

# The Long-Run Equity Risk Premium

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## ABSTRACT

Based on a survey of U.S. Chief Financial Officers (CFOs), we present expectations of the equity risk premium measured over a 10-year horizon relative to a 10-year U.S. Treasury bond. This multi-year survey has been conducted each quarter from June 2000 to June 2005. Each quarter the survey also provides measures of cross-sectional disagreement about the risk premium, skewness, and a measure of individual uncertainty. The individual uncertainty is deduced from the 80% confidence interval that each respondent provides for his or her risk premium assessment. We also present evidence on the determinants of the long-run risk premium. Our analysis suggests that there is a positive correlation between the ex ante risk premium and real interest rates as reflected in Treasury Inflation Indexed Notes.

JEL Classification: *G11, G31, G12, G14*

Keywords: *Cost of capital, equity premium, long-term market returns, long-term equity returns, expected excess returns, disagreement, individual uncertainty, skewness, asymmetry, survey methods, risk and reward*

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## **1. Introduction**

We analyze the results of the June 2005 survey of Chief Financial Officers (CFOs) conducted by Duke University and CFO Magazine. 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. While our data set are limited to 21 observations, our analysis suggests that there is a correlation between the real interest rates implied in Treasury Inflation Indexed Notes and the long-run equity risk premium.

## **2. Method**

### *2.1 Design*

The quarterly survey of CFOs was initiated in the third quarter of 1996.<sup>1</sup> Every quarter, Duke University polls financial officers with a short survey on important topical issues (Graham and Harvey, 2005). The usual response rate for the quarterly survey is 5%-8%. Starting in June of 2000, a question on expected stock market returns was added to the survey. Fig. 1 summarizes the results from the risk premium question.<sup>2</sup> While the survey asks for both the one-year and ten-year expected returns, we focus on the ten-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.

### *2.2 Delivery and response*

In the early years, the surveys were faxed to executives. The delivery mechanism was changed to the Internet starting with the December 4, 2001 survey. Among other things, we now collect the

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<sup>1</sup> The surveys from 1996Q3-2004Q2 were partnered with a well-known national organization of financial executives. The 2004Q3-2004Q4 surveys were solely Duke University surveys, which used Duke mailing lists (previous survey respondents who volunteered their email addresses) and purchased email lists. The surveys from 2005Q1 to present are partnered with CFO Magazine. The recent sample includes both the Duke mailing lists and the CFO Magazine subscribers that meet the criteria for policy-making positions.

respondents' IP addresses (though not their identity or company) and are able to examine consistency of responses across different surveys. Respondents are given four business days to fill out the survey. Usually, two-thirds of the surveys are returned within two business days.

The response rate of 5-8% could potentially lead to a non-response bias. There are four reasons why we are not overly concerned with the response rate. First, our response rate is within the range that is documented in many other survey studies. Second, Graham and Harvey (2001) conduct a standard test for non-response biases (which involves comparing the results of those that fill out the survey early to the ones that fill it out late) and find no evidence of bias. Third, Brav, Graham, Harvey and Michaely (2005) conduct a captured sample survey at a national conference in addition to an Internet survey. The captured survey responses (to which over two-thirds participated) are qualitatively identical to those for the Internet survey (to which 8% responded), indicating that non-response bias does not significantly affect their results. Fourth, Brav et al. contrast survey responses to archival data from Compustat and find archival evidence for the universe of Compustat firms that is consistent with the responses from the survey sample.

### *2.3 Data*

In each quarter, we trim the top two and bottom two risk premium observations. Given that we have, on average, more than 200 responses each quarter, this implies a less than 1% trim in each of the tails. In addition, of the over 5,000 survey observations, there was only a single observation (in the June 2000 survey) that we consider not credible. The trimmed and untrimmed data are very similar with the exception of the June 2000 survey.

There are two other steps that we take. First, for the purpose of some of our statistics, we require that the expected risk premium forecast be no more than the best-case scenario and no less than the worst-case scenario. If the ordering is violated, then the observation is deleted. Second, there are two instances in which respondents report in decimals rather than percentages. In these cases, we change the inputs to adhere to the survey format rather than deleting the observations.

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<sup>2</sup> In the text, we refer to the most recent survey as June 2005. In Fig.1, this is the survey for 2005Q3. The table refers to the exact closing date of the survey, which was May 31, 2005.

#### *2.4 The survey instrument and summary statistics*

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 eight and ten questions. Some of the questions are repeated every quarter and some change through time depending on economic conditions. The historical surveys can be accessed at <http://www.cfosurvey.org>. Appendix 1 shows the risk premium question in the June 2005 survey.

While the survey is anonymous, we collect demographic information on seven firm characteristics, including industry, sales revenue, number of employees, headquarters location, ownership (public or private), and proportion of foreign sales.

During the past five years, we have collected over 5,000 responses to the survey. Panel A of Table 1 presents the date that the survey window opened, the number of responses for each survey, 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 Fig. 1, which displays the historical risk premiums contained in Table 1. The lowest premium record is 2.88% in March, 2002, whereas the highest premium is 4.65% in September, 2000.

As of this writing, the equity risk premium is 2.98%. The June 2005 survey shows that the expected annual S&P 500 return is 7.08% and the implied risk premium is 2.98% (7.08-4.10).<sup>3</sup> The median expected return of 7% is down from the 7.5% reported in the March 2005 survey. Panel B of Table 1 presents some summary statistics that pool all the responses. The overall average ten-year risk premium return is 3.66%.<sup>4</sup>

The cross-sectional standard deviation across the individual CFO forecasts in a quarter is a measure of disagreement. In March 2005, the standard deviation of the expected return forecasts is 2.47%. In June 2005, the standard deviation, which represents the disagreement among CFOs, drops to 2.21%.

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<sup>3</sup> See, for example, Ghysels (1998), Welch (2000), Ghysels (1998), Fraser (2001), Harris and Marston (2001), Pástor and Stambaugh (2001), Fama and French (2002), Goyal and Welch (2003), Graham and Harvey (2003), and Ang and Bekaert (2005) for studies of the risk premium.

<sup>4</sup> Using the Ibbotson Associates data from January 1926 through December 2004, the arithmetic (geometric) average return on the S&P 500 over and above the U.S. Treasury bill is 8.43% (6.47%). Fama and French (2002) study the risk premium on the S&P 500 from 1872-2000 using fundamental data. They argue that the ex ante risk premia is between 2.55% and 4.32% for 1951-2000 period. Ibbotson and Chen (2001) estimate a long-term risk premium between 4 and 6%. Also see Siegel (1999), Asness (2000), Heaton and Lucas (2000) and Jagannathan, McGratten and Scherbina (2001).

We also report information on the average of the CFOs' assessments of the one in ten chance that the market will exceed or fall below a certain level. In June of 2005, the worst case total return drops from 3.23% to 2.50%. There are only two other surveys that have lower worst case returns. The best return also drops from 11.16 to 10.88%. There is only one other survey that had a lower best case return.

With information on the 10% 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 90<sup>th</sup> and 10<sup>th</sup> 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 10<sup>th</sup> and 90<sup>th</sup> percentiles. Notice that while disagreement decreases from March to June 2005, the average of individual volatilities increases from 2.99% to 3.17%.

There is also a natural measure of asymmetry in each respondent's response. We look at the difference between each individual's 90% tail and the mean forecast and the mean minus the 10% tail. Hence, if the respondent's forecast of the excess return is 6% and the tails are -8% and +11%, then the distribution is negatively skewed with a value of -9% (=5%-14%). 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 skew slightly decreased in June 2005 relative to March 2005.

*Graham-Harvey: Long-run equity risk premium*

Table 1  
**Summary statistics based on the responses from the  
 21 CFO Outlook Surveys from June 2000 to June 2005**

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	Average of worst 10% market return scenario	Average of individuals' best 10% market return scenario	Skewness of risk premium estimates	Average of individuals' asymmetry
6-Jun-00	2000Q3	206	6.1	4.35	3.9	2.99				0.81	
7-Sep-00	2000Q4	184	5.7	4.65	4.3	2.70				0.49	
4-Dec-00	2001Q1	239	5.5	4.20	4.5	2.31				0.37	
12-Mar-01	2001Q2	137	4.9	4.46	4.1	2.59				0.38	
7-Jun-01	2001Q3	204	5.4	3.79	3.6	2.43				0.49	
10-Sep-01	2001Q4	198	4.8	3.77	3.2	2.53				-0.11	
4-Dec-01	2002Q1	275	4.7	3.98	3.3	2.34				0.66	
11-Mar-02	2002Q2	234	5.3	2.88	2.7	2.17	3.21	3.66	12.23	0.30	-0.28
4-Jun-02	2002Q3	321	5.0	3.18	3.0	2.59	3.41	3.11	12.15	1.96	-0.39
16-Sep-02	2002Q4	363	3.9	4.00	4.1	2.27	3.36	3.10	12.01	1.03	-0.25
2-Dec-20	2003Q1	283	4.2	3.71	3.8	2.39	3.19	3.38	11.83	1.31	-0.28
19-Mar-03	2003Q2	180	3.7	3.66	3.3	2.12	3.57	1.92	11.40	0.49	-0.60
16-Jun-03	2003Q3	368	3.6	3.89	4.4	2.34	3.74	2.17	12.07	0.89	-0.33
18-Sep-03	2003Q4	165	4.3	3.21	3.7	1.87	2.80	3.34	10.78	-0.02	-0.42
10-Dec-03	2004Q1	217	4.4	3.83	3.6	2.22	3.24	3.35	11.94	0.74	-0.46
24-Mar-04	2004Q2	202	3.7	4.10	4.3	2.06	3.46	2.84	12.00	-0.03	-0.28
16-Jun-04	2004Q3	177	4.8	3.04	3.3	2.28	3.06	3.11	11.20	0.96	-0.39
12-Sep-04	2004Q4	177	4.3	3.24	3.3	2.32	3.13	2.70	10.98	0.64	-0.47
5-Dec-04	2005Q1	291	4.4	3.20	3.2	2.63	3.00	3.16	11.10	2.01	-0.36
28-Feb-05	2005Q2	275	4.3	3.19	3.2	2.47	2.99	3.23	11.16	1.49	-0.32
31-May-05	2005Q3	318	4.1	2.98	2.9	2.21	3.17	2.50	10.88	0.50	-0.25
Average of quarters		239	4.6	3.68	3.60	2.37	3.24	2.97	11.55	0.73	-0.36
Standard deviation			0.70	0.52	0.53	0.25	0.25	0.49	0.52	0.58	0.10

B. By individual responses

Survey for										
All	5014	3.66	3.64	2.43	3.26	2.95	11.61	0.88	-0.35	

2.5 *The evidence from interviews*

To further explore the risk premium, we conduct brief interviews on the topic of the cost of capital and the risk premium to understand the question that CFOs believe they are answering. We conducted 12 interviews over the 2003-2005 period.<sup>5</sup> We gain a number of insights from the interviews. There is remarkable consistency in the CFOs' views.

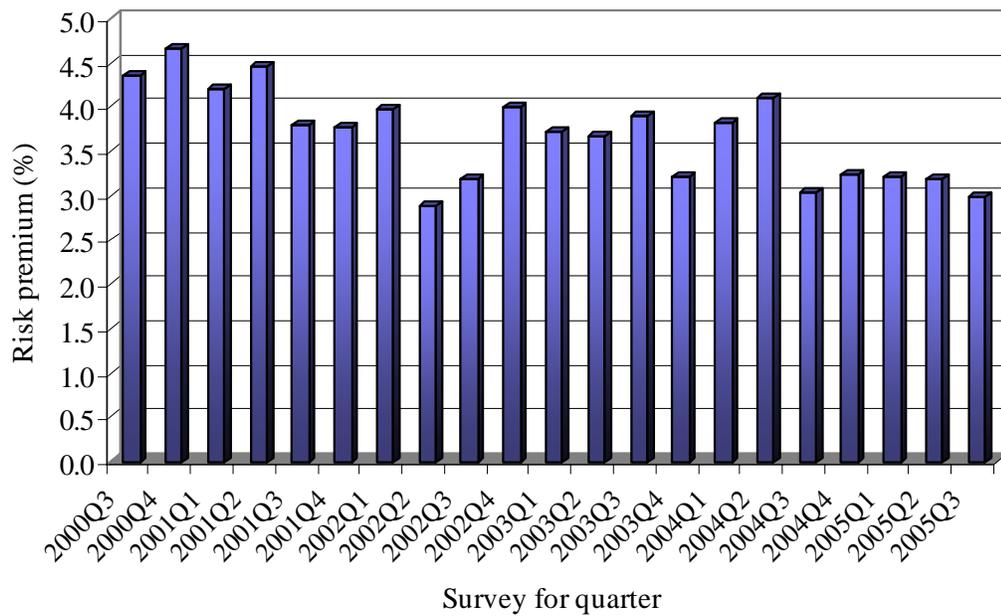
First, the CFOs closely track both their company's stock and the market. They are often called upon internally (e.g., Board of Directors) or externally (analyst conference calls) to explain their company's stock price. As a result, they need to separate out the systematic and idiosyncratic variation in their company's stock returns. To do this, they attempt to understand the forces that might cause systematic variation in the market.

<sup>5</sup> Three of these interviews exclusively focused on the risk premium question. Eight interviews were non-exclusive and based on surplus time available in the interviews in Brav et al. (2005) and Graham, Harvey and Rajgopal (2005). The remaining interview was conducted in 2005.

Second, the CFOs believe that the “risk premium” is a long-term measure of expected excess returns and best covered by our question on the expected excess return over the next ten years – rather than the one-year question. Three-fourths of the interviewees use a form of the Capital Asset Pricing Model (which is consistent with the evidence in Graham and Harvey, 2001). They use a measure of the risk premium in their implementation of the CAPM. Often their 10-year risk premium is supplemented so that that company’s hurdle rate exceeds their expected excess return on the S&P 500. Also, while not specified in the question, CFOs interpret the 10-year expected market return as the return to a buy-and-hold strategy. As a result, our survey measures the geometric rather than arithmetic average return.

Figure 1

**10-year expected equity return - 10-year Treasury bond yield**

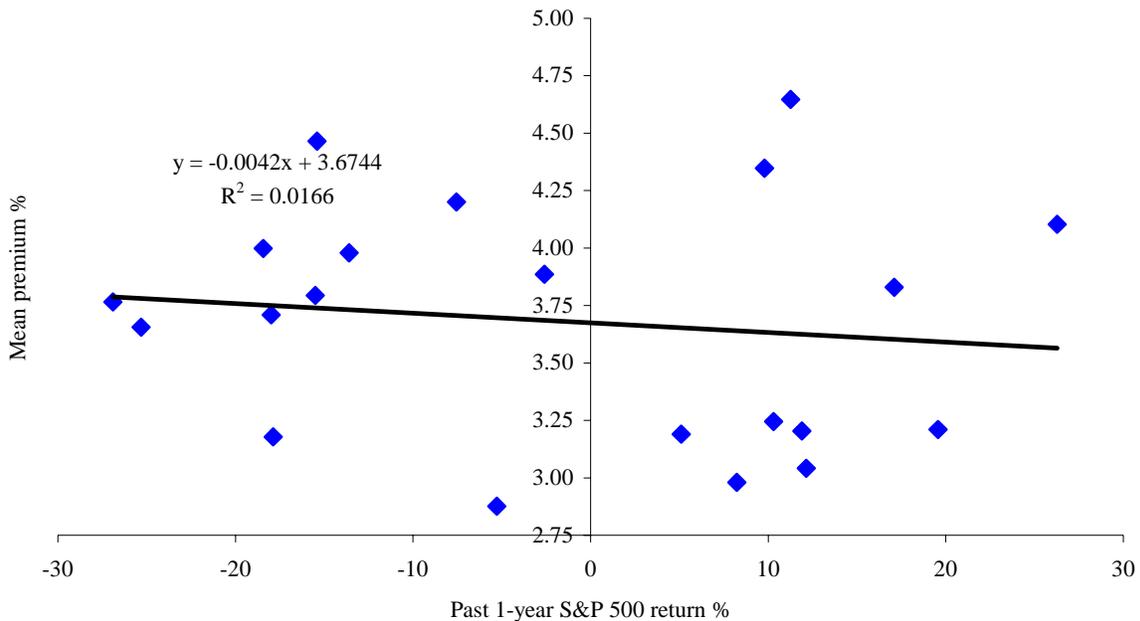


### 2.6 Determinants of the risk premium

While we document the level and a limited time-series of the long-run risk premium, statistical inference is complicated by the fact that the forecasting horizons are overlapping. 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 fact that from one quarter to the next, there are 38 common quarters being forecasted. This naturally induces a moving-average process.

We will, however, characterize the time-variation in the risk premium without formal statistical tests. Figure 2 examines the relation between the mean premium and previous one-year returns on the S&P 500.

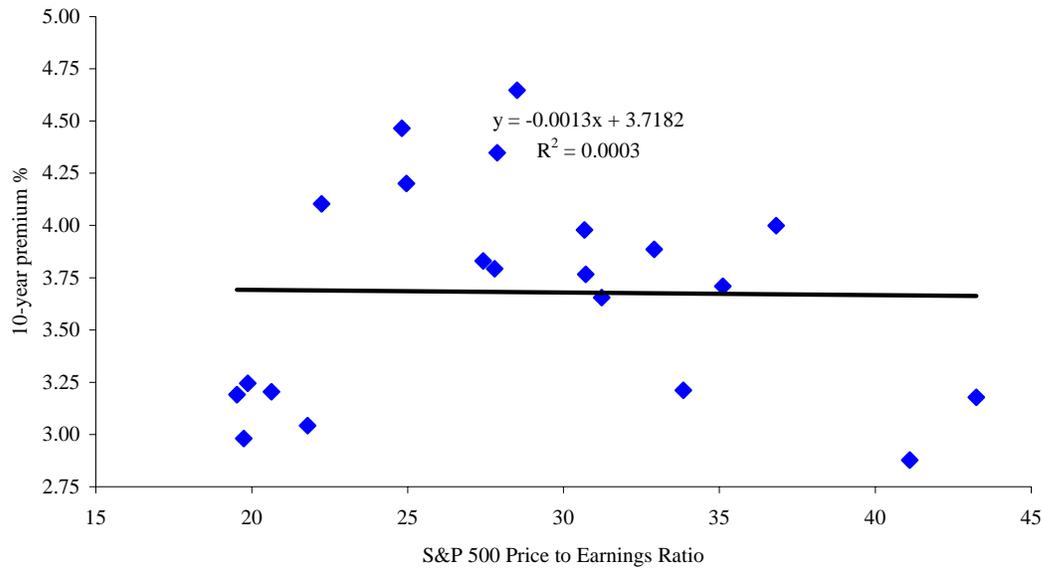
Figure 2  
The mean premium and past one-year returns on the S&P 500 index



The evidence suggest that there is no correlation between past returns and the level of the long-run risk premium. This contrasts with our analysis of the one-year risk premium presented in Graham and Harvey (2004).

An alternative to using past-returns is to examine a measure of valuation. Figure 3 examines a scatter of the mean premium and the price-to-earnings ratio of the S&P 500.

Figure 3  
The mean premium and the S&P 500 price-to-earnings ratio

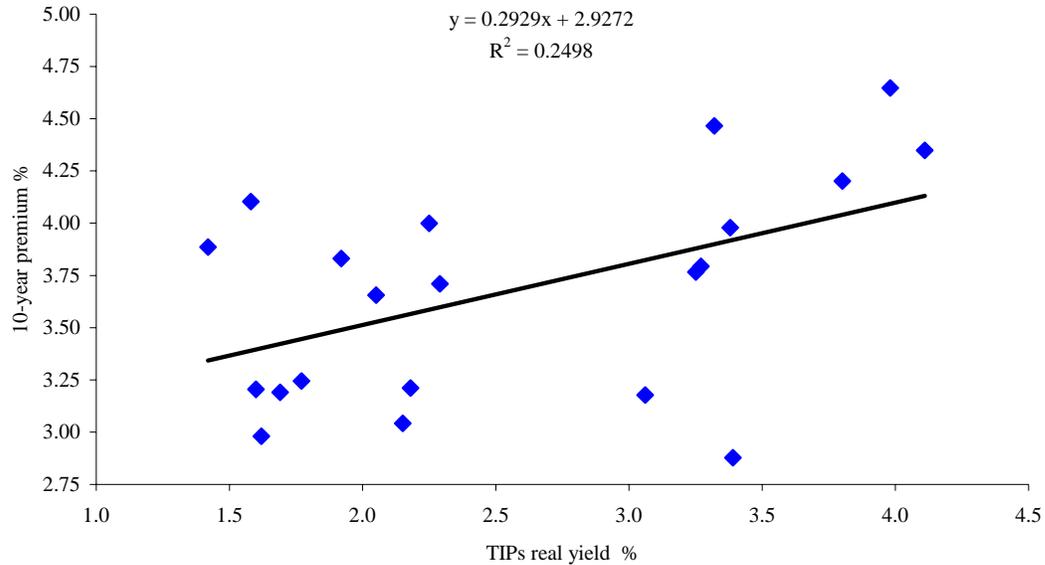


Looking at the data in Fig. 3, it appears that the inference is very similar, i.e. there is no relation. However, given there are so few data points, the analysis is highly influenced by some of the extraordinarily high price-to-earnings ratios. You need only to exclude the P/E ratios above 40 to dramatically change the correlation.

Finally, we 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 stocks and bonds. Figure 4 examines the 10-year on the run yield on the Treasury Inflation Indexed Notes.

Figure 4

The mean premium and the real yield on Treasury Inflation Indexed Notes



In this case, there is a positive correlation. Lower TIPS yields are associated with lower equity risk premiums. The analysis suggests that the long-run equity premium and real interest rates move together.

### 2.6 Other survey questions

The June 2005 survey contains a number of other questions. <http://www.cfosurvey.org> presents the full results of these questions. The site also presents results conditional on the demographic characteristics. For example, one can examine the CFOs views of the risk premium conditional on the industry in which the CFO works.

## 3. Conclusions

We provide a direct measure of ten-year market returns based on a multi-year survey of Chief Financial Officers. We show that there is remarkably little time-variation. Importantly, we have a ‘measure’ of expectations. We do not claim that it is the true market expectation. Nevertheless, it is a measure that has not been studied before and reflects the expectations of an important group high level financial executives.

We measure more than the risk premium. Our survey allows one to track the assessment of the 10% best case and worst case risk premium outcomes as perceived by the CFOs. Our results also reveal the disagreement among CFOs and how it changes through time.

With only 21 observations each with a 10-year horizon, it is impossible to evaluate the accuracy of the market excess return forecasts. Even simple correlations with economic data are complicated because of the overlapping nature of the risk premium forecasts. Our preliminary examination of the determinants of the long-term risk premium suggests that premiums not influenced by past stock returns. However, we present intriguing evidence that there is a positive correlation between real interest rates and the long-run premiums. We will perform further analysis as more data become available from future surveys.

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Appendix A  
The Survey Instrument

Duke University/CFO Magazine  
Business Outlook Survey  
Spring 2005

No individual firms are identified and only aggregate data are made public. Please respond by Sunday, May 29. If you have any questions about this survey, please [contact us](#).

10. On May 24, 2005 the annual yield on 10-yr treasury bonds was 4.1%. Please complete the following:

**a. Over the next 10 years, I expect the average annual S&P 500 return will be:**

Worst Case: There is a 1-in-10 chance the actual average return will be less than:

%

**Best Guess:** I expect the return to be:

%

Best Case: There is a 1-in-10 chance the actual average return will be greater than:

%

**b. During the next year, I expect the S&P 500 return will be:**

Worst Case: There is a 1-in-10 chance the actual return will be less than:

%

**Best Guess:** I expect the return to be:

%

Best Case: There is a 1-in-10 chance the actual return will be greater than:

%