

THE EQUITY RISK PREMIUM: AN ANNOTATED BIBLIOGRAPHY

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1. Arnott, Robert D., and Clifford S. Asness, “Does Dividend Policy Foretell Earnings Growth?” Working paper, 2001.

Contrary to the predictions of Ibbotson and Chen and others who apply M&M dividend invariance intertemporally, earnings growth has been fastest when dividend payout is highest, not lowest. This is due to diminishing marginal productivity of capital. As a result, investors should not look to today’s low payout ratios as a sign of stronger-than-historical earnings growth in the future.

2. Arnott, Robert D., and Peter L. Bernstein, “What is a “Normal” Risk Premium?” Working paper, 2001.

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% (about 1.4% more than the bond yield). The subsequent positive surprise was due to four historical accidents: (1) bonds had unanticipated losses; (2) valuations quadrupled, as measured by the price/dividend ratio; (3) the market survived; and (4) “stocks have gone from passing essentially no economic growth through to the shareholders to passing [through] much of the...growth.”² These observations are used to construct a framework for estimating the ERP at each point in time including the present. The “normal” ERP, or historical average of what investors were actually expecting, is 2.4% and the current ERP is around zero.

3. Arnott, Robert and Ronald Ryan. “The Death of the Risk Premium: Consequences of the 1990’s.” *Journal of Portfolio Management*, Spring 2001.

Applying the DDM to current (January 2000) valuations produces an ERP of -0.9%, consisting of a real equity expected return of 3.2% minus a real TIPS yield of 4.1%. A similar analysis of the ERP at the end of 1925 shows that it was 2.7%.

¹ The author may be contacted at l.siegel@fordfound.org. Abbreviations are defined at the end of the article.

² I think the authors are double counting the reduction in dividend yield; some of the lower yield was due to a lower dividend payout ratio, not just the higher P/E; thus (applying M&M intertemporally as one is sometimes cautioned not to do) the “passing through” of economic growth was made possible by the lower dividend payouts.

Pension funds, especially (given their liability characteristics) should invest more in bonds given these estimates.

4. Asness, Clifford S. (2000a), "Bubble Logic or How to Learn to Stop Worrying and Love the Bull," unpublished manuscript, AQR Capital Management, LLC, June 2000.

In a draft of a popular book, investors are encouraged to "do the math" of calculating DCF estimates of companies' and the market's value (or, alternatively, IRR estimates of the return). The Shiller (1998) method of averaging the most recent 10 years' real earnings to calculate an alternative P/E series is used to illustrate market overvaluation. Popular views that support exorbitant stock valuations are lampooned, and Wall Street is blamed for promoting some of these ideas. (Wall Street dresses up its salesmen, or "analysts," in the clothes of "independent science" but they do not engage in scientific inquiry.) "Why doesn't General Motors have analysts?"

5. Asness, Clifford S. (2000b), "Stocks vs. Bonds: Explaining the Equity Risk Premium," *Financial Analysts Journal*, March/April 2000.

When one includes stock volatility and bond volatility as well as bond yields in a forecast (valuation) model, the stock market looks much less overpriced (because stock volatility was low, and bond volatility high, at the time the article was written). That is, the ERP is low in equilibrium because stocks are not much riskier than bonds.

LBS note: This article seems dated. Nevertheless, secular changes in the volatility of a market (stocks or bonds) should be taken into account when making forecasts of the ERP.

6. Bernstein, Peter L., "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 1997.

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 ERP of 3%, although the more interesting finding is that equity returns are mean-reverting while bond returns have no mean to which to regress. Thus, in the very long run and in real terms, stocks are safer than bonds.

7. Blanchard, Olivier Jean (1993), "Movements in the Equity Premium," *Brookings Papers on Economic Activity*, Macroeconomics 2: 75-118.

Fama and French (2001) write, "Blanchard (1993) uses dividend growth rates to estimate the expected rate of capital gain, which he combines with an expected dividend yield to estimate the expected stock return. But his focus is different and his approach is more complicated than ours. He is interested in the path of the

conditional expected stock return. His conditional expected return is the sum of the fitted values from time-series regressions of the realized dividend yield and a weighted average of 20 years of future dividend growth rates on four predetermined variables (the dividend yield, the real rate of capital gain, and the levels of interest rates and inflation).”

Low- and high-frequency fluctuations in the ERP are found. The low-frequency fluctuation is due to structural changes such as the decline in overall risk since World War II. The short frequency is related to valuation and the market cycle. The currently expected ERP is low (2 to 3 percent). However, real bond yields are high and should continue to be (because the overall return on capital is set in the real economy, and is cut up between fixed income and equities according to investors’ risk preferences), so the WACC in the macroeconomy has not changed as dramatically as the ERP. Implications of this forecast for the macroeconomy are explored. An excellent panel discussion, that includes Robert Shiller and Jeremy Siegel, follows.

8. Brown, Stephen J., William N. Goetzmann, and Stephen A. Ross, “Survival,” *Journal of Finance*, July 1995.

“Empirical analysis of rates of return in Finance implicitly condition on the security surviving into the sample. We investigate the implications of such conditioning on the time series of rates of return. In general this conditioning induces a spurious relationship between observed return and total risk for those securities that survive to be included in the sample. The result has immediate implications for the equity premium puzzle” (that is, to explain it away because the returns used to frame the “puzzle” were neither expected nor were they achieved by many investors).

9. Campbell, John Y., Peter A. Diamond, and John B. Shoven, “Estimating the Real Rate of Return on Stocks over the Long Term,” presented to the Social Security Advisory Board, August 2001.

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

9a (Campbell). Under certain stringent conditions, E/P is an unbiased estimator of the expected equity return. Noting that earnings are highly cyclical, a more stable numerator for E/P is produced by taking the 10-year trailing average of real earnings, E* (after Graham and Dodd [1934]; see also Campbell and Shiller [1998], Shiller [2000], and Asness [2000]). From this perspective, current data suggest that the structural ERP is now close to zero, or that P will fall, causing the ERP 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% to 3.5% is forecast, along with an ERP of 1.5% to 2.5% geometric (3% to 4% arithmetic).

9b (Diamond). Stocks cannot earn a real total return of 7% or else they will have a market capitalization of 39.5 times U.S. GDP by the year 2075 (assuming a 2% 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%, stocks must fall by 53% in real terms over the next 10 years (assuming a 2% dividend yield). Increasing the dividend payout does reduce the projected capitalization/GDP ratio materially but in no case below 7.86 in 2075.

9c (Shoven). Dividends are irrelevant, due to 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% (say, 6% to 6.5%). Because of high (3%) real rates as projected – not the very high current TIPS yield – the ERP is only 3% to 3.5%, but these projections require one to reduce the 7% 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%.

10. Campbell, John Y., and Robert J. Shiller, “Valuation Ratios and the Long-Run Stock Market Outlook,” *Journal of Portfolio Management* 24, 1998. Updated, Cowles Foundation Discussion Paper #1295, Yale University, March 2001.

The D/P ratio can forecast either changes in D, which is what efficient market theory suggests, or changes in P, or both. Empirically it forecasts only changes in P. 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, but still quite bearish, when one uses [D + share buybacks], E, the 10-year moving average of E in constant dollars, or other variables in the denominator. Real stock returns close to zero over the next ten 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, while 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. However, “something extremely unusual” may be going on: “The very fact that ratios have moved so far outside their historical range poses a challenge...both to the traditional view that stock prices reflect rational expectations of future cash flows, and to our view that they are substantially driven by mean reversion.... In our personal judgment, while we do not expect a complete return to traditional valuation levels, we still interpret the broad variety of evidence as suggesting a poor long-term outlook for the stock market.”

11. Claus, James and Jacob Thomas. “Equity Premia as Low as Three Percent? Evidence from Analysts’ Earnings Forecasts for Domestic and International Stock Markets,” *Journal of Finance*, October 2001, pp. 1629-1666.

The Ibbotson or historical-extrapolation method gives estimates of ERP that are much too high, relative to both purely utility-based estimates (Mehra and Prescott) and estimates based on valuation (for example, Campbell and Shiller). “Rather than examine observed returns, we estimate for each year since 1985 the discount rate that equates U.S. stock market valuations with the present value of prevailing [analysts’] forecasts of cash flows. Subtracting 10-year risk-free rates from these estimated discount rates suggests that the equity premium is only about 3%. An examination of...Canada, France, Germany, Japan, and the United Kingdom...provides similar results....[E]very one of our 59 country-year estimates lies well below [the Ibbotson estimate of] 8% [and above zero except in Japan in the first half of the 1990’s].” Known upward biases in analysts’ earnings forecasts are corrected in making the estimates. Possible reasons why the historical method might have overstated the expected ERP in recent years are discussed, with reference to Campbell (1991)³ and other authors.

12. Cochrane, John H., “Where is the Market Going? Uncertain Facts and Novel Theories,” *Economic Perspectives* 21 (November 1997): 3-37, Federal Reserve Bank of Chicago.

If stock expected returns are going to return to their historic means, then near- and even middle-term forecasts are extraordinarily bearish. This forecast can be realized through sharply negative returns for a period of time, then returns at the historic mean; or (a much more appealing prospect) lower returns from this point forward. The math doesn’t distinguish between these possibilities.⁴

Several threads are explored. First, the “long-term average” (historical) return is “poorly measured” (that is, one is not confident that the sample mean is representative).⁵ Second, “average returns have been low following times of high stock prices, such as the present.”

Third, referring to the equity premium puzzle, “standard models that summarize a vast amount of other information” [i.e., that are robust for purposes other than predicting the stock market]...“do not predict anything like the historical equity premium. After a decade of effort, a range of drastic

³ Campbell, John Y., “A Variance Decomposition for Stock Returns,” *The Economic Journal* 101 (405), 157-179.

⁴ Instead, one must decide if one believes that market prices reflect all available information. If they do, then the current price is fair and future returns will be lower. If they don’t, then the market could crash, after which future returns might revert to their historical mean or some other number. It doesn’t necessarily follow, however, that if the market is inefficient and overpriced, that it will crash.

⁵ Cochrane does *not* mean that the actual historical returns are inaccurately representations of what investors achieved – a point raised by some authors concerned with taxes, management fees, undiversification etc.

modifications to the standard models can account for the historical equity premium. But it remains to be seen whether the drastic modifications and a high equity premium, or the standard models and a low equity premium, will triumph in the end.”

Finally, however, “low average returns do not imply [that] one should change one’s portfolio. Someone has to hold every stock on the market... Thus, one should only hold less [in] stocks than the average person if one is different from everyone else in some crucial way. It is not enough to be bearish, one must be more bearish than everyone else.”

13. Constantinides, George M., John B. Donaldson, and Rajnish Mehra, “Junior Can’t Borrow: A New Perspective on the Equity Premium Puzzle, working paper, March 2001. Forthcoming in the *Quarterly Journal of Economics*.

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 PCM. Thus equities are (on average over time) underpriced and bonds are overpriced, producing a higher ERP than predicted by Mehra and Prescott.⁶

14. Cornell, Bradford, *The Equity Risk Premium*, Wiley Frontiers in Finance, 1999.

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

15. Diermeier, Jeffrey J., Ibbotson, Roger G., and Siegel, Laurence B., “The Supply for Capital Market Returns,” *Financial Analysts Journal*, March/April 1984.

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

⁶ Mehra and Prescott’s “puzzle” can be boiled down to “if stocks are so great, why don’t people buy more of them (pushing prices up and returns down to the point where they are less great)?” Constantinides et al. supply a possible explanation.

⁷ While well written, the book is poorly edited, with many typos.

corporate sector can grow, may cause the dividend growth rate to be slower than the GDP growth rate.

16. Elton, Edwin J., "Presidential Address: Expected Return, Realized Return and Asset Pricing Tests," *Journal of Finance*, August 1999, pp. 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 ERP.

17. Fama, Eugene F., and Kenneth R. French, "The Corporate Cost of Capital and the Return on Corporate Investment," *Journal of Finance*, December 1999.

COMPUSTAT data are used to estimate the IRR of the capitalization-weighted corporate sector from 1950 to 1996. This IRR, 10.72%, is assumed to have been the nominal WACC. By observing the capital structure and assuming a corporate debt yield 150 basis points above Treasuries, and making the usual tax adjustment to the cost of debt, a nominal expected equity total return of 12.8% is derived. This produces an ERP of 6.5%. 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.⁸ Because the period studied is long, the result is not particularly sensitive to the exit price.

18. Fama, Eugene F. and Kenneth R. French, "The Equity Premium," *Journal of Finance*, April 2001.

The real equity premium that was expected at the time is estimated over 1872-2000 using the constant-growth version of the DDM. It is 3.54% per year. The estimate from the historical-return method, 5.57%, is almost 60% higher.

"The difference between the two is largely due to the last fifty years. The equity premium for 1872-1950 from the [DDM], 4.17% per year, is close to the estimate from the [historical return method], 4.40%. In contrast, the equity premium for 1951-2000 produced by the [historical return method], 7.43% per year, is almost three times the estimate, 2.55%, from the [DDM].

"The estimate of the expected real equity premium for 1951-2000 from the *earnings* growth model, 4.32% per year, is larger than the estimate from the [DDM]. But the earnings growth estimate is still less than 60% of the estimate from the [historical return method].

"...[T]he lower equity premium estimates for 1951-2000 from fundamentals are closer to the expected premium. [First,] the standard error of the estimate from the dividend growth model is less than half the the standard error of

⁸ Bradford Cornell points out that while the IRR analysis gives the appearance of being forward-looking, it is not; it is purely historical. Moreover, the Compustat database is survival biased before 1965.

the estimate from the average return. [Second], valuation theory specifies relations among the book-to-market ratio, the return on investment, and the cost of equity capital (the expected stock return). The 1951-2000 estimates of the expected stock return from the dividend and earnings growth models line up with other fundamentals in the way valuation theory predicts.” In contrast, the estimate from historical returns is too high by these criteria.

19. Ibbotson, Roger G., and Peng Chen, “The Supply of Stock Market Returns,” working paper, 2001.

If one simply uses the DDM to forecast stock returns, the forecast violates Modigliani and Miller 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 DDM estimate, an additional-growth term of 2.28% *as well as* using a current-dividend number of 2.05%, which is what the dividend yield would have been in 2000 if the dividend payout ratio had equalled its the historical average of 59.2%. The ERP thus estimated is about 4% (geometric) or 6% (arithmetic), about 1.25% lower than the straight historical estimate.

20. Ibbotson, Roger, and Rex A. Sinquefeld, “Stocks, Bonds, Bills and Inflation: Year-by-Year Historical Returns (1926-74),” *Journal of Business* 49 (1), 1976. Updated in *Stocks, Bonds, Bills and Inflation: 2000 Yearbook*, Ibbotson Associates, Chicago, 2001.

Stock total returns consist of a stationary part (the ERP) 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 ERP is the past arithmetic mean ERP, currently (in 2000) 7.8%. To this is added the current interest rate, 5.7% (on 20-year Treasury bonds). The sum of these, 13.5%, 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 ERP reflects equilibrium at all times including the present, and forms the proper estimator of the future ERP.⁹

⁹ While the Ibbotson approach is sometimes described as an equilibrium theory, I would point out that an equilibrium theory is one that specifies the price at which the quantity of capital supplied will equal the quantity of capital demanded. (The DDM is an example.) At the very least, the Ibbotson approach is not a disequilibrium theory (one that proposes a value different from the price). However, all the Ibbotson approach really does is to assert that the current market price is equal to the value because markets are in equilibrium. It goes on (apparently) to imply that the expected return is insensitive to the price. Thus it is consistent with an equilibrium without actually describing the conditions for one.

21. Jagannathan, Ravi, Ellen R. McGrattan, and Anna Scherbina, “The Declining U.S. Equity Premium”, Federal Reserve Bank of Minneapolis, Quarterly Review, Fall 2000.

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 ERP. 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 1990's as it was in the 1960's, but the ERP is smaller because bond yields have increased. The ERP in 1999 is – 0.27% for the S&P 500, -0.05% for the “CRSP portfolio,” and 2.71% for the “Board of Governors stock portfolio” (a broad-cap portfolio with many small stocks that pay high dividend yields)¹⁰. The analysis is shown to be reasonably robust when tested for sensitivity to the dividend growth rate being too low, the dividend yield being too low because of share repurchases (see Wadhvani [1999]¹¹), 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 ERP based on the S&P 500 rises to 1.26%.

22. Jorion, Philippe, and William N. Goetzmann, “Global Stock Markets in the Twentieth Century,” *Journal of Finance*, June 1999.

The U.S. equity market experience in the twentieth century is an unrepresentative sample of what can and does happen. The high ERP observed globally is mostly a result of high equity returns in the United States (with a 4.3% 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%), and there were many non-surviving countries. While the large capitalization of the U.S. 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).

¹⁰ This difference in ERP makes sense only if the Board of Governors stock portfolio is equally weighted.

¹¹ Wadhvani, Sushil B., “The U.S. Stock Market and the Global Economic Crisis,” National Institute Economic Review, January 1999, sets forth a numerical example showing that the value of stocks is invariant to share repurchases. One must be careful, however, to use the right growth rate (since changes in the number of shares cause the growth rate of dividends-plus-repurchases to differ from the growth rate of dividends-only).

23. Kritzman, Mark P. “The Equity Risk Premium Puzzle: Is it Misspecification of Risk?” *Economics and Portfolio Strategy*, Peter L. Bernstein, Inc., New York, March 15, 2001. Plus personal communications.

Investors don’t know when they are going to need their money back (for consumption), so the terminal-wealth criterion used by Mehra and Prescott to frame the equity-premium 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 ERP is justified by utility theory than is proposed by Mehra and Prescott.

LBS note: the “stew.” Mark Kritzman, Tom Philips, and I have all expressed (mostly to each other) the idea that the equity risk premium “puzzle” can be resolved by a mixture of factors. Cornell (1999) has also addressed this point and call it the “stew” solution to the puzzle. I will give my version. First, equity investing is much more risky than Mehra and Prescott assume, for the reasons described by Kritzman and because of uncertainty about the survival of markets, and because of model error (for example, setting aside the issue of survival, the possibility that one might invest using an estimate of the expected return that is much higher than the true mean). Second, equity investing is (or at least has been) much less rewarding than described in the usual historical sources. This is due to taxes, transaction costs and loads, management fees, and undiversification.¹² Put the two lists together, and the premium puzzle goes away.

24. McGrattan, Ellen R., and Edward C. Prescott, “Is the Stock Market Overvalued?” Federal Reserve Bank of Minneapolis, Quarterly Review, Fall 2000.

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

LBS note: McGrattan and Prescott seem to propose that (1) there is no risk premium and (2) that is about right. The inescapable conclusion is that they either believe stocks are not riskier than bonds, or that investors do not require a reward for risk-taking.

¹² By “undiversification” I mean the cost, in terms of expected utility, of holding portfolios less diversified than the market (until 1973 there were no index funds, and most portfolios are still not all that well diversified).

25. McGrattan, Ellen R., and Edward C. Prescott, "Taxes, Regulations, and Asset Prices," National Bureau of Economic Research, Working Paper #8623, December 2001.

"U.S. stock prices have increased much faster than gross domestic product (GDP) in the postwar period. Between 1962 and 2000, corporate equity value relative to GDP nearly doubled. In this paper, we determine what standard growth theory says the equity value should be in 1962 and 2000, the two years for which our steady-state assumption is a reasonable one. We find that the actual valuations were close to the theoretical predictions in both years. The reason for the large run-up in equity value relative to GDP is that the average tax rate on dividends fell dramatically between 1962 and 2000. We also find that, given legal constraints that effectively prohibited the holding of stocks as reserves for pension plans, there is no equity premium puzzle in the postwar period. The average returns on debt and equity are as theory predicts." However, going forward one should expect no further gains from tax policy; the currently expected real return on equities is "around 4%," down from 8% in the early postwar period.

26. Mehra, Rajnish, and Prescott, Edward C. "The Equity Premium: A Puzzle." *Journal of Monetary Economics*, v. 15, 1985. pp. 145-161.

The observed equity premium is at least an order of magnitude higher than would be predicted by conventional utility theory, where the risk of stocks is defined as uncertainty about terminal wealth. The risk aversion parameter consistent with the observed premium is 30 to 40, implying that if consumption falls by 1%, the marginal value of a dollar of income increases by 30 to 40 percent. This is clearly absurd. 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% ERP, and possibly one as small as 0.25%.

27. Mehra, Rajnish. "The Equity Premium: Why Is It A Puzzle?" Working paper, 2001.

The equity premium "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: "The *deus ex machina* of...modern asset pricing theory...is that asset are priced such that, *ex ante*, the loss in marginal utility incurred by sacrificing current consumption and buying an asset at a certain price is equal to the expected gain in marginal utility contingent on the anticipated in consumption when the asset pays off in the future." In other words, 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 ERP of at most 1% emerges. An extensive discussion reveals why this is the case and addresses various attempts made by other authors to resolve the puzzle.

28. Philips, Thomas K. “Why Do Valuation Ratios Forecast Long-Run Equity Returns?” *Journal of Portfolio Management*, Spring 1999, pp. 39-44.

The Edwards-Bell-Ohlson equation¹³ 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 B/P, E/P, and D/P. (2) If a corporation’s ROE equals its cost of capital (expected return), then its P/B ratio should be 1, and its expected return should equal E/P. The analysis suggests that nominal total expected equity returns shrank from almost 14% in 1982 to 6.5% 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.

29. Shiller, Robert J., *Irrational Exuberance*. Princeton University Press, Princeton, N.J., 2000.

LBS note: This influential book provides a wealth of historical detail, but does not either set forth a direct forecast of the ERP or provide enough information to deduce the author’s forecast. Using ten years of trailing real earnings (see, originally, Graham and Dodd [1934]¹⁴) to estimate normalized P/E’s, Shiller concludes that the market is not only overpriced but well outside the range established by previous periods of high stock prices.

30. Siegel, Jeremy J., *Stocks for the Long Run*, second edition, McGraw-Hill, New York, 1998.

LBS note: This is the “concordance” to Ibbotson’s “bible.” While covering many topics with great erudition, its views on the ERP are summarized in the following paragraphs:

“I have shown that the real return on equity...has averaged about 7.0% over long periods of time. For the 2% dividend yield prevailing in the late 1990’s, this mean that real share prices must appreciate at 5% per year maintain a 7% real rate of return. In order to keep the P/E ratio stable, this means that real EPS must grow by at least 5% per year.

“One might wonder how the real growth of per-share earnings could exceed the long-run real growth of the economy, which is at most 3% per year. This is because per-share earnings are not the same as total earnings. With a 2%

$$^{13} P_0 = B_0 + \sum_{i=1}^{\infty} \frac{E[(ROE_i - r)B_{i-1}]}{(1+r)^i}$$

¹⁴ Graham, Benjamin, and David Dodd, *Security Analysis*, McGraw-Hill, New York, 1934.

dividend yield, firms have sufficient cash flow to repurchase their shares... [at a rate such that] the number of shares would fall at 2% per year. In this case, aggregate real earnings can grow at 3% at the same time per-share earnings are growing at 5%.”

LBS note: Siegel (1998) thus prefigures Ibbotson and Chen in applying Modigliani and Miller intertemporally. The 7% real return forecast does not imply an ERP exactly equal to the historical ERP. The difference would be caused by the extent, if any, to which the expected real return on bonds differs from their historical return.

31. Siegel, Jeremy. “The Shrinking Equity Premium.” *Journal of Portfolio Management*, Fall 1999, pp. 10-19.

Siegel recants. Analysis of dividend and earnings multiples suggests a real return (not an ERP) of only 3.1% to 3.7% for stocks, lower than the real TIPS yield. While 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 due to transaction costs and undiversification.) On the positive side, the Jorion and Goetzmann finding that world markets returned a real capital gain of only 0.8% over 1921 to the present, compared to 4.3% in the U.S., is misstated because the analysis is of the median portfolio, not the average. The GDP-weighted average is only 0.28% 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 U.S. causes the annualized world index return to lie within 1.00% of the U.S. return *by construction*).

32. Siegel, Jeremy J., and Richard H. Thaler, “The Equity Premium Puzzle,” *Journal of Economic Perspectives*, Winter 1997.

Proposed resolutions of the equity premium puzzle fall into two categories: (1) observations that the stock market is riskier, or the ERP 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.

33. Welch, Ivo (2000a), “Research Roundtable: The Equity Premium,” Yale University, June 30, 2000 (SSRN Electronic Paper Collection abstract #234713).

Following an introductory literature review and bibliography, eleven discussants provide responses to the question, “What do you teach MBA students about the equity premium?”

34. Welch, Ivo (2000b), “Views Of Financial Economists On The Equity Premium And Other Issues.” *Journal of Business*, October 2000, pp. 501-537.

The author writes, “The consensus of 226 academic financial economists forecasts an arithmetic equity premium of 7% per year over 10 and 30 year horizons; and 6% to 7% over 1 and 5 year horizons. Pessimistic and optimistic 30-year scenario forecasts average 2% and 13%. Respondents claim to revise their forecast downward when the stock market rises. They perceive the profession's consensus to be higher than it really is and are influenced by this perception.”

Abbreviations

B/P – book/price
CRSP – Center for Research in Security Prices
D – dividends
D/P – dividend/price
DCF – discounted cash flow
DDM – dividend discount model
E – earnings
E* – ten-year trailing average of real earnings
E/P – earnings/price
EDM – earnings discount model
EPS – earnings per share
ERP – equity risk premium
GDP – gross domestic product
GNP – gross national product
IRR – internal rate of return
LBS – Laurence B. Siegel (the author of this report)
M&M – Modigliani and Miller
P/B – price/book
P/D – price/dividend
P/E – price/earnings
ROE – return on equity
TIPS – Treasury inflation protection securities
WACC – weighted average cost of capital