Year Forecasted versus Actual EPS Growth Rates



Negative Earnings Growth Rate Forecasts

One explanation of the persistent bias of analysts' projections is a resistance to report negative earnings growth rates. A resistance to report negative earnings growth could be linked to the investment banking influences addressed by the Global Analyst Research Settlements. It could also be caused by a cognitive bias often called familiarity. Familiarity is a behavioral flaw common to investors. Investors have a tendency to favor investments they know, such as the common stock of their employer. Similarly, analysts may become attached to companies they follow and lose objectivity.

Using long-term growth projections, we begin by comparing the number of companies with projected negative EPS growth rates to those with actual negative EPS growth rates in each time period. The differences are striking. The results are summarized in Panel A and Panel B of Figure 6.

Panel A shows the percent of companies with actual negative EPS growth. The average number of companies with actual negative EPS growth is 391 with a minimum of 227 and a maximum of 644. An average of 31.12% of all companies had negative earnings growth in each quarter.

Shown in Panel B is the percent of companies with forecasted negative EPS growth. The average number of companies with forecasted negative EPS growth by quarter is only 2.10 with a minimum of 0 and a maximum of 13. Only 0.17% of all companies were projected to have negative earnings growth. [2]

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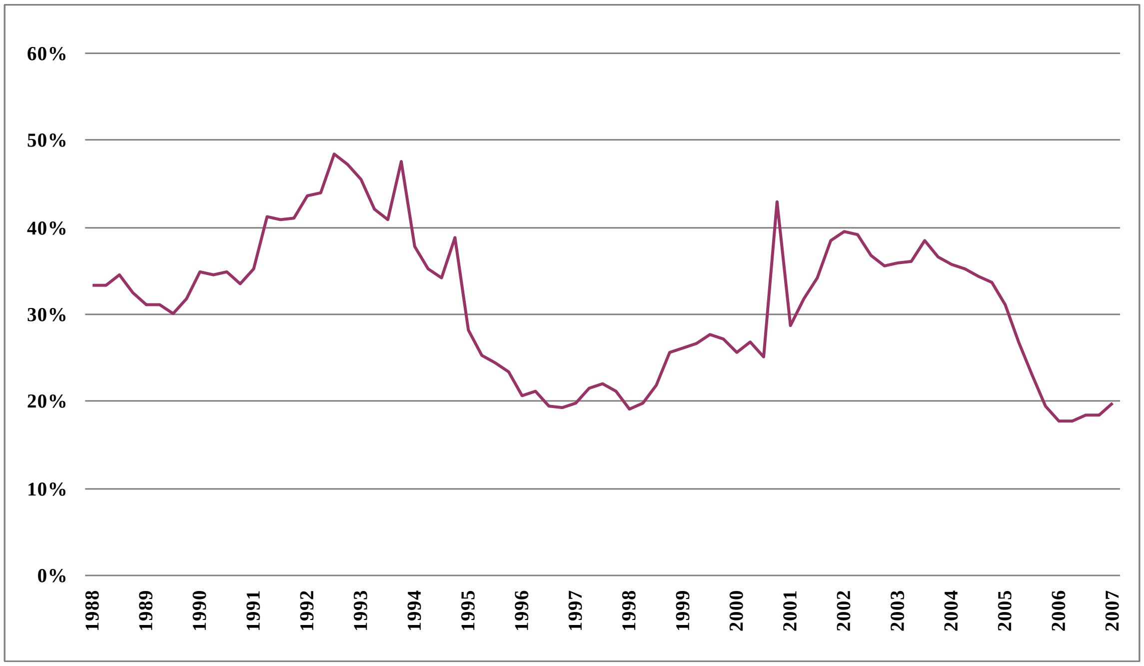
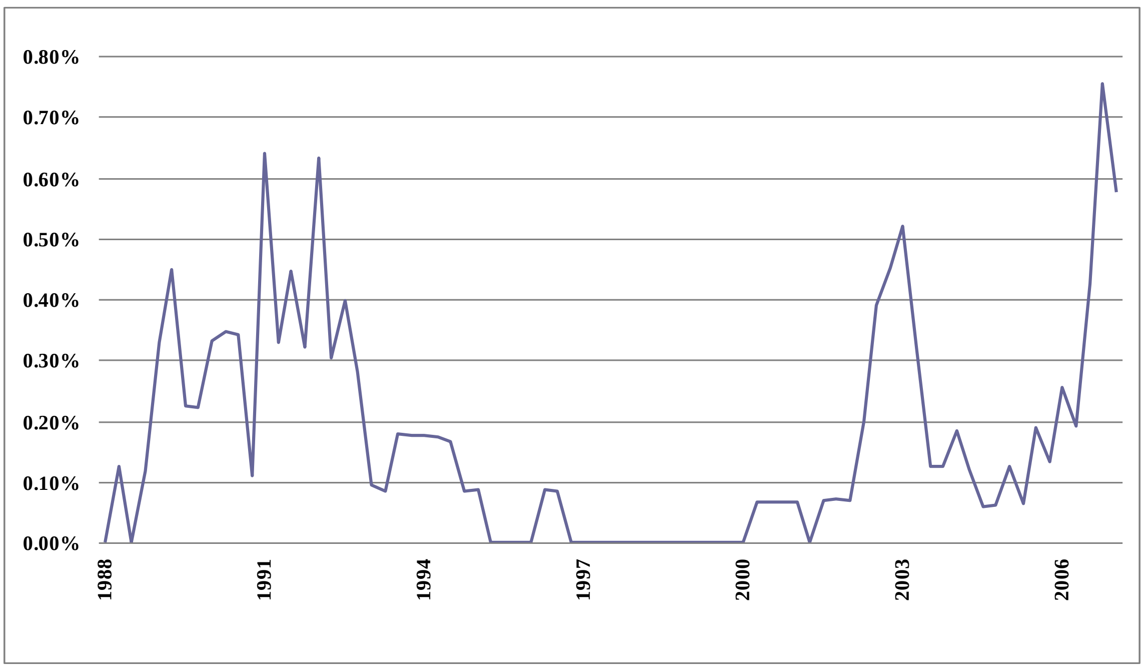
[2] We also examine the percentage of negative earnings growth that is captured by analysts' projections. We begin by collecting all companies that experienced negative long-term growth in each time period. Then we calculate the percentage of those companies that were project to have long-term negative EPS growth. An average of 0.55% of companies that reported negative EPS growth was captured by analysts' estimates. The average number of companies with negative earnings growth that were missed by analysts was 389 out of an average 391 companies that reported an actual decline in earnings. There is clear resistance by analysts to project negative growth.

Figure 6
Comparison of Companies with
Actual and Forecasted Negative EPS Growth
Panel A: Percent of Companies with Actual Negative EPS Growth



Panel B: Percent of Companies with Forecasted Negative EPS Growth



Results after the Global Analyst Research Settlements

The Global Analysts Research Settlements (GARS) is a set of agreements reached on April 23, 2003 between the SEC, NASD, NYSE and ten of the largest U.S. investment firms. GARS, as outlined by the Securities and Exchange Commission (2003), addresses conflicts of interest within firms that have investment banking and analysts operations. A conflict of interest can exist between the investment banking and analysis departments of the large investment firms. The investment firms involved in the settlement had engaged in practices involving the influence by investment bankers seeking favorable analysts' projections within their firm.

As part of the settlement decision several regulations were introduced to prevent investment bankers from pressuring analysts to provide favorable projections. These regulations include (1) firms must separate their investment banking and analysis departments with firewalls; (2) budget allocation to management in research departments must be independent of investment departments; (3) research analysts are prohibited from attending pitches with investment bankers during advertising and promotion of IPOs; and (4) historical analysts' ratings must be made available to investors.

One possible explanation for the upward bias in analysts' forecasts is the conflict of interest that exists between analysts and investment bankers. This presumably would have been removed by the GARS. For this reason, we compare long-term actual and forecasted growth rates for the periods prior to and following the GARS. The persistence of a bias following the GARS would indicate another explanation for the bias.

Table 8 shows descriptive statistics for long-term analysts' earnings growth rates estimates before and after the GARS. Actual and forecasted growth rate estimates are higher since the GARS and forecast errors have decreased. While forecast errors have decreased, they are still significantly positive.

It is evident that analysts' growth rate forecasts have remained around their historic levels of about 15%. Growth rates remain at levels that are unattainable given historic and expected GDP growth. Hence, there is no evidence that analyst behavior has changed since the GARS.

Table 8
Comparison of Long-Term Analysts' EPS Growth Rate Forecasts Before and After GARS

1988 – 2002(1)			
	Actual	Forecasted	FE
Mean	8.25%	14.40%	141.65%
Median	8.20%	13.88%	65.29%
SD	4.06%	1.36%	197.57%
n	61	61	61
2003 – 2007(2)			
Mean	12.33%	16.77%	66.94%
Median	11.28%	16.94%	51.60%
SD	5.49%	0.92%	61.70%
n	16	16	16

(1) Based on data beginning in 1984. (2) From April 2003 to and including the first quarter of 2007.

Possible Explanations for the Upward Bias

There are three suggested explanations for the upward bias. The first, as suggested by previous research, is based on career concerns or conflicts of interest. Analysts are rewarded for biased forecasts by their employers who want them to hype stocks so that the brokerage house can garner trading commissions and win underwriting deals. However, the scrutiny of the GARS should have removed this influence. We find little evidence of a change in forecast bias following the GARS. Therefore another explanation is likely.

A second explanation is based on selection bias. Analysts only follow stocks that they recommend and do not issue forecasts on those that they do not like. A third explanation is a cognitive or behavioral bias commonly called familiarity. Analysts become attached to the companies that they follow and lose objectivity.

The second and third explanations imply that analysts are systematically biased. If analysts systematically believe that they follow companies that are superior to others, they will be reluctant to issue negative earnings forecasts. Since they are only projecting the companies they follow, and not the market, the end result is a strong upward bias on earnings projections.

Summary

In this study we examine the accuracy of analysts' long-term and one-year ahead EPS growth rate forecasts over the last 20 years. Unlike previous studies, we examine long-term and one-year analysts' earnings growth rate forecasts and not quarterly EPS forecasts. Long-term EPS growth rate projections are consistently overly-optimistic. Analysts' growth rate forecasts of earnings are better for one-year than for three- to five-years, but are still over-optimistic. We discover that analysts only underestimate EPS growth rates for periods of earnings recoveries after economic recession. We find that analyst coverage does not have an impact on the overly-optimistic bias in projected EPS growth rates. We do discover that a contributing factor in the bias in analysts' long-term and one-year EPS growth rate estimates is the resistance of analysts to project negative earnings growth rates. We show that analysts' projections fail to capture the majority of negative earnings growth realized by corporations they follow. Finally, we examine the level of long-term analysts' EPS growth rate forecasts following the GARS. We find that analysts' forecasts have not significantly changed and continue to be overly-optimistic. Analysts' long-term EPS growth rate forecasts before and after the GARS, are about two times the level of historic GDP growth.

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Beats' Get the Brush-Off

Despite Rise In Topped Forecasts, Stocks Hold Firm

By ALEXANDRA SCAGGS

More companies are beating Wall Street profit expectations. But their shares are hardly budging.

So far, "beats" on first-quarter earnings have prompted share prices to rise by an average of 0.5%, or half the size of the usual jumps over the past three years.

The high number of beats and the muted reaction to them comes after companies and analysts lowered forecasts heading into the first quarter, worried about instability in Europe and the sustainability of the U.S. recovery. At the same time, the abundance of better-than-expected results is prompting investors to look beyond the beats.

Enlarge Image

Shares of Google fell even after the company topped earnings estimates.

That has left investors underwhelmed by overall results, a sentiment reflected in the broader market. Since the unofficial start to first-quarter earnings season in early April, the Standard & Poor's 500-stock index is up about 0.6%. That's a slowdown from the first quarter, when the index surged 12%.

The S&P 500 on Monday shed 11.59 points, or 0.84%, to 1366.94.

"The proof is in the pudding, in terms of the response this time around," said Eric Lascelles, chief economist with Royal Bank of Canada RY +0.76%. He added that with earnings beats so commonplace, "investors are certainly becoming more skeptical and discerning" on what is in the reports.

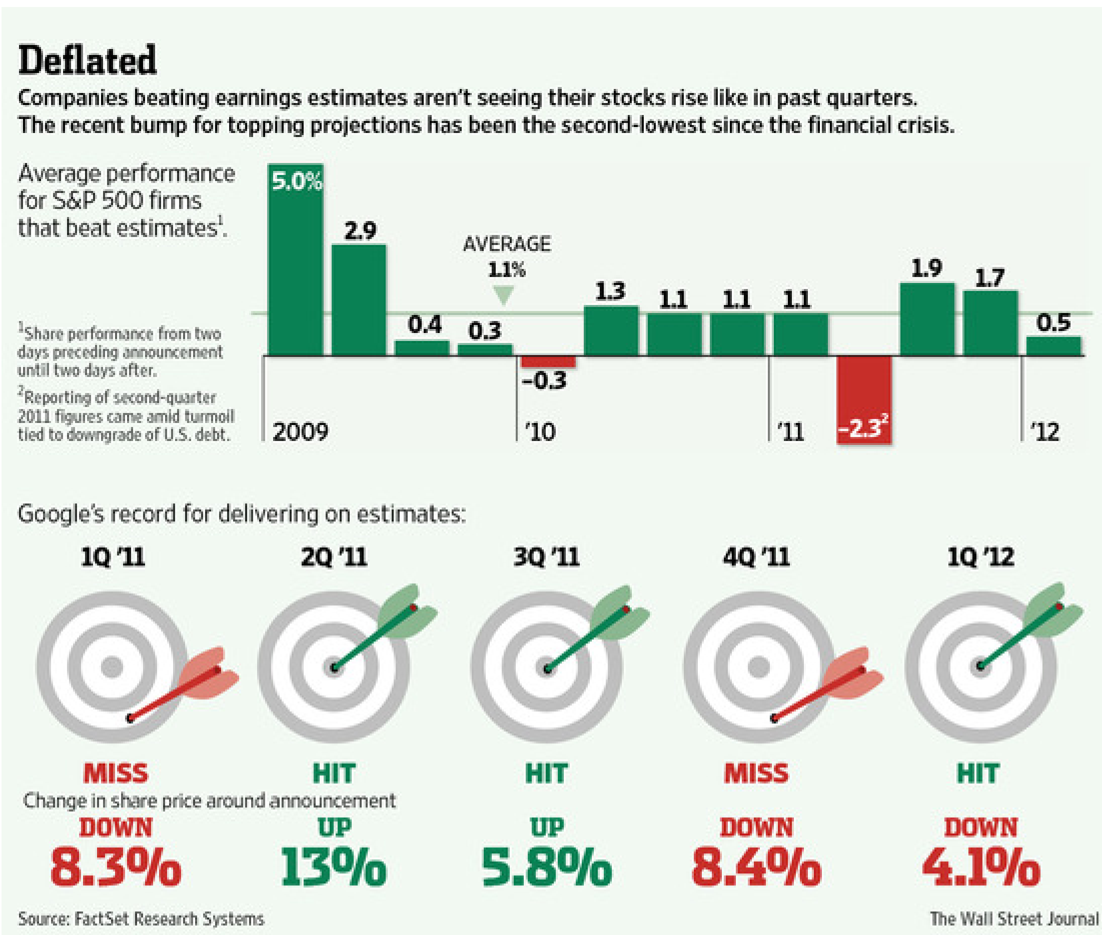
While companies have been massaging investor expectations for decades, the pace at which they are registering earnings beats is unusual.

Of the companies in the S&P 500 index that have announced results by the market's opening Monday morning, 79% have posted earnings-per-share results that beat analyst estimates, according to Thomson Reuters data. That's on par with the record rate set for earnings for the third quarter of 2009. In a typical quarter, from 1994 to present, 62% of companies surpassed expectations.

As of Monday's market opening, 101 companies had reported earnings beats for the first quarter of calendar-year 2012. Those companies saw their shares rise an average of 0.5% from two days before the report until two days after it, according to FactSet. FactSet uses that period of time so it can measure the effect of reports on companies that report results during market hours.

Enlarge Image

Close



To be sure, earnings season is still young. Through Friday only a little more than 20% of the S&P 500 has reported. These numbers could change over the next few weeks as a slew of reports are expected to be released.These numbers could change over the next few weeks as a slew of reports are expected to be released.

Michelle Clayman, chief investment officer at New Amsterdam Partners, which has $2.7 billion under management, said her firm looks at companies' guidance issued two months before quarter-end, and weighs that against analyst estimates and updated projections from the company.

"Over the last couple of years, people have realized you can't just look at the earnings beat," Ms. Clayman said.

Investors are watching to see how shares of Apple Inc. AAPL -1.33%fare after the company releases results after the close of markets on Tuesday.

The company has missed estimates only once since 2007, as far back as FactSet has tracked that data. Apple posted an earnings blowout for the fourth quarter of 2011, sending its market capitalization briefly above $600 billion.leading a broader stock market rally in the first three months of the year. Since then, though, shares have slid.

This year's relative weakness was led by a handful of high-profile firms. Google, GOOG +0.44%Wells Fargo, WFC +0.81%J.P. Morgan JPM +0.30%and Intel INTC +0.42%are among the companies that posted profits above Street expectations, only to see their stock prices drop.

Until this month, Google hadn't seen its shares fall after an earnings beat for over a year. When the company topped earnings estimates in its January 2011 report, it also announced it would move Eric Schmidt from his role as chief executive. In the four days surrounding that report, the company saw shares fall 2.4%. This year, the company beat estimates solidly but the stock still fell more than 4%.

Companies in the S&P 500-stock index were cutting guidance in the first quarter at nearly twice the rate that they were increasing it, for the first time since the first quarter of 2009, according to Thomson Reuters data.

"There's been a tendency for everyone to be very conservative over the past couple of years," said Gregory Harrison, an analyst with Thomson Reuters.

But, as RBC's Mr. Lascelles warns, investors may not pay as much attention to whether a company beats estimates if the projections are seen as low-ball numbers.

"If you mislead too many times, you lose your credibility," he said.

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http://www.wsj.com/articles/dont-fight-the-fed-its-lower-for-longer-for-bond-yields-1447583404

MARKETS | STOCKS | ABREAST OF THE MARKET

Don’t Fight the Fed: It’s Lower for Longer for Bond Yields

Few analysts and traders expect rates to keep rising for long

The central bank’s Federal Open Market Committee is expected to raise interest rates at its Dec. 15-16 meeting.
PHOTO: ANDREW HARRER/BLOOMBERG NEWS

By MIN ZENG
Updated Nov. 15, 2015 9:41 p.m. ET

Bond investors aren’t fighting the Fed, but they aren’t panicking about higher interest rates, either.

Futures-market bets on rising U.S. interest rates have reached a six-month high, reflecting expectations that the Federal Reserve will raise short-term rates next month for the first time since 2006. The yield on the benchmark 10-year Treasury note has risen, too, trading Friday at 2.280%, near the highest level since July.

Yet, few analysts and traders expect rates to keep rising for long. Many investors say the yield on the 10-year note is likely to trade between 2.25% and 2.5% for the remainder of this year, reflecting uneven economic growth, soft inflation and strong demand for high-quality debt that has consistently foiled expectations for rising rates since the financial crisis.

“It is very hard for long-term Treasury yields to rise substantially in this environment,” said John Bellows, portfolio manager at Western Asset Management Co., which had $446.1 billion in assets under management at the end of September. “It could take a long time for long-term Treasury yields to normalize.”

Even so, signs are abundant that investors are preparing for higher rates.

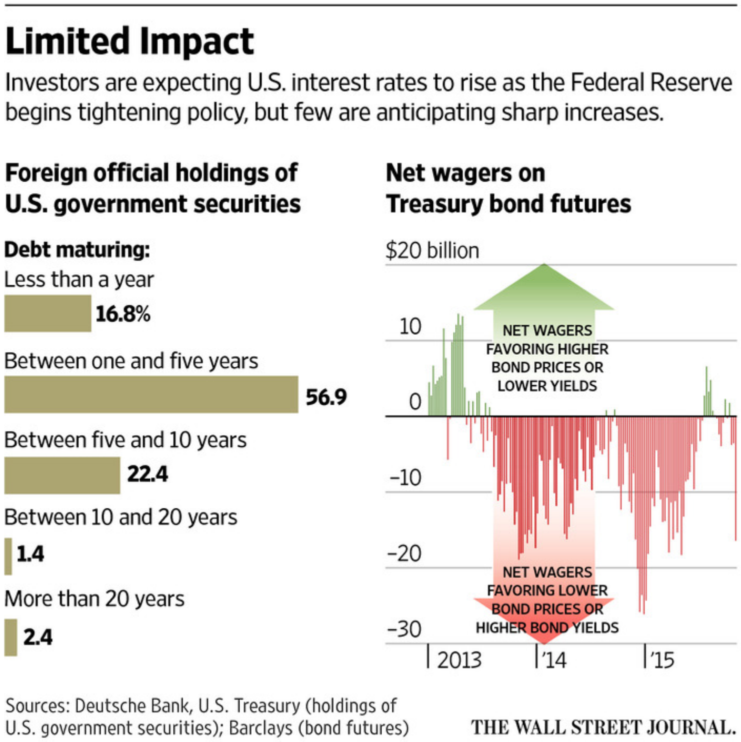
Fed funds futures, used by investors and traders to place bets on central-bank policy, have risen to reflect a 70% likelihood of a rate increase in December, according to data from CME Group. That is up from 38% on Oct. 28, when the Fed said a rate increase at the December meeting remains on the table.

Investors including hedge funds and money managers have accumulated $16.4 billion in net short positions on 10-year Treasury note futures for the week that ended Nov. 3, the highest level since May, according to data from Cheng Chen, interest-rate strategist at TD Securities. A short position is a wager on lower bond prices and higher yields.

U.S. bond funds and exchange-traded funds targeting U.S. government bonds posted $2.126 billion net cash outflow for the week ended Nov. 11, according to data from fund tracker Lipper. It was the biggest weekly outflow since May and the fifth consecutive week of net redemption, a sign that fundholders are selling bonds in anticipation that their prices will fall as rates increase.

At the same time, robust demand will set a cap on rates. Sales of 10-year and 30-year Treasury debt last week attracted strong demand from home and abroad. Indirect bidding, a gauge of foreign demand, was 60.5% for the 10-year note auction, the fourth largest on record for a 10-year-note sale.

Sales by foreign central banks prevented bond yields from falling significantly in August and September when global stock and commodity prices swooned.



Foreign private investors have been filling the void. Such investors bought a net $208.5 billion of Treasury notes and bonds in the 12 months through August, the fastest pace since May 2014, according to Deutsche Bank. The purchases reflect in part a global stock selloff in August, which prompted many investors to buy government debt.

Torsten Slok, chief international economist at Deutsche Bank Securities, said the nature of overseas central banks’ Treasury holdings helped mitigate the impact of their selling on U.S. rates.

Foreign central banks held 56.9% of their overall investments in U.S. government debt in securities maturing in one to five years. Investments in Treasury debt maturing in a decade or more accounted for only 3.8% of the total, which cushioned the impact on long-term bond yields, Mr. Slok said.

Many investors say low inflation driven by weak commodities prices and a stronger dollar supports the case for the Fed to raise rates slowly, minimizing the impact on markets.

“With the Fed signaling a very shallow tightening campaign and with inflation where it is, why should the 10-year yield rise dramatically?” said Tom Girard, head of Fixed Income Investors, an investment division of NYL Investors, which has $137 billion of assets under management.

Mr. Girard said he has bought long-term Treasury bonds recently as yields rose. He said the 10-year yield could fall to 2% or lower by the end of the year should riskier markets such as stocks suffer a large pullback.

The S&P 500 Index fell 3.6% last week to 2023.04, snapping a six-week winning streak. U.S. crude-oil futures tumbled 8% for the week, to $40.74 a barrel, and copper prices dropped to the lowest level since July 2009.

To be sure, not everyone is certain the Fed’s tightening campaign will be as measured as the market expects.

“The Fed’s gradual and shallow path has been on people’s radar screen for a while, so the risk for the bond market is that the Fed may tighten more aggressively than people think,” said David Donabedian, chief investment officer at Atlantic Trust Private Wealth Management, which has $26.1 billion assets under management.

In part, limited rate-increase expectations reflect gains in the dollar against other currencies, which has driven up returns on U.S. assets for overseas investors.

U.S. government debt overall has posted a total return—including bond-price gains and interest payments—of 0.5% this year through Thursday, according to data from Barclays PLC. The return amounts to 13% in euro terms, 3.1% in British pounds and 3% in yen.

Andrew Milligan, head of global strategy at Standard Life Investments, which has $393.1 billion of assets under management, said a stronger dollar “is doing part of the Fed’s work” by tightening financial conditions in the U.S.

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http://www.wsj.com/articles/u-s-bond-market-takes-flight-an-upbeat-sign-for-economy-1446402762

MARKETS | STOCKS | ABREAST OF THE MARKET

Corporate Bond Market Booms, a Bright Sign for U.S. Economy

Corporate-debt issuance heads for another record year as sales rebound after summer lull

Microsoft Corp. issued $13 billion in bonds last week, and opened this store on New York's Fifth Avenue.
PHOTO: STEPHANIE KEITH/BLOOMBERG NEWS

By MIKE CHERNEY

Updated Nov. 1, 2015 3:57 p.m. ET

The bond market is booming again, a sign of investors' faith in the resilience of the U.S. economy.

U.S. bond sales by companies with good credit ratings hit $103 billion in October, a record for the month, according to deal tracker Dealogic. Corporate-bond sales in the U.S. are on track for their fourth straight annual record, according to data from the Securities Industry and Financial Markets Association.

Many analysts say they expect bond sales to continue at a vigorous pace through the end of the year, reflecting steady economic growth, pent-up investor demand following a late-summer slowdown in bond issuance, and efforts by corporate treasurers to lock in low interest rates before a possible Federal Reserve interest-rate increase in December.

Microsoft Corp. sold $13 billion in new bonds on Thursday, a day after the Fed said it might raise rates this year for the first time since 2006. Earlier in the week, insurer ACE Ltd. sold $5.3 billion and Nike Inc. sold $1 billion, its first debt sale in more than two years. Oil-field services giant Halliburton Co. is planning a large bond sale that could hit the market as early as this week.

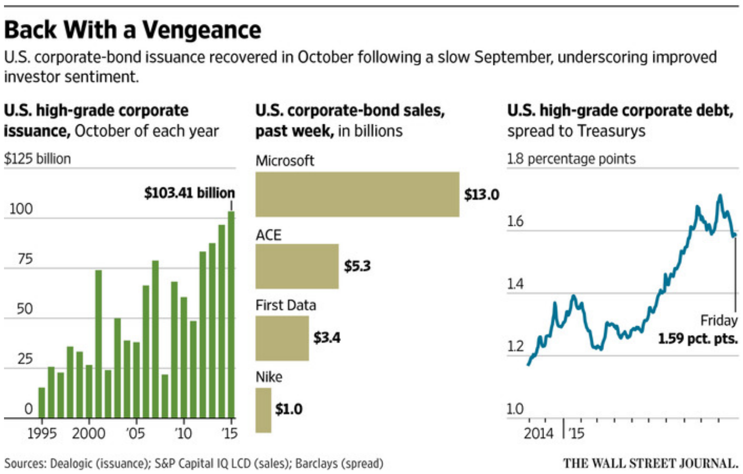
The gap in yields between highly rated corporate bonds and benchmark Treasurys had fallen from 1.71 percentage points at the beginning of October to 1.59 percentage points as of Friday, according to Barclays data. A smaller spread means buyers are willing to accept lower interest payments relative to Treasurys to own corporate bonds, and suggests investors perceive that default and other risks are falling. High-grade corporate bonds yielded 3.22% as of Friday, according to the S&P U.S. Investment Grade Corporate Bond Index.

Overall, high-grade U.S. corporate bonds have returned 0.32% this year, a figure that includes price changes and interest payments, according to Barclays.

Even some riskier companies are finding strong demand. Payment-technology company First Data Corp. , which carries ratings in the “junk” category, said on Friday that it sold $3.4 billion in bonds with a 7% interest rate, after preparing to sell just $750 million.

The bond market’s bounceback is a positive sign for a U.S. economy that was perceived to have lost some momentum in the second half of 2015. U.S. economic growth cooled in the third quarter, and job gains have slowed, but the economy appears to be plodding along despite a sharp slowdown in emerging markets.

Corporate bonds are a “better leading indicator for the economy than most of the other market metrics out there,” said Gene Tannuzzo, who helps oversee the $2.3 billion Columbia Strategic Income Fund. “If we see a nice rebound, that will tell you that the economy is in an OK spot.”



Risk appetite has recovered from a late-summer swoon that swept markets and sharply reduced bond sales in September. U.S. stock indexes are again up this year after deep declines late this summer.

Investment-grade companies sold $105 billion in September, down roughly 23% from a year earlier and the lowest figure for September since 2011, according to Dealogic. September is typically a much stronger month for debt issuance than October, as investors and bankers return from summer vacations.

The slowdown in debt deals highlighted growing worries that corporate financial health has already peaked and that the credit cycle—the ease with which companies can borrow money—could be in its latter stages, presaging an economic downturn.

“When nothing is happening in major parts of the market, that’s when you worry,” said Mark Bamford, global head of fixed income syndicate at Barclays.

For the bond market, September was “unique in that we hadn’t had a period where access was questioned,” said Andrew Karp, co-head of Americas investment-grade capital markets at Bank of America Merrill Lynch.

Johnson & Johnson, one of the few companies that maintain a pristine triple-A credit rating, plans to finance a $10 billion share-repurchase program with new debt.

Other companies are also laying the groundwork for debt issuance.

“We will be adding debt to the balance sheet,” Tony Tripeny, chief financial officer at glassmaker Corning Inc., said on a conference call Tuesday, according to a transcript from FactSet. He didn’t give an exact time frame but said it would be “over the next few years.”

There are still some signs that the credit cycle may be peaking. Defaults on junk-rated companies are expected to increase, and more companies are getting downgraded by credit-rating firms. Corporate executives are pursuing more acquisitions amid difficulty finding revenue growth, which could mean bigger debt loads for some companies down the road.

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THE WALL STREET JOURNAL.

Tuesday, October 9, 2012
Page B1

Companies Feast on Cheap Money

Market for 30-Year Bonds, Priced at Stark Lows, Brings Out GE, UPS and Other Once-Shy Issuers

By VIPAL MONGA

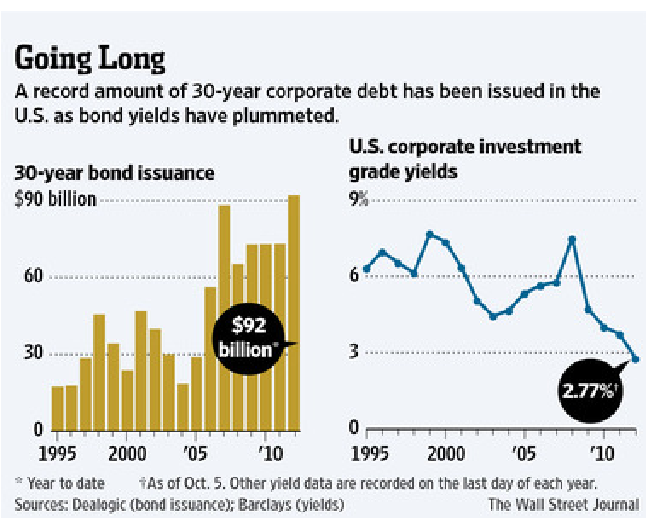
Companies are taking advantage of investors' appetite for yield—and fear of riskier bets—by issuing more long-term bonds, aiming to reduce their refinancing needs in coming years, when interest rates are likely to be higher.

Investment-grade companies have sold more 30-year bonds in the U.S. so far in 2012 than in any full year since 1995, according to data provider Dealogic.

The $91.9 billion of 30-year bonds sold in 166 offerings this year, is about 26% more than the $73.2 billion sold in 145 deals during all of 2011.

Issuers are being drawn to the longer maturities by low interest rates, the result of the Federal Reserve's loose monetary policy and the global economy's continuing weakness.

For investors, the longer maturities provide better returns than shorter-term debt without the default worries associated with the high-yielding debt of some of Europe's troubled economies.



However, more long-term debt issuance now could limit the supply of bonds in the future, meaning investors will need to find other places to put their cash.

For corporations, there is a sense that now is as good a time as any to raise debt, particularly as the near-term economic outlook dims.

That view helped make September the second busiest month for 30-year issuance this year, with 24 companies raising $12.3 billion.

"No treasurer or CFO wants to be the one treasurer or CFO who didn't get cheap long-term money when it was available," says Mark Gray, an analyst with Moody's Investors Service.

Among those tapping the market was United Parcel Service Inc. UPS +0.09%On Sept. 24, UPS refinanced $1.75 billion of five-year bonds coming due in January 2013 through a three-part bond deal, including $375 million of 30-year bonds that paid 3.625% annually.

The timing of the deal "was a combination of the current credit market and looking at avoiding fourth-quarter uncertainty," said UPS spokeswoman Susan Rosenberg.

Ms. Rosenberg said that there was seven times the demand for the bonds than the amount available.

She added that the company wanted to raise the funds ahead of any disruption to the economy caused by government negotiations over tax and spending cuts.

The corporate-debt market is enticing many companies that haven't issued long-dated bonds for years. General Electric Co. GE +0.02%jumped in on Oct. 1, selling $7 billion of bonds, including $2 billion of 30-year bonds.

Although GE's finance arm, GE Capital, is a frequent bond issuer, the recent offering was the first by the parent company in five years.

The company plans to use part of the proceeds to refinance $5 billion of debt coming due in February 2013.

A GE spokesman said the issuance was consistent with its strategy of being "opportunistic in accessing markets and prefunding maturities, particularly with interest rates at historically low levels."

On Sept. 28, Comcast Corp. CMCSA -1.13%sold $1 billion of 30-year bonds for its NBCUniversal subsidiary, with a 4.45% rate, compared with rates ranging between 6.5% and 7% for 30-year bonds Comcast sold in past years.

That difference represents an annual interest-payment savings of roughly $20 million on $1 billion of debt.

Investor demand for corporate bonds has narrowed their spread with benchmark 30-year U.S. Treasurys.

The spread measures how risky investors consider the bonds relative to U.S. Treasurys, which are considered among the safest investments.

On Thursday, the spread between 30-year Treasurys, which yielded 2.89%, and 30-year corporate debt was 1.83 percentage points, the lowest since Aug. 10, 2011, according to S&P Capital IQ's Leveraged Commentary & Data unit.

The tighter spread suggests investors see less risk in corporate bonds.

The low yields present a problem to investors, because they are buying bonds at historically high prices that will fall if the Fed begins raising interest rates. Bond prices move in the opposite direction of interest rates.

However, bond-fund managers have little choice but to buy the debt, if they can, especially when highly regarded issuers like GE re-enter the market.

Investment-grade companies have been very stable lately. Moody's Mr. Gray said that only four companies have suffered ratings downgrades since July, "which speaks to the fact that things are pretty stable out there."

He added that the long-term issuance is a positive for companies.

"If a company can lock in cheap long-term money for a refinancing, it takes maturity risk out of the equation for a long time. Over the near term it gives a company breathing room," Mr. Gray said.

The demand is making it easy for companies to come to market, particularly those with the higher ratings. "Whether you're mid-BBB or mid-A, if you're a solid, large market cap company in a noncyclical industry, you've got very, very good access," said one investment-grade bond banker.

Write to Vipal Monga at vipal.monga@wsj.com

THE WALL STREET JOURNAL.
WSJ.com

HEARD ON THE STREET | April 26, 2010

Wall Street's Missed Expectations

By LIAM DENNING

Wall Street's sell-side analysts are a famously Panglossian tribe. But it turns out that they are actually too pessimistic when it comes to predicting company earnings, particularly in the wake of recession.

With 172 of the S&P 500's members having so far reported quarterly earnings, 143 have beaten their consensus forecast, according to data collated by Thomson Reuters. On average, their numbers came in 21% above the Street's collective wisdom.

Less than 40% of the index's members have reported, so the current score of 83% having beaten forecasts—easily the highest for any quarter since at least 1999—may not stand. But having a high percentage of companies beat the Street isn't unusual. Thomson's data show that, on average, 64% of companies have done so in any given quarter since the start of 1999, compared with 18% that miss. The average earnings "surprise" is 2%, although these data swing erratically.

This is less surprising than it appears. Corporate management, for better or worse, go to great lengths to guide analysts toward the right numbers. After all, the last thing you want to do is deliver a nasty surprise. Just ask Ingersoll Rand, which missed the consensus forecast by 11% on Friday and saw its shares plunge 8.5% at one point.

Analysts are also prone to the same greed and fear that fuel the financial markets' gyrations. The most optimistic quarter since 1999, in which only 52% of S&P 500 companies beat the consensus forecast, was the last three months of 2000, just as the tech bubble was turning to bust.

With that in mind, it is little wonder that pessimism has really taken hold recently, with the percentage of companies beating earnings forecasts well above average since the second quarter of 2009. But there could be more to this than mere psychology. So far this quarter, for example, 69% of S&P 500 companies that have reported have beaten revenue estimates, according to Thomson. The implication is that final demand is stronger than anticipated.

Tobias Levkovich of Citigroup points to the importance of labor. Corporate America cut costs rapidly as recession took hold. That helped offset some of the damage inflicted on earnings by falling sales. But the ranks of the unemployed weigh heavily on expectations for a recovery in sales. That leaves scope for surprisingly good revenue numbers, relative to estimates, which in turn provides great operating leverage at the profit line, given earlier cost cutting.

So there is reason to suspect analysts' expectations will continue to be trumped by better results as the current reporting season progresses. But at some point, that unemployment rate has to fall if optimism is to be restored on a sustainable basis.

—Liam Denning

BUSINESS

Electric Utilities Get No Jolt From Gadgets, Improving Economy

Electricity Sales Anemic for Seventh Year in a Row

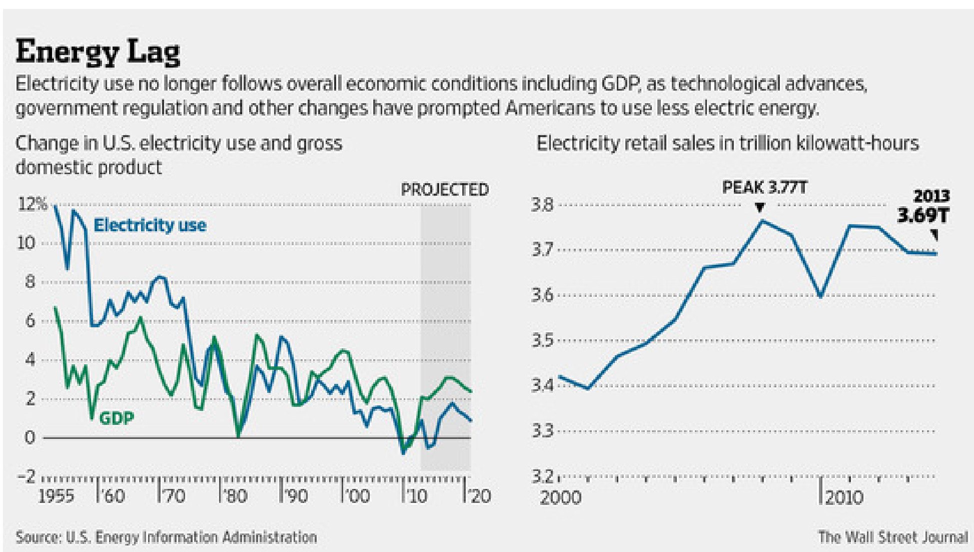
By REBECCA SMITH

July 28, 2014 8:25 p.m. ET

When customers of American Electric Power Co. started dialing back on power consumption in early 2009, company executives figured consumers and businesses were just pinching pennies because of the recession.

Five years and an economic recovery later, electricity sales at the Columbus, Ohio-based power company still haven't rebounded to the peak reached in 2008. As a result, executives have had to abandon their century-old assumption that the use of electricity tracks overall economic conditions.

"It's a new world for us," says Chief Executive Nick Akins.



Utility executives across the country are reaching the same conclusion. Even though Americans are plugging in more gadgets than ever and the unemployment rate had dropped at one point to a level last reported in 2008, electricity sales are looking anemic for the seventh year in a row.

Sluggish electricity demand reflects broad changes in the overall economy, the effects of government regulation and technological changes that have made it easier for Americans to trim their power consumption. But the confluence of these trends presents utilities with an almost unprecedented challenge: how to cope with rising costs when sales of their main product have stopped growing.

Sales volume matters because the power business ranks as the nation's most capital-intensive industry. When utilities are flush with cash, they buy lots of expensive equipment and raise dividends for investors. When they're selling less of their product, they look for ways to cut or defer spending. Regulators typically allow utilities to charge rates that are high enough to cover their basic expenses, but that doesn't guarantee them strong profits.

Utilities typically need to expand sales volume by 1% or more a year just to maintain their expensive, sprawling networks of power plants, transmission lines and substations, says Steven Piper, an energy analyst for SNL Energy, a research company.

"That's where the existential crisis is coming from," he adds.

Historically, economic expansion meant expanding electricity sales. In fact, during the 1950s and 1960s, energy demand outpaced the growth in the gross domestic product. Then, from 1975 to 1995, GDP and electricity sales grew in tandem.

But the connection now appears to be broken. The U.S. Energy Information Administration said recently that it no longer foresees any sustained period in which electricity sales will keep pace with GDP growth.

Some of the trends affecting the electric industry have been building for decades. Among them: Americans have migrated to states with milder weather. And although it may seem counterintuitive, it takes less energy to keep houses cool in warm climates than to warm them in cold climates. According to federal data, less than half of all Americans now live in colder states, down from almost 60% in 1960.

Demand from industry has also changed as manufacturing plants have moved overseas or even within the U.S. Edison International, for example, has lost most of its aerospace and defense customers in Southern California. Ted Craver, chief executive, says industrial customers consumed half of Southern California Edison's electricity in the 1980s but require only 10% today.

Increasingly, both residential and business customers are making their own power rather than buying it from utilities. In Arizona, for example, solar companies are siphoning off utility customers.

Sherry Pfister, a retiree who once worked at the Palo Verde nuclear power plant 45 miles west of Phoenix, says she didn't hesitate to lease solar panels for her home in Waddell, Ariz., and says the panels have cut her utility bill by a third.

"Why isn't everybody doing it?" she wonders.

Sluggish electricity demand reflects broad changes in the overall economy, the effects of government

Her supplier, Sunnova Inc., wooed her with solar panels that cost 70 cents a watt, a fifth of the cost in 2008. Solar energy "is the next shale gas," says Sunnova Chief Executive John Berger, predicting it will upend the utility business.

Energy efficiency blunts the impact of population and economic growth, because upgrades in lighting, appliances and heavy equipment reduce energy needs. In 2005, the average refrigerator consumed 840 kilowatt-hours of electricity a year, according to the U.S. Energy Information regulation and technological changes. *Bloomberg News*

Administration. A typical 2010 replacement needed only 453 kilowatt-hours of electricity.

As their sales have lagged behind, utilities have raised prices, and that, too, is discouraging use. Most U.S. households pay 12 cents a kilowatt-hour today, up one-third from a decade ago, according to EIA data. A 2012 study from the California Public Utilities Commission found that customers have had a "strong response to price changes."

To fight rising costs, Washington, D.C., has hired a consultant to help cut its electricity use 20% by 2015—and to save $10 million a year. FirstFuel Software sniffs out waste at the district's 400 buildings with the help of smart meters and special software.

"We're not going to win the grand innovation prize," says Sam Brooks, head of energy and sustainability for the District of Columbia, but he adds that just turning off the lights and shutting off furnaces when buildings are unoccupied turns out to be an easy way to save money.

Electricity demand is likely to be even more subdued in coming years. The U.S. Environmental Protection Agency wants to slash greenhouse-gas emissions from power plants, in part by trimming electricity use. Its goal is to offset any increases in energy use because of population growth by promoting energy-efficiency measures.

Utilities aren't waiting for better times. They're increasing spending on big solar projects and energy-efficiency programs for which they earn income as investors or managers. And many executives are searching for new services to offer.

"The industry has been pretty resilient the past hundred years," says Bill Johnson, chief executive of the Tennessee Valley Authority, which furnishes electricity to nine million people in seven states. "I wouldn't count us out quite yet."

Electricity demand also isn't bleak everywhere. FirstEnergy Corp. , which is based in Akron, Ohio, says demand is increasing from such industries as steel, auto, oil refining and chemical production.

But that hasn't been enough to make up for losses elsewhere. Anthony Alexander, the company's chief executive, forecasts that it will take until 2016 at the earliest for its electricity sales to recover to prerecession levels.

"It's pretty much a lost decade," he says.

Write to Rebecca Smith at rebecca.smith@wsj.com

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BUSINESS

As Conservation Cuts Electricity Use, Utilities Turn to Fees

Double-digit percentage increases for distribution, maintenance anger power consumers

Electricity providers in 22 states have proposed increases in the monthly fees charged consumers for maintenance and other services, in many cases by double-digit percentages, as power consumption per square foot of residential space declines. *PHOTO: MICHAEL NAGLE/BLOOMBERG NEWS*

By REBECCA SMITH
October 20, 2015

Electric utilities across the country are trying to change the way they charge customers, shifting more of their fixed costs to monthly fees, raising the hackles of consumer watchdogs and conservation advocates.

Traditionally, charges for generating, transporting and maintaining the grid have been wrapped together into a monthly cost based on the amount of electricity consumers use each month. Some utilities also charge a basic service fee of $5 or so a month to cover the costs of reading meters and sending out bills.

Now, many utility companies are seeking to increase their monthly fees by double-digit percentages, raising them to $25 or more a month regardless of the amount of power consumers use. The utilities argue that the fees should cover a bigger proportion of the fixed costs of the electric grid, including maintenance and repairs.

“The [electricity] grid is becoming a more complex machine, and there needs to be an equitable sharing of its costs,” said Lisa Wood, a vice president of the Edison Foundation, the nonprofit arm of the utility industry’s trade group Electric Electric Institute. A typical American household pays $110 a month for electricity, she said; more than half goes to cover fixed costs.

Utilities in at least 24 states have requested higher fees, according to the Environmental Law & Policy Center in Chicago, which opposes some of these increases. If regulators allow the fee increases, “the result is that low-use customers pay more than in the past, and high-use customers pay less,” said Bradley Klein, a senior attorney for the group.

RELATED

- Electric Utilities Skip Fight Against Carbon Rule (http://www.wsj.com/articles/with-market-on-their-side-electric-utilities-skip-fight-against-carbon-rule-1444606397) (Oct. 11, 2015)
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- Utilities’ Profit Recipe: Spend More (http://www.wsj.com/articles/utilities-profit-recipe-spend-more-1429567463) (April 20, 2015)

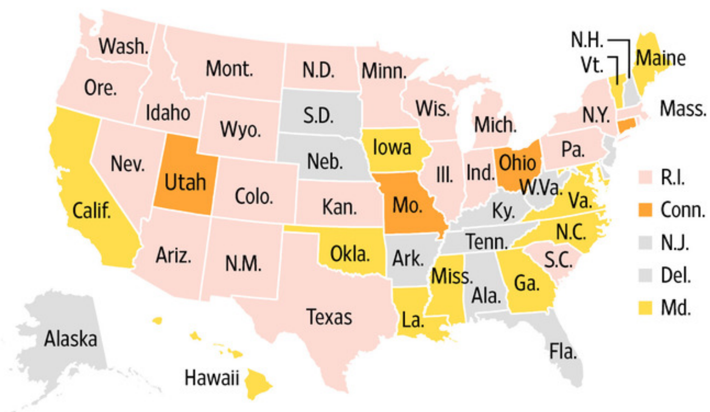
The problem for utilities is that many consumers are using less power these days, in large part because appliances and equipment are getting more energy efficient. Even though U.S. homes are getting bigger, energy consumption per square foot is going down, according to the federal Energy Information Administration. The rise of rooftop solar power in some parts of the country also is chipping away at power sales.

In recent fights in Connecticut, Pennsylvania, Iowa and other states, regulators have said they are sympathetic to the plight of utilities but don’t want them to raise fees too aggressively.

Power Shift

Electric utilities in 22 states are proposing to raise their fees and utilities in another four states could seek increases within 24 months.

- Current fixed charge proposals
- New proposal expected within 12 or 24 months
- Proposal expected or possible but timing uncertain
- No current or near-term expected activity



Note: As of September
Sources: Natural Resources Defense Council, National Consumer Law Center and Vote Solar
THE WALL STREET JOURNAL.

Eversource Energy 's Connecticut Light & Power asked for permission last year to raise its fee 59% to $25.50 a month from $16. But the state's utility regulator balked, instead granting the company permission to charge residential customers 20% more, or $19.25 a month, starting this year.

The size of the initial request angered customers so much that the Legislature got involved and passed a bill in June that requires the fee to be reviewed—and likely lowered—the next time the utility seeks a general rate increase.

"Fixed fees are unpopular because they disempower the customer and discourage investments in rooftop solar and energy efficiency," said William Dornbos, Connecticut director for the Maine-based Acadia Center, a public interest group that promotes clean energy.

He says high monthly fees reduce the proportion of the total bill that a customer can lower by conserving energy, reducing the incentive to embrace solar and cut usage.

Eversource said Connecticut Light & Power's cost of providing service, excluding the cost of the electricity itself, is about $35 a month per home. "We proposed what we believed to be a more reasonable charge," said Mitch Gross, an Eversource spokesman.

In Pennsylvania, PPL Corp. , parent of Pennsylvania Power & Light, wants to raise its customer-service charge by about 42% to $20 from $14.13, as part of an overall 6% rate increase. Under its rate proposal, about 60% of the added revenues would come from a higher monthly charge.

> ‘*The more dollars they collect through a fixed monthly charge, the less their revenue fluctuates*’
>
> —Tanya McCloskey, Penn. Office of Consumer Advocate

PPL spokesman Paul Wirth said the utility figures it costs about $38 a month to provide service to a typical home, including the cost of meter reading and billing, but excluding the cost of electricity. “Since our cost to provide service is mostly fixed, we think our rate design ought to reflect that more accurately,” he said.

Pennsylvania’s Office of Consumer Advocate, which represents electricity customers, has generally opposed fee increases. Tanya McCloskey, the acting head of the agency, said she knows that for utilities, “the more dollars they collect through a fixed monthly charge, the less their revenue fluctuates from weather or recession or other things.” But she says she thinks utilities sometimes exaggerate the proportion of their costs that are truly fixed.

PECO, the Philadelphia utility that is part of Exelon Corp. , agreed earlier this month to charge customers $8.45 a month apiece, up from $7.13, rather than the $12 it proposed in March.

Indianapolis Power & Light is asking state regulators for permission to boost its monthly fees, with the biggest percentage increases falling on customers who use little power. Households consuming less than 325 kilowatt-hours of electricity a month—about 15% of its customers—would pay $11.25 a month, 68% more than the current $6.70.

Residences using more than 325 kilowatt-hours of electricity would pay $17 a month, or 54% more than the current of $11. The utility also wants to increase the price for electricity by anywhere from 3.69% for the biggest consumers to 28% for the smallest users.

Ken Flora, Indiana Power’s director of regulatory affairs, said he thinks the proposal fairly distributes the costs of the electric grid. But the plan has drawn vigorous opposition from a broad coalition of consumer advocates, including those representing the elderly, the poor, and conservation-minded consumers.

Write to Rebecca Smith at rebecca.smith@wsj.com

Corrections & Amplifications

Lisa Wood is a vice president of the nonprofit Edison Foundation. An earlier version of this article incorrectly described her as a vice president of the Edison Electric Institute and the institute as the nonprofit arm of the foundation. (Oct. 20, 2015)

- HEARD ON THE STREET
- April 26, 2010

Wall Street's Missed Expectations

By LIAM DENNING

Wall Street's sell-side analysts are a famously Panglossian tribe. But it turns out that they are actually too pessimistic when it comes to predicting company earnings, particularly in the wake of recession.

With 172 of the S&P 500's members having so far reported quarterly earnings, 143 have beaten their consensus forecast, according to data collated by Thomson Reuters. On average, their numbers came in 21% above the Street's collective wisdom.

Less than 40% of the index's members have reported, so the current score of 83% having beaten forecasts—easily the highest for any quarter since at least 1999—may not stand. But having a high percentage of companies beat the Street isn't unusual. Thomson's data show that, on average, 64% of companies have done so in any given quarter since the start of 1999, compared with 18% that miss. The average earnings "surprise" is 2%, although these data swing erratically.

This is less surprising than it appears. Corporate management, for better or worse, go to great lengths to guide analysts toward the right numbers. After all, the last thing you want to do is deliver a nasty surprise. Just ask Ingersoll Rand, IR -0.78%which missed the consensus forecast by 11% on Friday and saw its shares plunge 8.5% at one point.

Analysts are also prone to the same greed and fear that fuel the financial markets' gyrations. The most optimistic quarter since 1999, in which only 52% of S&P 500 companies beat the consensus forecast, was the last three months of 2000, just as the tech bubble was turning to bust.

With that in mind, it is little wonder that pessimism has really taken hold recently, with the percentage of companies beating earnings forecasts well above average since the second quarter of 2009. But there could be more to this than mere psychology. So far this quarter, for example, 69% of S&P 500 companies that have reported have beaten revenue estimates, according to Thomson. The implication is that final demand is stronger than anticipated.

Tobias Levkovich of Citigroup points to the importance of labor. Corporate America cut costs rapidly as recession took hold. That helped offset some of the damage inflicted on earnings by falling sales. But the ranks of the unemployed weigh heavily on expectations for a recovery in sales. That leaves scope for surprisingly good revenue numbers, relative to estimates, which in turn provides great operating leverage at the profit line, given earlier cost cutting.

So there is reason to suspect analysts' expectations will continue to be trumped by better results as the current reporting season progresses. But at some point, that unemployment rate has to fall if optimism is to be restored on a sustainable basis.

—Liam Denning

- RETIREMENT PLANNING
- OCTOBER 10, 2011

Pensions Wrestle With Return Rates

By MICHAEL CORKERY

Turmoil in Europe, the sluggish economy and low interest rates are intensifying pressure on public pension-fund systems to reduce the annual-performance assumptions they use to determine contributions from taxpayers and employees.

Some lawmakers and pension officials are pushing to abandon the roughly 8% annual-return assumption set by many public-employee funds, saying the rate is unrealistically high given upheaval in markets around the world and the preceding financial crisis.

"After 10 years of listening to the experts be wrong on the downside more than half the time, I would like to be more cautious," said James Dalton, chairman of the Oregon Public Employees Retirement System.

Enlarge Image

Close

The pension system, which covers about 325,000 members, affirmed its 8% assumption this summer despite a dissenting vote from Mr. Dalton. Oregon exceeded its 8% assumed rate over the most recent 20-year period but fell short over five years and 10 years.

In Minnesota, lawmakers are considering whether to lower the large state pension funds' 8.5% return assumptions, among the highest in the nation. Pension officials at the Teachers' Retirement System of the State of Illinois are mulling a change to the system's 8.5% return target.

The nation's largest public pension, the California Public Employees' Retirement System, could face pressure to trim its assumptions if the $220 billion fund's monthly returns are disappointing. Calpers is set to release those results this week.

The assumed rate of return is critical because it determines how much a city or state and its workers must contribute to a pension system. As with many other investors, optimism prevails among many pension-fund managers. "We are in a low-return environment with a lot of downside risk," said Joseph Dear, Calpers chief investment officer. Nevertheless, Mr. Dear sees little reason to change the fund's 7.75% assumption, because that target is achievable over the long term, he said.

Since the financial crisis, at least 19 state and local pension plans have cut their return targets, while more than 100 others have held rates steady, according to a survey of large funds by the National Association of State Retirement Administrators.

But to keep meeting these assumptions, pension funds might be tempted to take on more risk, some officials and analysts warn.

"To target 8% means some aggressive trading," said Jeffrey Friedman, a senior market strategist at MF Global. "Ten-year Treasurys are yielding around 2%, economists say we are headed for a double-dip, and house prices aren't getting back to 2007 levels for the next decade, maybe."

"Good luck to them," Mr. Friedman said of pension managers still striving to hit longstanding targets.

The Teacher Retirement System of Texas reaffirmed its 8% annual return target after its consultant said the pension system, with about $100 billion in assets, should expect a median rate of return slightly greater than 8% over the next decade.

The consultant, Hewitt Ennis–Knupp, also noted that, during the past 20 years, the Texas pension fund earned a rate of return of 8.9% on invested assets. Brian Guthrie, executive director of the Teacher Retirement System of Texas, said he hasn't "looked under the hood" of the analysis, though pension officials checked with their actuary to make sure the target is in line with most other pension funds'. A spokeswoman for EnnisKnupp declined to comment.

"It doesn't matter what your assumptions are," said Laurie Hacking, executive director of the Teachers Retirement Association of Minnesota, which supports sticking with its 8.5% target return assumption. "It is what that market delivers that matters and how you react to that."

Ms. Hacking said Minnesota reacted to big investment losses after the financial crisis by cutting back on pension benefits and increasing contributions to the fund from employees and school districts. Those moves had a greater impact on the funding level of the teachers' system, now a relatively healthy 78%, than lowering return assumptions, she said.

But tweaking the number could have immediate, real-life consequences. Many public pension funds use their assumed rates of return to calculate the present value of benefits they owe retired workers in the future. So the lower the rate, the greater the obligations appear.

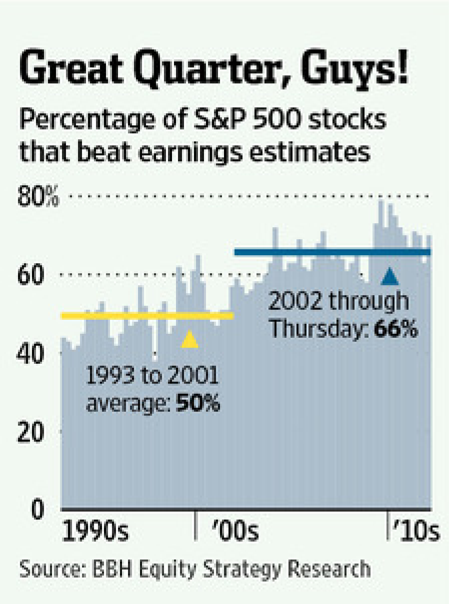
This spring, the New Hampshire legislature put off implementing a decision by the retirement board to lower the rate to 7.75% from 8.5% this year. The move by lawmakers was meant to spare New Hampshire cities and towns from having to make additional contributions to the fund without much warning, even if it means keeping return assumptions few people expect the fund to meet.

"It's a tough decision," said Jeb Bradley, Republican majority leader in the New Hampshire State Senate. "We knew we had to lower it, but we were trying to give ample warning" to cities and towns, he said. Many unions representing New Hampshire public workers objected to the delay in reducing the assumed rate.

In Minnesota, legislators last year reduced cost-of-living adjustments for retired public workers until the funding level of the pension system improves. Lowering the rate of return could lower the pension system's funding level and potentially delay when the cost-of-living adjustments are restored. Some state lawmakers say lowering the rate will benefit the system over the long haul. "A new day has dawned," said Morrie Lanning, chairman of the Legislative Commission on Pensions and Retirement in Minnesota, who wants to lower the return target. "It may have made sense in the past, but it's not realistic anymore."

Earnings Surprises Lose Punch

Surprise, surprise, surprise!



Gomer Pyle might have been about as competent an equity strategist as he was a marine. While the knee-jerk reaction to a positive earnings surprise is often, well, positive, gains can be fleeting. The reason is that companies and the analysts who cover them typically set the bar low enough that a "beat" has to be substantial, and not marred by unpleasant news about the outlook, to really have an impact.

Take the current earnings season. Now that a little over four-fifths of S&P 500 companies by market value have reported, Brown Brothers Harriman says 70% of those have beaten estimates. But since Alcoa Inc. AA -2.24%informally kicked off the current reporting season April 10, the S&P 500 is down slightly.

While this "positive surprise ratio" of 70% is above the 20 year average of 58% and also higher than last quarter's tally, it is just middling since the current bull market began in 2009. In the past decade, the ratio only dipped below 60% during the financial crisis. Look before 2002, though, and 70% would have been literally off the chart. From 1993 through 2001, about half of companies had positive surprises, which seems natural.

What changed? One potential reason is the tightening of rules governing analyst contacts with management. Analysts now must rely on publicly available guidance or, gasp, figure things out by themselves. That puts companies, with an incentive to set the bar low so that earnings are received positively, in the driver's seat. While that makes managers look good short-term, there is no lasting benefit for buy-and-hold investors. In fact, an October study by CXO Advisory Group found that the average weekly index return during earnings season has been slightly negative since 2000, while it has been positive for the rest of the year.

Enlarge Image

Close

Reuters

Since Alcoa informally kicked off the current reporting season April 10, the S&P 500 is down slightly.

The important statistic is actual corporate profits. BBH estimates the S&P 500 recorded operating earnings of $25.31 a share last quarter. That is about $1.50 higher than analyst consensus estimates a month ago but around $1.00 below last July's estimate. That is a typical pattern as expectations start out too optimistic and, by the time actual earnings approach, are too low. When the ink is dry, though, actual profits rarely make it to where expectations first began.

As Gomer would exclaim: "Well gaw-lee."

Write to Spencer Jakab at spencer.jakab@wsj.com

THE WALL STREET JOURNAL.

http://www.wsj.com/articles/the-new-era-of-low-stock-returns-1427499210

MARKETS

The New Era of Low Stock Returns

By JASON ZWEIG

March 27, 2015 7:33 p.m. ET

After more than six years of a bull market, investors should stare a cold, hard truth straight in the face: Future returns on stocks are likely to be far slimmer than the fat gains of the past few years.

Leading investment analysts think you will be lucky to squeeze out an average return of 2% annually, after inflation and fees, from a typical portfolio of stocks and bonds over the coming decade or so.

Investment expenses will loom much larger in a world of smaller expected returns. So will avoiding big mistakes.

The Dow Jones Industrial Average fell 2.7% from its Monday high to its close on Friday as economic growth seemed to falter. But that wasn't nearly enough to make stocks cheap.

One measure of valuation, based on data compiled by Yale University economist Robert Shiller, shows that the market price of the S&P 500 is about 27 times its average earnings over the past 10 years, adjusted for inflation. The long-term average, based on data going back to 1871, is about 16 times adjusted earnings.

So how have U.S. stocks performed in the past when valued around 27 times average earnings? Over the following 10 years, they generated total returns, counting dividends and adjusting for inflation, averaging about 2.5% annually, Prof. Shiller told me earlier this month.

Another method of estimating future stock returns yields a higher expectation—by a hair.

Over time, the return on stocks after inflation has tended to come very close to the sum of two numbers: dividend yield—total dividends over the past year divided by the current share price—plus the inflation-adjusted growth rate in dividends. The yield on the S&P 500 is 2%. For more than a century, the growth rate has averaged about 1.5% after inflation. Add those two numbers and you get 3.5%.

Now consider that the yield—interest income divided by price—on 10-year U.S. Treasury notes is 2% and that the government's core measure of inflation is running at about 1.7% annually.

If you have half your portfolio in stocks that return 3.5% and half in bonds that return 0.3%, you will earn about 1.9% after inflation. If stocks average the 2.5% return from Prof. Shiller's data, then a balanced portfolio will return only 1.4% after inflation. (These numbers assume no fees, taxes or trading costs.)

Either way, "it's pretty awful by historical standards," says William Bernstein, an investment manager at Efficient Frontier Advisors in Eastford, Conn.

Before you despair, bear in mind that the 2.5% expected return that Prof. Shiller derives from his historical data is an average of many 10-year periods in which stock returns ranged from losses of nearly 5% to gains of about 7%. All these results are averaged annually including dividends and after inflation. So 2.5% is a general expectation, not an exact certainty.

Still, keeping your expectations low is a good idea. “The problem isn’t that you might be not able to get better than a 2% return,” Mr. Bernstein says, “but that even getting 2% isn’t going to be psychologically easy.” With stocks and bonds alike still near record prices, they remain vulnerable to the sort of shocking decline that can shake many investors out of their conviction.

A few clear guidelines can help you stay the course.

First, you aren’t entitled to higher returns just because you feel you need (or deserve) them. If traditional investments deliver paltry returns, that doesn’t ensure that “alternatives” like hedge funds, complex trading techniques or esoteric bond funds will do any better.

Take extra risk in a low-return world and you are likely to reap the risk without earning the reward.

“The things that feel most uncomfortable in the short run are generally the most rewarding in the long run,” Mr. Bernstein says, “and right now one of the most uncomfortable things is holding cash and fixed income.” By hanging onto your cash even at today’s invisible yields, you will be able to buy stock in the next downturn when shares finally become cheap again.

You can also look overseas now. “The expected returns on foreign stocks are higher,” Mr. Bernstein says, “plus you’re buying the currencies cheap relative to the dollar.”

Stocks in Europe and selected other international markets are one-half to one-third as costly as U.S. shares by Prof. Shiller’s measure.

Inching up your exposure to non-U.S. stocks through portfolios like the iShares Core MSCI Total International Stock exchange-traded fund or the Vanguard Total International Stock Index Fund makes good sense. The funds each charge annual expenses of 0.14%, or $14 per $10,000 invested.

Next, treat every nickel like a manhole cover.

Purge any expensive mutual funds, replacing them with well-diversified, low-cost index funds or ETFs. Against a backdrop of 2% returns, a half-percentage-point reduction in management fees will give a bigger boost to your returns than almost anything else you can do.

Finally, most financial advisers, when pressed, will concede that their fees are negotiable. Now, when a 1% annual fee eats half your expected rate of return, is an excellent time to haggle.

—intelligentinvestor@wsj.com; twitter.com/jasonzweigwsj

The New Era of Low Stock Returns

hristophe Vorlet

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U.S. stocks fell about 3% between Monday and Thursday this past week as economic growth seemed to falter. But that wasn't nearly enough to make stocks cheap. One measure of valuation, based on data compiled by Yale University economist Robert Shiller , shows that the market price of the S&P 500 is about 27 times its average earnings over the past 10 years, adjusted for inflation. The long-term average, based on data going back to 1871, is about 16 times adjusted earnings.

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FEATURE ARTICLE

The effect of the SEC's regulation fair disclosure on analyst forecast attributes

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Abstract

Purpose – This study aims to examine the effect of the Securities and Exchange Commission's regulation fair disclosure (Reg. FD) on analyst forecast performance for pre-Reg. FD closed-call (CLC) and open-call (OPC) firms compared with the non-conference-call (NCC) firms in the post-Reg. FD period.

Design/methodology/approach – Specifically, it examines whether Reg. FD influenced the earnings forecast accuracy and forecast dispersion of financial analysts for the previous-CLC firms in the post-Reg. FD period compared with the previous-OPC firms, and both sets of conference call firms relative to the NCC firms in the same period.

Findings – The main findings indicate that forecast accuracy improved for both OPC and CLC firms compared with the NCC firms in the post-Reg. FD period. More importantly, the differences in earnings forecast performance between the pre-Reg. FD OPC and CLC firms had disappeared in the post-Reg. FD period.

Originality/value – These results offer further confirmation of previous findings that Reg. FD has contributed to leveling the playing field for financial analysts and investors.

Keywords Financial institutions, Earnings, Forecasting, Disclosure, Conferencing

Paper type Viewpoint

1. Introduction

On October 23, 2000, the US Securities and Exchange Commission (SEC) issued regulation fair disclosure (hereafter Reg. FD) which prohibits selective disclosure of material nonpublic information to certain financial analysts, institutional investors and others prior to making it available to the general public. Information is considered material if it is important enough to persuade an investor to buy or sell a stock. Before the implementation of Reg. FD, most conference calls were accessible only to certain analysts and institutional investors. It has been argued that conference calls, because they were predominantly closed, may have contributed to an information gap between analysts privy to the call and analysts and other investors excluded from the call. The intent of Reg. FD was to prevent this selective disclosure of information.

A number of published studies have already examined the impact of Reg. FD on various aspects of the capital markets and investment climate, including the effect on

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analyst forecast accuracy and dispersion, although the findings have been contradictory. Using data from the first three quarters after the release of Reg. FD, Agarwal and Chadha (2003) report that sell-side analysts' forecasts were less accurate and more dispersed than before its adoption, where Heflin *et al.* (2003) report no change in analysts' earnings forecast bias, accuracy or dispersion compared to the pre-Reg. FD period. Furthermore, Shane *et al.* (2001), also using data from the same period, find that analysts gathered more information between earnings announcements so that their forecasts are ultimately as accurate as those made in the period before Reg. FD was adopted.

This study has two main objectives. The first is to examine if there were changes in analyst earnings forecast errors (FE) and forecast dispersion (FD) in the pre- and post-Reg. FD period between the "closed-call" (henceforth referred to as CLC) firms and "open-call" (OPC) firms. The second objective is to determine if there were any changes in analyst earnings forecast attributes between the CLC and OPC firms as a group (labeled CC – conference call firms), and the non-conference-call (NCC) firms in the post-Reg. FD environment.

Thus, this study contributes to the existing literature by differentiating between firms in the pre-Reg. FD period that held closed conference calls, firms that held open conference calls, and other firms which held NCCs. By limiting the study only to OPC and NCC firms in the post-Reg. FD period, we are able to control for extraneous factors such as changing group membership in our analyses. Second, because the study covers the period from October 1998 to September 2002, more quarterly observations are available to conduct the tests than in previous research.

The remainder of this study is organized as follows. Section 2 presents a brief summary of previous studies focused on only the main sources, and an outline of the hypotheses examined in the paper. Section 3 describes the sample selection and a brief outline of our research methodology. Section 4 presents the major results of the study. Section 5 presents the conclusions and suggestions for future research. In the Appendix, we provide details on the research methodology and the regression equations used to analyze the data.

2. Literature review and hypothesis development

2.1 Brief review

Economic theory suggests that expanded disclosures can reduce information asymmetry arising between the firm and its shareholders or among potential buyers and sellers of firm shares and benefit firms by correcting any firm mis-valuation and increasing institutional interest and liquidity for the firm's stock. For example, Diamond and Verrecchia (1991) find that credible commitments by managers to improve disclosure increasing the precision of public information about firm value results in higher current stock prices due to reduced information asymmetry and increased liquidity. Frankel *et al.* (1999) provide evidence that firms holding conference calls as a voluntary disclosure medium tend to be relatively larger, more profitable, more heavily followed by analysts, and access the capital markets more often than other firms.

In other related findings, Bowen *et al.* (2002) provide evidence that regular use of earnings-related conference calls could present a selective disclosure problem if the public is not privy to these calls, even if conference calls tend to reduce both FE and FD. Bushee and Noe (2000) find that firms with greater analyst following and greater institutional ownership are less likely to have conference calls that provide open access to all investors. Core (2001) presents evidence consistent with the intuition that informed investors prefer less disclosure, and that analysts and institutions produce information that reduces information asymmetry and the need for conference calls.

As cited previously, some of the research focused on the effect of Reg. FD on financial analyst behavior have yielded mixed results. In general, however, the majority of these studies conclude that Reg. FD has had the intended benefit of diminishing the information advantage of analysts with previously exclusive access to management, although some anecdotal stories in the press still hint at the continued exclusive disclosure of material non-public information (*Wall Street Journal*, 2004). Interested readers can contact the lead author for a more detailed reference list.

2.2 Expected effects of Reg. FD on analysts forecast performance and related stock market

The arguments surrounding Reg. FD revolve around two major themes:

(1) its potential to level the playing field for all investors; and
(2) its potential to increase the cost of capital by restricting the availability of information to investors.

The first of these themes relies on the rationale that, by providing equal access to firm information, Reg. FD can reduce the level of information asymmetry, leading stock prices to be less dependent on private information. This logic implies that any loss of accuracy in earnings forecasts by analysts would be offset by the wider dissemination of information and hence, a more informed general investor population. In addition, Reg. FD may enhance the accuracy and precision of analysts' earnings forecasts, if it succeeded in opening up new sources of information to analysts, or if analysts could substitute the information obtained directly from companies with the information gathered from customers, suppliers, competitor's industry observers, and other sources of information. That is consistent with Mohanram and Sunder's (2006) finding, analysts may substitute privately acquired information for public-disclosed information for firms after the enactment of Reg. FD.

The counter-argument relies on the possibility that Reg. FD could have an adverse effect on certain analysts' forecast accuracy through denying them the sometimes-exclusive access to management that they previously enjoyed. Given the important role of financial analysts as intermediaries who provide professional investment to the capital markets, the decreased accuracy may have deleterious capital market consequences. In addition, it has been argued that Reg. FD induce firms to reduce the level of information and guidance that they may have provided originally in the closed conference calls, but which they may be unwilling to impart in open conference calls.

Recently, Bushee *et al.* (2004) find that Reg. FD had a significantly negative impact on managers' decisions to continue hosting conference calls even though this impact was not large. Hence, the level of specialty guidance may have decreased in the post-Reg. FD period. At the same time, Gintschel and Markov (2004) report that the informativeness of analysts output has dropped in the post-FD environment.

Specifically, they found that the absolute price impact of information disseminated by financial analysts dropped by 28 percent in this period. Eleswarapu *et al.* (2004) also report that the return volatility around mandatory announcements had decreased, and the impact was more pronounced for smaller and less liquid stocks. Taken together, these results suggest a strong impact of Reg. FD on the functioning of capital markets.

2.3 Hypothesis development

Extant studies assume that public information is common across all analysts and private information is idiosyncratic and uncorrelated across analysts. They have used FE and FD as proxies for analyst forecast attributes. Both FE and FD capture the extent to which private information differs across analysts, which also represents the level of actual past selective disclosure. For instance, Barron *et al.* (1998) present a model that expresses two properties of their forecasts, proxied by both dispersion in individual forecasts and the squared error in the mean forecast, as functions of the amount or "precision" of analysts' public and private information in forecasting firms' earnings. Sunder (2001) further find that "restricted-call" firms faced higher information asymmetry compared to "open-call" firms in the pre-Reg. FD period, while in the post-Reg. FD period, the differences in information asymmetry between two groups do not persist.

In summary, analysts should make more FE for OPC firms than for CLC firms if open conference calls do not provide as much information as closed conference calls. The first objective of Reg. FD was to level the playing field among all investors and analysts with respect to access to corporate information. If this objective were achieved with the implementation of Reg. FD, then one observable effect should be no difference in analysts' earnings forecast attributes between the previous-OPC and previous-CLC firms. This line of reasoning leads to the following set of hypotheses (stated in null form):

$H_01.1$. Analysts' quarterly earnings FE for the previous-CLC firms are not significantly different from those for the previous-OPC firms in the post-Reg. FD period (i.e. $FE^{CLC}_{POST} \approx FE^{OPC}_{POST}$).

$H_01.2$. Analysts' quarterly earnings FD for the previous-CLC firms is not significantly different from that for the previous-OPC firms in the post-Reg. FD period (i.e. $FD^{CLC}_{POST} \approx FD^{OPC}_{POST}$).

Using the same line of reasoning, it can be argued that the earnings FE and FD of NCC firms should be greater than those of both CLC and OPC firms (if they remained conference call firms) in the post-Reg. FD period. In other words, Reg. FD's exclusive effect should be on closing the information gap between the OPC and CLC firms, but should have no effect on the greater informativeness of conference calls as a means of communicating more information to investors (as demonstrated by prior research). This leads to the following set of hypotheses (in alternative form):

$H_a1.3$. Analysts' quarterly earnings FE for NCC firms are significantly greater than those for both previous-CLC and OPC firms in the post-Reg. FD period (i.e. $FE^{NCC}_{POST} > (FE^{CLC}_{POST}, FE^{OPC}_{POST})$).

H_a 1.4. Analysts' quarterly earnings FD for NCC firms is significantly greater than that for both previous-CLC and OPC firms in the post-Reg. FD period (i.e. $FD^{NCC}_{POST} > (FD^{CLC}_{POST}, FD^{OPC}_{POST})$).

In addition to the effects hypothesized above, the effectiveness of Reg. FD can be further evaluated by its effect on changes in the forecast attributes. That is, if the equality of the earnings forecast attributes between the CLC and OPC firms in the post-Reg. FD period is to be attributed to the adoption of Reg. FD, then the change in the forecast attributes from the pre- to the post-FD period should reflect this. So the absolute change in both FE and FD for the previous-CLC firms should be bigger than those for the OPC firms. These hypotheses can be stated in alternative form as follows:

H_a2.1. The absolute change in analysts' quarterly earnings FE for the previous-CLC firms is significantly higher than that for the previous-OPC firms in the post-Reg. FD period (i.e. $|\Delta FE^{CLC}| > |\Delta FE^{OPC}|$).

H_a 2.2. The absolute change in analysts' quarterly earnings FD for the previous-CLC firms is significantly higher than that for the previous-OPC firms in the post-Reg. FD period (i.e. $|\Delta FD^{CLC}| > |\Delta FD^{OPC}|$).

3. Brief description of research methodology

3.1 Sample selection

Following the Bushee *et al.* (2003) approach, firms on the Bestcalls.com list are considered to be "open-call" firms (i.e. calls that allow unlimited real time access), while the firms provided by First Call Corporation but not included on the Bestcalls.com list are considered to be "closed-call" firms (i.e. calls that restrict access to invited professionals) in the pre-Reg. FD period. According to Bowen *et al.* (2002, p. 286, footnote 1), Bestcalls.com launched a web site in March 1999 publicizing the dates and times of conference calls open to individual investors. However, some firms did not allow individuals access to their calls. Meanwhile, other firms began live broadcasts of their conference calls using internet web casts. So it is reasonable to assume that after March 1999, all firms on the Bestcalls.com list had OPCs. Therefore, we divide the samples into three groups, OPC, CLC and NCC (where no disclosures are made via conference calls) firms in the pre-Reg. FD period. More specifically, the firms listed by the Bestcalls.com are regarded as OPC firms, while the firms listed by First Call Corporation but not included in the Bestcalls.com list are regarded as CLC firms. Firms listed in CRSP and the I/B/E/S databases but not included in either Bestcalls.com or First Call Corporation lists are regarded as pre-NCC firms.

To obtain better control of extraneous factors, the sample is restricted to firms which retained their status in both pre- and post-Reg. FD environments. We exclude firms that Bestcalls.com lists as NCC firms, as well as NCC firms now listed as CC firms. The analyst forecast data used are obtained from I/B/E/S database, and earnings announcement dates and other control variables from quarterly Compustat data sets. To ensure the meaningful computation of dispersion, the minimum number of analysts following a firm is set to four. All firms are required to have non-missing quarterly I/B/E/S forecast data during the period of October 1998 through September 2002 and non-missing quarterly Compustat data. After applying this screening process, the surviving sample consists of 1,697 firms (521 OPC, 990 CLC, and 186 NCC firms).

The total final sample consists of 12,806 firm-quarter observations in the pre-Reg. FD period, and 13,104 firm-quarter observations in the post-Reg. FD period.

3.2 Research methodology

Empirical accounting research frequently utilizes the properties of analyst forecasts, such as accuracy, dispersion, bias, etc. to construct proxies for variables of interest. For instance, FD and errors in the mean forecast are used to proxy for the uncertainty or the degree of consensus among analysts or market expectations. Based on prior research, we estimated the effect of Reg. FD on analysts' forecast attributes by running a series of regression equations. Technical details on the regressions estimated are provided in Appendix. The description below is a brief summary of the approach used in the paper.

To control for factors that have been shown in prior research to be highly related to the levels of analyst FE and FD, we include in our regressions proxies measures for firm size, industry effect, earnings predictability, earnings surprise, and age of the forecast. Firm size and the level of FE or the level of FD are proxies for the richness of the firm's information environment. The ability of analysts to forecast the current quarter's earnings depends on both earnings surprise in the prior quarter and any information disclosed during the conference call. Forecast age is also an important determinant of forecast accuracy.

We estimate two regression equations, with the dependent variable in the first equation the absolute FE, and in the second equation, the FD. The independent variables in both equations include the dummy variables to represent the CLC and OPC firms, interaction terms to control for the presence of high-technology firms in the sample, forecast age (AGE), the number of analysts which follow a given firm (ANA), the size of earnings surprise in the previously released quarterly earnings (SURP), and firm size (SIZE).

The interaction terms for high-technology firms are designed to evaluate whether forecast attributes are consistently different for firms in the high technology sector. Barron *et al.* (2002) find that lower levels of analyst consensus are associated with high-tech firms because of their relatively high R&D expenditures. Therefore, a significantly positive coefficient on HighTech is consistent with the belief that analysts make more FE and dispersion for high-technology firms due to a higher information asymmetry as compared to non-high-technology firms.

4. Empirical results

4.1 Descriptive statistics

Tables I-III present some descriptive statistics on the post-Reg. FD period variables. Panel A reveals that both the mean and the median of analyst FE for NCC firms are greater than those for CLC and OPC firms in the post-Reg. FD period. Also the median of FD for NCC firms is greater than the median for both OPC and CLC firms in the post-Reg. FD period. Panel B presents the significant difference in means of FE and FD using statistical tests for the differences (specifically, Scheffe's tests and *t*-tests) in the post-Reg. FD period.

The first part of panel B shows that the means of OPC and CLC firms are not statistically different (at the 0.05 probability level), whereas the means for the other two groups, NCC and OPC, NCC and CLC are significantly different in the post-Reg. FD period. On the other hand, the second part of panel B shows the means between

	CLC firms	OPC firms	NCC firms
Descriptive statistics [a]			
FE			
Mean	0.0109	0.0202	0.0254
Median	0.0019	0.0021	0.0024
Std. deviation	0.0561	0.3335	0.1513
FD			
Mean	0.0032	0.0085	0.0065
Median	0.0008	0.0008	0.0009
Std. deviation	0.0183	0.2166	0.0412
AGE			
Mean	60.8104	61.9091	59.6318
Median	61.0000	63.0000	59.0000
Std. deviation	32.2772	31.7771	32.3843
ANA			
Mean	8.1587	9.7380	8.2127
Median	7.0000	8.0000	7.0000
Std. deviation	4.7847	6.1128	4.3793
SURP			
Mean	−0.0029	−0.0055	−0.0041
Median	−0.0007	−0.0016	−0.0009
Std. deviation	0.0396	0.0454	0.1156
SIZE			
Mean	7.3864	7.6700	7.2287
Median	7.2105	7.5224	7.3333
Std. deviation	1.6543	1.6927	1.5248

Notes: [a]Variables definitions: FE_{it} = absolute difference between actual earnings per share for quarter *t* less the mean forecast as provided by IBES summary file at the end of the quarter *t* deflated by the stock price at the beginning of quarter t. FD_{it} = standard deviation of all analyst forecasts made at the end of the quarter *t* from the "consensus" (mean) of analysts' forecasts deflated by the stock price at the beginning of quarter *t*. $AGE_{i,t}$ = the number of calendar days between the analyst's forecast date and the date of the actual earnings announcement at quarter t. $ANA_{i,t}$ = the total number of analysts releasing an earnings forecast for the firm i at quarter t. $SURP_{it} = \{EPS_t - EPS_{t-4}\}/P_{t-4}$, where EPS_t is the primary earnings share (excluding extraordinary items) for quarter *t* and P_{t-4} is the ending price per share at quarter $t - 4$. $SIZE_{it}$ = the log of market value of equity at the beginning of quarter t.

[b]All correlations are significant at the 0.001 level or better except for the correlation between SURP and ANA, and ANA and AGE, which are not significant at conventional levels.

[c]Above of the table is the Pearson correlation coefficients and the below is the Spearman correlation coefficients.

[1]NCC – non-conference call firms; [2] CLC – closed-call firms; [3] OPC – open-call firms.

& = Statistically significant at a probability of less than 0.10;

* = Statistically significant at a probability of less than 0.05;

** = Statistically significant at a probability of less than 0.01;

*** = Statistically significant at a probability of less than 0.001

Table I.
Univariate tests on analysts forecast attributes and other variables after Reg. FD: Panel A

NCC and CC, and between CLC and OPC in the post-Reg. FD period are statistically different. All the *t*-values are significant for each comparison except for the comparison of FD between NCC and CC in the post-Reg. FD period. These preliminary results are generally consistent with *H1.1-H1.4*.

Panel C presents correlation coefficients (both the Pearson product-moment and Spearman rank-order correlations) between analyst forecast attributes and their determinants in the post-Reg. FD period. All the correlation coefficients have signs consistent with those expected for the regression coefficients and all are significant except for the correlation coefficient between the number of analysts following (ANA) and forecast age (AGE), and between ANA and earnings surprise (SURP). The correlation coefficients between the number of analysts following (ANA) and the firm size (SIZE) is the highest among all coefficients, which is consistent with the previous research findings that large firms usually have a large group of analysts following regardless of the implementation of Reg. FD.

4.2 Regression results

Table IV presents the results of regressing analyst FE and FD in the pre- and post-Reg. FD periods by using equations (1) and (2). As expected, the coefficients of two dummy variables, CLC and OPC, are significantly negative. Moreover, the coefficients of CLC are greater than the coefficients of OPC for both regressions of FE and FD in both pre- and post-Reg. FD periods. Also as expected, forecast age (AGE), the number of forecasts (ANA) and high-tech firms (HighTech) are positively associated with FE and FD, while earnings surprise (SURP) and firm size (SIZE) are negatively associated with FE and FD.

Focusing on the tests of *H1-H4*, the results in Table IV (PRE period) indicate that conference calls did provide additional information to financial analysts, with both OPC and CLC firms having fewer earnings FE than NCC firms prior to the

Table II. Univariate tests on analysts forecast attributes and other variables after Reg. FD: Panel B

Tests	Group/Variables[a]	FE	FD
Scheffe's tests and Satterthwaite unequal variance t-tests for OPC[3], CLC[2] and NCC[1] firms			
Scheffe's test – Difference in means	NCC[1] – CLC[2]	0.0224*	0.0057*
	NCC[1] – OPC[3]	0.0224*	0.0062*
	CLC[2] – OPC[3]	−0.0001	0.0005
T-test among 3 groups: *t* value	NCC[1] – (CLC[2] + OPC[3])	4.43***	1.47
	CLC[2] – OPC[3]	4.18***	3.71***

Note: See Table I for key

Table III. Univariate tests on analysts forecast attributes and other variables after Reg. FD: Panel C

Variables[a]	FE	FD	AGE	ANA	SURP	SIZE
Correlations between forecast attributes and other variables[bc]						
FE	1	0.7646	0.0620	−0.0329	−0.1510	−0.1749
FD	0.6123	1	0.0253	−0.0405	0.0415	−0.1706
Age	0.1422	0.0151	1	0.0108	−0.0191	0.0228
ANA	−0.1604	−0.1827	0.0526	1	−0.0196	0.5160
SURP	−0.3063	−0.1450	−0.0170	−0.0012	1	−0.0020
Size	−0.3806	−0.4391	0.0233	0.5003	0.0381	1

Note: See Table I for key

Table IV.
Regression of analyst FE and dispersion on both pre- and post-Reg. FD variables

Regression of FE and FD		Among NCC, CLC and OPC firms							
		Before Reg. FD (PRE)				After Reg. FD (POST)			
		FE		FD		FE		FD	
Variables[a]	Expected sign	Coefficient	*t*-value	Coefficient	*t*-value	Coefficient	*t*-value	Coefficient	*t*-value
Intercept		0.0169	56.49***	0.0049	59.16***	0.0877	31.26***	0.0203	30.08***
CLC	–	*– 0.0006*	*– 2.34* *	*– 0.0004*	–6.05***	–0.0225	–12.09***	–0.0045	–10.09***
OPC	–	*– 0.0011*	*– 4.09* ***	*– 0.0005*	*– 7.02* ***	*– 0.0232*	*– 11.72* ***	*– 0.0046*	*– 9.67* ***
HighTech × CLC	+	–0.0004	–2.71**	–0.0004	–9.1***	0.0121	6.43***	0.0025	5.54***
HighTech × OPC	+	0.0016	11.9***	0.0002	5.32***	0.0127	7***	0.0016	3.66***
HighTech × NCC	+	0.0019	3.31***	–0.0003	–1.72&	–0.0077	–2.39*	0.0029	3.81***
AGE	+	0.0001	29.38***	0.0001	6.56***	0.0001	9.89***	0.0000	4.37***
ANA	+	0.0001	5.82***	0.0001	7.34***	0.0010	8.95***	0.0002	7.82***
SURP	–	–0.0366	–35.5***	–0.0022	–7.71***	–0.2127	–24.14***	0.0145	6.83***
SIZE	–	–0.0018	–74.74***	–0.0005	–66.51***	–0.0097	–28.82***	–0.0022	–26.81***
Adjusted R^2		0.1294		0.0847		0.0697		0.0434	
F-statistic		1,038.41***		647.11***		213.36***		129.65***	
F-test ($\alpha_1 = \alpha_2, \beta_1 = \beta_2$)		*31.73* ***		*11.28* ***		*0.37*		*0.11*	

Notes: [a]Variables definitions: FE_{it}, absolute difference between actual earnings per share for quarter t less the mean forecast as provided by IBES summary file at the end of the quarter t deflated by the stock price at the beginning of quarter t; FD_{it}, standard deviation of all analyst forecasts made at the end of the quarter t from the "consensus" (mean) of analysts' forecasts deflated by the stock price at the beginning of quarter t; $AGE_{i,t}$, the number of calendar days between the analyst's forecast date and the date of the actual earnings announcement at quarter t; $ANA_{i,t}$, the total number of analysts releasing an earnings forecast for the firm i at quarter t; $SURP_{it} = \{EPS_t - EPS_{t-4}\}/P_{t-4}$, where EPS_t is the primary earnings share (excluding extraordinary items) for quarter t and P_{t-4} is the ending price per share at quarter $t - 4$; $SIZE_{it}$, the log of market value of equity at the beginning of quarter t; [b]all correlations are significant at the 0.001 level or better except for the correlation between SURP and ANA which is not significant at conventional levels; [c]above of the table is the Pearson correlation coefficients and the below is the Spearman correlation coefficients; [1]NCC – non-conference call firms; [2]CLC – closed-call firms; [3]OPC – open-call firms; [&]statistically significant at a probability of <0.10; *statistically significant at a probability of <0.05; **statistically significant at a probability of <0.01; ***statistically significant at a probability of <0.001

implementation of Reg. FD. This conclusion can be drawn from the differences in the values of the intercepts terms for the NCC and CLC dummy variables. The intercept of the regression of FE in the pre-Reg. FD period is 0.0169 for NCC firms, 0.0163 (i.e. 0.0169 − 0.0006) for CLC firms, and 0.0158 (i.e. 0.0169 − 0.0011) for OPC firms. The intercept of the regression of FD in the pre-Reg. FD period is 0.0049 for NCC firms, 0.0045 (i.e. 0.0049 − 0.0004) for CLC firms, and 0.0044 (i.e. 0.0049 − 0.0005) for OPC firms.

Further examination of the regressions results in Table IV (POST period) supports the inference that analysts still made more FE and had higher FD for the NCC firms as compared to the OPC and CLC firms after the release of Reg. FD. In the post-Reg. FD period, the intercept of the regression of FE is 0.0877 for NCC firms, 0.0652 (i.e. 0.0877 − 0.0225) for CLC firms, and 0.0645 (i.e. 0.0877 − 0.0232) for OPC firms. The intercept of the regression of FD in the post-Reg. FD period is 0.0203 for NCC firms, 0.0158 (i.e. 0.0203 − 0.0045) for CLC firms, and 0.0157 (i.e. 0.0203 − 0.0046) for OPC firms.

To determine if Reg. FD has any impact on analysts FE, it is necessary to compare the coefficients across CLC and OPC firms within each period which can be done using the standard F-test. The F-tests performed show that the observed differences between the coefficients of interest (α_1 and α_2 in equation (1) and β_1 and β_2 in equation (2) in the Appendix) support the hypotheses presented earlier. In the pre-Reg. FD period, the F-value for FE (FD) is 31.73 (11.28), and the p-value is significant at the 0.001 level. Thus, these two null hypotheses that $\alpha_1 = \alpha_2$, and $\beta_1 = \beta_2$ can both be rejected. However, in the post-Reg. FD period, the F-value for FE (FD) is 0.37 (0.11) with an insignificant probability level. Thus, the null hypotheses that $\alpha_1 = \alpha_2$ in equation (1) and $\beta_1 = \beta_2$ in equation (2) cannot be rejected.

In summary, there are observable differences in the regression coefficients between CLC and OPC firms in the PRE period, and these statistically significant differences in coefficients disappear in the POST period. These results thus support both *H1.1* and *H1.2*, and provide evidence that differences in analyst forecast performance between the previous-CLC and previous-OPC firms do not persist after Reg. FD went into effect[1].

4.3 Univariate analyses of change in analyst forecast attributes

Tables V-VII present some descriptive statistics on the absolute change in analyst FE ($|\Delta FE|$) and FD ($|\Delta FD|$). From panel A, it can be observed that the means of $|\Delta FE|$ and $|\Delta FD|$ for CLC firms are smaller than those for OPC firms. Panel B presents the significant difference in means of the absolute change in FE and FD using both Scheffe's tests and the pairwise t-tests.

The results from Scheffe's tests show the comparisons in means are significantly different at the 0.05 level among three groups except for one comparison, $|\Delta FE|$ between CLC and OPC firms. At the same time, the results from the t-tests show that there is no significant difference in mean levels of $|\Delta FE|$ or $|\Delta FD|$ for the comparison between NCC and CC (including CLC and OPC firms) firms and the comparison between CLC and OPC firms. Panel C presents the Pearson and Spearman correlation coefficients between the absolute change in analyst forecast attributes and their determinants.

Statistics	CLC firms	OPC firms	NCC firms
Descriptive statistics[a]			
$\lvert \Delta FE \rvert$			
Mean	0.0113	0.0199	0.0318
Median	0.0021	0.0023	0.0024
Std. deviation	0.0477	0.4281	0.2186
$\lvert \Delta FD \rvert$			
Mean	0.0027	0.0069	0.0087
Median	0.0005	0.0005	0.0007
Std. deviation	0.0129	0.2061	0.0744
ΔAGE			
Mean	1.1795	1.3668	8.0495
Median	−1.0000	−1.0000	−1.0000
Std. deviation	46.5676	45.8835	53.9615
ΔANA			
Mean	1.5168	2.0406	1.1011
Median	1.0000	1.0000	0.0000
Std. deviation	4.8651	5.4807	4.6420
$\Delta SURP$			
Mean	−0.0062	−0.0134	−0.0048
Median	−0.0031	−0.0029	−0.0018
Std. deviation	0.0596	0.0909	0.1276
lagSIZE			
Mean	7.3170	7.6682	7.1224
Median	7.1327	7.5000	7.1416
Std. deviation	1.6198	1.7113	1.4797
lagFE			
Mean	0.0086	0.0083	0.0132
Median	0.0016	0.0017	0.0020
Std. deviation	0.0451	0.0349	0.0474
lagFD			
Mean	0.0021	0.0020	0.0035
Median	0.0007	0.0006	0.0009
Std. deviation	0.0093	0.0098	0.0167

Notes: [a]Variable definition: CLC = a dummy variable equal to 1 if the firm is a CLC firm and 0 if the firm is a NCC or OPC firm. $\lvert \Delta FE_t \rvert$=the absolute value of the difference between forecast errors in the post- and the pre-Reg. FD period deflated by the price at the beginning of the pre-Reg. FD period. $\lvert \Delta FD_t \rvert$ = the absolute value of the difference between forecast dispersion in the post- and the pre-Reg. FD period deflated by the price at the beginning of the pre-Reg. FD period. ΔAGE_t = the difference in forecast age between the post- and pre-Reg. FD period. ΔANA_t = the difference in the number of followed analysts between the post- and pre-Reg. FD period. $\Delta SURP_t$ = the difference in earnings surprise between the post- and pre-Reg. FD period. lagSIZE = the log of market value of equity in the pre-Reg. FD period. lagFE, lagFD = the level of forecast error or forecast dispersion in the pre-Reg. FD period.

[b]Above the table is the Pearson correlation coefficients and the below is the Spearman correlation coefficients. All correlations are significant at the 0.001 level or better except for the correlations between ΔSURP and ΔANA, ΔSURP and ΔAGE, ΔAGE and lagFE, and ΔSURP and lagSIZE, which are not significant at conventional levels.

[1]NCC – non-conference call firms;

[2]CLC – closed-call firms;

[3] OPC – open-call firms.

& = Statistically significant at a probability of less than 0.10;

* = Statistically significant at a probability of less than 0.05;

** = Statistically significant at a probability of less than 0.01;

*** = Statistically significant at a probability of less than 0.001

Table V. Univariate tests on the change in analysts forecast attributes: Panel A

4.4 Regression results for change in analyst forecast attributes

Table VIII presents the regression results obtained when the absolute changes in analyst quarterly FE (|ΔFE|) and FD (|ΔFD|) are regressed on the hypothesized independent variables (as presented in equations (3) and (4) in Appendix). The sign of coefficients on the dummy variable, OPC, for both regressions of |ΔFE| and |ΔFD| is not significant, a result which contradicts *H2.1* and *H2.2*. In addition, the sign of coefficients on the dummy variable, NCC, is significantly positive for both regressions of |ΔFE| and |ΔFD|.

Because we adopt October 23, 2000 as the boundary between the pre-Reg. FD period and the post-period, it is possible that the failure to support *H2.1* and *H2.2* may be due to the choice of the cut-off date. Previous research by Mac (2003) finds that firms had already changed their voluntary disclosure policy in the pre-enactment period (December 20, 1999-October 22, 2000), before Reg. FD became effective on October 23, 2000. Thus, if some firms in the sample have already changed their voluntary disclosure policy prior to the release of Reg. FD because they anticipate the passage of Reg. FD, the tests may not be sufficiently powerful.

Figures 1 and 2 show the graph of the means of FE and FD among three groups, CLC, OPC and NCC firms, from the third quarter of 1998 to the third quarter of 2002. Both Figures 1 and 2 show that FE and FD for NCC firms are higher than those for both OPC and CLC firms in both pre- and post-Reg. FD periods. However, the means of FE (FD) for CLC firms are greater than those for OPC firms in the pre-Reg. FD period

Tests[a]	Group/Variables[a]	|ΔFE[a]|	|ΔFD[b]|
Test of difference in means of ΔFE and ΔFD – Scheffe's tests and Satterthwaite unequal variance T-tests			
1. Scheffe's Tests – Difference between Means	NCC[1] – CLC[2]	0.158*	0.0046*
	NCC[1] – OPC[3]	0.0163*	0.005*
	CLC[2] – OPC[3]	0.0005	0.0004
2. *T* tests – *t* value	NCC[1] – (CLC[2] + OPC[3])	1.62	1.18
	CLC[2] – OPC[3]	1.02	1.03

Note: See Table V for key

Table VI. Univariate tests on the change in analysts forecast attributes: Panel B

	|ΔFE|	|ΔFD|	ΔAge	ΔANA	ΔSURP	lagSIZE	lagFE	lagFD
Correlations[ab]								
|ΔFE|	1	0.5810	0.1128	−0.0467	−0.1486	−0.1476	0.6277	0.5205
|ΔFD|	0.5004	1	0.0806	−0.0322	0.0634	−0.1171	0.4934	0.5922
ΔAge	0.0741	0.0556	1	−0.0493	−0.0375	−0.1274	0.0402	0.0073
ΔANA	−0.0649	−0.0663	−0.0121	1	−0.0090	0.1034	−0.0306	−0.0211
ΔSURP	−0.1501	−0.0723	0.0035	0.0023	1	0.0060	0.0006	−0.0746
lagSIZE	−0.2966	−0.3287	−0.0728	0.1086	−0.0038	1	−0.1846	−0.1692
lagFE	0.5398	0.4751	0.0465	−0.0540	0.0159	−0.3826	1	0.7908
lagFD	0.4242	0.5425	0.0352	−0.0858	−0.0189	−0.3673	0.5494	1

Note: See Table V for key

Table VII. Univariate tests on the change in analysts forecast attributes: Panel C

Variables[a]	Expected sign	$\|\Delta FE\|$ Coefficient	$\|\Delta FE\|$ t-value	$\|\Delta FD\|$ Coefficient	$\|\Delta FD\|$ t-value
Intercept		0.0075	2.61**	0.0005	0.68
OPC	−	−0.0013	−0.88	−0.0003	−0.87
NCC	−	0.0188	7.26***	0.0029	4.11***
HighTech × CLC	+	0.0018	0.71	0.0014	2.05*
HighTech × OPC	+	0.0069	2.98**	0.0012	1.93&
HighTech × NCC	+	−0.0175	−3.27**	−0.0021	−1.42
ΔAGE	+	0.0001	4.13***	0.0000	3.57***
ΔANA	+	−0.0004	−1.7&	−0.0001	−1.29
ΔSURP	−	−0.0900	−11.69***	0.0039	1.84&
lagSIZE	−	−0.0005	−1.25	0.0000	−0.11
lagFE	−	0.8006	42.55***		
lagFD	−			0.8514	40.01***
Adjusted R^2		0.4435		0.3831	
F-statistic		222.35***		173.53***	

Notes: [a]Variable definition: CLC, a dummy variable equal to 1 if the firm is a CLC firm and 0 if the firm is a NCC or OPC firm; OPC, a dummy variable equal to 1 if the firm is a OPC firm and 0 if the firm is a NCC or CLC firm; HighTech, a dummy variable equal to 1 if the firm is a high-technology firm and 0 if the firm is not a high-technology firm; $|\Delta FE_t|$, the absolute value of the difference between FE in the post- and the pre-Reg. FD period deflated by the price at the beginning of the pre-Reg. FD period; $|\Delta FD_t|$, the absolute value of the difference between FD in the post- and the pre-Reg. FD period deflated by the price at the beginning of the pre-Reg. FD period; ΔAGE_t, the difference in forecast age between the post- and pre-Reg. FD period; ΔANA_t, the difference in the number of followed analysts between the post- and pre-Reg. FD period; $\Delta SURP_t$, the difference in earnings surprise between the post- and pre-Reg. FD period; lagSIZE, the log of market value of equity in the pre-Reg. FD period; lagFE, lagFD, the level of FE or FD in the pre-Reg. FD period; [1]NCC – non-conference call firms; [2]CLC – closed-call firms; [3]OPC – open-call firms; [&]statistically significant at a probability of less than 0.10; [*]statistically significant at a probability of <0.05; [**]statistically significant at a probability of <0.01; [***]statistically significant at a probability of <0.001

Table VIII.
Regression of the change in analyst forecast attributes

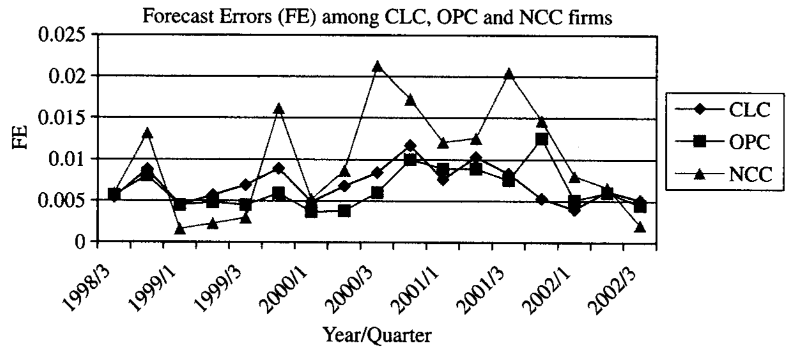

Figure 1.

(before the third quarter of 2000), but generally indistinguishable in the post-Reg. FD period.

The statistical tests performed earlier show that the difference in OPC and CLC means for FE and FD are not statistically significant (when the control variables are

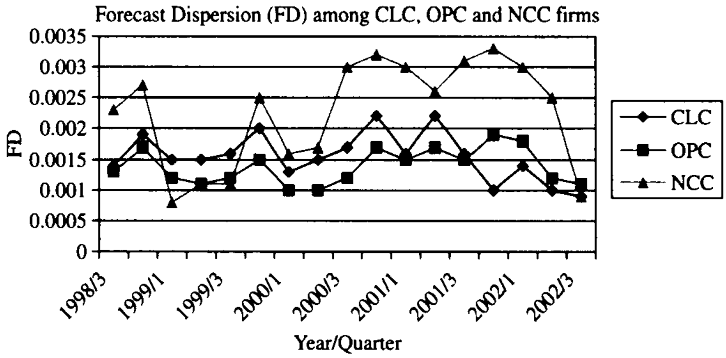

Figure 2.

accounted for) in the post-Reg. FD period. However, CLC firms have statistically significant (and positive) intercepts compared to NCC firms in both pre- and post-Reg. FD periods. This finding indicates that both FE and FD for NCC firms increase relative to those of OPC and CLC firms (both of which held conference calls). Thus, the overall view conveyed is that conference calls continue to be useful in helping analysts to produce accurate forecasts during a period when NCC firms experience a huge jump in earnings FE and FD.

4.5 Additional analysis and robustness tests

It can be argued that FE is another factor which affects FD. To evaluate this possibility, we use a recursive two-stage regression approach by allowing FE to be included as an explanatory variable for the FD equation. The regression results of FE and FD are qualitatively consistent with the previous results without adding FE in the regression of FD.

To evaluate the robustness of these results to possible outliers, we apply four diagnostic tests recommended by Belsley *et al.* (1980):

(1) the diagonal of the projection matrix (Hat matrix);

(2) the studentized residuals (RSYUDENT);

(3) the change in the determinants of the covariance matrix of the estimates (CovRatio); and

(4) the change in the predicted value (DFFITS).

The filters are applied by setting observations exceeding the cutoffs recommended by Belsley *et al.* (1980) to missing values. Qualitatively, the results are the same regardless of whether the outliers are eliminated or not.

5. Conclusion

Prior to the release of Reg. FD, CLC firms were accustomed to disclosing material nonpublic information to certain analysts and institutional investors while not concurrently releasing the information to the general public. There is considerable anecdotal evidence indicating that managers penalize analysts based on the content of their forecasts by limiting or cutting off analysts' future contact with management. Since, voluntary disclosures (e.g. conference calls) put individual investors at a larger informational disadvantage, it has been of concern to the SEC that the effect of selective disclosure is similar to insider trading. The primary purpose of Reg. FD is to curtail analysts' private channels to companies that they had previously enjoyed.

The results of this study are somewhat mixed. On one hand, there is support for the inference that, at least with respect to closing the information gap between analysts privy to the closed conference calls and those not privy to these calls, Reg. FD succeeded in that no statistical difference in earnings FE and FD between the previous-CLC and previous-OPC firms remained in the post-Reg. FD period. Moreover, in the post-Reg. FD period, conference calls continue to lead to lower FE and FD for both previous-OPC and previous-CLC firms, despite a huge jump in the earnings forecast attributes for firms which do not hold conference calls.

Against these favorable findings may be offset the contrary finding that no change in the earnings forecast attributes centered on the actual date of adoption of Reg. FD could be detected. Moreover, the findings reported by Gintschel and Markov (2004) that the informativeness of analysts' information output have declined in the post-Reg. FD period suggests that analysts' forecast attributes may no longer play as vital a role in the capital markets as in the pre-Reg. FD period. To the extent that this was the intent of the SEC in adopting Reg. FD, then the policy may be deemed to be a success[2].

Notes

1. These results are consistent with the findings reported by Shane *et al.* (2001). They provide evidence that analysts gather relatively more uncertainty-relieving information between earnings announcements and by the end of the quarter, their forecasts are as accurate as they were in the prior year. That is to say, the previous-CLC firms may have changed their selective disclosure policy, and Reg. FD may have contributed to the leveling of such information asymmetry.
2. It is not clear what the implication of the findings of Clement and Tse (2003) that investors respond more strongly to the earlier forecasts than to the later forecasts (despite the greater accuracy of the later forecasts) are to the findings reported by Gintschel and Markov (2004). Presumably, analysts forecasts may be more useful when released early that later. The effect of Reg. FD on analyst behavior in terms of earlier or later revisions of forecasts have yet to be examined.

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Appendix. Description of regression equations estimated

Test of first set of hypotheses (H1.1-H1.4)

We use the following two regression models in the cross-sectional tests to test *H1.1-H1.4*, using data for the pre- and the post-Reg. FD period, respectively:

$$\begin{aligned}\mathrm{FE}_{it} = {} & \alpha_0 + \alpha_1\mathrm{CLC}_{it} + \alpha_2\mathrm{OPC}_{it} + \alpha_3(\mathrm{HighTech}\times\mathrm{CLC}) + \alpha_4(\mathrm{HighTech}\times\mathrm{OPC}) \\ & + \alpha_5(\mathrm{HighTech}\times\mathrm{NCC}) + \alpha_6\mathrm{AGE}_{i,t} + \alpha_7\mathrm{ANA}_{i,t} + \alpha_8\mathrm{SURP}_{i,t} + \alpha_9\mathrm{SIZE}_{it} + \varepsilon_{it}\end{aligned} \tag{1}$$

$$\begin{aligned}\mathrm{FD}_{it} = {} & \beta_0 + \beta_1\mathrm{CLC}_{it} + \beta_2\mathrm{OPC}_{it} + \beta_3(\mathrm{HighTech}\times\mathrm{CLC}) + \beta_4(\mathrm{HighTech}\times\mathrm{OPC}) \\ & + \beta_5(\mathrm{HighTech}\times\mathrm{NCC}) + \beta_6\mathrm{AGE}_{i,t} + \beta_7\mathrm{ANA}_{i,t} + \beta_8\mathrm{SURP}_{i,t} + \beta_9\mathrm{SIZE}_{it} + \varepsilon_{it}\end{aligned} \tag{2}$$

where, CLC, a dummy variable equal to 1 if the firm is a CLC firm and 0 if the firm is a NCC or OPC firm; OPC, a dummy variable equal to 1 if the firm is an OPC firm and 0 if the firm is a NCC or CLC firm; NCC, a dummy variable equal to 1 if the firm is a NCC firm and 0 if the firm is an OPC or CLC firm; HighTech, a dummy variable equal to 1 if the firm is a high-technology firm and 0 if the firm is not a high-technology firm; FE_{it}, the absolute difference between actual earnings per share for quarter t less the mean forecast as provided by IBES summary file at the end of the quarter t deflated by the stock price at the beginning of quarter t; FD_{it}, the standard deviation of all analyst forecasts made at the end of the quarter t from the "consensus" (mean) of analysts' forecasts deflated by the stock price at the beginning of quarter t. The consensus forecast used is the last one on the IBES summary tape prior to earnings being reported; AGE_{it}, the number of calendar days between the analyst's forecast date and the date of the actual earnings announcement at quarter t; ANA_{it}, total number of analysts releasing an earnings forecast for the firm i at quarter t; $SURP_{it} = \{EPS_t - EPS_{t-4}\}/P_{t-4}$, a proxy for the difficulty in forecasting earnings, where EPS_t is the primary earnings share (excluding extraordinary items) for quarter t and P_{t-4} is the ending price per share at quarter $t-4$.; $SIZE_{it}$, the log of market value of equity at the beginning of quarter t.

To evaluate *H1.1*, an F-test of whether $\alpha_1 = \alpha_2$ in equation (1) is performed. Similarly, to evaluate *H1.2*, an F-test of whether $\beta_1 = \beta_2$ in equation (2) is performed. Rejection of the equalities and the relative magnitude of the two parameters would permit us to infer that analyst earnings forecast attributes are different for the previous-CLC firms versus the previous-OPC firms in the post-Reg. FD period. The test of *H1.3* is an F-test of whether $\alpha_1 + \alpha_2 = 0$. Rejection of that equality would provide support for *H1.3*. Similarly, a test of *H1.4* is whether $\beta_1 + \beta_2 = 0$, with its rejection an indication that *H1.4* is supported by the data.

Test of second set of hypotheses (H2.1-H2.4)

To test *H2.1* and *H2.4*, the dependent variables for testing the attributes of analyst earnings forecast are the change in FE and the change in FD. Using changes rather than levels of FE and dispersion mitigates the effect of cross-sectional differences in information environments. The general form of each dependent variable is:

$$\frac{\text{Post-Reg. FD event measure} - \text{Pre-Reg. FD event measure}}{\text{Stock price at Pre-Reg. FD event date}}$$

The pre-Reg. FD event measure component of the dependent variable is the quarterly FE or quarterly FD measured at quarter t before Reg. FD, and the post-Reg. FD event measure component of the dependent variable is the quarterly FE or quarterly FD measured at quarter t after Reg. FD:

$$|\Delta FE| = \left|\frac{FE_{post,it} - FE_{pre,it}}{P_{pre,it}}\right|$$

$$|\Delta FD| = \left|\frac{FD_{post,it} - FD_{pre,it}}{P_{pre,it}}\right|$$

The regressions estimated to evaluate *H2.1* and *H2.4* can be written as follows:

$$\begin{aligned}|\Delta FE_{it}| = {} & \lambda_0 + \lambda_1 OPC_{it} + \lambda_2 NCC_{it} + \lambda_3(\text{HighTech} \times \text{CLC}) \\ & + \lambda_4(\text{HighTech} \times \text{OPC}) + \lambda_5(\text{HighTech} \times \text{NCC}) + \lambda_6 \Delta AGE_{it} + \lambda_7 \Delta ANA_{it} \\ & + \lambda_8 \Delta SURP_{it} + \lambda_9 lagSIZE_{i,pre} + \lambda_{10} lagFE_{i,pre} + \delta_{it}\end{aligned} \quad (3)$$

$$\begin{aligned}|\Delta FD_{it}| = {} & \gamma_0 + \gamma_1 OPC_{it} + \gamma_2 NCC_{it} + \gamma_3(\text{HighTech} \times \text{CLC}) \\ & + \gamma_4(\text{HighTech} \times \text{OPC}) + \gamma_5(\text{HighTech} \times \text{NCC}) + \gamma_6 \Delta AGE_{it} + \gamma_7 \Delta ANA_{it} \\ & + \gamma_8 \Delta SURP_{it} + \gamma_9 lagSIZE_{i,pre} + \gamma_{10} lagFD_{i,pre} + \delta_{it}\end{aligned} \quad (4)$$

where $lagSIZE_{i,pe}$, the log of market value of equity in the pre-Reg. FD period; $lagFE_{i,pre}$, the level of FE in the pre-Reg. FD period; $lagFD_{i,pre}$, the level of FD in the pre-Reg. FD period, and all terms are as defined earlier.

As presented in equations (3) and (4), the CLC effect is captured in the intercept. Thus, to evaluate *H2.1*, the test is whether $\lambda_1 < 0$ in equation (3). This essentially examines whether the change in FE is higher for the firms classified as CLC in the pre-Reg. FD period than that for the OPC firms. If so, then Reg. FD had a more pronounced effect on the firms which previously held closed conference calls. This is exactly the effect that should be expected if Reg. FD had the desired effect.

Similarly, to evaluate *H2.2*, the test is whether $\gamma_1 < 0$ in equation (4). Rejection of the equality with positive coefficients would permit an inference that the absolute change in analyst earnings forecast attributes for the previous-CLC firms was greater than the absolute change for the previous-OPC firms.

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FEATURE ARTICLE

The effect of the SEC's regulation fair disclosure on analyst forecast attributes

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Abstract

Purpose – This study aims to examine the effect of the Securities and Exchange Commission's regulation fair disclosure (Reg. FD) on analyst forecast performance for pre-Reg. FD closed-call (CLC) and open-call (OPC) firms compared with the non-conference-call (NCC) firms in the post-Reg. FD period.

Design/methodology/approach – Specifically, it examines whether Reg. FD influenced the earnings forecast accuracy and forecast dispersion of financial analysts for the previous-CLC firms in the post-Reg. FD period compared with the previous-OPC firms, and both sets of conference call firms relative to the NCC firms in the same period.

Findings – The main findings indicate that forecast accuracy improved for both OPC and CLC firms compared with the NCC firms in the post-Reg. FD period. More importantly, the differences in earnings forecast performance between the pre-Reg. FD OPC and CLC firms had disappeared in the post-Reg. FD period.

Originality/value – These results offer further confirmation of previous findings that Reg. FD has contributed to leveling the playing field for financial analysts and investors.

Keywords Financial institutions, Earnings, Forecasting, Disclosure, Conferencing

Paper type Viewpoint

1. Introduction

On October 23, 2000, the US Securities and Exchange Commission (SEC) issued regulation fair disclosure (hereafter Reg. FD) which prohibits selective disclosure of material nonpublic information to certain financial analysts, institutional investors and others prior to making it available to the general public. Information is considered material if it is important enough to persuade an investor to buy or sell a stock. Before the implementation of Reg. FD, most conference calls were accessible only to certain analysts and institutional investors. It has been argued that conference calls, because they were predominantly closed, may have contributed to an information gap between analysts privy to the call and analysts and other investors excluded from the call. The intent of Reg. FD was to prevent this selective disclosure of information.

A number of published studies have already examined the impact of Reg. FD on various aspects of the capital markets and investment climate, including the effect on

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analyst forecast accuracy and dispersion, although the findings have been contradictory. Using data from the first three quarters after the release of Reg. FD, Agarwal and Chadha (2003) report that sell-side analysts' forecasts were less accurate and more dispersed than before its adoption, where Heflin *et al.* (2003) report no change in analysts' earnings forecast bias, accuracy or dispersion compared to the pre-Reg. FD period. Furthermore, Shane *et al.* (2001), also using data from the same period, find that analysts gathered more information between earnings announcements so that their forecasts are ultimately as accurate as those made in the period before Reg. FD was adopted.

This study has two main objectives. The first is to examine if there were changes in analyst earnings forecast errors (FE) and forecast dispersion (FD) in the pre- and post-Reg. FD period between the "closed-call" (henceforth referred to as CLC) firms and "open-call" (OPC) firms. The second objective is to determine if there were any changes in analyst earnings forecast attributes between the CLC and OPC firms as a group (labeled CC – conference call firms), and the non-conference-call (NCC) firms in the post-Reg. FD environment.

Thus, this study contributes to the existing literature by differentiating between firms in the pre-Reg. FD period that held closed conference calls, firms that held open conference calls, and other firms which held NCCs. By limiting the study only to OPC and NCC firms in the post-Reg. FD period, we are able to control for extraneous factors such as changing group membership in our analyses. Second, because the study covers the period from October 1998 to September 2002, more quarterly observations are available to conduct the tests than in previous research.

The remainder of this study is organized as follows. Section 2 presents a brief summary of previous studies focused on only the main sources, and an outline of the hypotheses examined in the paper. Section 3 describes the sample selection and a brief outline of our research methodology. Section 4 presents the major results of the study. Section 5 presents the conclusions and suggestions for future research. In the Appendix, we provide details on the research methodology and the regression equations used to analyze the data.

2. Literature review and hypothesis development

2.1 Brief review

Economic theory suggests that expanded disclosures can reduce information asymmetry arising between the firm and its shareholders or among potential buyers and sellers of firm shares and benefit firms by correcting any firm mis-valuation and increasing institutional interest and liquidity for the firm's stock. For example, Diamond and Verrecchia (1991) find that credible commitments by managers to improve disclosure increasing the precision of public information about firm value results in higher current stock prices due to reduced information asymmetry and increased liquidity. Frankel *et al.* (1999) provide evidence that firms holding conference calls as a voluntary disclosure medium tend to be relatively larger, more profitable, more heavily followed by analysts, and access the capital markets more often than other firms.

In other related findings, Bowen *et al.* (2002) provide evidence that regular use of earnings-related conference calls could present a selective disclosure problem if the public is not privy to these calls, even if conference calls tend to reduce both FE and FD. Bushee and Noe (2000) find that firms with greater analyst following and greater institutional ownership are less likely to have conference calls that provide open access to all investors. Core (2001) presents evidence consistent with the intuition that informed investors prefer less disclosure, and that analysts and institutions produce information that reduces information asymmetry and the need for conference calls.

As cited previously, some of the research focused on the effect of Reg. FD on financial analyst behavior have yielded mixed results. In general, however, the majority of these studies conclude that Reg. FD has had the intended benefit of diminishing the information advantage of analysts with previously exclusive access to management, although some anecdotal stories in the press still hint at the continued exclusive disclosure of material non-public information (*Wall Street Journal*, 2004). Interested readers can contact the lead author for a more detailed reference list.

2.2 Expected effects of Reg. FD on analysts forecast performance and related stock market

The arguments surrounding Reg. FD revolve around two major themes:

(1) its potential to level the playing field for all investors; and

(2) its potential to increase the cost of capital by restricting the availability of information to investors.

The first of these themes relies on the rationale that, by providing equal access to firm information, Reg. FD can reduce the level of information asymmetry, leading stock prices to be less dependent on private information. This logic implies that any loss of accuracy in earnings forecasts by analysts would be offset by the wider dissemination of information and hence, a more informed general investor population. In addition, Reg. FD may enhance the accuracy and precision of analysts' earnings forecasts, if it succeeded in opening up new sources of information to analysts, or if analysts could substitute the information obtained directly from companies with the information gathered from customers, suppliers, competitor's industry observers, and other sources of information. That is consistent with Mohanram and Sunder's (2006) finding, analysts may substitute privately acquired information for public-disclosed information for firms after the enactment of Reg. FD.

The counter-argument relies on the possibility that Reg. FD could have an adverse effect on certain analysts' forecast accuracy through denying them the sometimes-exclusive access to management that they previously enjoyed. Given the important role of financial analysts as intermediaries who provide professional investment to the capital markets, the decreased accuracy may have deleterious capital market consequences. In addition, it has been argued that Reg. FD induce firms to reduce the level of information and guidance that they may have provided originally in the closed conference calls, but which they may be unwilling to impart in open conference calls.

Recently, Bushee *et al.* (2004) find that Reg. FD had a significantly negative impact on managers' decisions to continue hosting conference calls even though this impact was not large. Hence, the level of specialty guidance may have decreased in the post-Reg. FD period. At the same time, Gintschel and Markov (2004) report that the informativeness of analysts output has dropped in the post-FD environment.

Specifically, they found that the absolute price impact of information disseminated by financial analysts dropped by 28 percent in this period. Eleswarapu *et al.* (2004) also report that the return volatility around mandatory announcements had decreased, and the impact was more pronounced for smaller and less liquid stocks. Taken together, these results suggest a strong impact of Reg. FD on the functioning of capital markets.

2.3 Hypothesis development

Extant studies assume that public information is common across all analysts and private information is idiosyncratic and uncorrelated across analysts. They have used FE and FD as proxies for analyst forecast attributes. Both FE and FD capture the extent to which private information differs across analysts, which also represents the level of actual past selective disclosure. For instance, Barron *et al.* (1998) present a model that expresses two properties of their forecasts, proxied by both dispersion in individual forecasts and the squared error in the mean forecast, as functions of the amount or "precision" of analysts' public and private information in forecasting firms' earnings. Sunder (2001) further find that "restricted-call" firms faced higher information asymmetry compared to "open-call" firms in the pre-Reg. FD period, while in the post-Reg. FD period, the differences in information asymmetry between two groups do not persist.

In summary, analysts should make more FE for OPC firms than for CLC firms if open conference calls do not provide as much information as closed conference calls. The first objective of Reg. FD was to level the playing field among all investors and analysts with respect to access to corporate information. If this objective were achieved with the implementation of Reg. FD, then one observable effect should be no difference in analysts' earnings forecast attributes between the previous-OPC and previous-CLC firms. This line of reasoning leads to the following set of hypotheses (stated in null form):

$H_01.1$. Analysts' quarterly earnings FE for the previous-CLC firms are not significantly different from those for the previous-OPC firms in the post-Reg. FD period (i.e. $FE^{CLC}_{POST} \approx FE^{OPC}_{POST}$).

$H_01.2$. Analysts' quarterly earnings FD for the previous-CLC firms is not significantly different from that for the previous-OPC firms in the post-Reg. FD period (i.e. $FD^{CLC}_{POST} \approx FD^{OPC}_{POST}$).

Using the same line of reasoning, it can be argued that the earnings FE and FD of NCC firms should be greater than those of both CLC and OPC firms (if they remained conference call firms) in the post-Reg. FD period. In other words, Reg. FD's exclusive effect should be on closing the information gap between the OPC and CLC firms, but should have no effect on the greater informativeness of conference calls as a means of communicating more information to investors (as demonstrated by prior research). This leads to the following set of hypotheses (in alternative form):

$H_a1.3$. Analysts' quarterly earnings FE for NCC firms are significantly greater than those for both previous-CLC and OPC firms in the post-Reg. FD period (i.e. $FE^{NCC}_{POST} > (FE^{CLC}_{POST}, FE^{OPC}_{POST})$).

H_a 1.4. Analysts' quarterly earnings FD for NCC firms is significantly greater than that for both previous-CLC and OPC firms in the post-Reg. FD period (i.e. $FD^{NCC}_{POST} > (FD^{CLC}_{POST}, FD^{OPC}_{POST})$).

In addition to the effects hypothesized above, the effectiveness of Reg. FD can be further evaluated by its effect on changes in the forecast attributes. That is, if the equality of the earnings forecast attributes between the CLC and OPC firms in the post-Reg. FD period is to be attributed to the adoption of Reg. FD, then the change in the forecast attributes from the pre- to the post-FD period should reflect this. So the absolute change in both FE and FD for the previous-CLC firms should be bigger than those for the OPC firms. These hypotheses can be stated in alternative form as follows:

H_a2.1. The absolute change in analysts' quarterly earnings FE for the previous-CLC firms is significantly higher than that for the previous-OPC firms in the post-Reg. FD period (i.e. $|\Delta FE^{CLC}| > |\Delta FE^{OPC}|$).

H_a 2.2. The absolute change in analysts' quarterly earnings FD for the previous-CLC firms is significantly higher than that for the previous-OPC firms in the post-Reg. FD period (i.e. $|\Delta FD^{CLC}| > |\Delta FD^{OPC}|$).

3. Brief description of research methodology

3.1 Sample selection

Following the Bushee *et al.* (2003) approach, firms on the Bestcalls.com list are considered to be "open-call" firms (i.e. calls that allow unlimited real time access), while the firms provided by First Call Corporation but not included on the Bestcalls.com list are considered to be "closed-call" firms (i.e. calls that restrict access to invited professionals) in the pre-Reg. FD period. According to Bowen *et al.* (2002, p. 286, footnote 1), Bestcalls.com launched a web site in March 1999 publicizing the dates and times of conference calls open to individual investors. However, some firms did not allow individuals access to their calls. Meanwhile, other firms began live broadcasts of their conference calls using internet web casts. So it is reasonable to assume that after March 1999, all firms on the Bestcalls.com list had OPCs. Therefore, we divide the samples into three groups, OPC, CLC and NCC (where no disclosures are made via conference calls) firms in the pre-Reg. FD period. More specifically, the firms listed by the Bestcalls.com are regarded as OPC firms, while the firms listed by First Call Corporation but not included in the Bestcalls.com list are regarded as CLC firms. Firms listed in CRSP and the I/B/E/S databases but not included in either Bestcalls.com or First Call Corporation lists are regarded as pre-NCC firms.

To obtain better control of extraneous factors, the sample is restricted to firms which retained their status in both pre- and post-Reg. FD environments. We exclude firms that Bestcalls.com lists as NCC firms, as well as NCC firms now listed as CC firms. The analyst forecast data used are obtained from I/B/E/S database, and earnings announcement dates and other control variables from quarterly Compustat data sets. To ensure the meaningful computation of dispersion, the minimum number of analysts following a firm is set to four. All firms are required to have non-missing quarterly I/B/E/S forecast data during the period of October 1998 through September 2002 and non-missing quarterly Compustat data. After applying this screening process, the surviving sample consists of 1,697 firms (521 OPC, 990 CLC, and 186 NCC firms).

The total final sample consists of 12,806 firm-quarter observations in the pre-Reg. FD period, and 13,104 firm-quarter observations in the post-Reg. FD period.

3.2 Research methodology

Empirical accounting research frequently utilizes the properties of analyst forecasts, such as accuracy, dispersion, bias, etc. to construct proxies for variables of interest. For instance, FD and errors in the mean forecast are used to proxy for the uncertainty or the degree of consensus among analysts or market expectations. Based on prior research, we estimated the effect of Reg. FD on analysts' forecast attributes by running a series of regression equations. Technical details on the regressions estimated are provided in Appendix. The description below is a brief summary of the approach used in the paper.

To control for factors that have been shown in prior research to be highly related to the levels of analyst FE and FD, we include in our regressions proxies measures for firm size, industry effect, earnings predictability, earnings surprise, and age of the forecast. Firm size and the level of FE or the level of FD are proxies for the richness of the firm's information environment. The ability of analysts to forecast the current quarter's earnings depends on both earnings surprise in the prior quarter and any information disclosed during the conference call. Forecast age is also an important determinant of forecast accuracy.

We estimate two regression equations, with the dependent variable in the first equation the absolute FE, and in the second equation, the FD. The independent variables in both equations include the dummy variables to represent the CLC and OPC firms, interaction terms to control for the presence of high-technology firms in the sample, forecast age (AGE), the number of analysts which follow a given firm (ANA), the size of earnings surprise in the previously released quarterly earnings (SURP), and firm size (SIZE).

The interaction terms for high-technology firms are designed to evaluate whether forecast attributes are consistently different for firms in the high technology sector. Barron *et al.* (2002) find that lower levels of analyst consensus are associated with high-tech firms because of their relatively high R&D expenditures. Therefore, a significantly positive coefficient on HighTech is consistent with the belief that analysts make more FE and dispersion for high-technology firms due to a higher information asymmetry as compared to non-high-technology firms.

4. Empirical results

4.1 Descriptive statistics

Tables I-III present some descriptive statistics on the post-Reg. FD period variables. Panel A reveals that both the mean and the median of analyst FE for NCC firms are greater than those for CLC and OPC firms in the post-Reg. FD period. Also the median of FD for NCC firms is greater than the median for both OPC and CLC firms in the post-Reg. FD period. Panel B presents the significant difference in means of FE and FD using statistical tests for the differences (specifically, Scheffe's tests and *t*-tests) in the post-Reg. FD period.

The first part of panel B shows that the means of OPC and CLC firms are not statistically different (at the 0.05 probability level), whereas the means for the other two groups, NCC and OPC, NCC and CLC are significantly different in the post-Reg. FD period. On the other hand, the second part of panel B shows the means between

	CLC firms	OPC firms	NCC firms
Descriptive statistics [a]			
FE			
Mean	0.0109	0.0202	0.0254
Median	0.0019	0.0021	0.0024
Std. deviation	0.0561	0.3335	0.1513
FD			
Mean	0.0032	0.0085	0.0065
Median	0.0008	0.0008	0.0009
Std. deviation	0.0183	0.2166	0.0412
AGE			
Mean	60.8104	61.9091	59.6318
Median	61.0000	63.0000	59.0000
Std. deviation	32.2772	31.7771	32.3843
ANA			
Mean	8.1587	9.7380	8.2127
Median	7.0000	8.0000	7.0000
Std. deviation	4.7847	6.1128	4.3793
SURP			
Mean	−0.0029	−0.0055	−0.0041
Median	−0.0007	−0.0016	−0.0009
Std. deviation	0.0396	0.0454	0.1156
SIZE			
Mean	7.3864	7.6700	7.2287
Median	7.2105	7.5224	7.3333
Std. deviation	1.6543	1.6927	1.5248

Notes: [a]Variables definitions: FE_{it} = absolute difference between actual earnings per share for quarter *t* less the mean forecast as provided by IBES summary file at the end of the quarter *t* deflated by the stock price at the beginning of quarter t. FD_{it} = standard deviation of all analyst forecasts made at the end of the quarter *t* from the "consensus" (mean) of analysts' forecasts deflated by the stock price at the beginning of quarter *t*. $AGE_{i,t}$ = the number of calendar days between the analyst's forecast date and the date of the actual earnings announcement at quarter t. $ANA_{i,t}$ = the total number of analysts releasing an earnings forecast for the firm i at quarter t. $SURP_{it} = \{EPS_t - EPS_{t-4}\}/P_{t-4}$, where EPS_t is the primary earnings share (excluding extraordinary items) for quarter *t* and P_{t-4} is the ending price per share at quarter $t - 4$. $SIZE_{it}$ = the log of market value of equity at the beginning of quarter t.

[b]All correlations are significant at the 0.001 level or better except for the correlation between SURP and ANA, and ANA and AGE, which are not significant at conventional levels.

[c]Above of the table is the Pearson correlation coefficients and the below is the Spearman correlation coefficients.

[1]NCC – non-conference call firms; [2] CLC – closed-call firms; [3] OPC – open-call firms.

& = Statistically significant at a probability of less than 0.10;

* = Statistically significant at a probability of less than 0.05;

** = Statistically significant at a probability of less than 0.01;

*** = Statistically significant at a probability of less than 0.001

Table I. Univariate tests on analysts forecast attributes and other variables after Reg. FD: Panel A

NCC and CC, and between CLC and OPC in the post-Reg. FD period are statistically different. All the *t*-values are significant for each comparison except for the comparison of FD between NCC and CC in the post-Reg. FD period. These preliminary results are generally consistent with *H1.1-H1.4*.

Panel C presents correlation coefficients (both the Pearson product-moment and Spearman rank-order correlations) between analyst forecast attributes and their determinants in the post-Reg. FD period. All the correlation coefficients have signs consistent with those expected for the regression coefficients and all are significant except for the correlation coefficient between the number of analysts following (ANA) and forecast age (AGE), and between ANA and earnings surprise (SURP). The correlation coefficients between the number of analysts following (ANA) and the firm size (SIZE) is the highest among all coefficients, which is consistent with the previous research findings that large firms usually have a large group of analysts following regardless of the implementation of Reg. FD.

4.2 Regression results

Table IV presents the results of regressing analyst FE and FD in the pre- and post-Reg. FD periods by using equations (1) and (2). As expected, the coefficients of two dummy variables, CLC and OPC, are significantly negative. Moreover, the coefficients of CLC are greater than the coefficients of OPC for both regressions of FE and FD in both pre- and post-Reg. FD periods. Also as expected, forecast age (AGE), the number of forecasts (ANA) and high-tech firms (HighTech) are positively associated with FE and FD, while earnings surprise (SURP) and firm size (SIZE) are negatively associated with FE and FD.

Focusing on the tests of *H1-H4*, the results in Table IV (PRE period) indicate that conference calls did provide additional information to financial analysts, with both OPC and CLC firms having fewer earnings FE than NCC firms prior to the

Table II. Univariate tests on analysts forecast attributes and other variables after Reg. FD: Panel B

Tests	Group/Variables[a]	FE	FD
Scheffe's tests and Satterthwaite unequal variance t-tests for OPC[3], CLC[2] and NCC[1] firms			
Scheffe's test – Difference in means	NCC[1] – CLC[2]	0.0224*	0.0057*
	NCC[1] – OPC[3]	0.0224*	0.0062*
	CLC[2] – OPC[3]	−0.0001	0.0005
T-test among 3 groups: *t* value	NCC[1] – (CLC[2] + OPC[3])	4.43***	1.47
	CLC[2] – OPC[3]	4.18***	3.71***

Note: See Table I for key

Table III. Univariate tests on analysts forecast attributes and other variables after Reg. FD: Panel C

Variables[a]	FE	FD	AGE	ANA	SURP	SIZE
Correlations between forecast attributes and other variables[bc]						
FE	1	0.7646	0.0620	−0.0329	−0.1510	−0.1749
FD	0.6123	1	0.0253	−0.0405	0.0415	−0.1706
Age	0.1422	0.0151	1	0.0108	−0.0191	0.0228
ANA	−0.1604	−0.1827	0.0526	1	−0.0196	0.5160
SURP	−0.3063	−0.1450	−0.0170	−0.0012	1	−0.0020
Size	−0.3806	−0.4391	0.0233	0.5003	0.0381	1

Note: See Table I for key

Table IV.
Regression of analyst FE and dispersion on both pre- and post-Reg. FD variables

Regression of FE and FD		Among NCC, CLC and OPC firms							
		Before Reg. FD (PRE)				After Reg. FD (POST)			
		FE		FD		FE		FD	
Variables[a]	Expected sign	Coefficient	*t*-value	Coefficient	*t*-value	Coefficient	*t*-value	Coefficient	*t*-value
Intercept		0.0169	56.49***	0.0049	59.16***	0.0877	31.26***	0.0203	30.08***
CLC	–	*– 0.0006*	*– 2.34* *	*– 0.0004*	– 6.05***	– 0.0225	– 12.09***	– 0.0045	– 10.09***
OPC	–	*– 0.0011*	*– 4.09* ***	*– 0.0005*	*– 7.02* ***	*– 0.0232*	*– 11.72* ***	*– 0.0046*	*– 9.67* ***
HighTech × CLC	+	– 0.0004	– 2.71**	– 0.0004	– 9.1***	0.0121	6.43***	0.0025	5.54***
HighTech × OPC	+	0.0016	11.9***	0.0002	5.32***	0.0127	7***	0.0016	3.66***
HighTech × NCC	+	0.0019	3.31***	– 0.0003	– 1.72&	– 0.0077	– 2.39*	0.0029	3.81***
AGE	+	0.0001	29.38***	0.0001	6.56***	0.0001	9.89***	0.0000	4.37***
ANA	+	0.0001	5.82***	0.0001	7.34***	0.0010	8.95***	0.0002	7.82***
SURP	–	– 0.0366	– 35.5***	– 0.0022	– 7.71***	– 0.2127	– 24.14***	0.0145	6.83***
SIZE	–	– 0.0018	– 74.74***	– 0.0005	– 66.51***	– 0.0097	– 28.82***	– 0.0022	– 26.81***
Adjusted R^2		0.1294		0.0847		0.0697		0.0434	
F-statistic		1,038.41***		647.11***		213.36***		129.65***	
F-test ($\alpha_1 = \alpha_2, \beta_1 = \beta_2$)		*31.73* ***		*11.28* ***		*0.37*		*0.11*	

Notes: [a]Variables definitions: FE_{it}, absolute difference between actual earnings per share for quarter *t* less the mean forecast as provided by IBES summary file at the end of the quarter *t* deflated by the stock price at the beginning of quarter *t*; FD_{it}, standard deviation of all analyst forecasts made at the end of the quarter *t* from the "consensus" (mean) of analysts' forecasts deflated by the stock price at the beginning of quarter *t*; $AGE_{i,t}$, the number of calendar days between the analyst's forecast date and the date of the actual earnings announcement at quarter *t*; $ANA_{i,t}$, the total number of analysts releasing an earnings forecast for the firm *i* at quarter *t*; $SURP_{it} = \{EPS_t - EPS_{t-4}\}/P_{t-4}$, where EPS_t is the primary earnings share (excluding extraordinary items) for quarter *t* and P_{t-4} is the ending price per share at quarter $t-4$; $SIZE_{it}$, the log of market value of equity at the beginning of quarter *t*; [b]all correlations are significant at the 0.001 level or better except for the correlation between SURP and ANA which is not significant at conventional levels; [c]above of the table is the Pearson correlation coefficients and the below is the Spearman correlation coefficients; [1]NCC – non-conference call firms; [2]CLC – closed-call firms; [3]OPC – open-call firms; [&]statistically significant at a probability of <0.10; *statistically significant at a probability of <0.05; **statistically significant at a probability of <0.01; ***statistically significant at a probability of <0.001

implementation of Reg. FD. This conclusion can be drawn from the differences in the values of the intercepts terms for the NCC and CLC dummy variables. The intercept of the regression of FE in the pre-Reg. FD period is 0.0169 for NCC firms, 0.0163 (i.e. 0.0169 − 0.0006) for CLC firms, and 0.0158 (i.e. 0.0169 − 0.0011) for OPC firms. The intercept of the regression of FD in the pre-Reg. FD period is 0.0049 for NCC firms, 0.0045 (i.e. 0.0049 − 0.0004) for CLC firms, and 0.0044 (i.e. 0.0049 − 0.0005) for OPC firms.

Further examination of the regressions results in Table IV (POST period) supports the inference that analysts still made more FE and had higher FD for the NCC firms as compared to the OPC and CLC firms after the release of Reg. FD. In the post-Reg. FD period, the intercept of the regression of FE is 0.0877 for NCC firms, 0.0652 (i.e. 0.0877 − 0.0225) for CLC firms, and 0.0645 (i.e. 0.0877 − 0.0232) for OPC firms. The intercept of the regression of FD in the post-Reg. FD period is 0.0203 for NCC firms, 0.0158 (i.e. 0.0203 − 0.0045) for CLC firms, and 0.0157 (i.e. 0.0203 − 0.0046) for OPC firms.

To determine if Reg. FD has any impact on analysts FE, it is necessary to compare the coefficients across CLC and OPC firms within each period which can be done using the standard *F*-test. The *F*-tests performed show that the observed differences between the coefficients of interest (α_1 and α_2 in equation (1) and β_1 and β_2 in equation (2) in the Appendix) support the hypotheses presented earlier. In the pre-Reg. FD period, the *F*-value for FE (FD) is 31.73 (11.28), and the *p*-value is significant at the 0.001 level. Thus, these two null hypotheses that $\alpha_1 = \alpha_2$, and $\beta_1 = \beta_2$ can both be rejected. However, in the post-Reg. FD period, the *F*-value for FE (FD) is 0.37 (0.11) with an insignificant probability level. Thus, the null hypotheses that $\alpha_1 = \alpha_2$ in equation (1) and $\beta_1 = \beta_2$ in equation (2) cannot be rejected.

In summary, there are observable differences in the regression coefficients between CLC and OPC firms in the PRE period, and these statistically significant differences in coefficients disappear in the POST period. These results thus support both *H1.1* and *H1.2*, and provide evidence that differences in analyst forecast performance between the previous-CLC and previous-OPC firms do not persist after Reg. FD went into effect[1].

4.3 Univariate analyses of change in analyst forecast attributes

Tables V-VII present some descriptive statistics on the absolute change in analyst FE ($|\Delta FE|$) and FD ($|\Delta FD|$). From panel A, it can be observed that the means of $|\Delta FE|$ and $|\Delta FD|$ for CLC firms are smaller than those for OPC firms. Panel B presents the significant difference in means of the absolute change in FE and FD using both Scheffe's tests and the pairwise *t*-tests.

The results from Scheffe's tests show the comparisons in means are significantly different at the 0.05 level among three groups except for one comparison, $|\Delta FE|$ between CLC and OPC firms. At the same time, the results from the *t*-tests show that there is no significant difference in mean levels of $|\Delta FE|$ or $|\Delta FD|$ for the comparison between NCC and CC (including CLC and OPC firms) firms and the comparison between CLC and OPC firms. Panel C presents the Pearson and Spearman correlation coefficients between the absolute change in analyst forecast attributes and their determinants.

Statistics	CLC firms	OPC firms	NCC firms
Descriptive statistics[a]			
|ΔFE|			
Mean	0.0113	0.0199	0.0318
Median	0.0021	0.0023	0.0024
Std. deviation	0.0477	0.4281	0.2186
|ΔFD|			
Mean	0.0027	0.0069	0.0087
Median	0.0005	0.0005	0.0007
Std. deviation	0.0129	0.2061	0.0744
ΔAGE			
Mean	1.1795	1.3668	8.0495
Median	−1.0000	−1.0000	−1.0000
Std. deviation	46.5676	45.8835	53.9615
ΔANA			
Mean	1.5168	2.0406	1.1011
Median	1.0000	1.0000	0.0000
Std. deviation	4.8651	5.4807	4.6420
ΔSURP			
Mean	−0.0062	−0.0134	−0.0048
Median	−0.0031	−0.0029	−0.0018
Std. deviation	0.0596	0.0909	0.1276
lagSIZE			
Mean	7.3170	7.6682	7.1224
Median	7.1327	7.5000	7.1416
Std. deviation	1.6198	1.7113	1.4797
lagFE			
Mean	0.0086	0.0083	0.0132
Median	0.0016	0.0017	0.0020
Std. deviation	0.0451	0.0349	0.0474
lagFD			
Mean	0.0021	0.0020	0.0035
Median	0.0007	0.0006	0.0009
Std. deviation	0.0093	0.0098	0.0167

Notes: [a]Variable definition: CLC = a dummy variable equal to 1 if the firm is a CLC firm and 0 if the firm is a NCC or OPC firm. $|\Delta FE_t|$=the absolute value of the difference between forecast errors in the post- and the pre-Reg. FD period deflated by the price at the beginning of the pre-Reg. FD period. $|\Delta FD_t|$ = the absolute value of the difference between forecast dispersion in the post- and the pre-Reg. FD period deflated by the price at the beginning of the pre-Reg. FD period. ΔAGE_t = the difference in forecast age between the post- and pre-Reg. FD period. ΔANA_t = the difference in the number of followed analysts between the post- and pre-Reg. FD period. $\Delta SURP_t$ = the difference in earnings surprise between the post- and pre-Reg. FD period. lagSIZE = the log of market value of equity in the pre-Reg. FD period. lagFE, lagFD = the level of forecast error or forecast dispersion in the pre-Reg. FD period.

[b]Above the table is the Pearson correlation coefficients and the below is the Spearman correlation coefficients. All correlations are significant at the 0.001 level or better except for the correlations between ΔSURP and ΔANA, ΔSURP and ΔAGE, ΔAGE and lagFE, and ΔSURP and lagSIZE, which are not significant at conventional levels.

[1]NCC – non-conference call firms;

[2]CLC – closed-call firms;

[3] OPC – open-call firms.

& = Statistically significant at a probability of less than 0.10;

* = Statistically significant at a probability of less than 0.05;

** = Statistically significant at a probability of less than 0.01;

*** = Statistically significant at a probability of less than 0.001

Table V.
Univariate tests on the change in analysts forecast attributes: Panel A

4.4 Regression results for change in analyst forecast attributes

Table VIII presents the regression results obtained when the absolute changes in analyst quarterly FE (|ΔFE|) and FD (|ΔFD|) are regressed on the hypothesized independent variables (as presented in equations (3) and (4) in Appendix). The sign of coefficients on the dummy variable, OPC, for both regressions of |ΔFE| and |ΔFD| is not significant, a result which contradicts *H2.1* and *H2.2*. In addition, the sign of coefficients on the dummy variable, NCC, is significantly positive for both regressions of |ΔFE| and |ΔFD|.

Because we adopt October 23, 2000 as the boundary between the pre-Reg. FD period and the post-period, it is possible that the failure to support *H2.1* and *H2.2* may be due to the choice of the cut-off date. Previous research by Mac (2003) finds that firms had already changed their voluntary disclosure policy in the pre-enactment period (December 20, 1999-October 22, 2000), before Reg. FD became effective on October 23, 2000. Thus, if some firms in the sample have already changed their voluntary disclosure policy prior to the release of Reg. FD because they anticipate the passage of Reg. FD, the tests may not be sufficiently powerful.

Figures 1 and 2 show the graph of the means of FE and FD among three groups, CLC, OPC and NCC firms, from the third quarter of 1998 to the third quarter of 2002. Both Figures 1 and 2 show that FE and FD for NCC firms are higher than those for both OPC and CLC firms in both pre- and post-Reg. FD periods. However, the means of FE (FD) for CLC firms are greater than those for OPC firms in the pre-Reg. FD period

Table VI. Univariate tests on the change in analysts forecast attributes: Panel B

Tests[a]	Group/Variables[a]	|ΔFE[a]|	|ΔFD[b]|
Test of difference in means of ΔFE and ΔFD – Scheffe's tests and Satterthwaite unequal variance T-tests			
1. Scheffe's Tests – Difference between Means	NCC[1] – CLC[2]	0.158*	0.0046*
	NCC[1] – OPC[3]	0.0163*	0.005*
	CLC[2] – OPC[3]	0.0005	0.0004
2. *T* tests – *t* value	NCC[1] – (CLC[2] + OPC[3])	1.62	1.18
	CLC[2] – OPC[3]	1.02	1.03

Note: See Table V for key

Table VII. Univariate tests on the change in analysts forecast attributes: Panel C

	|ΔFE|	|ΔFD|	ΔAge	ΔANA	ΔSURP	lagSIZE	lagFE	lagFD
Correlations[ab]								
|ΔFE|	1	0.5810	0.1128	−0.0467	−0.1486	−0.1476	0.6277	0.5205
|ΔFD|	0.5004	1	0.0806	−0.0322	0.0634	−0.1171	0.4934	0.5922
ΔAge	0.0741	0.0556	1	−0.0493	−0.0375	−0.1274	0.0402	0.0073
ΔANA	−0.0649	−0.0663	−0.0121	1	−0.0090	0.1034	−0.0306	−0.0211
ΔSURP	−0.1501	−0.0723	0.0035	0.0023	1	0.0060	0.0006	−0.0746
lagSIZE	−0.2966	−0.3287	−0.0728	0.1086	−0.0038	1	−0.1846	−0.1692
lagFE	0.5398	0.4751	0.0465	−0.0540	0.0159	−0.3826	1	0.7908
lagFD	0.4242	0.5425	0.0352	−0.0858	−0.0189	−0.3673	0.5494	1

Note: See Table V for key

Variables[a]	Expected sign	|ΔFE| Coefficient	|ΔFE| t-value	|ΔFD| Coefficient	|ΔFD| t-value
Intercept		0.0075	2.61**	0.0005	0.68
OPC	−	−0.0013	−0.88	−0.0003	−0.87
NCC	−	0.0188	7.26***	0.0029	4.11***
HighTech × CLC	+	0.0018	0.71	0.0014	2.05*
HighTech × OPC	+	0.0069	2.98**	0.0012	1.93&
HighTech × NCC	+	−0.0175	−3.27**	−0.0021	−1.42
ΔAGE	+	0.0001	4.13***	0.0000	3.57***
ΔANA	+	−0.0004	−1.7&	−0.0001	−1.29
ΔSURP	−	−0.0900	−11.69***	0.0039	1.84&
lagSIZE	−	−0.0005	−1.25	0.0000	−0.11
lagFE	−	0.8006	42.55***		
lagFD	−			0.8514	40.01***
Adjusted R^2		0.4435		0.3831	
F-statistic		222.35***		173.53***	

Notes: [a]Variable definition: CLC, a dummy variable equal to 1 if the firm is a CLC firm and 0 if the firm is a NCC or OPC firm; OPC, a dummy variable equal to 1 if the firm is a OPC firm and 0 if the firm is a NCC or CLC firm; HighTech, a dummy variable equal to 1 if the firm is a high-technology firm and 0 if the firm is not a high-technology firm; $|\Delta FE_t|$, the absolute value of the difference between FE in the post- and the pre-Reg. FD period deflated by the price at the beginning of the pre-Reg. FD period; $|\Delta FD_t|$, the absolute value of the difference between FD in the post- and the pre-Reg. FD period deflated by the price at the beginning of the pre-Reg. FD period; ΔAGE_t, the difference in forecast age between the post- and pre-Reg. FD period; ΔANA_t, the difference in the number of followed analysts between the post- and pre-Reg. FD period; $\Delta SURP_t$, the difference in earnings surprise between the post- and pre-Reg. FD period; lagSIZE, the log of market value of equity in the pre-Reg. FD period; lagFE, lagFD, the level of FE or FD in the pre-Reg. FD period; [1]NCC – non-conference call firms; [2]CLC – closed-call firms; [3]OPC – open-call firms; &statistically significant at a probability of less than 0.10; *statistically significant at a probability of <0.05; **statistically significant at a probability of <0.01; ***statistically significant at a probability of <0.001

Table VIII. Regression of the change in analyst forecast attributes

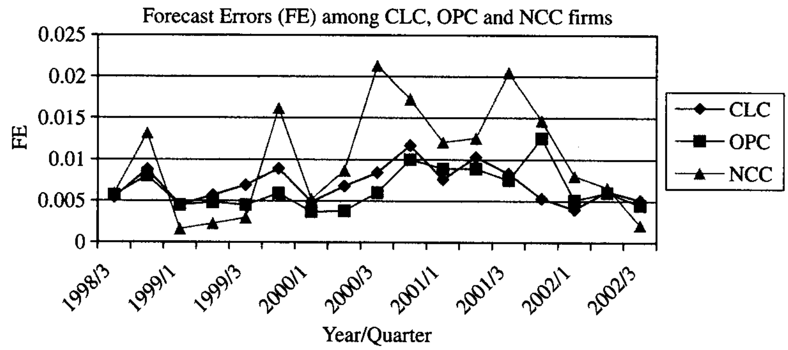

Figure 1.

(before the third quarter of 2000), but generally indistinguishable in the post-Reg. FD period.

The statistical tests performed earlier show that the difference in OPC and CLC means for FE and FD are not statistically significant (when the control variables are

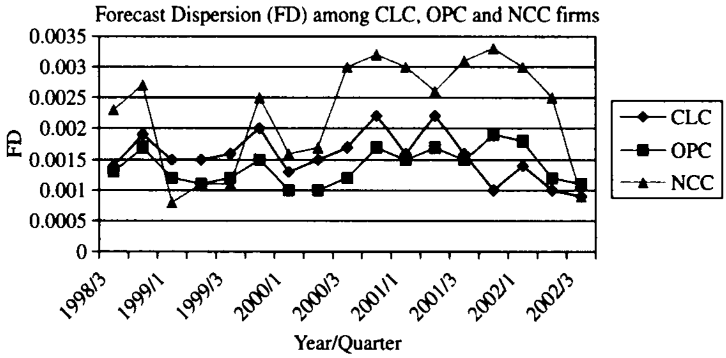

Figure 2.

accounted for) in the post-Reg. FD period. However, CLC firms have statistically significant (and positive) intercepts compared to NCC firms in both pre- and post-Reg. FD periods. This finding indicates that both FE and FD for NCC firms increase relative to those of OPC and CLC firms (both of which held conference calls). Thus, the overall view conveyed is that conference calls continue to be useful in helping analysts to produce accurate forecasts during a period when NCC firms experience a huge jump in earnings FE and FD.

4.5 Additional analysis and robustness tests

It can be argued that FE is another factor which affects FD. To evaluate this possibility, we use a recursive two-stage regression approach by allowing FE to be included as an explanatory variable for the FD equation. The regression results of FE and FD are qualitatively consistent with the previous results without adding FE in the regression of FD.

To evaluate the robustness of these results to possible outliers, we apply four diagnostic tests recommended by Belsley *et al.* (1980):

(1) the diagonal of the projection matrix (Hat matrix);
(2) the studentized residuals (RSYUDENT);
(3) the change in the determinants of the covariance matrix of the estimates (CovRatio); and
(4) the change in the predicted value (DFFITS).

The filters are applied by setting observations exceeding the cutoffs recommended by Belsley *et al.* (1980) to missing values. Qualitatively, the results are the same regardless of whether the outliers are eliminated or not.

5. Conclusion

Prior to the release of Reg. FD, CLC firms were accustomed to disclosing material nonpublic information to certain analysts and institutional investors while not concurrently releasing the information to the general public. There is considerable anecdotal evidence indicating that managers penalize analysts based on the content of their forecasts by limiting or cutting off analysts' future contact with management. Since, voluntary disclosures (e.g. conference calls) put individual investors at a larger informational disadvantage, it has been of concern to the SEC that the effect of selective disclosure is similar to insider trading. The primary purpose of Reg. FD is to curtail analysts' private channels to companies that they had previously enjoyed.

The results of this study are somewhat mixed. On one hand, there is support for the inference that, at least with respect to closing the information gap between analysts privy to the closed conference calls and those not privy to these calls, Reg. FD succeeded in that no statistical difference in earnings FE and FD between the previous-CLC and previous-OPC firms remained in the post-Reg. FD period. Moreover, in the post-Reg. FD period, conference calls continue to lead to lower FE and FD for both previous-OPC and previous-CLC firms, despite a huge jump in the earnings forecast attributes for firms which do not hold conference calls.

Against these favorable findings may be offset the contrary finding that no change in the earnings forecast attributes centered on the actual date of adoption of Reg. FD could be detected. Moreover, the findings reported by Gintschel and Markov (2004) that the informativeness of analysts' information output have declined in the post-Reg. FD period suggests that analysts' forecast attributes may no longer play as vital a role in the capital markets as in the pre-Reg. FD period. To the extent that this was the intent of the SEC in adopting Reg. FD, then the policy may be deemed to be a success[2].

Notes

1. These results are consistent with the findings reported by Shane *et al.* (2001). They provide evidence that analysts gather relatively more uncertainty-relieving information between earnings announcements and by the end of the quarter, their forecasts are as accurate as they were in the prior year. That is to say, the previous-CLC firms may have changed their selective disclosure policy, and Reg. FD may have contributed to the leveling of such information asymmetry.
2. It is not clear what the implication of the findings of Clement and Tse (2003) that investors respond more strongly to the earlier forecasts than to the later forecasts (despite the greater accuracy of the later forecasts) are to the findings reported by Gintschel and Markov (2004). Presumably, analysts forecasts may be more useful when released early that later. The effect of Reg. FD on analyst behavior in terms of earlier or later revisions of forecasts have yet to be examined.

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Appendix. Description of regression equations estimated

Test of first set of hypotheses (H1.1-H1.4)

We use the following two regression models in the cross-sectional tests to test *H1.1-H1.4*, using data for the pre- and the post-Reg. FD period, respectively:

$$\begin{aligned} FE_{it} = {} & \alpha_0 + \alpha_1 CLC_{it} + \alpha_2 OPC_{it} + \alpha_3(\text{HighTech} \times CLC) + \alpha_4(\text{HighTech} \times OPC) \\ & + \alpha_5(\text{HighTech} \times NCC) + \alpha_6 AGE_{i,t} + \alpha_7 ANA_{i,t} + \alpha_8 SURP_{i,t} + \alpha_9 SIZE_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

$$\begin{aligned} FD_{it} = {} & \beta_0 + \beta_1 CLC_{it} + \beta_2 OPC_{it} + \beta_3(\text{HighTech} \times CLC) + \beta_4(\text{HighTech} \times OPC) \\ & + \beta_5(\text{HighTech} \times NCC) + \beta_6 AGE_{i,t} + \beta_7 ANA_{i,t} + \beta_8 SURP_{i,t} + \beta_9 SIZE_{it} + \varepsilon_{it} \end{aligned} \quad (2)$$

where, CLC, a dummy variable equal to 1 if the firm is a CLC firm and 0 if the firm is a NCC or OPC firm; OPC, a dummy variable equal to 1 if the firm is an OPC firm and 0 if the firm is a NCC or CLC firm; NCC, a dummy variable equal to 1 if the firm is a NCC firm and 0 if the firm is an OPC or CLC firm; HighTech, a dummy variable equal to 1 if the firm is a high-technology firm and 0 if the firm is not a high-technology firm; FE_{it}, the absolute difference between actual earnings per share for quarter t less the mean forecast as provided by IBES summary file at the end of the quarter t deflated by the stock price at the beginning of quarter t; FD_{it}, the standard deviation of all analyst forecasts made at the end of the quarter t from the "consensus" (mean) of analysts' forecasts deflated by the stock price at the beginning of quarter t. The consensus forecast used is the last one on the IBES summary tape prior to earnings being reported; AGE_{it}, the number of calendar days between the analyst's forecast date and the date of the actual earnings announcement at quarter t; ANA_{it}, total number of analysts releasing an earnings forecast for the firm i at quarter t; $SURP_{it} = \{EPS_t - EPS_{t-4}\}/P_{t-4}$, a proxy for the difficulty in forecasting earnings, where EPS_t is the primary earnings share (excluding extraordinary items) for quarter t and P_{t-4} is the ending price per share at quarter $t - 4$.; $SIZE_{it}$, the log of market value of equity at the beginning of quarter t.

To evaluate *H1.1*, an F-test of whether $\alpha_1 = \alpha_2$ in equation (1) is performed. Similarly, to evaluate *H1.2*, an F-test of whether $\beta_1 = \beta_2$ in equation (2) is performed. Rejection of the equalities and the relative magnitude of the two parameters would permit us to infer that analyst earnings forecast attributes are different for the previous-CLC firms versus the previous-OPC firms in the post-Reg. FD period. The test of *H1.3* is an F-test of whether $\alpha_1 + \alpha_2 = 0$. Rejection of that equality would provide support for *H1.3*. Similarly, a test of *H1.4* is whether $\beta_1 + \beta_2 = 0$, with its rejection an indication that *H1.4* is supported by the data.

Test of second set of hypotheses (H2.1-H2.4)

To test *H2.1* and *H2.4*, the dependent variables for testing the attributes of analyst earnings forecast are the change in FE and the change in FD. Using changes rather than levels of FE and dispersion mitigates the effect of cross-sectional differences in information environments. The general form of each dependent variable is:

$$\frac{\text{Post–Reg. FD event measure} - \text{Pre–Reg. FD event measure}}{\text{Stock price at Pre–Reg. FD event date}}$$

The pre-Reg. FD event measure component of the dependent variable is the quarterly FE or quarterly FD measured at quarter t before Reg. FD, and the post-Reg. FD event measure component of the dependent variable is the quarterly FE or quarterly FD measured at quarter t after Reg. FD:

$$|\Delta FE| = \left|\frac{FE_{post,it} - FE_{pre,it}}{P_{pre,it}}\right|$$

$$|\Delta FD| = \left|\frac{FD_{post,it} - FD_{pre,it}}{P_{pre,it}}\right|$$

The regressions estimated to evaluate *H2.1* and *H2.4* can be written as follows:

$$\begin{aligned}|\Delta FE_{it}| = {} & \lambda_0 + \lambda_1 OPC_{it} + \lambda_2 NCC_{it} + \lambda_3(\text{HighTech} \times \text{CLC}) \\ & + \lambda_4(\text{HighTech} \times \text{OPC}) + \lambda_5(\text{HighTech} \times \text{NCC}) + \lambda_6 \Delta AGE_{it} + \lambda_7 \Delta ANA_{it} \\ & + \lambda_8 \Delta SURP_{it} + \lambda_9 lagSIZE_{i,pre} + \lambda_{10} lagFE_{i,pre} + \delta_{it}\end{aligned} \quad (3)$$

$$\begin{aligned}|\Delta FD_{it}| = {} & \gamma_0 + \gamma_1 OPC_{it} + \gamma_2 NCC_{it} + \gamma_3(\text{HighTech} \times \text{CLC}) \\ & + \gamma_4(\text{HighTech} \times \text{OPC}) + \gamma_5(\text{HighTech} \times \text{NCC}) + \gamma_6 \Delta AGE_{it} + \gamma_7 \Delta ANA_{it} \\ & + \gamma_8 \Delta SURP_{it} + \gamma_9 lagSIZE_{i,pre} + \gamma_{10} lagFD_{i,pre} + \delta_{it}\end{aligned} \quad (4)$$

where $\text{lagSIZE}_{i,\text{pe}}$, the log of market value of equity in the pre-Reg. FD period; $\text{lagFE}_{i,\text{pre}}$, the level of FE in the pre-Reg. FD period; $\text{lagFD}_{i,\text{pre}}$, the level of FD in the pre-Reg. FD period, and all terms are as defined earlier.

As presented in equations (3) and (4), the CLC effect is captured in the intercept. Thus, to evaluate *H2.1*, the test is whether $\lambda_1 < 0$ in equation (3). This essentially examines whether the change in FE is higher for the firms classified as CLC in the pre-Reg. FD period than that for the OPC firms. If so, then Reg. FD had a more pronounced effect on the firms which previously held closed conference calls. This is exactly the effect that should be expected if Reg. FD had the desired effect.

Similarly, to evaluate *H2.2*, the test is whether $\gamma_1 < 0$ in equation (4). Rejection of the equality with positive coefficients would permit an inference that the absolute change in analyst earnings forecast attributes for the previous-CLC firms was greater than the absolute change for the previous-OPC firms.

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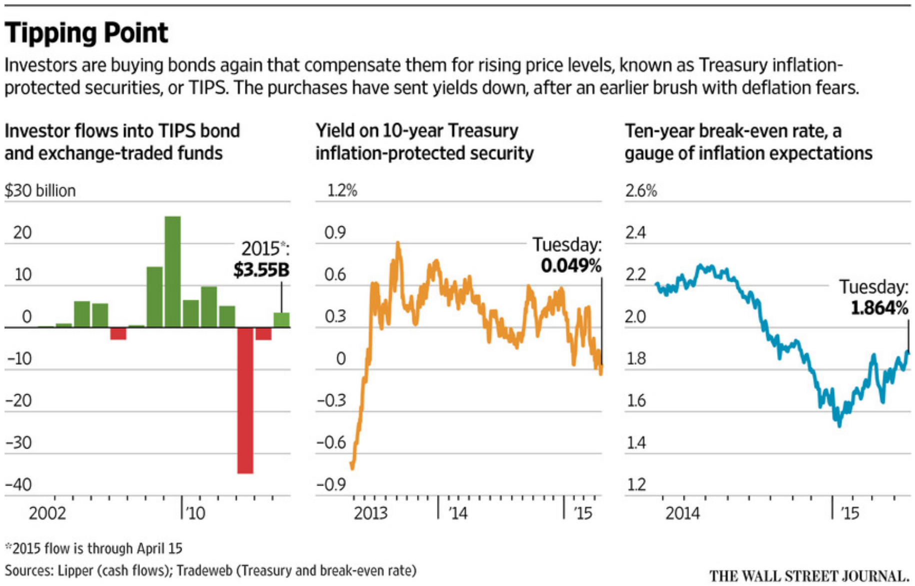
Investors Find TIPS Appealing Once More

Rally by inflation-protected Treasurys signals worries about deflation have been alleviated



By
Min Zeng

-

April 21, 2015 7:36 p.m. ET

Investors are piling into U.S. government bonds that protect against inflation at the fastest pace in three years, a sign of diminishing fears over falling consumer prices.

Money managers poured $3.55 billion into U.S. bond mutual funds and exchange-traded funds focusing on Treasury inflation-protected securities, according to fund-tracker Lipper data for 2015 through April 15. That follows two consecutive years of net outflows.

The rush into TIPS suggests that aggressive central-bank stimulus programs, a stabilization in oil prices and a pause in the dollar's rally have alleviated investors' worries about deflation, a cycle of declining consumer prices and deferred consumption that some economists say could lead to economic contraction.

"The big picture is that the deflation scare may be behind us,'' said Gemma Wright-Casparius, senior bond-fund manager at Vanguard Group, which has over $3.26 trillion in global assets under management. "The overall sentiment will be inflation moving higher over the next 12 months."

If the rate of inflation in the U.S. breaches a certain threshold, holders of TIPS are repaid more than the face value of the bonds when the principal comes due. Rising prices can erode the value of regular bonds.

It was the prospect of steadily falling prices that stoked worries about growth earlier in the year, especially in Europe. In the eurozone, consumer prices have fallen every month since November. To battle the threat of deflation, the European Central Bank, led by President Mario Draghi, unleashed a bigger-than-expected bond-buying program last month. The Bank of Japan **8301 4.79 %** expanded its own program in October.

In Europe, ECB President Mario Draghi launched a bond-buying program last month to battle the threat of deflation.
PHOTO: ANDREW HARRER/BLOOMBERG NEWS

In the past month, oil prices have rebounded from six-year lows and the dollar's appreciation against major currencies has stalled. Both factors have lessened the likelihood that the U.S. could tip into deflation.

The consumer-price index rose a seasonally adjusted 0.2% in March from a month earlier, but fell 0.1% on an annualized basis. Core CPI, which excludes volatile food and energy items, rose to 1.8% on an annualized basis last month. Strategists at Credit Suisse **CS -0.08 %** forecast core CPI will accelerate to 2% by the end of September 2016.

At the same time, Federal Reserve officials have played down the possibility of an increase in short-term benchmark interest rates this summer. That has bolstered the buying of TIPS because some investors see rising inflation risks down the road the longer the Fed maintains a loose monetary policy.

On Friday, the yield on 10-year TIPS dipped to negative-0.03%, the lowest level since June 2013. Bond yields fall as prices rise.

Yields have risen since then. On Tuesday, the yield on 10-year TIPS was 0.049%, still down from 0.506% at the end of 2014. The regular 10-year Treasury note yielded 1.913%.

Even as concerns about deflation fade, few investors see consumer prices rising rapidly, which limits TIPS' appeal. The gap between yields on TIPS and regular 10-year Treasurys was 1.864 percentage point Tuesday.

This "break-even rate" is a measure of investors' inflation expectations and suggests they see inflation running at a 1.864% annualized rate on average in a decade. The break-even rate hit 1.53 percentage point in January, the lowest level since 2010.

TIPS had a big selloff in the second half of 2014 as plunging oil prices galvanized deflation fears. TIPS funds saw net outflows of $2.98 billion in 2014 and $34.77 billion in 2013, according to Lipper. The recent rally in TIPS reflects investors' struggle to obtain bonds that offer a good mix of income and safety. The $1.07 trillion TIPS market is part of the broader $12.6 trillion U.S. government-debt market.

More than a quarter of government bonds in Europe are now trading with negative yields, according to analysts. The ECB's bond purchases are forcing money managers to scramble for alternatives outside the eurozone.

"Global demand has elevated valuation in U.S. Treasury markets, including TIPS,'' said James Ong, a portfolio manager at asset-management firm Invesco Ltd. **IVZ 0.82 %** , which has $798.3 billion of assets under management. "We recommended buying TIPS.

TIPS overall have handed investors a total return—including price gains and interest payments—of 2.81% for this year through Monday, beating a 1.8% return on regular Treasury debt, according to Barclays **BCS 0.39 %** PLC.

"We still find TIPS attractive" even after their recent good performance, said Jeremie Banet, a portfolio manager focusing on inflation-bond investments at Pacific Investment Management Co., with $1.59 trillion in assets under management at the end of March. Pimco, one of the largest investors in TIPS, has boosted its exposure this year.

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