The Equity Premium: Estimates and Forecasts*

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ABSTRACT

This study uses a nonparametric block bootstrap method to develop more accurate estimates of U.S. equity premiums than are available from the limited historical data. The results show a substantial decline in equity premiums in the last four decades. The estimated equity premiums are 5.05% over Treasury bills for calculating the cost of equity, 3.63% over intermediate-term government bonds for medium-term wealth projections and asset allocations, and 2.99% over long-term government bonds for long-term wealth projections and asset allocations. Single moving averages, calculated over increasing periods, generally provide the most accurate forecasts of the equity premiums. The forecast premiums are not significantly different from the realized equity premiums in the forecast periods. Expected equity premiums, estimated by setting negative forecasts equal to zero, have means and Sharpe ratios that are closer to realized numbers than those based on unadjusted forecasts, and lower standard errors than the realized premiums. The major contributions of this paper are the new methods presented to develop fairly accurate estimates and forecasts of equity premiums for different horizons. The findings are consistent with several other studies and serve to strengthen the earlier evidence of time-varying equity premiums, which have recently been lower than in earlier decades.

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The equity premium is a critical input in capital budgeting, asset allocation, and wealth projection. Since Mehra and Prescott (1985) argued that the historical U.S. equity premium was unreasonably high, researchers have used diverse approaches to explain and estimate the equity premium. Mayfield (2004, p. 466), however, noted that "although a substantial body of research shows that expected returns vary over time, the static approach of estimating the risk premium as the simple average of historical excess stock returns remains the most commonly employed method in practice." As Black (1993) pointed out, the key issue is estimating expected return, not explaining historical returns, and accurate estimates of expected return require a long enough period that the expected return will not change. This study uses a nonparametric block bootstrap method to develop more accurate estimates of annual, 5-year, and 10-year equity premiums than are available from the limited historical data. In addition, forecasting methods are employed to generate optimum forecast and expected equity premiums, which are tested against realized premiums in the forecast periods. The research objectives are to develop accurate estimates and forecasts of equity premiums.

I. Literature Review

Mehra and Prescott (1985) observed that, in view of the low correlation between stock returns and important risks, such as consumption, faced by investors, the large historical U.S. equity premium of about 6% between 1889 and 1978 implied an implausibly high risk-aversion coefficient of 30 to 40. Based on the historical volatility and covariance of stocks and bonds, the authors estimated that assuming reasonable risk aversion for the average investor suggested a maximum equity premium of 0.35%. Challenged by this apparent anomaly, researchers have offered diverse solutions to the equity premium puzzle.

Some studies have taken a theoretical approach. Abel (1990) showed that a utility function where current consumption is compared to the consumption level of others (keeping up with the Joneses) could explain the equity premium with a risk aversion coefficient of 6. Mankiw and Zeldes (1991) pointed out that excluding pension funds, only one-quarter of individuals hold stocks, and considering that the consumption of stockholders is three times more sensitive to stock market volatility than the total population, the coefficient of risk aversion required to explain the equity premium puzzle drops to 10. Constantinides, Donaldson, and Mehra (2002) argued that the equity premium is determined by older investors, who are more risk-averse than younger investors due to their shorter investment horizon, and suggested that the premium would be lower if younger investors had sufficient liquidity to invest in equity.

Other researchers have investigated the equity premium empirically in different periods and countries. Blanchard (1993) estimated that the U.S. equity premium had fallen to 2% to 3% by the early 1990s due to a decline in expected real returns on stocks and a rise in expected real risk-free rates. Siegel (1998) reported that the U.S. equity premium was 4% over a longer period, from 1802 through 1997. Dimson, Marsh and Staunton (2002a) showed that, while the U.S. equity premium has been above average, one-third of sixteen countries studied provided higher equity premiums than the U.S. over a 102-year period.

Several explanations have been offered for the high equity premium observed in the U.S. in recent decades. Reitz (1988) suggested that the high equity premium might reflect investor concern about a small chance of large losses due to an economic catastrophe. Fama (1991) pointed out that a large equity premium, implying that investors are highly risk-averse to small negative consumption shocks, is consistent with “the perception that consumers live in morbid fear of recessions (p. 1596).” Dimson, Marsh and Staunton (2002) cited three reasons for the large equity premiums in the second half of the twentieth century: unexpected economic growth exceeding the expectations of U.S. investors, declining required rate of return due to reduction of business and investment risk, and lower transaction and monitoring costs. Siegel (2005) showed that real returns on stocks have been fairly stable, varying by less than 1 percentage point (pp) during three subperiods from 1802 through 2004, but real returns on bonds and bills have fallen by more than 2 pps and 4 pps, respectively, between the first and last subperiods, resulting in a widening of the equity premium.[1]

Some researchers have investigated explanatory factors for the equity premium. Fama and French (1989) showed that the expected excess returns on stocks and corporate bonds move together, and three variables forecast both stock and bond returns: dividend yield, default spread, and term spread. This indicates a predictable variation in expected returns, which are negatively related to business conditions. Mayfield (2004) examined the relationship between the market risk premium and shifts

[1]The author indicated that the spread between long and short rates increased due to the rise in long rates owing to a higher inflation premium on long-term bonds after World War II and the fall in short rates due to increased liquidity of T-bills.

in investment opportunities, indicated by changes in market volatility, and showed that more than half of the historical average excess market return is related to the risk of future changes in investment opportunities. He also found evidence of a structural shift in market volatility and concluded that the realized market excess return may substantially overstate the market risk premium after the 1930s. Correcting for the potential bias in ex post returns, he estimated the market risk premium after 1940 at 5.6%. Kyriacou, Madsen, and Mase (2006) showed that the equity premium has been significantly positively related to the inflation rate over 132 years, and this has produced a substantially larger premium after 1914. They estimated that about 2 pps of the estimated equity premium is due to inflation over the estimation period. Their results indicated that much of the equity premium could be attributed to the relatively poor performance of bonds during high inflation periods, implying that bonds have provided less effective hedging against inflation than stocks. The authors identified a clear break in the relative performance of stocks and bonds around 1914, when the gold standard partially collapsed.

Several studies have attempted to explain or estimate projected equity premiums based on fundamental variables and forecasts. Reichenstein and Rich (1993) found that the market risk premium estimated directly from Value Line forecasts of dividends and capital gains explains about 30% of the variation in continuously compounded excess returns on the S&P 500 over periods of six quarters during 1968-90. They also showed that the estimated market risk premium has a more consistent relationship with stock returns than the dividend yield or earnings/price ratio does. A survey of 226 financial economists by Welch (2000) revealed consensus forecasts of arithmetic annual equity premiums of 6% to 7% for 1 and 5 years, and 7% over 10 and 30 years. Claus and Thomas (2001) estimated the equity premium from the discount rate that equates market valuations with expectations of future flows and found that, for each year between 1985 and 1998, the equity premium over the 10-year risk-free rate is about 3% or less in the U.S. and five other large stock markets. Dimson, Marsh and Staunton (2002) adjusted the historical U.S. equity premium for the effects of unexpected cash flows and decline in the required risk premium, and estimated the prospective arithmetic risk premium at 5.3%. Arnott and Bernstein (2002) estimated the projected U.S. equity premium over bonds since 1802 and suggested that real returns on both stocks and bonds will be 2% to 4%, implying no equity premium. Fama and French (2002) reported that, while the realized annual equity premium increased from 4.40% during 1872-1950 to 7.43% in 1951-2000, the expected equity premium, estimated with the dividend growth model, declined from 4.17% to 2.55% between these periods. The authors concluded that the expected and realized equity premiums have diverged after 1950 and attributed the high equity return from 1951 to lower discount rates, which resulted in large unexpected capital gains. They indicated that the lower estimated equity premiums for 1951-2000 based on fundamental models are closer to the expected premium because the estimates are more precise, their Sharpe ratios are more stable, and their relations with the book/market ratio and return on investment are more consistent with valuation theory.

Goyal and Welch (2008) reexamined the performance of variables that have been found to have predictive power in linear regressions of the equity premium: dividend-price ratios, dividend yields, earnings-price ratios, dividend payout ratios, corporate or net issuing ratios, book-market ratios, beta premiums, interest rates, and consumption-based macroeconomic ratios. They concluded that the prediction models are unstable and have failed, both in-sample and out-of-sample, over the last 30 years.

The literature review indicates that the diverse methods employed by researchers to estimate or forecast the equity premium with data from different sources and periods have yielded a wide range of results. Studies that find similar results with different methods and data can strengthen the evidence of equity premium estimates and forecasts. This study uses new methods and a different data source to develop estimates and forecasts of equity premiums over different investment horizons.

II. Data and Methodology

Annual equity premiums based on historical returns are extremely volatile and often negative because they reflect both pleasant and unpleasant surprises, so they cannot accurately indicate expected risk premiums. Multi-year risk premiums are less noisy estimates of expected premiums because positive and negative surprises partly offset each other over long periods.[2] Long-term stock returns have a predictable component due to mean reversion, which reduces the variability of returns and enhances the risk-return tradeoffs of stocks for long-term investors. Fama and French (1988) reported that autocorrelations turn negative for two-year stock returns, are most negative for 3- to 5-year returns, and return toward zero for 6- to 10-year returns. They interpreted this pattern as a slowly decaying stationary component in stock prices. Poterba and Summers (1988) also found evidence of transitory components in stock prices, with positive autocorrelation

[2]Dimson, Marsh and Staunton (2002) showed that historical risk premiums over rolling ten-year periods are smoother than annual premiums.

in short periods and negative autocorrelation in long periods. They reported negative serial correlation for both real and excess returns over long periods.

This study is based on real monthly returns. Fama and French (2002) observed that real returns are more relevant for consumption, which is the goal of investment in portfolio theory. Bali and Guirguis (2004) found a seasonal component in monthly market excess returns during 1926-2000. They reported that January has higher returns than the other months, and the returns in October are insignificant. The equity premium for short, medium, and long terms is measured relative to three different risk-free securities: Treasury bills, intermediate-term government bonds, and long-term government bonds. Treasury bills have negligible inflation risk and are not correlated with stocks. The investment horizon for stocks, however, matches long-term government bonds. Intermediate-term government bonds offer a balance between inflation and maturity risks.

Monthly returns on the following securities during 1926-2007 are obtained from Ibbotson Associates (2008) and deflated by the inflation rate to compute real returns: Treasury bills (TB) – a one-bill portfolio containing, at the beginning of each month, the bill having the shortest maturity not less than one month; intermediate-term government bonds (IGB) – a one-bond portfolio with a maturity near five years; long-term government bonds (LGB) – a one-bond portfolio with a maturity near twenty years; and large company stocks – the Standard and Poor's 500 stock composite index. Although other data series extend farther back into the past, this study focuses on the last 82 years because the data available for earlier periods are qualitatively different,[3]

[3]Stock returns available before 1926 do not include dividends.

the market index was not broadly diversified in earlier years,[4] and the equity premium was impacted by the breakdown of the gold standard in 1914.

The 984 months of available data provide only sixteen 5-year and eight 10-year non-overlapping equity premiums. Bootstrapping can reduce estimation risk when the true parameters of a distribution are unknown. Bootstraps approximate the distribution of an estimator by resampling data, using the observed distribution rather than an assumed distribution. This study uses nonparametric block bootstraps, which preserve both serial correlation and cross-sectional correlations within the blocks. The equity premiums are estimated by constructing 1,000 independent samples using a block bootstrap random sampling method with replacement[5] from the real monthly returns for 1926-2007 as well as for two subperiods: 1926-1966 and 1967-2007. For the annual equity premium, a month is randomly sampled with replacement a thousand times, the continuously compounded real monthly returns on stocks and TB are aggregated for each 12-month period starting with the sampled month, and the mean 12-month real returns on TB are subtracted from the returns on stocks. For the annual 5-year equity premium, the continuously compounded real monthly returns on stocks and IGB are summed for each 60-month period starting with the sampled month, and the annual equity premium is estimated as the difference between the mean 12-month real returns of stocks and IGB. The annual 10-year risk premium is estimated in a similar manner as the annual 5-year risk premium, except that LGB is used as the risk-free security and the mean 12-month real returns are calculated for 10-year periods.

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[4]Dimson, Marsh, and Staunton (2002a) reported that only 123 stocks were listed on the New York Stock Exchange and the railroad industry comprised 63% of total market value in 1900.

[5]Kunsch (1989) suggested using overlapping blocks for univariate time-series data.

If aggregate risk aversion is generally stable, future equity premiums should be predictable from historical equity premiums. There may be occasional structural shifts, such as the breakdown of the gold standard in 1914 and movement to a new inflation regime, but once aggregate risk aversion has adjusted to the structural shift, future equity premiums should stabilize at the new level.

To minimize forecast error, the equity premiums are forecast directly rather than forecasting stock returns and risk-free rates separately. The historical annual equity premiums over TB, IGB, and LGB, are used to develop rolling 1-year, 5-year, and 10-year forecasts, respectively, of equity premiums for the following periods, and annual means are computed for the forecast mutli-year premiums. Since historical data are not available for forecasting equity premiums for the first subperiod, equity premiums are forecast only for the second subperiod. To avoid look-ahead bias, the forecast equity premium over TB, IGB, and LGB for 1967, 1967-71, and 1967-76, respectively, are based on the historical annual equity premiums for 1926 through 1966. In each subsequent year, the historical data are expanded by one year to forecast the equity premiums starting in the following year. For the last set of forecasts, the forecast equity premium over TB for 2007 is based on the historical equity premiums for 1926 through 2006, the forecast equity premium over IGB for 2003-07 is based on the historical annual equity premiums for 1926 through 2002, and the forecast equity premium over LGB for 1998-07 is based on the historical annual equity premiums for 1926 through 1997. This method provides 41 forecasts of annual equity premiums over TB, 37 forecasts of annual 5-year equity premiums over IGB, and 32 forecasts of annual 10-year equity premiums over LGB.

Four methods are used to forecast the equity premiums: single moving average

(SMA), double moving average (DMA), single exponential smoothing (SES), and Holt's double exponential smoothing (DES). SMA and SES are appropriate for data with no trend, while DMA and DES are suitable for data with trend.

The SMA estimate for period t is:

$$SMA_t = {}_{t=1}{}^{n}\sum R_t/n \tag{1}$$

where R_t is the return in period t, and n is the total number of returns.

The DMA estimate for period t is:

$$DMA_t = 2\ SMA1_t - SMA2_t + 2\ (SMA1_t - SMA2_t)\ /\ (n - 1) \tag{2}$$

where $SMA1_t$ is the moving average of the historical return over period n, $SMA2_t$ is the moving average of the $SMA1_t$ over period n, and n is the number of periods over which the moving average is calculated.

The SES estimate for period t is:

$$SES_t = \alpha\ (r_{t-1}) + (1 - \alpha)\ SES_{t-1} \tag{3}$$

where r_{t-1} is the historical return in period t-1, and α is the smoothing constant with a value between 0 and 1.

Holt's DES estimate for period t is:

$$DES_t = \beta\ (SES_t - SES_{t-1}) + (1 - \beta)\ DES_{t-1} \tag{4}$$

where SES_t is the single exponential smoothing estimate for period t, and β is the smoothing constant with a value between 0 and 1.

The most accurate estimate of each equity premium for each period is identified by the lowest root mean squared error:

$$RMSE = ({}_{t=1}{}^{n}\sum (R_t - FR_t)^2\ /\ n)^{1/2} \tag{5}$$

where R_t is the actual return in period t, FR_t is the fitted return in period t, and n is the total number of returns.

Since expected equity premiums cannot be negative, forecast equity premiums that are negative are treated as zero in computing expected equity premiums. The magnitude and precision of the forecast and expected equity premiums are compared to realized premiums in the forecast periods based on their means, Sharpe ratios, and standard errors. T-tests for significant differences between the means of the forecast/expected and realized equity premiums are also conducted.

III. Results

A. Historical Equity Premiums

The historical data in Table I show a mean equity premium of 6.20% over TB, with a standard error of 2.13% and a Sharpe ratio of 0.32 during the study period. The mean equity premium over IGB is considerably lower, at 4.40%, but the Sharpe ratio is higher, at 0.58, due to the substantially lower standard deviation of stocks, and the standard error of 0.94% is also much lower. The mean equity premium over LGB (5.14%) is slightly higher than the premium over IGB, and the Sharpe ratio (1.02) is much higher because stocks also have a lower standard deviation of returns over the 10-year period. The long-term estimate of the equity premium is the most accurate, with the lowest standard error of 0.62%.

The subperiod analysis shows that stock returns fall and risk-free rates rise, resulting in declines in all the three equity premiums between 1926-1966 and 1967-2007. However, only the increase in the IGB and LGB returns, and the decrease in the equity premium over LGB, are statistically significant. The standard errors are uniformly lower in the second period. Since these findings are based on limited numbers of overlapping observations, bootstrapped estimates are examined next.

B. Bootstrapped Equity Premium Estimates

Compared to the historical equity premium in Table I, the bootstrapped estimate in Table II decreases from 6.20% to 5.43% for the equity premium over TB, but it increases from 4.40% to 5.21% for the equity premium over IGB, and from 5.14% to 5.29% for the equity premium over LGB, for the study period. The bootstrapped estimates, therefore, have a narrower range than the historical premiums. The standard deviation of bootstrapped stock returns in panel A is higher than the historical standard deviation, and the historical Sharpe ratio is 23% higher than the ratio based on bootstrapped returns. In panel B, however, the standard deviation of bootstrapped stock returns is similar to the historical standard deviation, and owing to the higher equity premium, the Sharpe ratio of bootstrapped returns is 17% higher than the historical ratio. In panel C, the standard deviation and Sharpe ratio of bootstrapped stock returns are similar to those of historical returns. The bootstrapped estimates of all the three equity premiums are more accurate, with standard errors ranging from 0.17% to 0.68%, compared to standard errors of 0.62% to 2.13% for the historical premiums.

The 10-year bootstrapped stock returns are significantly lower, and all the risk-free returns are significantly higher, in 1967-2007 compared to 1926-1966,[6] resulting in all the three equity premiums being significantly lower in the second subperiod. The declines in the equity premiums are mainly due to the increases in risk-free rates. The standard errors and Sharpe ratios are all lower in the second period.

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[6]Since the subperiod results are based on 1,000 independent random samples drawn from each period, the results for the full period are not averages of the subperiod results.

The Sharpe ratios of bootstrapped returns have much narrower differences between the subperiods than the historical ratios in panels A and B, and a similar difference in panel C. In Table I, the historical Sharpe ratios in the first period exceed the ratios in the second period by 0.07, 0.46, and 1.02 in panels A, B, and C, respectively. By comparison, the Sharpe ratios of bootstrapped returns in the first period exceed the ratios in the second period by 0.02, 0.22, and 1.00 in panels A, B, and C, respectively.

The lower standard errors and generally more stable Sharpe ratios indicate that the bootstrapped estimates are more accurate and reliable than the historical averages. These results indicate a substantial decline in equity premiums in the last four decades, compared to the previous four decades, consistent with the evidence of time-varying equity premiums (Fama and French, 2002). Further, the decline in equity premiums is primarily due to an increase in risk-free rates, as indicated by Blanchard (1993). In the last four decades, the estimated equity premium is 5.05% over Treasury bills for calculating the cost of equity, 3.63% over intermediate-term government bonds for medium-term wealth projections and asset allocations, and 2.99% over long-term government bonds for long-term wealth projections and asset allocations. The estimated equity premium over Treasury bills, based on continuously compounded monthly returns, is slightly lower than the consensus forecast arithmetic annual equity premium of 6% by financial economists (Welch, 2000), and the estimated equity premium over long-term government bonds is similar to the U.S. equity premium of 3.4% over the 10-year risk-free rate reported by Claus and Thomas (2001).

C. Forecast and Expected Equity Premiums

Panel A of Table III indicates that the SMA method, which is suitable for data with no trend, provides the best fit of the historical equity premiums over TB in 35 of the 41 years, including the last 32 years. The DMA method, which is appropriate for data with trend, produces the optimum forecast only in 1967, 1970-72, and 1974-75. The mean RMSE of the optimum forecasts is 16.20%. The optimal number of periods over which the equity premium is estimated varies between 9 and 37, with 33 to 37 years being used for the last 14 forecasts.

Panel B shows that the mean equity premium, Sharpe ratio, and standard error of the forecasts for the second subperiod are much lower than the historical data for the first period, indicating that the forecasts reflect the structural shift between the two periods, although the difference in mean equity premiums is not statistically significant. In Panel C, the mean forecast equity premium (FEP) of 2.60% is not significantly different from the realized equity premium (REP) of 4.57% in the forecast period. The Sharpe ratio is 0.10 higher for the REP than for the FEP.[7] The expected equity premium (EEP), which treats all negative forecasts as zero, has a mean and Sharpe ratio that are closer to the REP than the FEP does, and its standard error is also lower than the FEP's.

Table IV indicates that, for the FEP over IGB based on annual mean 5-year returns, the lowest RMSEs are for the DMA in two periods and for the SMA in 35 periods. The optimum number of periods for estimating the SMA increases from 9 to 12 in the earlier periods to a range of 32 to 37 in the last twelve periods. The overall mean RMSE of 16.45% is slightly higher than the mean RMSE for the equity premium over TB. The mean FEP of 1.84% for the second subperiod is significantly lower than the mean

[7]The historical standard deviation of stock returns is used to compute both the Sharpe ratios.

HEP of 6.20% in the first period, and not significantly different from the mean REP of 2.63% in the second period. The standard error and Sharpe ratio of the FEP are lower than those of the REP. The EEP has a much lower standard error, and a mean and Sharpe ratio that are much closer to the REP, than the FEP does.

In Table V, the DMA provides the best fit of the annual mean 10-year equity premium over LGB for 8 periods, while the SMA produces the optimum forecast in 24 periods. The optimum number of periods for estimating the SMA increases from 9 to 12 in the earlier periods to 33 in the last five periods. The overall mean RMSE of 17.03% is the highest for the three forecast equity premiums. The mean FEP of 2.08% for the second subperiod is significantly lower than the mean HEP of 7.36% in the first period and not significantly different from the REP of 2.93% in the second period. The standard error of the FEP is higher, while its Sharpe ratio is lower than that of the REP. The EEP has a mean that is much closer, as well as standard error and Sharpe ratio that are almost identical, to those of the REP.

Of the four forecasting methods used, only two methods — SMA and DMA — provide the optimum forecasts of the three equity premiums for all the periods. The SMA, estimated over increasingly long periods, generally provides the most accurate forecasts of the equity premiums, which are not significantly different from the realized premiums in the forecast periods. The expected premiums provide Sharpe ratios that are similar and standard errors that are lower than those of the realized premiums. Although all the available historical data, starting in 1926, were considered for identifying the optimum forecast of each equity premium for each period, the forecast equity premiums are much lower than the historical premiums in the first subperiod, and closer to the realized premiums in the forecast periods, indicating that the forecasting methods are picking up the structural shift in equity premiums in the second subperiod. An analysis of the number of periods used to calculate the SMA or DMA for the optimum forecasts reveals that none of them uses data before 1946, which included the Great Depression and World War II. Most of the optimum forecasts use historical data beginning in the 1950's or later because earlier data are structurally different from the later data. The range of expected annual equity premiums (2.73% to 3.41%) for periods of 1 to 10 years, based on adjusted forecast equity premiums, is similar to the forecast equity premiums of 2.55% to 4.32% by Fama and French (2002) based on dividend and earnings growth rates.

IV. Conclusions

This study uses a nonparametric block bootstrap method to develop more accurate estimates of U.S. equity premiums than are available from the limited historical data. The results show a substantial decline in equity premiums in the last four decades. The estimated equity premiums are 5.05% over Treasury bills for calculating the cost of equity, 3.63% over intermediate-term government bonds for medium-term wealth projections and asset allocations, and 2.99% over long-term government bonds for long-term wealth projections and asset allocations. Single moving averages, calculated over increasing periods, generally provide the most accurate forecasts of the equity premiums. The forecast premiums are not significantly different from the realized equity premiums in the forecast periods. Expected equity premiums, estimated by setting negative forecasts equal to zero, have means and Sharpe ratios that are closer to realized numbers than those based on unadjusted forecasts, and lower standard errors than the realized premiums. The major contributions of this paper are the new methods presented to develop fairly accurate estimates and forecasts of equity premiums for different horizons. The findings are consistent with several other studies and serve to strengthen the earlier evidence of time-varying equity premiums, which have recently been lower than in earlier decades.

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Table I
Historical Equity Premiums

				Differences Between 1967-2007 and 1926-1966		
	1926-2007	*1926-1966*	*1967-2007*	Mean	T-stat	P-value
Panel A: Annual Excess Returns on Stocks over Treasury Bills						
Stock Return (%)	6.87	7.94	5.79	-2.15	-0.50	0.6188
TB Return (%)	0.66	0.10	1.22	1.12	1.28	0.2046
Equity Premium (%)	6.20	7.84	4.57	-3.27	-0.77	0.4465
Standard Error (%)	2.13	3.50	2.44			
Std. Devn. of Stocks (%)	19.37	22.10	16.42			
Sharpe Ratio	0.32	0.35	0.28			
No. of Observations	82	41	41			
Panel B: Annual Excess Returns on Stocks over Intermediate-term Government Bonds in Overlapping 5-Year Periods						
Stock Return (%)	6.52	7.51	5.80	-1.71	-0.95	0.3451
IGB Return (%)	2.12	1.32	3.17	1.85	2.04	0.0454
Equity Premium (%)	4.40	6.20	2.62	-3.58	-1.84	0.0707
Standard Error (%)	0.94	1.61	1.09			
Std. Devn. of Stocks (%)	7.62	7.74	7.75			
Sharpe Ratio	0.58	0.80	0.34			
No. of Observations	78	37	37			
Panel C: Annual Excess Returns on Stocks over Long-term Government Bonds in Overlapping 10-Year Periods						
Stock Return (%)	7.02	8.18	6.80	-1.38	-1.11	0.2708
LGB Return (%)	1.88	0.83	3.87	3.04	3.12	0.0028
Equity Premium (%)	5.14	7.36	2.93	-4.43	-3.46	0.0013
Standard Error (%)	0.62	1.19	0.46			
Std. Devn. of Stocks (%)	5.06	4.66	5.28			
Sharpe Ratio	1.02	1.58	0.56			
No. of Observations	73	32	32			

Table II
Block Bootstrapped Equity Premium Estimates

				Differences Between 1967-2007 and 1926-1966		
Panel A: Annual Excess Returns on Stocks over Treasury Bills						
	1926-2007	*1926-1966*	*1967-2007*	Mean	T-stat	P-value
Stock Return (%)	6.21	8.11	6.44	-1.67	-1.67	0.0943
TB Return (%)	0.78	-0.47	1.39	1.86	9.22	0.0000
Equity Premium (%)	5.43	8.58	5.05	-3.53	-3.56	0.0004
Standard Error (%)	0.68	0.86	0.49			
Std. Devn. of Stocks (%)	20.98	26.81	16.57			
Sharpe Ratio	0.26	0.32	0.30			
No. of Observations	1000	1000	1000			
Panel B: Annual Excess 5-Year Returns on Stocks over Intermediate-term Government Bonds						
Stock Return (%)	7.23	7.25	6.91	-0.34	-0.95	0.3439
IGB Return (%)	2.02	1.10	3.28	2.18	11.53	0.0000
Equity Premium (%)	5.21	6.16	3.63	-2.53	-6.40	0.0000
Standard Error (%)	0.26	0.35	0.18			
Std. Devn. of Stocks (%)	7.69	8.78	7.58			
Sharpe Ratio	0.68	0.70	0.48			
No. of Observations	1000	1000	1000			
Panel C: Annual Excess 10-Year Returns on Stocks over Long-term Government Bonds						
Stock Return (%)	7.11	8.13	6.94	-1.19	-5.33	0.0000
LGB Return (%)	1.82	0.71	3.95	3.24	18.90	0.0000
Equity Premium (%)	5.29	7.42	2.99	-4.43	-19.46	0.0000
Standard Error (%)	0.17	0.21	0.08			
Std. Devn. of Stocks (%)	5.17	4.73	5.23			
Sharpe Ratio	1.02	1.57	0.57			
No. of Observations	1000	1000	1000			

Table III

Forecast, Historical, Realized, and Expected Equity Premiums over Treasury Bills

SMA = Single Moving Average. DMA = Double Moving Average. FEP = Forecast Equity Premium. HEP = Historical Equity Premium. REP = Realized Equity Premium. EEP = Expected Equity Premium.

Panel A. Summary of Forecasting Methods					
Forecast Periods	*Method*	*No. of Periods*	*Mean RMSE (%)*		
1967	DMA	11	15.79		
1968-1969	SMA	20	15.62		
1970-1972	DMA	11	15.66		
1973	SMA	20	15.38		
1974	DMA	11	15.70		
1975	DMA	9	16.60		
1976-1993	SMA	12	16.67		
1994-2001	SMA	33	15.53		
2002-2007	SMA	37	16.08		
Overall Mean			16.20		
Panel B. Differences Between FEP for 1967-2007 and HEP in 1926-1966					
	FEP	*HEP*	*FEP-HEP*	*T-stat*	*P-value*
Mean (%)	2.60	7.84	-5.24	-1.54	0.13
Standard Error (%)	0.74	3.50			
Sharpe Ratio	0.14	0.35			
No. of Observations	41	41			
Panel C. Differences Between FEP and REP in 1967-2007					
	FEP	*REP*	*FEP-REP*	*T-stat*	*P-value*
Mean (%)	2.60	4.57	-1.97	-1.30	0.20
Standard Error (%)	0.74	2.44			
Sharpe Ratio	0.14	0.24			
No. of Observations	41	41			
Panel D. Differences Between EEP and REP in 1967-2007					
	EEP	*REP*	*EEP-REP*	*T-stat*	*P-value*
Mean (%)	3.41	4.57	-1.16	-0.45	0.65
Standard Error (%)	0.49	2.44			
Sharpe Ratio	0.18	0.24			
No. of Observations	41	41			

Table IV
Forecast, Historical, Realized, and Expected Equity Premiums over Intermediate-term Government Bonds

SMA = Single Moving Average. DMA = Double Moving Average. FEP = Forecast Equity Premium. HEP = Historical Equity Premium. REP = Realized Equity Premium. EEP = Expected Equity Premium.

Panel A. Summary of Forecasting Methods			
Forecast Periods	*Method*	*No. of Periods*	*Mean RMSE (%)*
1967-71 to 1973-77	SMA	12	16.94
1974-78 to 1975-79	DMA	9	17.05
1976-80 to 1991-95	SMA	12	17.14
1992-96 to 1993-97	SMA	32	16.01
1994-98 to 1999-03	SMA	33	14.75
2000-04 to 2001-05	SMA	36	14.93
2002-06 to 2003-07	SMA	37	15.64
Overall Mean			16.45

Panel B. Differences Between FEP for 1967-2007 and HEP in 1926-1966					
	FEP	*HEP*	*FEP-HEP*	*T-stat*	*P-value*
Mean (%)	1.84	6.20	-4.36	-2.37	0.02
Standard Error (%)	0.79	1.61			
Sharpe Ratio	0.24	0.80			
No. of Observations	37	37			

Panel C. Differences Between FEP and REP in 1967-2007					
	FEP	*REP*	*FEP-REP*	*T-stat*	*P-value*
Mean (%)	1.84	2.63	-0.79	0.53	0.60
Standard Error (%)	0.79	1.09			
Sharpe Ratio	0.24	0.34			
No. of Observations	37	37			

Panel D. Differences Between EEP and REP in 1967-2007					
	EEP	*REP*	*EEP-REP*	*T-stat*	*P-value*
Mean (%)	2.73	2.63	0.10	0.08	0.93
Standard Error (%)	0.37	1.09			
Sharpe Ratio	0.36	0.34			
No. of Observations	37	37			

Table V
Forecast, Historical, Realized, and Expected Equity Premiums over Long-term Government Bonds
SMA = Single Moving Average. DMA = Double Moving Average. FEP = Forecast Equity Premium. HEP = Historical Equity Premium. REP = Realized Equity Premium. EEP = Expected Equity Premium.

Panel A. Summary of Forecasting Methods					
Forecast Periods	*Method*	*No. of Periods*	*Mean RMSE (%)*		
1967-76	DMA	9	17.57		
1968-77 to 1970-79	SMA	12	17.59		
1971-80 to 1975-84	DMA	9	17.14		
1976-85 to 1991-00	SMA	12	17.51		
1992-01	DMA	19	16.67		
1993-02	DMA	21	16.35		
1994-03 to 1998-07	SMA	33	15.16		
Overall Mean			17.03		
Panel B. Differences Between FEP for 1967-2007 and HEP in 1926-1966					
	FEP	*HEP*	*FEP-HEP*	*T-stat*	*P-value*
Mean (%)	2.08	7.36	-5.28	-3.72	0.00
Standard Error (%)	0.91	1.19			
Sharpe Ratio	0.41	1.58			
No. of Observations	32	32			
Panel C. Differences Between FEP and REP in 1967-2007					
	FEP	*REP*	*FEP-REP*	*T-stat*	*P-value*
Mean (%)	2.08	2.93	-0.85	-0.72	0.47
Standard Error (%)	0.91	0.46			
Sharpe Ratio	0.41	0.58			
No. of Observations	32	32			
Panel D. Differences Between EEP and REP in 1967-2007					
	EEP	*REP*	*EEP-REP*	*T-stat*	*P-value*
Mean (%)	3.04	2.93	0.11	0.14	0.89
Standard Error (%)	0.44	0.46			
Sharpe Ratio	0.60	0.58			
No. of Observations	32	32			