Market Efficiency

Efficient markets

- Can't use past prices to predict future prices except through pricing models like CAPM.
- No systematic abnormal returns.
- Strong form: All public and private information is fully embedded in stock prices.
- Verges on tautology in definition of abnormal performance: What are abnormal returns to information collection?

Firm's return should be predicted by β

- In an up-year, highest β firms should have highest returns
- In a down-year, highest β firms should have lowest returns
- Regress monthly returns for ten firms for 5 years on the market. Sort by estimated βs. Compare to actual returns.
- Other factors such as book-to-market and size may consistently forecast returns, but these can be included in a pricing model so should not be called "anomalies."

Anamolies

- January effect: January returns, esp. for small stocks, are too high. => Buy in December and sell in January.
- Weekend effect: Monday returns are too low. => Sell on Friday and buy on Monday.
- S&P effect: Sell short and hold on???
- Wednesday effect: Volatility over Wednesday when market is closed on Wednesday lower than volatility when market is open.
- Etc.

Noise traders v. Smart money[1]

- Arbitrage(u)rs push price to equilibrium. Buy when prices too low and sell short when prices are too high.
- Risk: (a) fundamental; (b) mispricing duration.
- Liquidity requirements for correcting type (b).
- May be able to set relative prices but hard to set overall level of prices – no arbitrage object.

Investor Sentiment:

- Trend chasing / fads / guru analysis / technical analysis (hd & shoulders) / stock broker advertisements /
- How do noise traders survive? Carry too much risk and are compensated for it. (Self fulfilling prophesy.)

Empirical evidence:

- Mean reversion.
- Stock returns are more volatile than cash flows.

However, volatility is predictable.[2]

Some references:

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[1] Shleifer & Summers, "The Noise Trader Approach to Finance," Journal of Economic Perspectives 4 (1990) 19-33.
[2] Bertonazzi & Maloney, "Does Implied Volatility Imply Volatility -- In Bonds?", Journal of Fixed Income, December 2001.

SORTING THE PIECES TO THE EQUITY RISK PREMIUM PUZZLE

BY ERIC BERTONAZZI & M.T. MALONEY

I. Introduction

The equity risk premium, that is, the amount by which equities outperform fixed income securities, continues to puzzle financial analysts. The drama has heightened in the 1990s and especially in the last few years as the equity market has recorded record returns. Price to earnings ratios are at an all time high.

It is not out of academic curiosity that analysts try to understand this conundrum. If the increase in stock prices reflects a higher return that is due to equities because of higher risk, then a dooms-day reckoning lurks somewhere on the horizon. That is, if the enormous returns to equities in the 1990s are the just reward to holding these risky assets, then a downturn of some vaguely similar proportion has to be recognized as a realistic possibility. On the other hand, the stock price run-up that we have seen in the last several years may simply reflect a re-pricing of assets in light of changing conditions. As such, it is an unexpected change the price level not the expected return to holding these assets. In particular, if the true underlying risk of equity has actually fallen or if the expected growth rate of earnings has dramatically increased, then the stock price run-up of the 1990s is a once-and-for-all adjustment in the price level, a fortuitous coincidence for those holding equities during this period, but one not likely to be repeated.

From the perspective of portfolio decision-making, neither possibility is particularly glamorous. On the one hand, a stock market crash may loom over equity dominated portfolios. On the other, the return to equity relative to fixed income assets will not be as large in the future as it has been in the past. Nonetheless, an answer to the question is important. If the fundamental risk of equities is truly reflected in the large positive returns enjoyed over the last several years, then prudent investors should seriously consider shifting a substantial portion of their assets to fixed income securities. On the other hand, if these large positive returns have been the result of price level adjustment, then there is every reason to leave assets in equities even though they will not continue to enjoy the magnitude of returns experienced in the past.

The purpose of this work is to present some empirical evidence that weighs in on this question. Something has changed. We attempt to determine the most likely possibility.

II. Setting the stage

The equity risk premium is the amount by which equities outperform fixed income securities. It comes from the Capital Asset Pricing Model (CAPM). CAPM says that investors choose between the risk free security and a market portfolio of all risky assets. The expected return on any one risky asset minus the risk free yield is equal to the covariance of that risky asset with the market divided by the variance of the market times the difference between the expected return for the market minus the risk free return. That is,

$$[E(r_i) - r_f] = \beta_i [E(r_m) - r_f]$$

where beta is the covariance of asset *i* with the market divided by the variance of the market. $[E(r_m) - r_f]$ is the equity risk premium (ERP). Operationally, CAPM identifies the expected return on a security as:

$$E(r_i) = \beta_i ERP + r_f \, .$$

This expected return is the value by which the expected future cash flows accruing to the security holders are properly discounted.

The pieces of the equity risk premium puzzle can be laid out in an orderly fashion by considering the constant growth model of stock prices. Assets with an indefinite life and an initial cash flow that grows at a constant rate over time can be priced by discounting this future cash flows. When we consider the market portfolio of all risky assets for which beta is 1, the formula is:

$$P = \frac{E}{ERP + r_f - g}$$

where P is the asset price, E is the current level earnings, ERP is the equity risk premium, r_f is the risk free return, and g is the growth rate of earnings. For practical purposes we can think of P as the index value of the S&P 500 and E is the sum of the earnings for all of these securities. They are expected to grow at a constant rate, g, starting from the current value. The discount rate applied to these earnings is $ERP + r_f$.

The discount and growth rates in the denominator are in real terms. The expected rate of inflation can be added to the discount rate to make it nominal, but then it must also be added to the growth rate. Hence, expected inflation cancels out of the equation. We will reintroduce expected inflation into the discussion at a later point, but recognize here that its direct effect is a wash.

For the purpose of setting the stage for our discussion, it is useful to rewrite the constant growth model in terms of the inverse price to earnings ratio. That is,

$$\frac{1}{P/E} = ERP + r_f - g$$

The inverse of the price to earnings ratio, or earnings to price (*E/P*), is a percent. In this formulation we can compare the market valuation of price relative to earnings with the component pieces, real growth, the real risk free rate, and the equity risk premium.

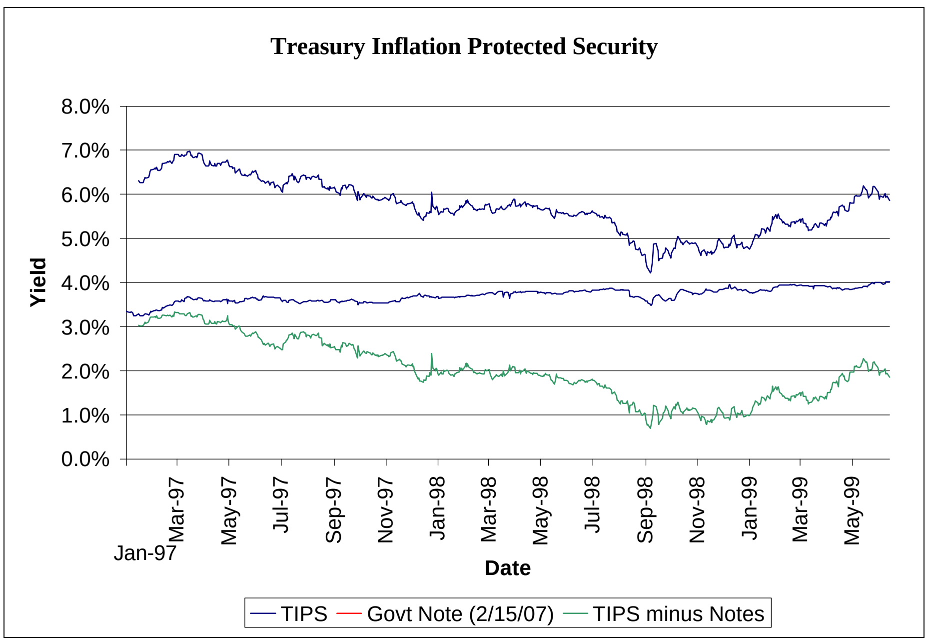
The measurement of the ERP is of some interest. Historical data are commonly used. The average annual return on capitalized value of widely traded securities from 1926 through 1998 is 10.8 percent. This is shown in Table 1. Also shown there is the average annual return on 20 year U.S. Government Treasury bonds. Their average annual return is 2.5 percent. One estimate of the ERP is the simple difference between these. Another is the average of annual difference between these. The two are nearly the same. This value is slightly higher than 8 percent.

The variance of the government long bond return is itself interesting. The standard deviation of this return is over 10 percent. This seems hardly a reasonable proxy for a risk free return. While government bonds are virtually default risk free (at least in the U.S.), they are not risk free in other dimensions. Notably, inflation significantly reduces the return on fixed income securities. Fixed income securities, because they pay a nominally denominated coupon and redemption, are particularly sensitive to inflation.

One way to assess the inflation component of government bond yields is to look at the return on the recently issues inflation protected bonds called TIPS (treasury inflation protected securities). Yields on these 10 year notes are shown in Figure 1. Also shown there are similar term regular bonds and the difference. Notice that the bounce in the yields on TIPS is much more damped than on regular bonds. Moreover, the variance of the yield on the difference between regular yields and TIPS yields is the largest. This implication is that inflation is the biggest component of variance in the yield on government bonds.

The yield on TIPS has moved some. Over the period of mid 1997 through mid 1999 it moved from 3.3% to around 4 percent. There is some risk even in inflation protected U.S. government bonds. The default risk is de minimus. However, there is variance due to changes in the real discount rate and in supply and demand of this security as the default security for flight away from risk as was experienced during the period of the Russian bond crisis.

Figure 1



The important point is that the real risk free rate is embedded in the yield on TIPS. That yield is currently around 4 percent, and it has not varied largely over the last two years. A reasonable implication is that the real risk free rate both historically and looking forward is somewhere around 4 percent. This conclusion is speculative but not wild-eyed. Looking back at the historical return on government bonds, it hard to explain negative returns except on the basis of inflation that was unexpected or, worse, unprotectable. If it was just unexpected, then possibly the 2.5 percent realized return over the last 75 years was the expected return and the current 4 percent is unusually high. However, an alternative explanation is that inflation is a cancer against which there is not perfect protection. By this line of logic, the 4 percent we see now is the real return that was always expected from government bonds and the difference between the experience 2.5 percent and the 4 percent that is now enjoyed is theft of the most dreadful sort.

III. Examining the Components

If the market portfolio is rationally priced, then the components of the constant growth model have to add up.[3] Some possibilities are outlined in the following table:

Table 2: Possible Combinations of Equity Risk Premium and Real Growth that Satisfy the Constant Growth Formula

Today's P/E = 33

Inverse *P/E*	=	Equity Risk Premium	+	Real Risk-Free Rate	-	Real Growth Rate
3%	=	1%	+	4%	-	2%
3%	=	3%	+	4%	-	4%
3%	=	6%	+	4%	-	7%
3%	=	8%	+	4%	-	9%

Other values outside these limits are possible, but the point is that the equation has to hold. Unless the market pricing of equities is irrational, there must be a balance between the equity risk premium and the expected real growth of earnings given the current real risk-free rate.

On one hand it may be the case that the expected rate of real growth in the economy is unchanged since 1994. The real growth rate that we were experiencing in 1994 of around 2 percent was a value that had maintained for most of the post WWII period. Arguably, this is a long-run constant. If the expected real growth in the economy today is 2 percent, it implies that the equity risk premium has fallen from the historical average since 1926 of around 8 percent to 1 percent today. On the other hand, if the equity risk premium is unchanged from its historical level, then it would take a real growth rate of 9 percent to validate the current price-earnings ratio.

Possibly the historical equity risk premium is overstated because the real discount rate has been undervalued due to inflation. One way to calculate the equity risk premium is to take the historical market return and subtract the current real government bond rate. This gives an equity risk premium of around 6 percent. Still, a 6 percent equity risk premium requires a real growth rate of 7 percent to justify the current value of the market relative to forecast earnings.

Real growth rates of 9 percent or even 7 percent are almost out of the question,[4] but it is possible that real growth has increased. Say that it is now 4 percent. FED Chairman Greenspan suggested that it might be this high in a recent speech. This would mean that the equity risk premium has fallen to 3 percent.

[3] At least on average. The price earnings ratio can vary over time due to stochastic variation in the timing of cash flows. *P/E* is simply a snapshot that captures the current price of assets and the near-term level of earnings.
[4] To put 9 percent growth in perspective, a middle-class family earning $50,000 today would be making more than $600,000 in real terms in a generation.

III. What does it mean?

Does it make sense that the equity risk premium may have fallen to 1 or 2 percent? Possibly. [Give some rationalizations here.]

Does it make sense that the real growth rate in the economy has increased to 7 percent? This is very unlikely. Real growth of this magnitude has only been experienced a few times in the history of mankind. […MORE Here]

However, it is somewhat more likely that the real rate of growth can be expected to be 4 or 5 percent in the future. If this is true it is a dramatic event. It means that real incomes will double every ??? years. It implies national wealth and welfare that were the dream of the 1960s but despaired of since.

To believe this scenario, we have to ask ourselves how the real growth rate of the economy could have essentially doubled in the last five years. One possible answer links real growth to government policy especially in the arena of monetary policy. [Lower inflation and permanent inflation protection => real growth.] [Technological progress through computers.]

[Realization of these possibilities, i.e., resolution of uncertainty.]

If the real growth rate has increased some, it still means that the equity risk premium has fallen. What might account for this? (a) Reduction in inflation risk. (b) Better monitoring. (c) More secure property rights system.

The implications of any of the various scenarios are profound for society and for individual investors. For instance, if the equity risk premium has truly fallen to 1 percent, the optimal portfolio strategy has changed dramatically for retired people and people close to retirement.

[MORE]

IV. Sorting Through the Evidence

What we want to do is use the available evidence to give us a clue as to which of the possible scenarios is most likely. To this end, we hypothesize that the equity risk premium is a function of several variables. What we then do is obtain statistical estimates of the parameters describing the relation between the equity risk premium and observable factors. This gives us a forecast of the equity risk premium and then, by inference, the expected real growth rate of earnings.

Arguably, the equity risk premium is a function of many things. We suggest that it may be determined by demographics and technology; it may be a function of the real risk-free rate of interest; it is likely a function of inflation expectations; and finally, it may be a function of the fundamental level of risk in the market. We are able to obtain empirically observable proxies for many of these factors. First, let’s discuss the nature of the relations.

Demographics and Technology

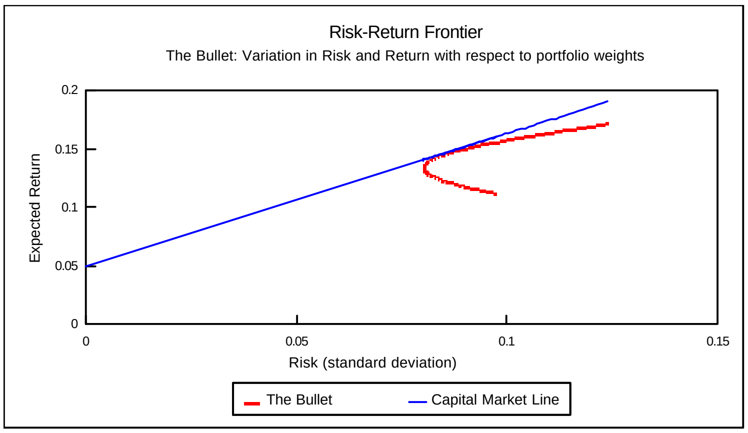
[PUT IN A DISCUSSION OF DEMOGRAPHICS AND TECHNOLOGY]

The Real Risk-Free Rate

In order to describe the relation between the equity risk premium and the risk free return, it is useful to visualize this using the simple Capital Asset Pricing Model. Figure 2 shows the standard CAPM equilibrium. The bullet-shaped curve is made up of all possible combinations of all risky assets. That is, assume that an investor holds some of each risky asset but holds them in different proportions. As the relative proportions change, the expected return and risk for the portfolio changes. The bullet is the map of all of those possible combinations.

The straight line (called "capital market line") connects the bullet at its highest point with the risk-free asset. The portfolio of any particular investor is balanced by holding more or less of the risk-free asset and the portfolio of risky assets associated with the tangency of the bullet and the capital market line. There is one optimal portfolio of risky assets; it is the one that yields the highest return relative to the risk reduction opportunity afforded by the risk-free asset. Thus, all assets are priced so that they fit into this optimal portfolio. The vertical height of this point on the bullet is the market rate of return earned by holding this portfolio of equities. The difference between this market return and the risk-free return is the equity risk premium.

Figure 2



Notice what happens as the risk-free return changes. Assume that the risk-free return falls to zero. The optimal portfolio changes as the tangency of the capital market line slides down and to the left along the bullet. The market return on the optimal portfolio falls, but not as much as the decline in the risk-free asset. This causes the gap between the market return and the risk-free return to increase. This means that the portfolio re-balancing behavior of investors described by the CAPM in a direct sense negatively relates the equity risk premium to the risk-free return.

Also, the equity risk premium may possibly be related to the risk-free return through feed-back effects. That is, changes in the risk-free return may change the shape of the bullet itself. The problem is, we do not have a clear theory about how such effects might occur and what direction their impact might be.

One problem with the CAPM, as well as other asset pricing models, is that we do not have perfect measures of the variables described in the model. For instance, there is not such thing as a portfolio of all risky assets. As a proxy, we use broad-based portfolios of large companies, such as the S&P 500. Similarly, there is no truly risk-free asset. Long term government bonds are close, but they do have some risk. Most importantly, government bonds are at risk to inflation. Empirically, this may be important because it means that changes in expectations about inflation can change the risk-free return and they are also likely to change the shape of the bullet. Hence, empirically we expect there to be a relation between the equity risk premium and the risk-free return over and above that described by the CAPM.

Fundamental Risk

[Discuss the VIX]

Inflation

V. Statistical Analysis

The empirical estimates are obtained in the following way. Daily values of the percentage change in the S&P 500 index option price are regressed on the percentage change in earnings, the change in the VIX, change in an inflation protected government bond yield, and the change in expected inflation.

The percentage change in the S&P 500 index option price is a measure of the rate of return enjoyed by holding a value-weighted portfolio of equities. The VIX is the implied variance of the S&P 100 Index Option derived using the Black-Scholes formula.[5] We use the twelve month trailing earnings for the S&P 500 firms. The new U.S. Treasury inflation protected securities (TIPS) offer a unique estimate of the real risk-free rate. There is virtually no default risk on U.S. government bonds. However, the risk of inflation does affect the value of the securities. TIPS with 10 year maturities have been issued since 1997. We follow the yield on the January 15, 2007 maturity bond. At the same time, we measure inflation expectations by taking the difference between this TIPS yield and the yield on an unprotected bond issued at around the same time.[6]

The TIPS data limit the sample used in the estimate to the period February 1997 through June 1999. However, we use longer time series on other variables for illustration and tests of robustness.

Figure 3 plots the value of the S&P 500 Index Option from 1989 through 1999 along with the trailing 12 month earnings for the S&P 500 firms. As can be seen in the graph, both the value of the index and earnings have risen over the period, though their movements are not in locked step.

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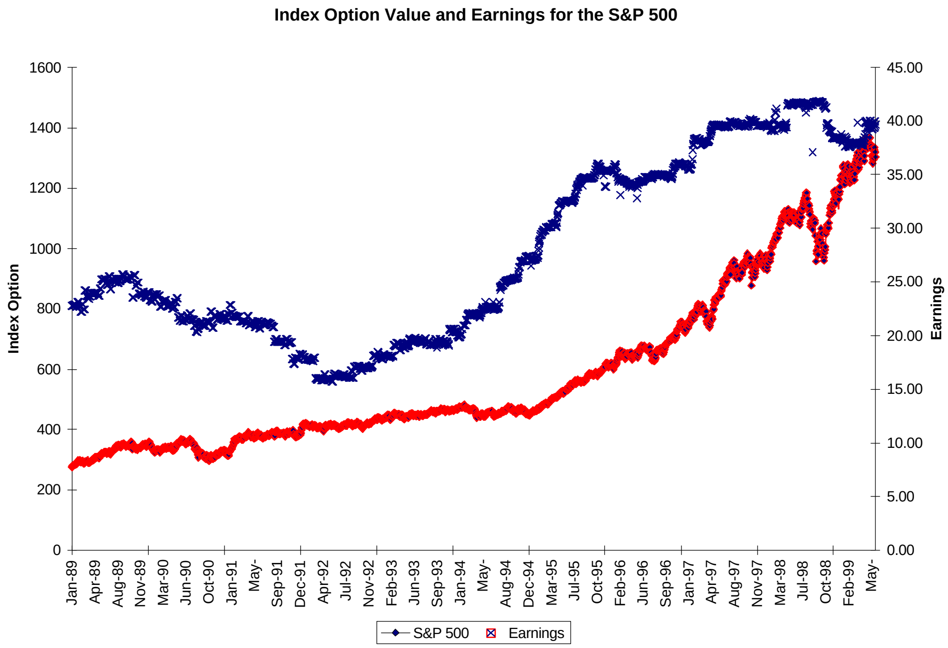
[5] The implied variances on the nearest to the money two month and four month S&P 100 index put and call are calculated. There is a high degree of correlation between the S&P 500 and 100 options.

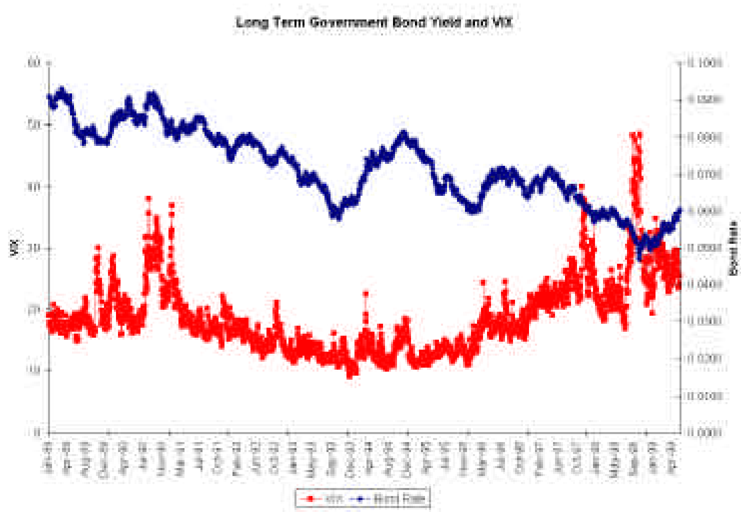
[6] The inflation unprotected security is a standard treasury 10 year bond with a February 15, 2007 maturity. The inflation protected bonds have not been on the market long enough for a constant maturity yield series to be published.

Figure 3



Similarly, Figure 4 shows the VIX and the yield on 30 year treasury bonds. The long-term government bond rate has exhibited a declining path over the sample period. On the other hand, the VIX has bounced around a good bit, but there is no obvious trend.

Figure 4



The regression results are presented in Table 3. All the right-hand side variables have the expected signs and each is highly significant. The regression was analyzed for lagging and leading effects but virtually nothing was found.[7]

Table 3: Regression Results

Dependent Variable: % Change in S&P 500 Options Index

Independent Variable	Parameter	t-stat
Intercept	.00054	4.91
% Change in Earnings	.0766	6.40
Change in VIX	-.00469	-55.80
Change in LT Govt Bond Yield	-3.170	-14.48

R^2: .597; Obs: 2561; Mean dependent var .0006

The magnitude of the coefficient on the percentage change in earnings is too small. The value is .077; this means that if earnings double, the value of the S&P increases by 7 percent. As we discussed above, the coefficient value should theoretically be somewhat larger than one. However, the measurement of earnings in our data is only weakly linked to the theory. Theoretically, stock prices reflect expected future earnings. The earnings measure that we use is the announced levels of past earnings. So it is reasonable that the fit is less than perfect. Because the variable has the correct sign and is statistically significant in explaining variation in the equity rate of return, we leave it in the regression.

The major contributor to the fit of the regression is the VIX. As the VIX increases, stock prices decline. The coefficient value says that if the VIX changes by 10 points, which is slightly less than two standard deviations, stock prices fall by around 5 percent. The VIX has varied between 9 and 48 over the last decade. It current stands at 25.

Adding the T-bond yield to the regression boost the R^2. A change in the yield on long-term government bonds by one percentage point (approximately one standard deviation) causes a 3 percent change in the S&P index. Long term yields are currently around 6 percent. They have been as low as 4.7 and as high as 9.3 during the last decade.

VI. Inferring the Equity Risk Premium and the Real Growth Rate

We now have enough information to calculate the equity risk premium as it described by equation (4). The values of the linear coefficients in equation (4) can be taken from the estimated regression. They are:

$$f_V = \frac{.0046}{P/E}$$

[7] It is a bit surprising that there were none on the earnings variable. We might expect some pre-announcement leaks. Just looking at the data, there seem to be some, but nothing turns out to be there statistically.

$$f_{r_f} = \frac{3.2}{P/E} - 1$$

Thus, the equity risk premium can be expressed in terms of an initial value and the current values of the price/earnings ratio, the VIX, and the long-term government bond rate:

$$r_p = r_p^0 + \frac{.0046}{P/E}V + \left(\frac{3.2}{P/E} - 1\right)r_f \qquad 1$$

Let's assume that the initial value of the equity risk premium is 7.5 percent. This was the value reported by Ibbotson in 1989. In this sense, we can think of equation (5) as describing the evolution of the equity risk premium since that time based on changes in the VIX and the government bond rate. From where we stand now, the P/E is around 33, the VIX is around 25, and the long-term government bond rate is around 6 percent. Based on these numbers, the current value of the equity risk premium is 2.4 percent.

Similarly, we can solve for the growth rate of earnings that is implied by the price/earnings ratio that we observe today. Substituting equation (5) into the constant growth model gives:

$$\frac{P}{E} = \frac{1}{r_p^0 + \frac{.0046}{P/E}V + \frac{3.2}{P/E}r_f - g}$$

Rewriting, we solve for *g*:

$$g = r_p^0 + \frac{1}{P/E} \cdot (.0046 \cdot V + 3.2 \cdot r_f - 1) \qquad 2$$

Again using 7.5 for the initial value of the equity risk premium, and given the current P/E of 33, the VIX of 25, and the long-term government bond rate of 6 percent, the implied growth rate in future earnings is 5.4 percent.

V. Conclusions

Our conclusion is that the equity risk premium has declined rather dramatically over the last decade. This is not a new idea; other researchers have said much the same. However, we add some new insight by linking changes in the equity risk premium to changes in the risk free return and a measure of the fundamental risk of equities. Based on these relations and on the levels of the risk free return and the fundamental risk, we peg the equity risk premium at 2.5 percent. We also calculate the expected growth in earnings. We find that this value is 5.4 percent.

These implied value of the equity risk premium is substantially different from its long-term estimated value. However, this is the value necessary to rationalize the current state of the economy. The empirical estimates account for the market's estimate of the underlying riskiness of equity returns and the relationship between this equity risk-return tradeoff and the risk-free return. Assuming that the market is rationally pricing assets as measured in the observed price/earnings ratio, the run-up in value during the 1990s implies that the return to equity over government bonds will be markedly lower in the future.

APPENDIX A: The Empirical Dimensions of the Constant Growth Formula

In order to make the constant growth model empirically useful, we take the natural logs of formula. The change in a natural log is the percentage change in the level of the variable. In logs, the constant growth formula is:

$$\ln P = \ln E - \ln(r_p + r_f - g)$$

which says that the market rate of return is a function of these various factors. Embodied in this are the relations between the equity risk premium and its determinants. This can summarized in the following formula:

$$r_p = f(V, r_f, I, D)$$

where V is level of fundamental risk in the market as measured by the VIX, r_f is the real risk-free rate, I stands for inflation expectations, and D is the dividend payout (?) rate, which captures the level of technological progress.

Taking derivatives with respect to the variables of interest gives:

$$\frac{\partial \ln P}{\partial \ln E} = 1 + \frac{g'(E) \cdot E}{r_p + r_f - g} \qquad 3$$

$$\frac{\partial \ln P}{\partial r_f} = -\frac{1 + f_{r_f}}{r_p + r_f - g} \qquad 4$$

$$\frac{\partial \ln P}{\partial V} = -\frac{f_V}{r_p + r_f - g} \qquad 5$$

$$\frac{\partial \ln P}{\partial I} = -\frac{f_I}{r_p + r_f - g} \qquad 6$$

$$\frac{\partial \ln P}{\partial D} = -\frac{f_D}{r_p + r_f - g} \qquad 7$$

Equations (1)-(3) are important because they can be estimated statistically. The left-hand side terms are found by regressing the percentage change in the S&P 500 index on the percentage change in earnings, the change in the inflation-protected, long-term government bond rate, expected inflation, the change in the VIX, and the change in the dividend payout rate.

Table 1: Returns on the Market and on Bonds

Date	Market Capitalization	Market Return	20 yr. U.S. Treasury Bond Yield	Difference	*Bond Value*
1926	30,890,430		9.3%		30,890,430
1927	42,438,935	37.4%	11.0%	26.4%	34,297,645
1928	58,242,776	37.2%	1.0%	36.2%	34,654,340
1929	54,734,181	-6.0%	3.2%	-9.2%	35,766,744
1930	40,937,013	-25.2%	10.7%	-35.9%	39,586,633
1931	21,402,095	-47.7%	4.2%	-51.9%	41,249,271
1932	18,319,955	-14.4%	27.1%	-41.5%	52,444,323
1933	27,951,912	52.6%	-0.6%	53.2%	52,140,146
1934	28,543,718	2.1%	8.0%	-5.9%	56,306,144
1935	40,068,270	40.4%	2.0%	38.4%	57,432,267
1936	51,821,784	29.3%	6.3%	23.0%	61,044,757
1937	32,521,123	-37.2%	-2.9%	-34.4%	59,286,668
1938	40,459,837	24.4%	8.3%	16.1%	64,201,532
1939	39,575,077	-2.2%	6.4%	-8.6%	68,329,691
1940	34,892,150	-11.8%	5.3%	-17.1%	71,957,997
1941	29,786,735	-14.6%	-8.8%	-5.8%	65,632,889
1942	32,382,762	8.7%	-6.1%	14.8%	61,642,410
1943	40,175,640	24.1%	-1.1%	25.2%	60,958,179
1944	46,765,141	16.4%	0.7%	15.7%	61,384,886
1945	62,932,689	34.6%	8.5%	26.1%	66,590,325
1946	60,038,518	-4.6%	-1.8%	-2.8%	65,375,051
1947	60,541,757	0.8%	-11.6%	12.5%	57,765,395
1948	59,042,206	-2.5%	0.7%	-3.1%	58,152,423
1949	68,229,662	15.6%	8.3%	7.3%	62,949,998
1950	85,545,411	25.4%	-5.7%	31.1%	59,336,668
1951	101,484,588	18.6%	-9.8%	28.4%	53,515,741
1952	111,983,709	10.3%	0.3%	10.1%	53,660,234
1953	108,982,538	-2.7%	3.0%	-5.7%	55,264,675
1954	160,308,567	47.1%	7.7%	39.4%	59,509,002
1955	198,019,579	23.5%	-1.6%	25.2%	58,533,054
1956	213,994,345	8.1%	-8.4%	16.5%	53,592,864
1957	189,606,470	-11.4%	4.5%	-15.8%	55,977,747
1958	270,449,313	42.6%	-7.9%	50.5%	51,566,700
1959	302,952,614	12.0%	-3.8%	15.8%	49,612,322
1960	302,275,967	-0.2%	12.3%	-12.5%	55,719,599
1961	382,066,947	26.4%	0.3%	26.1%	55,881,186
1962	360,100,672	-5.7%	5.7%	-11.4%	59,049,649
1963	424,542,908	17.9%	-0.5%	18.3%	58,783,926
1964	490,073,261	15.4%	2.3%	13.1%	60,135,956
1965	552,584,479	12.8%	-1.2%	14.0%	59,396,284
1966	495,534,760	-10.3%	0.3%	-10.6%	59,568,533
1967	628,543,380	26.8%	-12.2%	39.1%	52,283,302
1968	718,348,151	14.3%	-5.0%	19.3%	49,679,593
1969	641,083,084	-10.8%	-11.2%	0.4%	44,130,383
1970	639,893,154	-0.2%	6.6%	-6.8%	47,051,814
1971	747,511,986	16.8%	9.9%	6.9%	51,700,533

1972	1,006,944,340	34.7%	2.3%	32.5%	52,863,795
1973	806,132,137	-19.9%	-9.9%	-10.1%	47,640,852
1974	551,804,658	-31.5%	-7.9%	-23.7%	43,901,045
1975	742,743,932	34.6%	2.2%	32.4%	44,858,088
1976	921,712,684	24.1%	11.9%	12.2%	50,214,144
1977	865,930,639	-6.1%	-7.4%	1.4%	46,488,254
1978	898,698,285	3.8%	-10.2%	14.0%	41,741,804
1979	1,068,109,110	18.9%	-14.5%	33.4%	35,676,720
1980	1,384,989,900	29.7%	-16.4%	46.0%	29,836,441
1981	1,288,033,000	-7.0%	-7.1%	0.1%	27,724,021
1982	1,470,731,480	14.2%	36.5%	-22.3%	37,843,288
1983	1,821,720,270	23.9%	-3.1%	27.0%	36,666,362
1984	1,757,939,460	-3.5%	11.5%	-15.0%	40,890,327
1985	2,195,913,930	24.9%	27.2%	-2.3%	52,008,406
1986	2,467,298,670	12.4%	23.3%	-11.0%	64,131,566
1987	2,467,791,890	0.0%	-7.1%	7.1%	59,571,812
1988	2,702,044,800	9.5%	5.3%	4.2%	62,705,289
1989	3,290,804,640	21.8%	13.5%	8.3%	71,145,421
1990	2,970,824,350	-9.7%	0.1%	-9.8%	71,216,566
1991	3,982,063,190	34.0%	16.2%	17.8%	82,746,528
1992	4,375,078,670	9.9%	6.4%	3.5%	88,025,757
1993	5,020,231,210	14.7%	15.5%	-0.7%	101,660,947
1994	4,964,997,930	-1.1%	-10.5%	9.3%	91,037,378
1995	6,732,165,350	35.6%	29.0%	6.6%	117,438,217
1996	8,237,516,060	22.4%	-4.3%	26.6%	112,447,093
1997	10,699,532,000	29.9%	14.2%	15.7%	128,380,846
1998	13,175,870,700	23.1%			
	Average	10.8%	2.5%	8.1%	
	Std Dev	20%	11%	22%	

Equity Risk Premium

Average Market Return minus Average Bond Yield	**8.3%**
Average of Difference	**8.1%**