LESSONS FROM THE FINANCIAL CRISIS

CHAPTER 65

The Equity Risk Premium amid a Global Financial Crisis

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W e analyze the history of the equity risk premium from surveys of U.S. chief financial officers (CFOs) conducted every quarter from June 2000 to March 2009. The risk premium is the expected 10-year S&P 500 return relative to a 10-year U.S. Treasury bond yield. The last two surveys were conducted during the darkest parts of a global financial crisis, and our results show that the equity premium sharply increased during the crisis. The survey also provides measures of cross-sectional disagreement about the risk premium, skewness, and a measure of individual uncertainty. The level of disagreement in late 2008 and early 2009 is 64 percent higher than 2007 levels. We also present evidence on the determinants of the long-run risk premium. Our analysis suggests the level of the risk premium closely tracks both market volatility (reflected in the VIX index) as well as credit spreads.

INTRODUCTION

During any financial crises, risk increases. In the current crisis, we observed market volatility skyrocket and credit spreads explode. Presumably, crises are temporary phenomena. How does the existence of a crisis affect long-term risk premiums. While we can directly observe credit spreads and measures like a volatility index (VIX), the equity risk premium is elusive.

We provide a unique perspective on the risk premium by analyzing the results over the past 10 years of our quarterly survey of chief financial officers (CFOs). The survey is currently conducted by Duke University and *CFO* magazine. The survey closed on February 26, 2009, and measures expectations beginning in the second quarter of 2009. In particular, we poll CFOs about their long-term expected return on the S&P 500. Given the current 10-year T-bond yield, we provide estimates of the equity risk premium and show how the premium changes through time. We

also provide information on the disagreement over the risk premium as well as average confidence intervals.

METHOD

Design

The quarterly survey of CFOs was initiated in the third quarter of 1996.[1] Every quarter, Duke University polls financial officers with a short survey on important topical issues (Graham and Harvey 2009). The usual response rate for the quarterly survey is 5 to 8 percent. Starting in June of 2000, a question on expected stock market returns was added to the survey. Exhibit 65.1 summarizes the results from the risk premium question. While the survey asks for both the 1-year and 10-year expected returns, we focus on the 10-year expected returns herein, as a proxy for the market risk premium.

The executives have the job title of CFO, chief accounting officer, treasurer, assistant treasurer, controller, assistant controller, or vice president (VP), senior VP, or executive VP of finance. Given that the overwhelming majority of survey respondents hold the CFO title, for simplicity we refer to the entire group as CFOs. The survey is currently administered over the Internet.

The Premium During the Recent Crisis

The expected market return questions are a subset of a larger set of questions in the quarterly survey of CFOs. The survey usually contains between 8 and 10 questions. Some of the questions are repeated every quarter, and some change over time, depending on economic conditions. The historical surveys can be accessed at www.cfosurvey.org. During the past nine years, we have collected 11,288 responses to the survey. Panel A of Exhibit 65.1 presents the date that the survey window opened, the number of responses for each survey, and the 10-year Treasury bond rate, as well as the average and median expected excess returns. There is relatively little time variation in the risk premium. This is confirmed in Exhibit 65.2, which displays the historical risk premiums contained in Exhibit 65.1. The current premium, 4.74 percent, is the highest reading in the history of the survey. The March 2009 survey shows that the expected annual S&P 500 return is 7.49 percent, and the implied risk premium is 4.74 percent (7.49 – 2.75).[2] The expected annual S&P 500 return is roughly the same level as the year before. A major factor in the increase in the premium is the 10-year bond yield falling by more than 100 basis points.

Panel B of Exhibit 65.1 presents some summary statistics that pool all 11,288 responses. The overall average 10-year risk premium return is 3.46 percent.[3] The standard deviation is 2.67 percent.

The cross-sectional standard deviation across the individual CFO forecasts in a quarter is a measure of the disagreement of the participants in each survey. Disagreement has sharply increased during the global financial crisis. The average disagreement in 2007 averaged 2.5 percent. The most recent observation is 4.11 percent—a two-thirds increase and the highest observation on record.

We also report information on the average of the CFOs' assessments of the 1 in 10 chance that the market will exceed or fall below a certain level. In the most

recent survey, the worst-case total return is 1.27 percent, which is a record low. The best-case return is 12.40 percent, which is a record high. This reinforces the recent increase in the degree of uncertainty.

With information on the 10 percent tails, we construct a probability distribution for each respondent. We use Davidson and Cooper's (1976) method to recover each respondent's probability distribution:

$$\text{Variance} = ([x(0.90) - x(0.10)]/2.65)^2$$

where $x(0.90)$ and $x(0.10)$ represent the ninetieth and tenth percentiles of the respondent's distribution. Keefer and Bodily (1983) show that this simple approximation is the preferred method of estimating the variance of a probability distribution of random variables, given information about the tenth and ninetieth percentiles. The average of individual volatilities has also sharply increased. The average in 2007 was 3.21 percent and the current reading is 4.23 percent—another new high.

There is also a natural measure of asymmetry in each respondent's response. We look at the difference between each individual's 90 percent tail and the mean forecast and the mean minus the 10 percent tail. Hence, if the respondent's forecast of the excess return is 6 percent and the tails are –8 percent and +11 percent, then the distribution is negatively skewed with a value of –9 percent (= 5 percent – 14 percent). As with the usual measure of skewness, we cube this quantity and standardize by dividing by the cube of the individual standard deviation. In every quarter's survey, there is, on average, negative skewness in the individual forecasts. The average asymmetry became more negative at –0.47 and is currently at a record low level.

Recessions, the Financial Crisis and Risk Premiums

Our survey now spans two recessions: March 2001 to September 2001 and the recession that began in December 2007. Financial theory would suggest that risk premiums should vary with the business cycle. Premiums should be highest during recessions and lowest during recoveries. Previous research has used a variety of methods, including looking at ex post realized returns to investigate whether there is business cycle–like variation in risk premiums.

While we have only 36 observations and this limits our statistical analysis, we do see important differences. The average risk premium over the entire sample is 3.46 percent. During recessions, the risk premium is 3.97 percent and during nonrecessions, the premium falls to 3.37 percent. We also see variation in disagreement. During recessions, the disagreement among participants is 2.84 percent and during nonrecessions only 2.40 percent.

The recession that began in December 2007 is a much worse than normal recession. For example, the recession of 2001 was relatively mild and lasted only three quarters. The current recession is already double the length and includes some of the highest unemployment since World War II. Nevertheless, the risk premium is not really much different during this recession (so far) than during the 2001 recession. Over the past six quarters, the risk premium has averaged 3.88 percent. The variation in the risk premiums is displated in Exhibit 65.2.

Exhibit 65.1   Summary Statistics Based on the Responses from the 36 CFO Outlook Survey from June 2000 to February 2009

A.   By quarter

Survey Date	Survey for	Number of Survey Responses	10-year Bond Yield	Average Risk Premium	Median Risk Premium	Disagreement (standard deviation of risk premium estimates)	Average of Individual Standard Deviations	Individuals' Worst 10% Market Return Scenario	Average of Individuals' Best 10% Market Return Scenario	Skewness of Risk Premium Estimates	Average of Individuals' Asymmetry
June 6, 2000	2000Q3	206	6.10	4.35	3.9	2.99				0.81	
September 7, 2000	2000Q4	184	5.70	4.65	4.3	2.70				0.49	
December 4, 2000	2001Q1	239	5.50	4.20	4.5	2.31				0.37	
March 12, 2001	2001Q2	137	4.90	4.46	4.1	2.59				0.38	
June 7, 2001	2001Q3	204	5.40	3.79	3.6	2.43				0.49	
September 10, 2001	2001Q4	198	4.80	3.77	3.2	2.53				-0.11	
December 4, 2001	2002Q1	275	4.70	3.98	3.3	2.34				0.66	
March 11, 2002	2002Q2	234	5.30	2.88	2.7	2.17	3.21	3.66	12.23	0.30	-0.28
June 4, 2002	2002Q3	321	5.00	3.18	3.0	2.59	3.41	3.11	12.15	1.96	-0.39
September 16, 2002	2002Q4	363	3.90	4.00	4.1	2.27	3.36	3.10	12.01	1.03	-0.25
December 2, 2002	2003Q1	283	4.20	3.71	3.8	2.39	3.19	3.38	11.83	1.31	-0.28
March 19, 2003	2003Q2	180	3.70	3.66	3.3	2.12	3.57	1.92	11.40	0.49	-0.60
June 16, 2003	2003Q3	368	3.60	3.89	4.4	2.34	3.74	2.17	12.07	0.89	-0.33
September 18, 2003	2003Q4	165	4.30	3.21	3.7	1.87	2.80	3.34	10.78	-0.02	-0.42
December 10, 2003	2004Q1	217	4.36	3.83	3.6	2.22	3.24	3.35	11.94	0.74	-0.46
March 24, 2004	2004Q2	202	3.70	4.10	4.3	2.06	3.46	2.84	12.00	-0.03	-0.28
June 16, 2004	2004Q3	177	4.75	3.04	3.3	2.28	3.06	3.11	11.20	0.96	-0.39
September 12, 2004	2004Q4	177	4.25	3.24	3.3	2.32	3.13	2.70	10.98	0.64	-0.47
December 5, 2004	2005Q1	291	4.35	3.20	3.2	2.63	3.00	3.16	11.10	2.01	-0.36
February 28, 2005	2005Q2	275	4.28	3.19	3.2	2.47	2.99	3.23	11.16	1.49	-0.32
May 31, 2005	2005Q3	318	4.07	2.98	2.9	2.21	3.17	2.50	10.88	0.50	-0.25
August 29, 2005	2005Q4	325	4.20	2.93	2.8	2.20	3.23	2.26	10.82	0.96	-0.50

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November 21, 2005	2006Q1	342	4.52	2.39	2.5	2.14	3.40	2.35	11.38	0.57	−0.23
March 6, 2006	2006Q2	278	4.61	2.57	2.4	2.37	3.43	2.11	11.18	1.11	−0.36
June 1, 2006	2006Q3	500	5.05	2.69	3.0	2.69	3.26	3.10	11.70	2.00	−0.23
September 11, 2006	2006Q4	465	4.79	2.50	2.2	2.47	3.29	2.57	11.28	1.37	−0.32
November 21, 2006	2007Q1	392	4.58	3.21	3.4	2.92	3.31	2.98	11.75	1.93	−0.29
March 1, 2007	2007Q2	388	4.55	3.13	3.5	2.39	3.31	2.79	11.56	1.83	−0.38
June 1, 2007	2007Q3	419	4.90	2.94	3.1	2.12	3.20	3.10	11.58	0.61	−0.38
September 7, 2007	2007Q4	486	4.48	3.35	3.5	2.81	3.08	3.39	11.54	1.80	−0.33
December 1, 2007	2008Q1	465	4.04	3.78	4.0	2.73	3.25	2.99	11.60	1.47	−0.32
March 7, 2008	2008Q2	388	3.61	3.97	4.4	2.97	3.16	3.11	11.50	2.28	−0.29
June 13, 2008	2008Q3	390	4.15	3.12	2.9	2.72	3.28	2.49	11.20	2.02	−0.41
September 5, 2008	2008Q4	439	3.69	3.53	3.3	2.59	3.22	2.37	10.90	1.05	−0.41
November 28, 2008	2009Q1	545	3.10	4.12	3.9	3.10	3.66	1.77	11.47	1.66	−0.36
February 26, 2009	2009Q2	452	2.75	4.74	4.3	4.11	4.23	1.27	12.40	1.82	−0.47
Average of quarters		11,288	4.44	3.51	3.46	2.51	3.30	2.77	11.50	1.05	−0.36
Standard deviation			0.70	0.61	0.61	0.40	0.27	0.56	0.45	0.67	0.09
B. By individual responses											
Survey for											
All dates		11,288	3.46		3.30	2.67	3.48	2.49	11.48	1.49	−0.34

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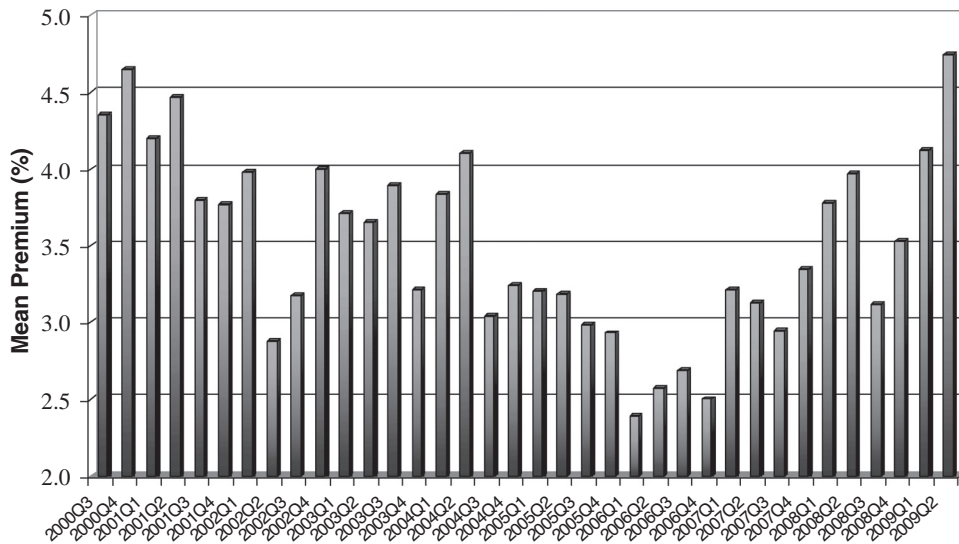
Exhibit 65.2   Ten-Year Forecasted S&P Returns Over and Above the 10-Year Treasury
Bond Yield

Explaining Variation in the Risk Premium

While we document the level and a limited time series of the long-run risk pre-
mium, statistical inference is complicated by overlapping forecasting horizons.
First, we have no way of measuring the accuracy of the risk premiums as forecasts
of equity returns. Second, any inference based on regression analysis is confounded
by the situation that from one quarter to the next, there are 38 common quarters
being forecasted. This naturally induces a moving-average process.

   We do, however, try to characterize the time variation in the risk premium
without formal statistical tests. Exhibit 65.3 examines the relation between the
mean premium and previous one-year returns on the S&P 500.

   The evidence suggests that there is a weak negative correlation between past
returns and the level of the long-run risk premium. This makes economic sense.
When prices are low (after negative returns), expected returns increase.

   An alternative to using past returns is to examine a measure of valuation.
Exhibit 65.4 examines a scatter of the mean premium versus the price-to-earnings
ratio of the S&P 500.

   Looking at the data in Exhibit 65.5, it appears that the inference is complicated
by a nonlinear relation. At very high levels of valuation, the expected return (the
risk premium) was low.

   We also examine the real yield on Treasury Inflation-Indexed Notes. The risk
premium is like an expected real return on the equity market. It seems reasonable
that there could be a correlation between expected real rates of return for stocks
and bonds. Exhibit 65.5 examines the 10-year-on-the-run yield on the Treasury
Inflation-Indexed Notes.

   In this case, there is a weak positive correlation. Lower Treasury Inflation-
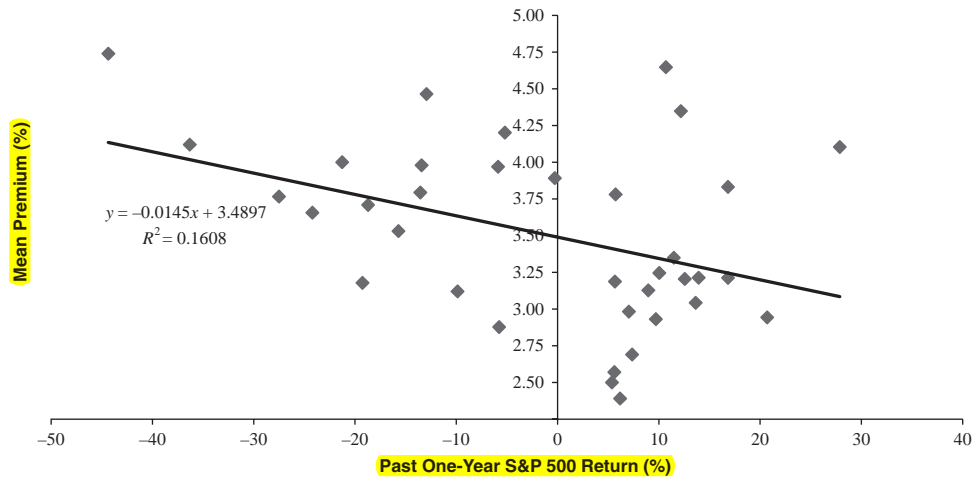Protected Securities (TIPS) yields are associated with lower equity risk premiums.

Exhibit 65.3   Equity Risk Premium and Past One-Year Returns on the S&P 500 Index

However, the analysis is only suggestive that the long-run equity premium and real interest rates move together.

Finally, we consider two measures of risk and the risk premium. Exhibit 65.6 shows that over our sample, there is evidence of a strong positive correlation between market volatility and the long-term risk premium. We use a five-day moving average of the implied volatility on the S&P index option (VIX) as our volatility proxy. The correlation between the risk premium and volatility is 0.68. If the closing day of the survey is used, the correlation is roughly the same. Asset pricing theory suggests that there is a positive relation between risk and expected

Exhibit 65.4   Equity Risk Premium and the S&P 500 Price-to-Earnings Ratio
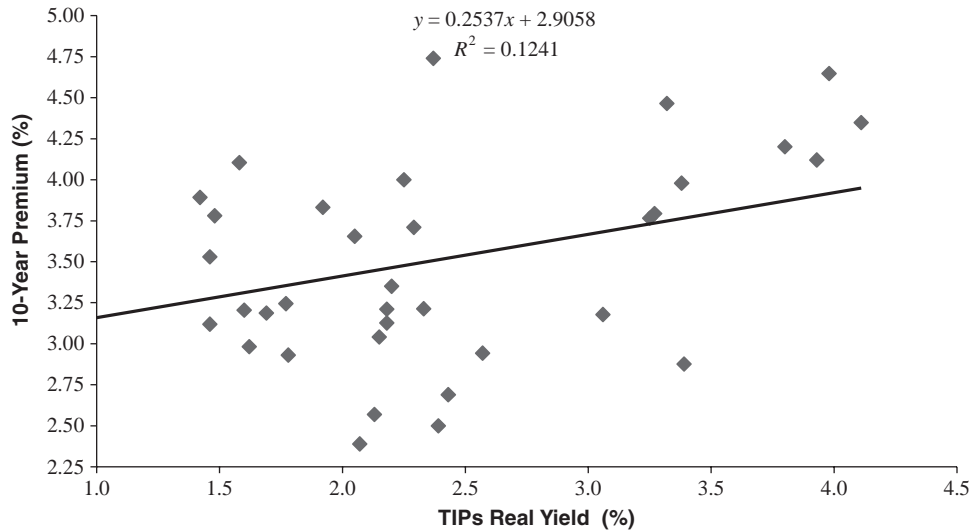
$$y = 0.2537x + 2.9058$$
$$R^2 = 0.1241$$

Exhibit 65.5   Equity Risk Premium and the Real Yield on Treasury Inflation Indexed Notes

return. While our volatility proxy doesn't match the horizon of the risk premium, the evidence, nevertheless, is suggestive of a positive relation.

We also consider an alternative risk measure, the credit spread. We look at the correlation between Moody's Baa-rated bond yields less the 10-year Treasury bond yield and the risk premium. Exhibit 65.7 shows a highly significant relation between the time-series with a correlation of 0.61.
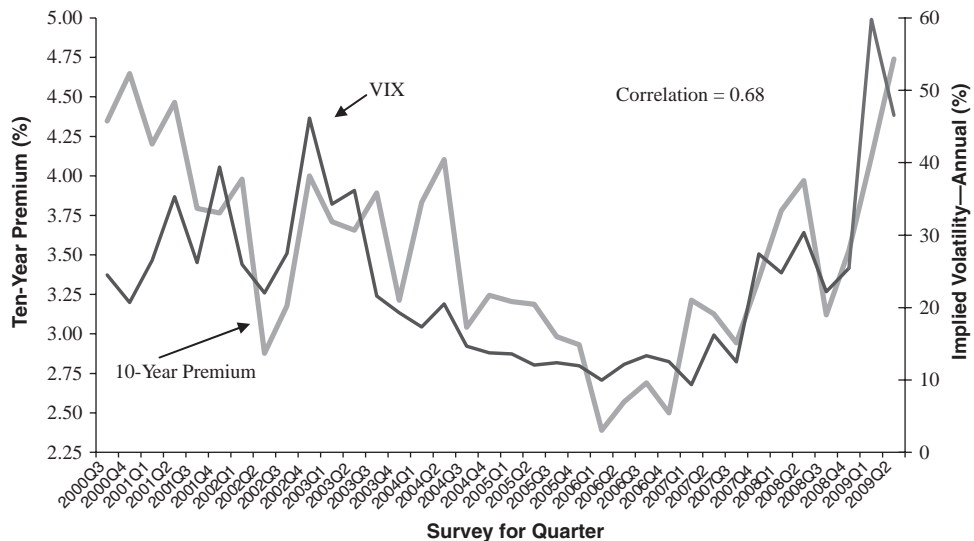

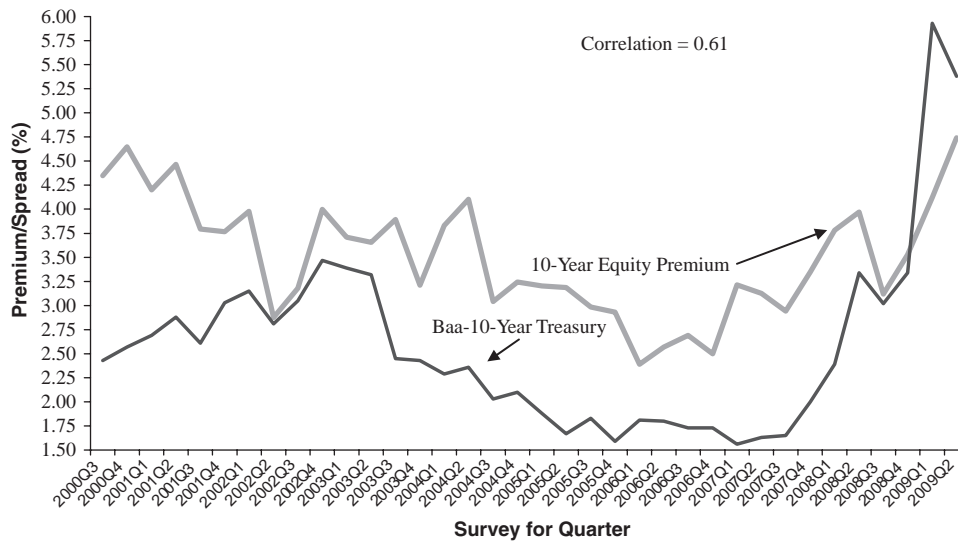Exhibit 65.6   Equity Risk Premium and the Implied Volatility on the S&P 100 Index Option (VIX)

Exhibit 65.7   Equity Risk Premium and Credit Spreads

CONCLUSIONS

During the financial crisis, we study a direct measure of 10-year market returns based on a multiyear survey of chief financial officers. Importantly, we have a measure of expectations. We do not claim it is the true market expectation. Nevertheless, the CFO measure has not been studied before.

While there is relatively little time variation in the risk premium, a number of patterns emerge. We offer evidence that the risk premium is higher during recessions than nonrecessions. Given the current global economic crisis, the risk premium has hit a record high for our nine years of surveys. We also present evidence on disagreement. With higher disagreement, people often have less confidence in their forecasts. We find that disagreement is also higher in recessionary times and the current level of disagreement is at a record level.

While we have 11,288 survey responses over nine years, much of our analysis uses summary statistics for each survey. As such, with only 36 unique quarters of predictions and a variable of interest that has a 10-year horizon, it is impossible to evaluate the accuracy of the market excess return forecasts. There is some weak correlation between past returns, real interest rates and the risk premium. In contrast, there is significant evidence on the relation between two common measures of economic risk and the risk premium. We find that both the implied volatility on the S&P index as well as a commonly used measure of credit spreads are highly correlated with the risk premium.

NOTES

1. The surveys from 1996Q3–2004Q2 were partnered with a well-known national organization of financial executives. The 2004Q3 and 2004Q4 surveys were solely Duke University surveys, which used Duke mailing lists (previous survey respondents who volunteered

their email addresses) and purchased e-mail lists. The surveys from 2005Q1 to present are partnered with *CFO.* The sample includes both the Duke mailing lists and the *CFO* subscribers who meet the criteria for policy-making positions.

2. See, for example, Welch (2000, 2001, 2009), Fraser (2001), Harris and Marston (2001), Pástor and Stambaugh (2001), Fama and French (2002), Goyal and Welch (2003a), Graham and Harvey (2003), and Fernandez (2004, 2006, 2009) for studies of the risk premium.

3. Using the Ibbotson Associates data from January 1926 through March 2009, the arithmetic (geometric) average return on the S&P 500 over and above the 30-day U.S. Treasury bill is 7.20 percent (5.40 percent). Using data from April 1953 to March 2009, the arithmetic (geometric) risk premium is 5.64 percent (4.56 percent). Over the April 1953 to March 2009 period, the arithmetic average return on the S&P 500 over the 10-year U.S. Treasury bond is 4.21 percent. Fama and French (2002) study the risk premium on the S&P 500 from 1872 to 2000 using fundamental data. They argue that the ex ante risk premiums are between 2.55 percent and 4.32 percent for the 1951 to 2000 period. Also see Siegel (1999), Asness (2000), and Jagannathan, McGratten and Scherbina (2001).

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