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Investor Extrapolation and Expected Returns

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This paper takes a new approach to examine whether investors extrapolate from past returns to form expectations about future stock returns. Unlike prior research that relies on experiments or surveys to derive investors' expectations, we estimate expected returns directly from stock prices, the book value of equity, and analyst earnings forecasts. We find that the expected returns are positively related to both past market returns and past stock returns. However, investors' expectations seem to be overoptimistic (overpessimistic) for stocks that had extremely high (low) returns in the previous year. Furthermore, we find that investors' expectations about future earnings growth rates are also positively related to past growth rates. The results remain robust after we control for analyst optimism and measures of risk. Taken together, our results are consistent with the findings that investors extrapolate from past stock returns and past earnings growth rates.

Keywords: Extrapolation, Representative heuristic, Investor behavior, Expected returns, Expected earnings growth rates

INTRODUCTION

How do investors form expectations about future stock returns? This is the question at the heart of modern finance research. Classic asset pricing models, such as Sharpe [1964] and Lintner [1965], suggest that a stock's expected return should be positively related to its systematic market risk. However, behavioral research seems to find that investors tend to extrapolate from the recent trends in stock prices and expect higher returns for stocks that have outperformed in the past. Based on experiments and surveys conducted on various subjects, such as professional and individual investors, chief financial officers, students, and finance professors, researchers have documented a robust positive association between expected returns and past returns (see, e.g., De Bondt [1993], Welch [2000, 2001], Graham and Harvey [2001], Vissing-Jorgensen [2003], and Shefrin [2005]). The evidence from behavioral research provides important insights into investors' expectations about future stocks returns. However, these experiments and survey studies are often challenged on the grounds that their results may not be applicable in the real financial market (see, e.g., Campbell [2003] and Lamont [2003]). Critics point out that experimental subjects such as students may not represent typical investors, and experimental settings rarely resemble a real market situation. Moreover, surveys usually rely on a limited sample of respondents who may not provide serious answers to the questionnaire. These concerns make it difficult to draw the conclusion that investors extrapolate from past returns.

In this study, we adopt a new approach to examine whether investors extrapolate from past stock returns when forming expectations about future returns. Rather than conducting experiments or surveys, we directly estimate expected returns as implied by the stock prices, book equity values and analysts' earnings forecasts. Specifically, following Easton [2004], we invert the residual income valuation model to obtain a simple linear relation between the ratio of forecasted earnings to current book equity value and the current price-to-book equity ratio. This linear relation allows us to use ordinary least squares regression to estimate expected returns, which are a function of the intercept and the slope coefficients from the regression. Compared with experiments and surveys, this approach has several merits. First, it is based on real market data, which means that our estimates reflect the expectations of real investors in the real market. Second, it allows us to obtain the estimates of expected returns for a large sample of stocks over a long period of time, which is typically not feasible for experiments and surveys. Third, this approach

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has been widely used in the literature to study investors' expected returns (see, e.g., Claus and Thomas [2001], Dhaliwal et al. [2005], Easton et al. [2002], Easton and Monahan [2005], Easton and Sommers [2007], Gebhardt et al. [2001], Lee et al. [2000], Pastor et al. [2007], among others). Finally, we follow Easton et al. [2002] to estimate expected returns and expected growth rates simultaneously. In this way, we avoid introducing a bias toward estimated expected returns by assuming a growth rate for the residual income valuation model. As a bonus, we also obtain estimates of investors' expected growth rates, which allows us to examine whether investors extrapolate from past growth rates as well.

For a large sample of stocks from 1981 to 2007, we find a positive relationship between expected returns and past returns for both market portfolios and individual stocks. On average, investors' expected annual returns for the aggregate market are 1.6 percentage points higher in the years following those with the highest market returns than in the years following the lowest market returns. Sorted into deciles based on realized returns in the previous year, stocks in the top decile with the highest past returns are expected to generate a return of 15.4% the next year, while stocks in the bottom decile with the lowest past returns have an expected return of only 7.9%. Multivariate regressions reveal that expected stock returns are positively and significantly related to past market returns and individual stock returns. Finally, we find that investors' expected returns are generally not justified by the realized returns in the following year. Their high expectations following bull markets and for stocks with the highest past returns are only met by low realized returns. Similarly, their low expectations following bear markets and for stocks with the lowest past returns appear to be too pessimistic. Taken together, our results are consistent with the view that investors extrapolate from past stock returns to form their expectations about future returns, and the extrapolation yields predictable errors in expected returns.

Investors' expectations about future growth rates exhibit similar patterns. The expected growth rates are positively related to the individual stocks' earnings growth rates in the previous year, as well as to the market's aggregate earnings growth rate in the last year. Further, the expected growth rates seem to be too optimistic for stocks whose earnings experienced the highest growth in the previous year, but too pessimistic for stocks reporting the largest decline in earnings in the past year. This evidence indicates that investors extrapolate from past earnings growth rates as well.

Our findings are not the result of the optimistic bias in analysts' earnings forecasts, which is a key input in our estimation of expected returns and growth rates. Easton and Sommers [2007] show that analyst optimism will introduce an upward bias in the estimated expected returns. If analyst earnings forecasts are overoptimistic, as shown in previous literature (see, e.g., Richardson et al. [2003]) and analyst optimism co-moves with past returns as shown by Barber et al. [2003], our results would merely reflect this co-movement. To rule out this possibility, we replace analyst earnings forecasts with realized earnings and re-estimate investors' expected returns and growth rates. We find similar results using the alternative estimates of expected returns and growth rates, suggesting that our results are not driven by the optimism bias in analysts' earnings forecasts.

Our results are also not driven by firm characteristics, such as firm size and book-to-market ratio, which may be related to expected returns (see, e.g., Fama and French [1992], and Daniel and Titman [1997]). As a robustness check, we control the firm size and book-to-market ratio when we form the portfolios based on past returns or growth rates. Specifically, we double sort sample firms into 3×3 equal-sized groups based on firm size and book-to-market ratio each year. Then the firms in each group are further sorted into 10 deciles on the basis of their returns in the previous year. We finally form return decile portfolios by grouping firms in the same return decile of all size and book-to-market ratio groups. We replicate our analyses to the redefined return decile portfolios and obtain similar results.

This study relates to the literature in two ways. First, it complements and supports previous studies in behavioral research about past returns and investor expected returns. By estimating expected returns directly from market data, we circumvent the common criticism of prior studies based on experiments and surveys. Second, by showing that past returns can significantly influence expected returns, our results have implications for future research on investor behavior and asset pricing. We believe that asset pricing models incorporating the extrapolation bias, as explored by Shefrin [2005], will better capture the behavior of the financial markets.

The rest of the paper is organized as follows. Section 2 reviews related studies on investor extrapolation bias. Section 3 describes the methodology to simultaneously estimate the expected returns and expected earnings growth rates. Section 4 presents the results of empirical analyses, and section 5 has the conclusion.

LITERATURE REVIEW

A critical question in modern finance research is how investors form their expectations about future stock returns. In classic asset pricing models such as Sharpe [1964] and Lintner [1965], investors are modeled as rational agents who choose a portfolio that can maximize their expected utility and minimize risk. According to these models, a stock's expected returns should be basically determined by its systematic risk, or the degree to which its returns co-move with the market returns. More recently, empirical research has established that some firm characteristics, such as firm size and book-to-market ratio, are more strongly associated with stock returns than systematic risk (Daniel and Titman [1997]). However, one problem of most empirical asset pricing studies is that they have to rely on realized returns to proxy for expected returns, since expected returns are unobservable. It is, however, arguable that realized returns tend to be a noisy and poor proxy for expected returns (Brav et al. [2005]).

Behavioral research takes a different approach to the study of expected returns. Through experiments and surveys, this stream of research directly measures the expectations of the subjects. In contrast to classic asset pricing models, behavioral research finds that investors tend to extrapolate from past stocks returns when forming expectations about future stock returns. For example, De Bondt [1993] asked a group of 27 students to predict future stock prices after showing them the prices of a bull or a bear market. He finds that students who saw bull market prices predicted a further rally in stock prices, and students who saw bear market prices predicted a further decline in stock prices. The same experiment was replicated by Shefrin [2005], who finds both students and professional investors predicted a continuation of the recent trends in the stock prices. De Bondt [1993] also investigated the expectations of investors surveyed by the American Association of Individual Investors (AAII). Since July 1987, AAII has conducted weekly surveys of 125 randomly selected investors about the likely direction of the stock market for the next six months. Using data from 1987–1992, De Bondt finds that more individual investors became bullish in their expectation about future market returns following a rise in the Dow Jones index. Vissing-Jorgensen [2003] finds a similar pattern using monthly data from the USB/Gallup survey of individual investors over the period June 1998 to December 2002. The USB/Gallup survey explicitly asks 1,000 investors each month for their expectations about returns of their portfolios and the overall stock market in the coming 12 months. Vissing-Jorgensen documents a strong positive association between investors' expected returns and past market returns.

Extrapolation is also observed in other groups of market participants. Graham and Harvey [2001] surveyed chief financial officers (CFOs) in more than 300 U.S. companies about their expected market returns in the following year. They find a positive association between CFO's expected market returns and past market returns. During the bull market period in 1997 and 1998, Welch [2000] surveyed 226 finance professors about their expected equity risk premium. On average, these professors predicted a premium of 7.2% per year over the next 30 years. After the market crash in 2000, Welch [2001] surveyed these professors again, and found that the expected risk premium had now decreased to 5.5% per year.

Besides stock returns, investors seem to extrapolate from a company's past growth rates and operating performance as well. Chan et al. [2003] find that analyst forecasts of a firm's long-term growth rates are positively correlated with the firm's recent realized growth rates. Lee et al. [2008] document that analyst long-term growth forecasts are optimistic during bull markets and pessimistic during bear markets. Investors also think that good companies are good investments, expecting good companies to continue their superior performance in the future (Shefrin and Statman [1995] and Solt and Statman [1989]).

Extrapolation is a manifestation of a representativeness heuristic documented by Tversky and Kahneman [1974]. A person who relies on representativeness usually judges the probability of an uncertain event by the degree to which the event resembles the essential or salient features of the process that may generate the event. Investors with representativeness bias will see an upward (downward) trend in recent prices as representative of an underlying return generating process that produces positive (negative) returns. When predicting future returns, they believe the same return generating process will continue to work and consequently they expect a continuation in stock prices (Shefrin [2005]).

A characteristic of the representativeness heuristic is that people focus too much on the salient features of the event while ignoring its base probability. When extrapolating from past stock returns, investors overlook the underlying time-series properties of stock returns, and particularly the fact that extremely high or low returns are unlikely to be sustained going forward. As a result, extrapolation leads to predictable errors in investors' expectations. Thus, while investors tend to set a high expectation after observing high past returns, the realized values will be more likely to revert to the mean level eventually, and so to fall short of investors' expectations.[1] In an influential study, Lakonishok et al. [1994] show that value stocks with high book-to-market ratios usually experienced large declines in earnings, sales and cash flows in the previous 5 years. However, these value stocks tend to outperform the glamour stocks that had superior growth in earnings, sales, and cash flows. The evidence is consistent with the idea that investors extrapolate from past growth to form their expectations about future growth, overshooting the realized growth.

A few studies use stock recommendations and target prices issued by financial analysts to proxy for investor expectations (Ang and Peterson [1985], Shefrin and Statman [2003]). In a recent study, Brav et al. [2005] use target prices to compute expected returns. They find that analyst expected returns are negatively associated with past returns. Their evidence is inconsistent with prior findings from surveys of individual and professional investors (Vissing-Jorgensen [2003], and Shefrin [2005]). However, it is possible that analysts may have different expectations.[2]

ESTIMATION OF EXPECTED RETURN AND EXPECTED EARNINGS GROWTH RATES

In this section we describe the method to simultaneously estimate the expected returns and the expected earnings growth rates based on the residual income valuation model.[3] We first derive a linear relationship between the observable accounting variables and stock prices from the residual income valuation model. Then we discuss how to implement the estimation procedure using simple ordinary least squares regressions. Before proceeding, we want to stress that it is advantageous to *simultaneously* estimate the expected returns and growth rates. Some existing studies also rely on the residual income model or its variants to estimate the expected returns, but they usually assume a predetermined value for future earnings growth rates. For example, the future earnings growth rate is assumed to linearly revert to a steady value like the risk-free rate minus 3% in Claus and Thomas [2001], historical industry median return on equity (ROE) in Gebhardt et al. [2001], and historical nominal GDP growth rate in Pastor et al. [2007]. Although based on sound economic reasons, these assumed values will surely introduce biases and noise in the estimated expected return (Easton et al. [2002]). Simultaneously estimating both the expected return and the expected earnings growth rate avoids this problem. After comparing different methods, Easton [2006, p. 392] recommends that "where possible, methods that simultaneously estimate growth and the expected rate of return should be used."

Residual Income Valuation Model

The residual income model expresses the stock price as the sum of current book equity value and the present value of future economic profits (Ohlson [1995]):

$$P_0 = BPS_0 + \sum_{k=1}^{\infty} \frac{EPS_k - r^* BPS_{k-1}]}{(1+r)^k}, \tag{1}$$

where BPS_k is the book equity value per share at the end of period k, EPS_k is earnings per share for period k, and r is the expected return. The term ($EPS_k - r *BPS_{k-1}$) captures the economic earnings of period k in excess of the cost of the capital required by investors. On the assumption of clean surplus accounting that the book equity value accumulates by the amount of retained earnings in each period, the residual income valuation model is just a variant of the discounted dividend valuation model.

If we assume that future economic profit grows at a constant rate of g, we can express the above equation as follows:

$$P_0 = BPS_0 + \frac{EPS_1 - r^* BPS_0}{r - g}. \tag{2}$$

The general residual income valuation model in Equation 1 could be transformed into Equation 2 even if the future economic profits do not grow at a constant rate. In the case of a nonconstant earnings growth rate, g in Equation 2 has the interpretation of the weighted average of all future periodical earnings growth rates (Jagannathan et al. [2000]).

Rearrange the modified residual income valuation model in Equation 2 and we get:

$$\frac{EPS_1}{BPS_0} = \alpha_0 + \alpha_1 \frac{P_0}{BPS_0}, \tag{3}$$

where $\alpha_0 = g$ and $\alpha_1 = r - g$. This establishes a linear relation between the expected ROE and price-to-book ratio. Assuming α_0 and α_1 are constant for a portfolio of stocks, we can use ordinary least squares regressions to estimate these parameters. Based on these estimates, it is straightforward to obtain investors' expected growth rate ($g = \alpha_0$) and expected return ($r = \alpha_0 + \alpha_1$).[4]

Empirical Implementation

To estimate Equation 3, we need to have expected earnings per share (EPS) for the next year. A widely used proxy for investor's expected EPS is analyst earnings forecasts. We thus measure the expected EPS as the first consensus (median) analyst earnings forecast for the current fiscal year released at least 14 days after the announcement of earnings for the previous fiscal year. We choose earnings forecasts issued 14 days after the earnings announcement date to ensure that analysts have incorporated the information of the previous fiscal year's earnings into their forecasts. Book equity value per share is measured at the end of the most recent fiscal year. To ensure that the price incorporates the information in analysts' earnings forecasts, we use the stock's closing price in the same month as the consensus analysts' forecast is released.

The closing prices are usually obtained one or two months after the end of the last fiscal year, while the residual income valuation model in Equation 2 applies to the price at the end of the fiscal year. To take this discrepancy into account, we follow Easton and Sommers [2007] to make some adjustments. We discount the price by the estimated expected return to the last fiscal year end to obtain consistent measurements. Since the rate used to discount the price needs to be estimated from the regression, we obtain the final estimates via iterative regressions. Specifically, we start with the original nondiscounted price to obtain an initial estimate of expected returns. We then use the price discounted by this initial expected return estimate and re-estimate the expected return. We replicate the regression in the second step using the price discounted by the estimate of expected return obtained from the last iteration until the change in the estimate of expected return is less than 0.001 in magnitude.

Following Easton et al. [2002], we estimate the regression model in Equation 3 using weighted least square (WLS) regression, with the stocks' market capitalization in the previous fiscal year end as the weight. WLS estimation gives the estimates of value-weighted expected returns and expected earnings growth rates, which may better represent the average expectations in the market. It also mitigates some data imperfections, such as extremely small book value of equity in the denominator of the dependent and explanatory variables in Equation 3. To further reduce the effect of outliers, we eliminate stocks whose EPS_1/BPS_0 and P_0/BPS_0 fall in the top or bottom 1% of the distribution.

EMPIRICAL RESULTS

Description of the Sample

We obtain the accounting data from COMPUSTAT, analyst earnings forecast data from I/B/E/S, and stock prices from CRSP. Our sample covers stocks traded on NYSE, AMEX, and NASDAQ spanning the period from 1981 to 2007. For a stock in year t to be included in the sample, it has to satisfy the following criteria: (1) it is a common stock, that is, with a share code of 10 and 11 at the end of the fiscal year t-1; (2) its fiscal year end is December, with a valid earnings announcement date that is no more than 4 months after the end of the fiscal year t-1; (3) it has positive book equity value per share at the end of the fiscal year t-1; and (4) it has a valid one-year forward earnings forecast which is released at least 14 days after the announcement of the earnings of the fiscal year t-1, and a valid closing price for the month during which the earnings forecast is released.[5] The final sample has 55,565 stock-year observations and 8,038 unique stocks. The number of stocks in the sample increases steadily from 1,094 for fiscal year 1981 to 2,980 for fiscal year 2000, and then declines gradually to 2,429 for fiscal year 2007.

The descriptive statistics of the value-weighted portfolio of all stocks in the sample are reported in Table 1. The past market return is based on the CRSP value-weighted return, including dividends in year $t - 1$,[6] whereas the past earnings growth rate is calculated as the value-weighted average of the earnings growth rates of all stocks in the sample in year $t - 1$. The expected return and the expected earnings growth rate are estimated every year based on the regression described in Section 3. Table 1 shows that the average annual return from all stocks in the sample is about 14% for the past 27 years, while investors' expected return is 13.1%. The average realized and expected annual earnings growth rates of the aggregate portfolio are 17.2% and 9.6%, respectively. Our estimates of expected returns and expected growth rates are comparable in magnitude to those reported in Easton and Sommers [2007]. It is noticeable that the realized returns and earnings growth rates are much more volatile than the expected values. The standard deviation for realized returns is 15.8%, while the standard deviation for expected returns is only 2.6%. The standard deviations for realized and expected earnings growth rates are 24.5% and 3.6%, respectively. This is not surprising, however, since realized returns and growth rates are often affected by dramatic events such as the September 11 terrorist attack, which investors cannot forecast when forming expectations.

In behavioral research such as that of De Bondt [1993] and Vissing-Jorgensen [2003], investors' expected returns are found to be positively related to past market returns. As a preliminary test, we first investigate if a positive relationship exists between our estimated expected market returns and past market returns. We classify the sample years into three states based on the realized market returns in the previous year. We then plot the average expected returns across different states in Figure 1. It is clear that investors' expectations about the following year's market returns are higher following bull markets than their expectations following bear markets. The difference (1.6%), however, is not statistically significant, probably because we have only 9 observations in each market state. The correlation coefficient between past market returns and expected market returns is 0.343, which is marginally significant (p-value = 0.08). Therefore, the results from our estimated expected returns are consistent with prior findings in behavioral research.

TABLE 1
Descriptive Statistics of the Market Portfolio
This table presents the descriptive statistics of the value-weighted returns and earnings growth rates of the market portfolio. The sample covers the period 1981–2007. Expected returns and expected earnings growth rates are estimated simultaneously using stock prices, book value of equity and analyst forecasts as in Equation 3.

Variables	N	Mean	Std Dev	Min	Med	Max
Returns in year t -1	27	0.140	0.158	−0.208	0.162	0.357
Expected returns at the beginning of year t	27	0.131	0.026	0.081	0.131	0.213
Realized returns in year t	26	0.133	0.157	−0.208	0.159	0.357
Earnings growth rates in year t -1	27	0.172	0.245	−0.381	0.167	0.650
Expected earnings growth rates at the beginning of year t	27	0.096	0.032	0.047	0.093	0.216
Earnings growth rates in year t	26	0.175	0.247	−0.381	0.184	0.650

Do Investors Extrapolate From Past Stock Returns and Earnings Growth Rates?

We proceed to investigate whether investors extrapolate from past stock returns and earnings growth rates. A positive

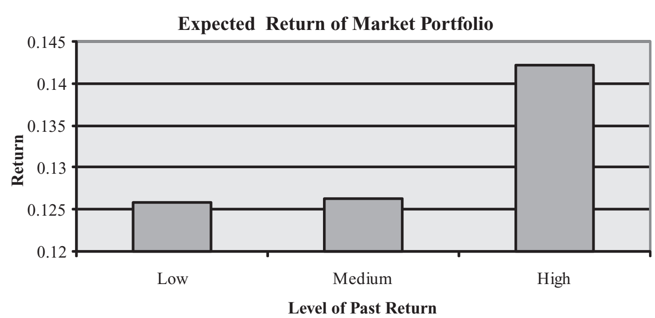

FIGURE 1 Expected returns of the market portfolio.
This figure plots the average expected returns under three different market states with different past realized values. We classify the sample period (1981–2007) into three market states by the returns in the previous year, and plot the average expected return for each state. Expected returns are estimated using the methodology described in the text.

TABLE 2
Relations Between Past and Expected Values of Returns and Growth Rates
This table presents the average past, expected and realized values of return and earnings growth rate for 10 portfolios formed based on the realized values in the previous year. The sample spans the period 1981–2007. Each year, we classify all stocks into deciles based on their returns in the previous year, and then report the time-series average of the returns in year t − 1, expected returns at the beginning of year t, and realized return in year t of each portfolio in the left panel. Similarly, each year we classify all stocks into deciles based on their earnings growth rates in the previous year and report the time-series average values of earnings growth rate in year t − 1, expected earnings growth rate, and realized earnings growth rate in year t of each portfolio in the right panel. Expected returns and expected earnings growth rates are estimated simultaneously using stock prices, book value of equity and analyst forecasts as in Equation 3.

	Returns			Earnings Growth Rates		
Portfolio	Past return in year t − 1	Expected returns at the beginning of year t	Realized returns in year t	Past growth rate in year t − 1	Expected growth rates at at the beginning of year t	Realized growth rate in year t
1 (Low)	−0.458	0.079	0.115	−3.867	0.065	1.359
2	−0.241	0.106	0.110	−0.629	0.066	1.124
3	−0.109	0.115	0.145	−0.240	0.090	0.111
4	−0.006	0.114	0.151	−0.046	0.091	0.016
5	0.081	0.119	0.125	0.068	0.086	−0.055
6	0.161	0.120	0.135	0.154	0.110	0.057
7	0.255	0.131	0.144	0.264	0.107	0.059
8	0.381	0.130	0.132	0.467	0.134	0.099
9	0.573	0.135	0.153	0.910	0.102	0.091
10 (High)	1.091	0.154	0.131	4.154	0.104	0.021
High – Low	1.549	0.075	0.016	8.021	0.039	−1.338
(t-stat)	(13.728)	(3.481)	(0.207)	(18.108)	(2.558)	(−5.079)

association between expected returns (growth rates) and past returns (growth rates) would provide supporting evidence for the extrapolation argument. Our tests begin with classifying firms each year into deciles according to their returns realized in the previous year, and estimating the expected returns of these decile portfolios based on the method described in section 3. We then examine the cross-sectional relation between the expected returns and the returns in the previous year. We apply the same procedure when we examine the behavior of expected earnings growth rates.

The mean values of returns in year t − 1, expected returns at the beginning of year t, and realized returns in year t for each value-weighted decile portfolio are reported in the left panel of Table 2, while the mean values of earnings growth rates are reported in the right panel. The comparison of expected returns across portfolios with various past returns reveals a clear pattern. Investors seem to expect well-performing stocks to further outperform in the future. The average expected return increases almost monotonically from 7.9% per annum for the worst-performing portfolio to 15.4% for the best-performing portfolio. The difference in expected returns of the two portfolios is 7.5% per annum, which is both economically and statistically significant. A similar pattern exists in investors' expected growth rates across portfolios with different past growth rates. The expected growth rate for the fastest growing portfolio is 10.4%, far above 6.5% for the slowest growing portfolio.

Furthermore, investors' extrapolation from the past realized returns and growth rates is not fully justified by the realized values. Stocks that are expected to generate the lowest returns because of poor returns in the previous year turn out to give a return of 11.5% in year t, higher than investors' expected return of 7.9%. By contrast, the best-performing stocks in the previous year only deliver a return of 13.1% in the following year, lower than investors' expectation of 15.4%.[7] The results for earnings growth rates are even more striking. There is clear evidence of mean reversion in earnings growth rates: fastest-declining stocks turn out to be the fastest-growing stocks in the next year and vice versa. Investors will be positively surprised when their expected growth rate of 6.5% for the previous year's fastest-declining stocks is dwarfed by a massive 135.9% increase in earnings in the next year. They will also be disappointed by 2.1% growth rate for previous year's fastest-growing stocks, which are expected to deliver a 10.4% growth rate. These results provide support for the argument that investor extrapolation leads to systematic errors in their expectations about stock returns and earnings growth rates.

In multivariate tests, we investigate whether investors extrapolate the past returns of the market portfolio and individual stocks simultaneously when forming expectations about future stock returns. On the basis of the UBS/Gallup survey data, Vissing-Jorgensen [2003] find that investors' expected return for their own portfolio is positively related to both past market returns and past portfolio returns. If investors extrapolate from both market returns and individual stock returns simultaneously, we expect the expected returns of deciles portfolios formed on past returns to be positively related to both the market returns and the portfolios' own returns in the previous year. To test this hypothesis, we regress expected

TABLE 3
Relation Between the Past and Expected Returns: Regression Results
This table presents the results of regressing the expected returns of decile portfolios formed on the past returns against the past market returns and the past portfolio returns as follows,

$$E(Ret_{i,t}) = \alpha + \beta^* Ret_{m,t-1} + \gamma^* Ret_{i,t-1} + \varepsilon_{i,t}$$

where $E(Ret_{i,t})$ is the value-weighted expected return for portfolio i at the beginning of year t, $Ret_{i,t-1}$ and $Ret_{m,t-1}$ are the value-weighted realized returns for portfolio i and the market portfolio in year $t-1$, respectively. Expected returns are estimated using stock prices, book value of equity and analyst forecasts as in Equation 3. Model 1 uses the raw past returns of decile portfolios in the right hand side of the regression. Model 2 replaces the raw portfolio returns with the portfolios' decile rankings based on their past returns. Model 3 uses dummies variables, Port1 to Port10, to indicate the decile portfolios. The sample spans the period 1981–2007. Each year, we construct 10 portfolios based on stock returns in the previous year. *, **, and *** indicate statistically significant at 10%, 5%, and 1% level.

	Model 1		Model 2		Model 3	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Intercept	0.111***	28.296	0.078***	12.014	0.070***	7.672
Ret_m	0.038**	1.961	0.062***	3.448	0.062***	3.436
Ret_i	0.025***	4.046				
Rank Ret_i			0.006***	6.268		
Port2					0.027**	2.144
Port3					0.036***	2.886
Port4					0.035***	2.828
Port5					0.040***	3.175
Port6					0.041***	3.260
Port7					0.052***	4.178
Port8					0.050***	4.042
Port9					0.056***	4.520
Port10					0.074***	5.964
Adj. R^2	0.086		0.155		0.148	

returns of decile portfolios against the market returns and individual portfolios' own returns in the past year:

$$E(Ret_{i,t}) = \alpha + \beta^* Ret_{m,t-1} + \gamma^* Ret_{i,t-1} + \varepsilon_{i,t}, \quad (4)$$

where $E(Ret_{i,t})$ is the value-weighted expected return for portfolio i at the beginning of year t, $Ret_{i,t-1}$ and $Ret_{m,t-1}$ are the value-weighted realized returns for portfolio i and the market portfolio in year $t-1$, respectively. This specification assumes a linear relationship between expected and past returns. However, expected returns are much less volatile than realized returns, which may suggest a nonlinear relationship between expected and past returns. To capture the potential nonlinearity, we replace the raw realized returns of decile portfolios with the corresponding decile rankings of portfolios or dummy variables indicating the specific portfolio.

TABLE 4
Relation Between the Past and Expected Earnings Growth Rates: Regression Results
This table presents the results of regressing the expected earnings growth rates of decile portfolios formed on the past growth rates against the past market growth rates and the past portfolio growth rates as follows,

$$E(GR_{i,t}) = \alpha + \beta^* GR_{m,t-1} + \gamma^* GR_{i,t-1} + \varepsilon_{i,t}$$

where $E(GR_{i,t})$ is the value-weighted expected earnings growth rate for portfolio i at the beginning of year t, $GR_{i,t-1}$ and $GR_{m,t-1}$ are the value-weighted realized earnings growth rates for portfolio i and the market portfolio in year $t-1$, respectively. Expected earnings growth rates are estimated using stock prices, book value of equity and analyst forecasts as in Equation 3. Model 1 uses the raw past growth rates of decile portfolios in the right hand side of the regression. Model 2 replaces the raw portfolio growth rates with the portfolios' decile rankings based on their past growth rates. Model 3 uses dummies variables, Port1 to Port10, to indicate the decile portfolios. The sample spans the period 1981–2007. Each year, we construct 10 portfolios based on earnings growth rates in the previous year. *, **, and *** indicate statistically significant at 10%, 5%, and 1% level.

	Model 1		Model 2		Model 3	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Intercept	0.091***	24.093	0.061***	9.025	0.061***	6.340
GR_m	0.020	1.556	0.025**	2.001	0.025**	2.034
GR_i	0.005***	3.171				
Rank GR_i			0.005***	5.191		
Port2					0.001	0.100
Port3					0.025*	1.879
Port4					0.027**	2.028
Port5					0.021	1.621
Port6					0.045***	3.455
Port7					0.042***	3.214
Port8					0.069***	5.221
Port9					0.037***	2.807
Port10					0.039***	2.967
Adj. R^2	0.042		0.097		0.126	

The regression results, presented in Table 3, reveal a consistent pattern across all the three model specifications. First, the expected returns are positively and significantly related to the past market returns. Second, after controlling for past market returns, expected returns are also positively and significantly related to the portfolios' own past returns. For example in Specification 2 the coefficient for the decile ranking of the past returns is 0.006 (t-statistics = 6.268). This coefficient indicates that moving from the worst-performing portfolio to the best-performing portfolio, investors' expected returns increase by almost 5.4 percentage points. The positive coefficients for the past market returns and past portfolio returns are consistent with the results in Vissing-Jorgensen [2003].

TABLE 5
Sensitivity Test: Using Realized Earnings to Estimate Expected Returns
This table presents the results of regressing the expected returns of decile portfolios formed on the past returns against the past market returns and the past portfolio returns as follows,

$$E(Ret_{i,t}) = \alpha + \beta^* Ret_{m,t-1} + \gamma^* Ret_{i,t-1} + \varepsilon_{i,t}$$

where $E(Ret_{i,t})$ is the value-weighted expected return for portfolio i at the beginning of year t, $Ret_{i,t-1}$ and $Ret_{m,t-1}$ are the value-weighted realized returns for portfolio i and the market portfolio in year $t-1$, respectively. Expected returns are estimated using stock prices, book value of equity and realized earnings as in Equation 7. Model 1 uses the raw past returns of decile portfolios in the right hand side of the regression. Model 2 replaces the raw portfolio returns with the portfolios' decile rankings based on their past returns. Model 3 uses dummies variables, Port1 to Port10, to indicate the decile portfolios. The sample spans the period 1981– 2007. Each year, we construct 10 portfolios based on stock returns in the previous year. *, **, and *** indicate statistically significant at 10%, 5%, and 1% level.

	Model 1		Model 2		Model 3	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Intercept	0.071***	9.416	−0.022	−1.722	−0.097***	−5.957
Ret_m	−0.005	−0.141	0.081**	2.305	0.081**	2.528
Ret_i	0.092***	7.485				
Rank Ret_i			0.018***	9.301		
Port2					0.120***	5.413
Port3					0.173***	7.835
Port4					0.183***	8.297
Port5					0.196***	8.860
Port6					0.196***	8.874
Port7					0.203***	9.171
Port8					0.205***	9.256
Port9					0.212***	9.603
Port10					0.226***	10.220
Adj. R^2	0.185		0.258		0.383	

Note. *, **, and *** indicate statistically significant at 10%, 5%, and 1% level.

Finally, we examine whether investor expectations about future earnings growth rates are positively related to past market and stock growth rates. We construct 10 portfolios based on the stocks earnings growth rates in the previous year and then regress the portfolios' expected growth rates on the market and portfolio growth rates in the previous year as in the following model:

$$E(GR_{i,t}) = \alpha + \beta^* GR_{m,t-1} + \gamma^* GR_{i,t-1} + \varepsilon_{i,t}, \tag{5}$$

where $E(GR_{i,t})$ is the value-weighted expected growth rate for portfolio i at the beginning of year t, $GR_{i,t-1}$ and $GR_{m,t-1}$ are the value-weighted realized growth rates for portfolio i and the market portfolio in year $t-1$, respectively. We also replace the raw past growth rates of decile portfolios with decile rankings or decile dummies. The regression results, presented in Table 4, indicate that expected growth rates are positively related to both market and portfolio growth rates in the previous year. The regression result in Specification 2 shows that investors' expected growth rate increases by 4.5 percentage points moving from the lowest-growing portfolio to the fastest-growing portfolio.

Taken together, the results show that investors' expectations about future stock returns and earnings growth rates are positively and significantly related to the realized values in the previous year. These results are consistent with the findings in behavioral research that investors extrapolate from the recent trends in stock prices and earnings growth rates when forming their expectation about the future.

Are The Results Driven By Optimism in Analysts' Earnings Forecasts?

Our estimation procedure requires the expected earnings per share in the following year as a key input. Consistent with prior studies, we use analyst earnings forecasts to proxy the investors' expectations in the main tests. However, it is well recognized that analyst forecasts tend to be overoptimistic, particularly if the forecasts are issued far ahead of the announcement of actual earnings (see, e.g., Richardson et al. [2003]). Easton and Sommers [2007] show that analyst optimistic bias introduces a significantly upward bias in the estimated expected returns. If the degree of analyst optimism increases with past stock returns, as documented in Barber et al. [2003], so does the bias in estimated expected returns. This will cause a spurious positive relation between estimated expected returns and past stock returns. To rule out this possibility, we follow Easton and Sommers [2007] to use the realized earnings per share to estimate the expected returns and expected growth rates. Easton and Sommers [2007] show that the residual income valuation model in Equation 2 could be rewritten as follows:

$$P_0 = BPS_0 + \frac{(EPS_0 - r^*BPS_{-1})^*(1+g)}{r-g}. \tag{6}$$

Re-arrange the above equation and we have

$$\frac{EPS_0}{BPS_{-1}} = \beta_0 + \beta_1 \frac{P_0 - BPS_0}{BPS_{-1}}, \tag{7}$$

where $\beta_0 = r$ and $\beta_1 = \frac{r-g}{1+g}$.

Equation 7 enables us to estimate r and g without using analyst earnings forecasts, since all the variables are known at the time of estimation. We then use the estimated expected return and expected earnings growth rate from the regression as specified in Equation 7 to check the robustness of our results.

The regression results for expected returns and expected growth rates are reported in Tables 5 and 6, respectively. The results confirm the significantly positive association between the expected portfolio returns (earnings growth rates) and

TABLE 6
Sensitivity Test: Using Realized Earnings to Estimate Expected Earnings Growth Rates
This table presents the results of regressing the expected earnings growth rates of decile portfolios formed on the past growth rates against the past market growth rates and the past portfolio growth rates as follows,

$$E(GR_{i,t}) = \alpha + \beta^* GR_{m,t-1} + \gamma^* GR_{i,t-1} + \varepsilon_{i,t}$$

where $E(GR_{i,t})$ is the value-weighted expected earnings growth rate for portfolio i at the beginning of year t, $GR_{i,t-1}$and $GR_{m,t-1}$are the value-weighted realized earnings growth rates for portfolio i and the market portfolio in year $t-1$, respectively. Expected earnings growth rates are estimated using stock prices, book value of equity and realized earnings as in Equation 7. Model 1 uses the raw past growth rates of decile portfolios in the right hand side of the regression. Model 2 replaces the raw portfolio growth rates with the portfolios' decile rankings based on their past growth rates. Model 3 uses dummies variables, Port1 to Port10, to indicate the decile portfolios. The sample spans the period 1981–2007. Each year, we construct 10 portfolios based on earnings growth rates in the previous year. *, **, and *** indicate statistically significant at 10%, 5%, and 1% level.

	Model 1		Model 2		Model 3	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Intercept	0.070***	11.788	−0.029***	−2.633	−0.131***	−10.611
GR_m	0.002	0.092	0.028	1.391	0.028*	1.795
GR_i	0.027***	11.217				
Rank GR_i			0.018***	10.425		
Port2					0.151***	8.860
Port3					0.204***	11.992
Port4					0.227***	13.301
Port5					0.216***	12.693
Port6					0.241***	14.117
Port7					0.239***	14.048
Port8					0.263***	15.458
Port9					0.232***	13.628
Port10					0.224***	13.157
Adj. R^2	0.327		0.295		0.577	

Note. *, **, and *** indicate statistically significant at 10%, 5%, and 1% level.

the past realized portfolio returns (earnings growth rates). Therefore, our results are not driven by analyst optimistic bias.

Are The Results Driven By Risks?

A possible explanation for higher expected returns for stocks with higher past year returns is that these stocks are riskier. This explanation seems unlikely because investors' expectations are too optimistic (pessimistic) for well-performing (badly performing) stocks relative to the realized returns in the following year. Nevertheless, as a robustness check, we control the potential risk-related firm characteristics such as firm size and book-to-market ratio when we form the portfolios based on past returns. Specifically, firms are first sorted into 3-by-3 equal-sized groups based on firm size and book-to-market ratio and further sorted into 10 deciles based on past returns within each of the nine groups. Finally, firms in the same return deciles across all size and book-to-market ratio groups are grouped together to form 10 portfolios which have different levels of past returns but a similar distribution in firm size and book-to-market ratio. We replicate our

TABLE 7
Sensitivity Test: Controlling Firm Size and Book-to-Market Ratio
This table presents the results of regressing the expected returns of decile portfolios formed on the past returns against the past market returns and the past portfolio returns as follows,

$$E(Ret_{i,t}) = \alpha + \beta^* Ret_{m,t-1} + \gamma^* Ret_{i,t-1} + \varepsilon_{i,t}$$

where $E(Ret_{i,t})$ is the value-weighted expected return for portfolio i at the beginning of year t, $Ret_{i,t-1}$ and $Ret_{m,t-1}$ are the value-weighted realized returns for portfolio i and the market portfolio in year $t-1$, respectively. Expected returns are estimated using stock prices, book value of equity and analyst forecasts as in Equation 3. Model 1 uses the raw past returns of decile portfolios in the right hand side of the regression. Model 2 replaces the raw portfolio returns with the portfolios' decile rankings based on their past returns. Model 3 uses dummies variables, Port1 to Port10, to indicate the decile portfolios. The sample spans the period 1981–2007. Each year, we classify all stocks into deciles based on their returns in the previous year in the following steps. Firms are firstly sorted into 3 by 3 equal-sized groups based on firm size and book-to-market ratio, and further sorted into 10 deciles based on past year returns within each of the nine groups. Finally, firms in the same deciles across all size and book-to-market ratio groups are grouped together to form 10 portfolios. *, **, and *** indicate statistically significant at 10%, 5%, and 1% level.

	Model 1		Model 2		Model 3	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Intercept	0.117***	39.936	0.102***	20.893	0.091***	13.329
Ret_m	0.036***	2.424	0.044***	3.301	0.044***	3.312
Ret_i	0.010*	1.673				
Rank Ret_i			0.003***	3.949		
Port2					0.028***	2.993
Port3					0.019**	2.016
Port4					0.030***	3.179
Port5					0.028***	3.025
Port6					0.030***	3.181
Port7					0.027***	2.877
Port8					0.030***	3.262
Port9					0.034***	3.625
Port10					0.042***	4.554
Adj. R^2	0.040		0.083		0.090	

Note. *, **, and *** indicate statistically significant at 10%, 5%, and 1% level.

analyses to the re-defined decile portfolios and report the regression results in Table 7. The results are quantitatively similar to those without controlling firm size and market-to-book ratio. Further, controlling firm size and market-to-book ratio does not remove the relation between the expected growth rates of growth decile portfolios with their past growth rates but rather makes the coefficient of past market growth rates insignificant in the regressions.[8] Overall, our main results are not driven by the firm's size and the book-to-market ratio, which may be related to risk.

CONCLUSION

Based on various surveys and experiments, prior research shows that investors extrapolate from past stock returns form their expectations. In general, investors expect the recent trend in stock prices to continue in the near future. The extrapolation bias is a manifestation of the more general representativeness heuristic documented in Tversky and Kahneman [1974]. However, the results based on surveys and experiments are often challenged on the grounds that they may not be applicable to real investors in financial markets. Critics argue that results from surveys and experiments may be specific for the sample and lack reliability.

In this paper we take a new approach to examine whether investors extrapolate from past stock returns when forming expectations about future returns. Instead of conducting experiments or surveys, we directly estimate investors' expected returns and expected growth rates from the observable stock prices, book value of equity, and analyst earnings forecasts. Our results indicate a significant and positive association between investors' expected returns and both past market returns and past stock returns. However, investors' expectations seem to be overoptimistic (overpessimistic) for stocks that had extremely high (low) returns in the previous year. The positive relationship between expected and past returns remains robust after we control for analyst optimism and measures of risk. Further, we find that investors' expectations about future earnings growth rates are also positively related to past growth rates. Taken together, our results are consistent with prior research showing that investors extrapolate from past stock returns and past earnings growth rates.

Our findings, which are based on real market data, complement prior studies based on experiments and surveys. The evidence of investor extrapolation has important implications for future asset pricing research. For example, it may provide a partial explanation for the well-documented momentum anomaly that stocks with high past returns continue to outperform stocks with low past returns in the short term (Jegadeesh and Titman [1993]). Incorporating the representativeness heuristics into asset pricing models, as in the approach taken by Shefrin [2005], should improve our understanding of investors' investment decisions and the formation of asset prices.

This study is subject to some limitations. First, though widely used in recent research, our measures of investors' expectations may fail to capture the real expectations in the market. We acknowledge that our analysis is valid only when the measures of expectations do measure expectations. Second, we cannot completely rule out the possibility that higher expected returns for stocks with higher past returns are due to fact that these stocks have higher risk. Although it is difficult to explain why stocks with higher past returns are riskier, we remind our readers to be cautious when interpreting our results.

NOTES

1. The mean-reversion in stock returns and growth rates has been documented in many studies (see, e.g., De Bondt and Thaler [1985], and Chan et al. [2003]).
2. Shefrin [2005] points out that representative heuristics can also lead people to predict a reversal in stock prices if they are overconfident about their prior knowledge on the return generating process.
3. See Easton et al. [2002] and Easton and Sommers [2007] for more details about the estimation methods.
4. One may wonder if the estimation results in a mechanical association between past returns and expected returns. If anything, this estimation will result in a negative association between past returns and expected returns. To see this, note that higher past returns lead to higher price today (P_0). Based on the model, higher P_0 should be related to lower, not higher, expected returns (r).
5. In the regression to estimate the expected rate of return and the expected earnings growth rate for a specific portfolio, we exclude observations with the dependent variable and the explanatory variable falling in the top or bottom 1% distribution within the portfolio.
6. We hypothesize that investors use market-wide realized return to form the expectation of future return. The results do not change if we use the return calculated from the S&P 500 or the value-weighted return of all stocks in our sample instead.
7. Note that the top decile with the highest past returns also generates higher returns in year t than the bottom decile with the lowest past returns. This is consistent with the well-documented momentum anomaly that past winners continue to outperform past losers in the short run (see, e.g., Jegadeesh and Titman [1993]).
8. The results about expected growth rates are untabulated but available upon request.

REFERENCES

Ang. J. and D. Peterson. "Returns, Risk, and Yield: Evidence from Ex Ante Data." *Journal of Finance*, (1985), pp. 537–548.

Barber, B., R. Lehavy, M. McNichols and B. Trueman. "Reassessing the Returns to Analysts' Recommendations." *Financial Analyst Journal* 59, (2003), pp. 88–96.

Brav, A., R. Lehavy and R. Michaely. "Using Expectations to Test Asset Pricing Models." *Financial Management*, (2005), pp. 31–64.

Campbell, J. "Comment: Perspectives on Behavioral Finance: Does 'Irrationality' Disappear with Wealth? Evidence from Expectations and Actions." *NBER Macroeconomics Annual*, 18, (2003), 194–200.

Claus, J. and J. Thomas. "Equity Risk Premium as Low as Three Percent? Evidence from Analysts' Earnings Forecasts for Domestic and International Stocks." *Journal of Finance, 56*, (2001), pp. 1629–1666.

Chan, L., J. Karceski and J. Lakonishok. "The Level and Persistence of Growth Rates." *Journal of Finance,* 58, (2003), pp. 643–684.

Daniel, K. and S. Titman. "Evidence on the Characteristics of Cross-sectional Variation in Stock Returns." *The Journal of Finance,* 52(1), (1997), pp. 1–33.

De Bondt, W. "Betting on Trends: Intuitive Forecasts of Financial Risk and Return." *International Journal of Forecasting*, 9, (1993), pp. 355–371.

De Bondt, W. and R. Thaler. "Does the Stock Market Overreact?" *Journal of Finance* 40, (1985), pp. 793–805.

Dhaliwal, D., L. Krull, O. Li and W. Moser. "Dividend Taxes and Implied Cost of Capital." *Journal of Accounting Research*, 43, (2005), pp. 675–708.

Easton, P. "PE Ratios, PEG Ratios, and Estimating the Implied Expected Rate of Return on Equity Capital." *The Accounting Review,* 79, (2004), pp. 73–96.

Easton, P. "Use of Forecasts of Earnings to Estimate and Compare Cost of Capital across Regimes." *Journal of Business, Finance, and Accounting,* 33, (2006), pp. 374–394.

Easton, P. and S. Monahan. "An Evaluation of Accounting-based Measures of Expected Returns." *The Accounting Review*, 80, (2005), pp. 501–538.

Easton, P. and G. Sommers. "Effects of Analysts' Optimism on Estimates of the Expected Rate of Return Implied by Earnings Forecasts." *Journal of Accounting Research,* 45 (2007), pp. 983–1015.

Easton, P., G. Taylor, P. Shroff and T. Sougiannis. "Empirical Estimation of the Expected Rate of Return on a Portfolio of Stocks." *Journal of Accounting Research,* 40, (2002), pp. 657–676.

Fama, E. and K. French. "The Cross-section of Expected Stock Returns." *Journal of Finance,* 47, (1992), pp. 427–465.

Gebhardt, W., C. Lee and B. Swaminathan. "Towards an Ex-ante Cost of Capital." *Journal of Accounting Research,* 39, (2001), 135–176.

Graham, J. and C. Harvey. "The Theory and Practice of Corporate Finance: Evidence from the Field." *Journal of Financial Economics* 60, (2001), pp. 187–243.

Jagannathan, R., E. R. McGrattan and A. Scherbina. "The Declining U.S. Equity Premium." *Federal Reserve Bank of Minneapolis Quarterly Review,* 24, (2000), pp. 3–19.

Jegadeesh, N. and S. Titman. "Returns for Buying Winners and Selling Losers: Implications for Stock Market Efficiency." *Journal of Finance,* 48, (1993), pp. 65–91.

Lakonishok, J., A. Shleifer and R. Vishny. "Contrarian Investment, Extrapolation, and Risk." *Journal of Finance,* 49, (1994), pp. 1541–1578.

Lamont, O. A. "Comment: Perspectives on Behavioral Finance: Does 'Irrationality' Disappear with Wealth? Evidence from Expectations and Actions." *NBER Macroeconomics Annual*, 18, (2003), 200–207.

Lee, B., J. O'Brien and K. Sivaramakrishnan. "An Analysis of Financial Analysts' Optimism in Long-term Growth Forecasts." *Journal of Behavioral Finance*, 9, (2008), pp. 171–184.

Lee, C., J. Myers and B. Swaminathan. "What is the Intrinsic Value of the Dow?" *Journal of Finance,* 54, (2000), pp. 1693–1741.

Lintner, J. "The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets." *Review of Economics and Statistics,* 47, (1965), pp. 13–37.

Richardson, S., S. Teoh and P. Wysocki. "The Walkdown to Beatable Analyst Forecasts: The Roles of Equity Issuance and Insider Trading Incentives." *Contemporary Accounting Research* 19, (2004), pp. 885–924.

Sharpe, W. "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk." *Journal of Finance,* 19, (1964), pp. 425–442.

Shefrin, H. *A Behavioral Approach to Asset Pricing Theory*, (2005), Burlington, MA: Elsevier.

Shefrin, H. and M. Statman. "Making Sense of Beta, Size and Book-to-Market." *Journal of Portfolio Management*, 21, (1995), pp. 26–34.

Shefrin, H. and M. Statman. "The Style of Investor Expectations." In *The Handbook of Equity Style Management*, Coggin, T and Frank Fabozzi (eds.), (2003), Danvers, MA: John Wiley & Sons.

Solt, M. and M. Statman. "Good Companies, Bad Stocks." *Journal of Portfolio Management*, 15, (1989), pp. 39–44.

Ohlson, J. "Earnings, Book Values, and Dividends in Equity Valuation." *Contemporary Accounting Research,* 11, (1995), pp. 661–688.

Pastor, L., M. Sinha and B. Swaminathan. "Estimating the Intertemporal Risk-return Trade-off Using the Implied Cost of Capital." *Journal of Finance*, (2007), forthcoming.

Tversky, A. and D. Kahneman. "Judgment under Uncertainty: Heuristics and Biases." *Science*, 185, (1974), pp. 1124–1131.

Vissing-Jorgensen, A. "Perspectives on Behavioral Finance: Does 'Irrationality' Disappear with Wealth? Evidence from Expectations and Actions." *NBER Macroeconomics Annual*, 18, (2003), 139–194.

Welch, I. "Views of Financial Economists on the Equity Premium and on Professional Controversies." *Journal of Business,* 73, (2000), pp. 501–537.

Welch, I. "The Equity Premium Consensus Forecast Revisited." Cowles Foundation discussion paper No. 1325, (2001).