The Equity Premium

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Abstract (Summary)
Investors require additional expected returns for bearing costs and risks. The equity premium is the compensation investors require for bearing the additional costs and risks of equity investment compared with government bonds (or cash). In this framework, the equity premium is constructed by assembling the premiums paid for each source of cost and risk. The results appeal to intuition and are closer to theoretical expectations than historical equity and bond return comparisons. [PUBLICATION ABSTRACT]

Full Text (2957 words)

[Headnote]
What level should investors require?

The equity premium relates required returns for equities to returns for cash and bonds. The equity premium is the compensation investors require for bearing the additional costs and risks of equity investment.

Understanding the equity premium is largely a matter of using clear terms. Arnott in "Proceedings" [2002] suggests equity risk premium for the forward-looking expected or required returns and equity excess return for historical performance numbers. It is also useful to refer to the total equity premium, which is the compensation investors require for risk and for non-risk items such as term structure expectations, trading costs, and taxes.

There is a substantial literature on the equity premium. Kocherlakota [1996], Cornell [1999], "Proceedings of Equity Risk Premium Forum" [2002], and Ilmanen [2003] provide excellent reviews with comprehensive references.

Mehra and Prescott [1985] demonstrate theoretically that under standard finance models the equity risk premium should be very low: "The largest premium obtainable with the Model is 0.35%, which is not close to the observed value" (p. 156). Observing that equities had outperformed cash by some 6 percentage points per year over a period of almost 90 years, Mehra and Prescott realized there is a puzzle.

The risk premium is all about expectations and requirements. If assets return their expected rates, there is little dispersion among them. Actual historical returns vary enormously because historical returns also predominantly reflect surprises (departures from, or changes in, expectations.) It is therefore extremely difficult to infer a risk premium from historical returns.

The great 20th century surprise was inflation. In the 19th century, there was no inflation, while the 20th century saw an inflation explosion. Much of the 20th century equity-bond return difference is the effect of unanticipated inflation on cash and bond performance. Wilkie [1995], Arnott and Bernstein [2002], and Hunt and Hoisington [2003] discuss inflation further.

COMPARING REQUIRED RETURNS ACROSS ASSET CLASSES

We develop an intuitive framework for construction of the total equity premium, piece by piece. We do not use historical returns or valuation indicators to assess the equity risk premium, but rather assess how high it j/zowM be, using information from other asset classes whose premiums are arguably more transparent. The approach is neither rigorous nor unique.

As a starting point, equities, bonds, and cash have one important general characteristic in common: Each provides a stream of income over time. For any income-producing asset, we can calculate a fair value by discounting the future expected cash flows at an appropriate rate-one that takes into account all relevant information: credit rating of the issuer, interest rate risk (or duration), discretionary variability of dividend income, trading, and tax costs.

Taking into account the full set of characteristics that investors would use to compare assets leads to a straightforward framework of analysis, illustrated in Exhibit 1. Note that discount rates and required rates of return are the same thing; the price now is the future value discounted back, while the future value is the price now plus its appreciation at the required rate. Required return is a natural characterization of how investors compare assets.

Cash is considered the risk-free asset, and its required return R^sub 0^ is known. The required return on fowg government bonds, over the shorter time horizon, is denoted R^sub L^. This is not the same as the long yield Y^sub L^ because the yield curve reflects expectations about interest rates in later periods as well as an interest rate risk premium.

For the long rate:

R^sub L^ = R^sub 0^, + fn[Duration(Bonds)l (1)

For long corporate bonds, the required return RH differs from the government bond rate solely because of issuer risk (normally expressed as a function of credit rating) . Smithers and Wright [2000] note that issuer differences can be used to refine risk premium measurements (although they do not pursue this). Corporate bonds are included to provide a yardstick for the issuer risk premium:

R^sub B^ = R^sub 0^ + fn[Duration(Bonds)] + fn[Issuer(Bonds)] (2)

The required return for equities, R^sub E^, differs from the long corporate rate because of additional uncertainty in the payout, additional duration, and additional costs. There is no term for price volatility. In the discounted income valuation, a change in the value of equities is either a change in the expected income stream or a change in the discount rate, and the framework includes both these terms:

R^sub E^ = R^sub 0^ + fn[Duration(Equity)] + fn[Issuer(Equity)] + fn(Income Risk) + fn(Tax)+ fn(Trading Costs) (3)

Putting these pieces together, we can construct the equity premium by measuring and extrapolating the duration premium from the yield curve, providing the details for Equation (1); inferring an appropriate issuer premium from corporate bond data [Equation (2)]; calculating tax and trading costs from known rates; and measuring the effect of income volatility in cross-sectional studies of equities, for Equation (3).

ASSIGNING REQUIRED RETURNS TO ASSET CHARACTERISTICS

We use the framework in Exhibit 1 to assign required returns to the various asset characteristics.

Term Structure and Interest Rate Risk

Required returns cannot be taken directly from the yield curve, which shows return expectations over lengthening time horizons. Here we need to compare required returns for different assets over the same time horizon.

Over the longer term, the average yield curve shape should reflect expected interest rate changes split evenly between rises and falls. The yield curve shape is then a measure of the interest rate risk premium. For equities, we must include interest rate risk over and above long bonds.

The going concern equity duration is the reciprocal of the dividend yield, a result implied by the Gordon [1962] model. At a typical U.S. equity market yield of 4%, duration is 25 years. We use this figure to capture the essential property that growth of equity income over time makes equities more interest rate-sensitive than bonds. The duration figure may be model-dependent and may shorten because of buy-backs.

The data in Exhibit 2 show that ten-year bonds have had an average premium of 1.6 percentage points per year over cash. The equity interest rate risk premium is estimated by fitting the yield curve (an exponential shape fits well) and extrapolating it to the equity time horizon (Exhibit 3). The best estimate for the additional annual equity premium is about 3 to 4 percentage points, the error attributable to analysis of the time series volatility of the yield curve slope.

The high differential between long-term and short rates as of December 2002 surely reflects expectations, since the cash rate of 1.2 percentage point is very low relative to its history. To isolate expectations, it is reasonable to assume there is no further interest rate forecasting beyond five years (the yield curve may continue to slope upward as it is the mean value or integral of the forward short rate curve). The choice of five years for the limit of interest rate forecasting is not precise, so we include an error term for this.

According to the best fit, the ten-year yield is explained by term structure alone. This attribution has an indicative error of 0.3%, the interest rate risk premium on the next-higher maturity. Extrapolating to the long duration limit for the currently low equity yield (the analysis is not sensitive to the long duration number) gives an additional interest rate risk premium for equities of 0.8%. The additional equity premium has an error of 1.0%, reflecting the difficulty (and the model-dependence) of separating term structure and interest rate risk in this case.

Issuer Risk

Equities are issued by corporations, and corporations have a risk of default. The total equity premium and the equity risk premium must therefore include some compensation for issuer risk. Issuer risk is readily measurable in the bond markets. We use gross redemption yields on Lehman Corporate Aggregate bond indexes for four credit rating classes of U.S. corporate bonds (AAA, AA, A, BAA) as well as a government bond series (Exhibit 4).

Issuer risk must be aggregated over all companies in the equity market. While not all listed equities have credit-rated debt, it is possible to make reasonable estimates. Equities rank below debt, and companies can cut dividends more readily than they can suspend bond repayments. The larger companies that dominate the equity indexes in capitalization terms are typically rated A or AA. These considerations suggest an average rating of between A and BAA and, for an indicative range for errors, AA to BAA.

Transaction costs are higher for corporate bonds than governments, and an estimated liquidity premium for corporate bonds of 0.5% has been subtracted from yield spreads. Using a series from January 1973, the issuer risk premium is estimated at around 0.9% ± 0.4%. As of the end of 2002, similar analysis produces an estimated issuer premium of 1.4% ± 0.8%.

For an alternative approach that estimates premiums directly using option-based models, see Cooper and Davydenko [2003].

Income Risk

Equities have income risk that government bonds and T-bills do not have, in the sense that dividend payments are not fixed or contractual. This element of unpredictability should require an additional premium in required return. If this income volatility requires additional return, then the more volatile the income, the greater the required return.

The cross-sectional relationship between income volatility and required return may be isolated by grouping equities according to income volatility. From all S&P 500 constituents, over the period January 1960-January 2003, we select companies with a known market value and a dividend record. The five-year dividend volatility is evaluated from quarterly data for each company each year, and companies are assigned to slots of zero to 4% annual dividend volatility, over 4% to under 8%, and so on.

Average dividend yields for these volatility groups are calculated over the entire period. Here, incremental dividend yield is used as a proxy for an incremental discount rate; the steady-state discount rate is dividend yield plus long-term growth, and it is reasonable to assume over so many company-years that average expected growth would not be a function of historical dividend volatility.

Dividend yields are flat to slightly negative across these groups, implying that there is no additional premium for additional volatility (see Exhibits 5 and 6). Running the analysis as of the end of 2002 yields similar results.

This result suggests that investors in equities are not sensitive to dividend variability, and that there should be no additional premium required for the equity market over cash. Variations of the methodology indicate that the result is not explained by the variation of average market yield over the period, or by historical earnings growth, or by recent buybacks. Price volatility gives an even more negative slope. These results are supported by a similar study in the U.K.

Note that we have treated dividend variability and issuer risk separately for convenience. Part of income uncertainty is priced in issuer risk, but since equity income is discretionary and equity ranks below debt, a firm's shares carry more income risk than its corporate bonds.

Transaction Costs

Equities cost significantly more to trade than government bonds. One would expect the rational investor to price securities on the basis of after-cost returns. It is more realistic, however, to look at actual investor holding periods to calculate an appropriate liquidity premium.

Jones [2002] gives a highly informative account of U.S. equity trading volumes and costs over the 20th century. Jones's detailed analysis produces an estimated premium effect of 50 basis points per year, which we use for the long-term adjustment.

For end-2002 costs, we take a simpler approach. Consider a trading time horizon, which is the time it takes for the dollar value of trading in the market to equal the total market capitalization. The liquidity premium is the average round-trip cost taken over the trading time horizon. Using recent trading times (under a year) with current commissions and spreads produces a current U.S. equity liquidity premium of 20 ± 20 basis points.

Tax Costs

Investors should demand a higher return rate from securities that are more highly taxed, because realized net-of-tax returns are what investors actually receive. Government issues are not treated specially in the U.S. In the U.K., for example, government bonds are offered with tax advantages over equities, so in the general case a tax cost term is required.

Assembling the Risk Premium

Estimates of the total equity premium and the equity risk premium are summarized in detail in Exhibit 7. On average, equities should have offered a total premium over government bonds of 1.7% ± 0.6% and a risk premium of 1.2% ± 0.6%.

These results appeal to intuition and are consistent with an increasingly accepted view that the true risk premium is considerably lower than the historical return differential (see, for example, a thorough review in Ilmanen [2003]). We have already shown why historical returns give unreliable results.

The December 2002 total premium is 2.6% ± 1.3% over bonds, reflecting mainly additional issuer risk. The result is very interesting. It means a higher return is required if equities are to be fairly valued against bonds. This premium taken over current long government bond rates of 4.8% gives a total required return over the ten years of 7.4%.

The required long-term growth (with a yield of 1.8% and using the Gordon model again) is 5.6%. In current conditions (a bear market, an economy facing difficulties, and very low inflation), this outcome seems implausible. The analysis quite strongly suggests that the U.S. equity market remained overvalued at the end of 2002.

ESTIMATING THE MEHRA AND PRESCOTT THEORETICAL PREMIUM

Mehra and Prescott's [1985] theory shows how a premium is required for assets that offer uncertain delivery of marginal utility. In terms of securities, this relates both to the volatility of returns and to the timing (in simple terms, the same payment is more valuable in bad times than in good). Measurements or estimates of this premium require us to identify and price only the corresponding characteristics.

An important question arises as to whether issuer risk is part of the theoretical risk premium. Over the very short term (the time horizon for the theoretical risk premium), we would not expect default to be a significant risk other than for already distressed, very low-grade issuers. Equity default is certainly rare (or, at least, it has been). If the Mehra and Prescott theoretical result is strictly a short-term only result, issuer risk should not be included in the premium estimate, which would then be low.

FURTHER WORK

It would be most interesting to explore a framework with a long time horizon and to include the impact of inflation. High and unexpected 20th century inflation explains much of the low real return to cash and bonds. In a real and long-term framework, cash and bonds would be seen as more risky and equities less so, so a smaller risk premium would very probably result.

The analysis here also raises interesting questions of how each premium component should be priced, in theory. In other words, is there a theoretically correct interest rate risk premium, a correct issuer premium, and so on? Mehra [2003] looks at pricing influences including costs and taxes, making modifications to the theory rather than to the measurements.

Refining both the theory and the measurement for each risk premium component will be an interesting task. In other words, our work raises as many new issues as it solves, and it will continue to be interesting to see the subject evolve.

SUMMARY

We have described a procedure for constructing the equity premium by assembling premiums paid for each source of cost and risk. According to historical average data, equities should offer a total premium over government bonds of 1.7% ± 0.6% and a risk premium of 1.2% ± 0.6%.

Investors do not all have the same time horizon and the same inflation risks. For long-term real investors, equities are the natural home, and it does seem that equity buyers accept short-term volatility as part of the package. These results appeal to intuition and are closer to theoretical expectations than historical equity and bond return comparisons.

ENDNOTE

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