A Framework for Value Investing[*]

Seungmin Chee
Assistant Professor, University of Oregon

Richard Sloan
L. H. Penney Professor of Accounting, UC Berkeley

Aydin Uysal
Ph.D. Candidate, UC Berkeley

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Abstract:

This paper provides a framework for defining, formulating and evaluating value investment strategies. We define the relative value of an investment in terms of the prospective yield implied by the investment's current price and expected future cash flows. We develop an intuitive and parsimonious approach for estimating the prospective yield by aggregating cum-dividend expected earnings over a suitable forecast horizon. We also adapt this approach to construct a realized yield metric that can be used as a more direct alternative to realized security returns in evaluating value strategies. We illustrate how our framework can be used to evaluate existing measures of value, construct improved measures of value, and attribute the returns to an investment strategy to value versus other sources.

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1. Introduction

Value investing is perhaps the most popular and enduring style of investing. Yet, despite its popularity, the theoretical underpinnings of value investing have developed little since the pioneering work of Graham and Dodd (1934). In this paper, we propose a definition of the relative value of an investment that is both theoretically rigorous and practically appealing. We then develop an associated framework to facilitate the evaluation of competing measures of value, the construction of improved measures of value, and the attribution investment returns to value versus other sources.

We define the relative value of an investment in terms of the prospective yield implied by the current price of the investment and the expected future cash distributions to be received on the investment. We are obviously not the first to propose evaluating investments on their prospective yields. For example, there is a large body of literature investigating the prospective yields on common stocks, which are variously referred to as implied costs of capital, implied expected returns and implied discount rates (e.g., Gebhardt, Lee and Swaminathan, 2001; Claus and Thomas, 2001; Easton and Monahan, 2005). We build on this literature by using the prospective yield as a starting point for our analysis of value investing.

We begin by describing our approach for the estimation of prospective yields. Our approach is based on Ohlson's (1995) models of earnings-based valuation. Ohlson shows that a security's prospective yield can be approximated by the aggregate expected cum-dividend earnings yield over a sufficiently long horizon. Analysts frequently provide earnings forecasts for 3 or more years into the future and our empirical analysis suggests that aggregation periods of 2 years are usually sufficiently long for reasonable convergence in prospective yield approximations. Our approach builds on Easton, Harris and Ohlson (1992) who introduce the technique of aggregating realized cum-dividend earnings in order to mitigate errors in annual earnings. At a conceptual level, the main advantage of our approach is that it is less dependent on terminal value assumptions. At a practical level, it is based on the expected 'earnings power' of a security, which is a primary focus of sell-side security analysts and a basic tenet of value investing (e.g., Graham and Dodd, 1934, p. 350).

We derive a number of insights from our framework. First, we show that our closed form solution for the prospective yield, when computed using realizations of past earnings rather than expectations of future earnings, offers a natural metric for the *ex post* evaluation of value strategies. We refer to the thus-computed construct as the 'realized yield'. We reason that the realized yield is preferable to the realized return, because the realized return is affected by a broader set of new information arriving during the evaluation period, and this new information represents noise from the perspective of evaluating value strategies.

Second, armed with estimates of the market-consensus earnings expectations, we can use our framework to decompose realized stock returns into components attributable to (i) the market-implied prospective yield at the beginning of the period, (ii) earnings surprises relative to consensus, and (iii) the change in the market-implied prospective yield. Our approach is more direct, intuitive and parsimonious than previous approaches based on predictive regressions for expected returns (e.g., Vuolteenaho, 2002).

Our empirical analysis examines various implications of the framework using consensus analysts' forecasts to proxy for expected earnings and produces several significant insights. First, we demonstrate that variation in long-horizon security returns is dominated by fundamentals. Second, we show that our approach to estimating the prospective yield by aggregating expected earnings over several future years dominates existing approaches to measuring value. Thus, our analysis highlights significant opportunities for improvement in the relative value metrics used by academics and practitioners. Third, we use our framework to determine the source of variation in future stock returns to various investment strategies. This analysis produces some interesting insights. For example, we show that the book-to-market ratio is a relatively poor measure of value and that much of its predictive ability with respect to future stock returns appears to arise from other sources.

The remainder of the paper proceeds as follow. In the next section, we provide a brief overview of value investing, develop our framework for defining and evaluating value strategies and discuss the relation of our framework to previous research. Section 3 describes data and variable measurement. Section 4 presents our empirical results and section 5 concludes.

2. Development of Hypotheses

2.1 Overview of Value Investing

Value investing is perhaps the oldest and most popular style of investing. Yet, despite its popularity, the theoretical underpinnings of value investing are not well defined. The seminal treatise on value investing is Graham and Dodd (1934). They advise value investors to focus their attention on securities "which are selling below the levels apparently justified by careful analysis of the relevant facts" (see p. 13). They further encourage value investors to concern themselves with "the intrinsic value of the security and more particularly with the discovery of discrepancies between the intrinsic value and the market price" (see p. 17). Graham and Dodd argue that speculative factors cause market prices to deviate from intrinsic values and that there is an inherent tendency for the resulting disparities to correct themselves through the adjustment of price to value (see pp. 22-23). Thus, securities selling below intrinsic value are expected to generate superior long-term investment performance. Graham and Dodd recognize that intrinsic value is an elusive concept. In providing broad guidance for the determination of intrinsic value, they note that:

> "In general terms it is understood to be the value which is justified by the facts, e.g., the assets, earnings, dividends, definite prospects, as distinct, let us say, from market quotations established by artificial manipulation or distorted by psychological excesses. But it is a great mistake to imagine that intrinsic value is as definite and as determinable as is the market price. Some time ago intrinsic value (in the case of common stock) was thought to be about the same thing as "book value," i.e., it was equal to the net assets of the business fairly priced. This view of intrinsic value was quite definite, but it proved almost worthless as a practical matter because neither the average earnings nor the average market price evinced any tendency to be governed by the book value. Hence this idea was superseded by a newer view, viz., that the intrinsic value of a business was determined by its earnings power. But the phrase 'earnings power' must imply a fairly confident expectation of certain future results. It is not sufficient to know what the past earnings have averaged, or even that they disclose a separate line of growth or decline. There must be plausible grounds for believing that this average or this trend is a dependable guide to the future."
> [Graham and Dodd (1934, p. 17)]

Both academic research on value investing and common practical approaches to value investing have evolved relatively little since the pioneering work of Graham and Dodd. For example, Fama and French (1992) popularized the use of the book-to-market ratio as a measure of relative value and Lakonishok, Shleifer and Vishny (1994) use both the book-to-market ratio and the trailing annual earnings to price ratio as measures of relative value. Providers of value indices also use similar ratios in value index construction. Russell uses the book-to-market ratio, S&P use a weighted combination of the book-to-market, trailing annual dividend-to-price, trailing annual sales-to-price and trailing annual cash flow-to-price ratios and Dow Jones uses a weighted average of the book-to-market, consensus forecast of next year's annual earnings-to-price, trailing annual earnings-to-price and dividend-to-price ratios. The fundamentals in the numerators in each of the above ratios are intended to capture the intrinsic value of the security and are then divided by the market price to arrive at a measure of relative value, with higher a ratio signifying greater relative value. The fundamentals used by both academics and practitioners closely follow Graham and Dodd's guidance of estimating intrinsic value using either current book value or proxies for earnings power (e.g., past earnings, past dividends, past sales and consensus forecast of future earnings). This approach for identifying the relative value of a security ignores many value-relevant attributes including the timing of the future cash distributions, the risks associated with the cash distributions and the liquidity of the investment. Graham and Dodd (1934) acknowledge the existence of these other attributes and suggest either making relative value comparisons across a class of investments with similar attributes (pp. 57-63) or incorporating an appropriate 'margin of safety' in the yields of more risky and illiquid securities (p. 231). Value investing can therefore be summarized by the following three steps:

1. Forecast the future earnings power on each security using existing data pertaining to the security and underlying business (e.g., dividends, book value, earnings).
2. Estimate the expected yield on the security implied by its earnings power and the current market price. Henceforth, we refer to this as the 'prospective yield'.
3. Determine the relative value of each security by ranking on the prospective yield (with higher yields indicating greater value) and either:
    a. Classifying investments into groups with similar attributes; or
    b. Incorporating an appropriate 'margin of safety' in the yields of more risky and illiquid investments.

The first two steps involve an objective forecasting exercise with observable outcomes. The third step is inherently more subjective in nature. There is widespread disagreement about both the other attributes that are value relevant and the appropriate technology for incorporating these attributes into the valuation. The remainder of the paper therefore focuses on the prospective yield with specific application to common stocks.

2.2 A Framework for Value Investing

We accomplish several tasks in this section. First, we formally define the prospective yield over the life of an investment. Second, we derive a simple closed form solution for estimating the prospective yield using earnings expectations. Third, we introduce an *ex post* version of our prospective yield, which we refer to as the realized yield. We propose the realized yield as a more direct alternative to the realized stock return for the *ex post* evaluation of value strategies. Fourth, we show how our framework can be used to decompose realized stock returns into a component attributable to the prospective yield, a component attributable to unexpected earnings and a component attributable to changes in the prospective yield.

Our framework closely follows Ohlson (1995) and begins with the familiar dividend discounting valuation model:

$$V_t = \sum_{\tau=1}^{\infty} \frac{E_t[d_{t+\tau}]}{(1+r)^{\tau}}$$

where

V_t = the intrinsic value of the investment at the end of period t

d_t = the net cash distribution paid by the investment at the end of period t

r = the appropriate discount rate

$E_t\,[.]$ = the expected value operator conditioned on information available at the end of period t.

A major issue in the implementation of the dividend-discounting model is the specification of the appropriate discount rate. As described in the previous section, the value investor addresses this issue by substituting the market price at the end of period t (denoted P_t) for V_t and then solving for the market-implied discount rate, which we refer to as the prospective yield, y_t:

$$P_t = \sum_{\tau=1}^{\infty} \frac{E_t[d_{t+\tau}]}{(1+y_t)^{\tau}}$$

While this formula mirrors the standard dividend-discounting model, P_t replaces V_t and we solve for the prospective yield, y_t, that sets the discounted value of the expected future cash distributions equal to the market price at the end of period t. The prospective yield is analogous to the implied cost of capital construct developed in previous research (e.g., Gebhardt, Lee and Swaminathan, 2001)[1].

The major challenge in estimating y_t is in forecasting the expected future cash distributions. Practitioners typically focus on forecasting earnings in place of cash flows. Ohlson (1995) formalizes this substitution by noting that cash distributions on equity securities are paid out of the undistributed contributed capital and accumulated past undistributed earnings of the firm, as defined by the accounting 'clean surplus' relation:

$d_t = BV_{t-1} + X_t - BV_t$

[1] We discuss the relation of our approach to the implied cost of capital literature in more detail in the next section.

where

BV_t = accounting book value of the security at the end of period t

X_t = accounting earnings generated during period t

A firm's accounting earnings is an estimate of the additional capital generated by its operations over the course of a period. Since firms typically reinvest a substantial portion of internally generated capital, accounting earnings provides a relatively timely measure of the new capital that has been generated by a firm's operations and will ultimately be distributed to investors. Substitution of the clean surplus relation into the dividend discounting model allows the prospective yield to be expressed in terms of current price and expected earnings. In particular, Ohlson (1995, p. 674) shows that if we define:

$$P_t^T \equiv \frac{E_t[Z_{t+T}^T]}{(1+y_t)^T - 1}$$

where

$$Z_{t+T}^T = \sum_{\tau=1}^{T} X_{t+\tau} + \sum_{\tau=1}^{T-1} (1+r_f)^{T-\tau} d_{t+\tau}$$

r_f = the risk free rate

then $P_t^T \rightarrow P_t$ as $T \rightarrow \infty$. Thus, for sufficiently large T, the prospective yield can be approximated as:

$$y_t \cong \left(\frac{E_t[Z_{t+T}^T]}{P_t} + 1\right)^{\frac{1}{T}} - 1$$

This expression provides a parsimonious closed form solution for the prospective yield. Note that $E_t[Z_{t+T}^T]$ is the expected aggregate cum-dividend earnings over the next T periods, thereby formalizing Graham and Dodd's intuition that the key input required for the assessment of the relative value of a security is the indicated earnings power.[2] There are two important issues associated with the implementation of this solution. First, for finite T, it is only an approximation. It therefore becomes an empirical matter as to whether this approximation proves useful for practical values of T. Second, $E_t[Z_{t+T}^T]$ explicitly incorporates forecasts of future dividends. This begs the question of why we benefit from recasting the dividend discounting valuation model in terms of accounting earnings. To understand

[2] See Graham and Dodd (1934) p. 354 and p. 429.

why, first note that $E_t[Z_t^T]$ only includes an adjustment for the return generated from reinvesting any dividends paid before the end of period t+T. If a security is not expected to pay a dividend during the next T-1 periods, then no forecast of future dividends is required. Intuitively, recasting the valuation model in terms of earnings is helpful when most earnings are expected to be reinvested for the foreseeable future. Since most firms reinvest the majority of their earnings, recasting the valuation model in terms of earnings allows for more of the information about the present value of future dividends to be captured in a finite forecast horizon.

We are now in a position to use our closed form solution for the prospective yield to develop some tools for evaluating value investing. To simplify notation, we begin by assuming that T=1 and that our closed form solution is an equality. With these assumptions, the task of the value investor is to forecast:

$$y_t = \frac{E_t[X_{t+1}]}{P_t}$$

This suggests that the performance of a value strategy can be directly evaluated using the realized yield, Y_{t+1}, where:

$$Y_{t+1} = \frac{X_{t+1}}{P_t}$$

Note that the realized yield provides a practical alternative to the realized stock return for evaluating value strategies, because it only focuses on that part of the realized return that the value investor set out to forecast. The realized stock return is also influenced by the end of period stock price, which may also be impacted by changing expectations of earnings beyond period t+1 and by changes in the prospective yield.

To better understand the determinants of realized stock returns, we can extend the framework to decompose realized stock returns into the prospective yield, an unexpected return attributable to news about future fundamentals and an unexpected return attributable to changes in the prospective yield. The market price at the beginning of period t+1 can be expressed as:

$$P_t = \frac{E_t[X_{t+1}]}{y_t}$$

While the market price at the end of period t+1 can be expressed as:

$$P_{t+1} = \frac{E_{t+1}[X_{t+2}]}{y_{t+1}}$$

If we define

$$\Delta E_{t+1}[X] = \frac{E_{t+1}[X_{t+2}] - E_t[X_{t+1}]}{E_t[X_{t+1}]}$$

and

$$\Delta y_{t+1} = \frac{y_{t+1} - y_t}{y_{t+1}}$$

Then it follows that the realized return between period t and period t+1 is:

$$R_{t+1} = \frac{P_{t+1} + d_{t+1}}{P_t} - 1 = \Delta E_{t+1}[X] - \Delta y_{t+1} - \Delta E_{t+1}[X] * \Delta y_{t+1} + \frac{d_{t+1}}{P_t}$$

And if we further define the realized fundamental return, F, as:

$$F_{t+1} = \Delta E_{t+1}[X] + \frac{d_{t+1}}{P_t}$$

Then the realized stock return can be decomposed as follows:

$$R_{t+1} = y_t + [F_{t+1} - y_t] - \Delta y_{t+1} - \Delta E_{t+1}[X] * \Delta y_{t+1}$$

This final expression reveals the three key drivers of the period t+1 realized stock return. First, we have the prospective yield or expected return, y_t. Second, we have the unexpected fundamental return, $[F_{t+1} - y_t]$. Note that the realized fundamental return, F_{t+1}, equals the sum of realized earnings growth plus realized dividend yield. In the absence of a dividend payout, earnings are expected to grow at a rate equal to the prospective yield. Conversely, with a 100% payout ratio, earnings growth is expected to be exactly zero. The third driver of the return is the change in the prospective yield, Δy_{t+1}, with increases in yields driving returns down. There is also a fourth term reflecting the interaction of earnings growth with the change in the prospective yield. This framework allows an investor who is armed with expectations of future earnings to decompose realized returns into their 3 key drivers.

The preceding analysis hinges critically on our assumptions that T=1 and that no dividends are paid before the end of the period. The framework is readily extended to cases where T>1 and dividends are paid in the interim. For T>1, we simply replace $E_t[X_{t+1}]$ with $E_t[Z_{t+T}^T]$, where

$$Z_t^T = \sum_{\tau=1}^{T} X_{t-T+\tau}$$

In cases where the security is expected to pay dividends, we must forecast the earnings that would have been generated from the reinvestment of dividends paid before the end of period T. This approach has been previously applied by Easton, Harris and Ohlson (1992). We follow Easton et al. in assuming that dividends are reinvested at the risk free rate.[3] The T period aggregate cum-dividend earnings ending in period t, denoted Z_t^T, is approximated as:

$$Z_t^T \cong \sum_{\tau=1}^{T} X_{t-T+\tau} + \sum_{\tau=1}^{T-1} d_{t-T+\tau}\left[\left(\prod_{\varphi=\tau}^{T-1}(1+r_{f,t-T+1+\varphi})\right)-1\right]$$

where

$r_{f,t}$= the risk free rate for period t

Substituting $E_t[Z_{t+T}^T]$ for $E_t[X_{t+1}]$ in our expression for y_t gives the following expression for the one period prospective yield using T periods of aggregate earnings:

$$y_t^T = \left(1+\frac{E_t[Z_{t+T}^T]}{P_t}\right)^{\frac{1}{T}} - 1$$

We can also measure the realized yield, Y_{t+T}^T, by substituting Z_{t+T}^T for $E_t[Z_{t+T}^T]$:

$$Y_{t+T}^T = \left(1+\frac{Z_{t+T}^T}{P_t}\right)^{\frac{1}{T}} - 1$$

Similarly, we can decompose the realized stock return over any T period interval into the prospective yield, the unexpected fundamental return and the change in the prospective yield by substituting $E_t[Z_{t+T}^T]$ for $E_t[X_{t+T}]$ in our preceding analysis.

Our framework hinges on the assumption that T is sufficiently large to summarize information about the prospective yield. Formally stated, this requires that:

$$y_t^T \cong y_t^{T+s}, \quad 0 \le s \le \infty$$

Intuitively, expected cum-dividend earnings for the next T periods must exhaust available information pertaining to the present value of expected future cash distributions. T=one year is clearly insufficient. For example, earnings can display predictable multi-year cycles and new product innovations can take more than one year to be reflected in earnings. For this reason, sell-side analysts often forecast earnings

[3] A natural alternative is to assume that dividends are reinvested at the prospective yield. This alternative has two limitations. First, we no longer have a closed form solution for and must use an iterative search procedure to the resulting polynomial. Second, and perhaps more importantly, this alternative does not represent an implementable investment strategy, since it essentially assumes that dividends can be reinvested at the hypothetical intrinsic value of the security rather than the actual market price.

for several years into the future. On the other hand, analysts rarely forecast earnings beyond 5 years into the future, suggesting that in the majority of cases, T=5 years will be sufficient for reasonable convergence. This is ultimately an empirical issue and so we defer further discussion until our empirical tests.

2.3 Summary and Implications

Our framework has a number of implications for both research and practice. We summarize the implications in this section and provide a more detailed comparison with existing literature in the next section.

(i) The prospective yield provides a theoretical basis for measuring the relative value of competing investments. Note that the prospective yield only considers the expected return implied by the current price and expected future cash distributions. It ignores other potentially value-relevant attributes including the risk, the timing of the expected cash distributions and the liquidity of the investment. The value investor can either directly compare the prospective yields on investments that are similar with respect to these other attributes.

(ii) We provide a simple closed-form solution for estimating the prospective yield over finite forecasting horizon:

$$y_t^T = \left(1 + \frac{E_t[Z_{t+T}^T]}{P_t}\right)^{\frac{1}{T}} - 1$$

This solution relies only on the clean surplus relation and the assumption that T is sufficiently large to summarize information about the prospective yield.

(iii) We propose a new diagnostic for the ex post evaluation of competing measures of relative value. We refer to this diagnostic as the realized yield, Y_{t+T}^T, where:

$$Y_{t+T}^T = \left(1 + \frac{Z_{t+T}^T}{P_t}\right)^{\frac{1}{T}} - 1$$

We show that for finite T, the realized yield allows for a more direct evaluation of a value strategy than the corresponding realized market return, because the realized security return is also impacted by new information about future fundamentals and changing expected returns.

(iv) The realized market return and the realized yield must converge over the life of a security, so these two types of return are predicted to be more highly correlated over longer investment horizons.

(v) We provide a parsimonious decomposition of the realized stock return into the prospective yield, the unexpected fundamental return and the change in the prospective yield. For example, if we use the consensus sell-side analysts' forecasts of future earnings to perform the decomposition, we can attribute the returns on any investment strategy to (i) consensus-implied prospective yield at the beginning of the period, (ii) consensus earnings surprise over the period, and (iii) changes in the consensus-implied discount rate during the period.

2.4 Relation to Prior Work

Our framework for value investing and the associated empirical implications are related to several areas of existing work. First, many of the insights from our framework are anticipated by the classic works on value investing. This is no coincidence, as our framework is designed to formalize such insights. Second, our analysis of the prospective yield is closely related to the large body of academic research on the implied cost of capital. Third, our decomposition of the realized market return into the fundamental return and the change in the expected return is related to a large body of research that decomposes realized market returns into cash flow news and discount rate news. We discuss these relations in more detail below.

2.4.1 Classic Works on Value Investing

Our framework is inspired by and formalizes some of the key intuition expressed in Graham and Dodd (1934). First, our approach to estimating the prospective yield parallels Graham and Dodd's approach to estimating the intrinsic value based on the indicated 'earnings power' (p. 17). Graham and Dodd define earnings power as "what the company might be expected year after year" (p. 354). Our approach of cumulating forecast earnings over multiple future years parallels closely with their concept of forecasting long-run earnings power. Our framework also distinguishes between fundamental versus non-fundamental determinants of security prices and demonstrates that news about fundamentals is the long-run determinant of investment returns. Graham and Dodd explicitly recognize the role of non-fundamental sources of stock price movement as follows "the market is a voting machine, whereupon countless individuals register choices which are the product partly of reason and partly of emotion" (1934, p. 23). Our fundamental return measure, F, captures the portion of the realized stock return that is the product of 'reason', thus allowing us to extract and analyze the portion of the stock return that is driven by 'emotion'.

Our framework also formalizes Keynes' (1953) arguments that while the long-run valuation of a security depends on its prospective yield, the short run price is 'liable to change violently as a result of the sudden fluctuation of opinion due to factors which do not really make much difference to the prospective yield' (p. 154). Keynes therefore distinguishes between 'the term speculation for the activity of forecasting the psychology of the market, and the term enterprise for the activity of forecasting the prospective yield of assets over their whole life' (p. 158).

Finally, our framework formalizes and extends Bogle and Swensen's (2009) decomposition of realized stock returns into a fundamental component and a speculative component. Bogle and Swensen apply their decomposition to aggregate market indices and identify three determinants of realized returns (p. 53):

1. The dividend yield at the beginning of the period
2. The earnings growth rate over the period
3. The change in the price earnings ratio during the period.

They identify the first two determinants as the drivers of the fundamental component of returns and the third determinant as the speculative component of returns. Note that this is just a more restricted version of our framework and their fundamental component of returns corresponds closely to ours. Their framework is more restrictive in that it requires fixed payout ratios and earnings growth rates. Bogle and Swensen apply their analysis to aggregate market indices, where the assumptions of stable payout ratios and earnings growth rates are reasonable. Our framework instead relies simply on earnings aggregation, making it more suitable for application to individual stocks, where their assumptions can be more troublesome (e.g., a stock that isn't currently paying a dividend). Bogle and Swensen's main conclusion also mirrors a key implication of our framework: 'As the time frame increases from a single year to a 25-year period, the powerful influence of short-term speculation recedes, and investment returns conform much more closely, if not precisely, to the investment fundamentals: dividend yields and earnings growth.

Implied Cost of Capital Literature

Our analysis is also closely related to the large body of previous research on the implied cost of capital (e.g., Gebhardt, Lee and Swaminathan, 2001; Claus and Thomas, 2001). At a theoretical level, our prospective yield measure is equivalent to the implied cost of capital measure. Where our analysis differs is in the approach for estimating this measure. The implied cost of capital literature generally employs discrete estimates of 'flows' (dividends, free cash flows or abnormal earnings) for several future annual periods and assumes a terminal growth rate for the final period's flow. A numerical search procedure is often used to solve the resulting polynomial for the implied cost of capital. We, in contrast, cumulate estimates of cum-dividend earnings over several future annual periods. Our approach differs from previous research in that we don't apply terminal period assumptions to the terminal period flow. Instead, we rely on the process of earnings aggregation over the entire forecast horizon.[4] This approach makes more efficient use of information from the entire forecast horizon and is less susceptible to forecasting errors in the terminal period flow. The existing literature has had limited success in coming up with measures of the implied cost of capital that can forecast realized returns, and this has been attributed to the naïve reliance on analysts' inefficient and biased earnings forecasts in the computation of terminal values (e.g., Easton and Monahan, 2005). Since our approach is less susceptible to these problems, we expect that the resulting estimates of the prospective yield will better forecast realized returns.

2.4.2 Return Decomposition Literature

Our analysis is also related to the large body of research that attempts to decompose stock returns into cash flow news and discount rate news. Shiller (1981) pioneered this literature by documenting that the variability of stock price indices cannot be accounted for by information about future dividends, because dividends do not vary enough to justify price movement. Shiller assumed a constant discount factor and subsequent research explores whether variability in stock prices can also be attributed to news about discount factors. The most common approach to return decomposition was originally proposed by Campbell and Shiller (1988) and Campbell (1991) and extended by Vuolteenaho (2002). This approach selects and handful of state variables to predict expected returns. The usual approach involves estimating a first order vector autoregression using a small number of predictive variables and monthly/annual data. Vuolteenaho, for example, uses realized returns, book-to-market ratio and return on equity as predictive variables. The expected return forecasts and associated persistence parameters are used to infer discount rate news and the residual is assigned to cash flow news. While theoretically appealing, this approach hinges critically on the specification of the predictive model. Chen and Zhao (2009) show that it is sensitive to the state variables chosen and can yield counterintuitive results. For example, they demonstrate that a seemingly reasonable implementation of this approach leads to the unappealing conclusion that variation in US Treasury bond returns is driven primarily by cash flow news.

Our approach differs from the above approach in several respects. First and foremost, we directly estimate the fundamental news. Second, we incorporate explicit forecasts of future fundamentals for

[4] Easton and Monahan (2005) employ several approaches to estimate the implied cost of capital. One approach aggregates analysts' forecasts of earnings over the next two years and so mirrors our approach. They find that this approach is relatively successful in forecasting future stock returns.

several years into the future, thus avoiding the reliance on a first order VAR using annual data. Third, our approach requires fewer subjective assumptions regarding model specification. In our empirical work, we simply use analyst consensus forecasts to estimate cash flow news. Our approach to return decomposition is also closely related to Chen and Zhao (2008). They also directly estimate cash flow news from analysts' forecasts. Their approach, however, parallels the approach used in the implied cost of capital literature and suffers from the same limitations as mentioned in the previous subsection. In particular, their approach is very dependent on the terminal year assumptions.

Our approach to return decomposition is also related to Daniel and Titman (2006). They decompose the 5-year stock return into a component that can be attributed to tangible information and a component that can be attributed to intangible information. Their approach for estimating tangible information involves regressions of the realized stock return on the cum-dividend growth in book value over the same period. They find that future stock returns are unrelated to the tangible component of the return and negatively related to the intangible component of the return. Their decomposition of returns into a tangible component corresponds to our decomposition of returns into a fundamental component. The key difference between the two studies is that we use the change in analysts' earnings expectations for estimating the fundamental component.

Finally, our study builds on the research of Easton, Harris and Ohlson (1992). They pioneer the approach of aggregating earnings over multiple years for the purpose of reducing measurement errors in earnings and they demonstrate that aggregating realized earnings and returns over longer periods increases their contemporaneous association. We build on their work by embedding their idea of earnings aggregation into a structured valuation framework and applying it to value investing.

3. Data and Variable Measurement

We use three main sources of data for this study. Historical accounting data are obtained from the COMPUSTAT files, stock return data are obtained from the CRSP daily files and analyst forecast data are obtained from I/B/E/S files. For empirical analysis that does not require analysts' forecasts, we use annual financial data from 1962 to 2012. If the analysis calls for analyst forecast data, we use annual financial data from 1983 to 2012. We use all available observations with the necessary data for each analysis, causing our sample size differs across analyses depending on the measurement interval and variable availability. Hence, we report sample sizes separately for each of our analyses. Financial firms are excluded from the sample. Table 1 summarizes the measurement of each of our variables and we expand on this summary below.

3.1 Realized Yield Estimates and Earnings Measured over Horizons beyond One Year

We measure all variables on a per-share basis, adjusted for stock splits and stock dividends as of the end of our sample period. Our tests use earnings measured before extraordinary items. To estimate the realized yield over *T* periods ending in period *t*, denoted Y_t^T, we first cumulate earnings over *T* periods ending in period *t* (X_t^T), where *T* varies from one to five years.

When dividend payments occur during the earnings measurement interval, we calculate the cumulative cum-dividend earnings (Z_t^T) by adding the hypothetical earnings that would have been generated on these dividends between the time of the dividend payment and the end of the measurement interval. We assume that the reinvested dividends earn the risk-free rate and use the realized one month T-bill rate as the risk-free rate.[5] Additionally, we assume that any dividends paid during fiscal year t-τ are paid half way through each fiscal year. For example, any dividends paid out during fiscal year t-τ are assumed to be reinvested for τ years and six months. The weighted average common shares outstanding over the measurement interval are used as a deflator for the *T* period cumulative cum-dividend earnings.

3.2 Prospective Yield Estimates and Analyst Consensus Forecasts of Future Earnings

We construct our prospective yield estimates using analyst consensus forecasts of future earnings. We do not claim that these forecasts represent efficient forecasts of future earnings. As a practical matter, we simply follow previous research in using these forecasts as proxies for earnings expectations. To the extent these forecasts are inefficient, our prospective yield estimates will be compromised.

To estimate the prospective yield at time *t*, denoted y_t^T, we first aggregate *T* years of analyst consensus forecasts of future earnings, $E_t[X_{t+T}^T]$. We select the I/B/E/S consensus forecasts of earnings 3 months after the fiscal year end of year *t*. For years without an explicit consensus forecast of earnings, we estimate future earnings using the consensus analyst long-term earnings growth forecast.

We calculate aggregate *T*-year of cum-dividend forecast earnings, $E_t[Z_{t+T}^T]$ by adding earnings that would be generated from the reinvestment of future dividends during *T* years of forecasting period. We forecast future dividends by applying the time *t* dividend payout ratio to the forecasts of earnings from year *t+1* through t+*T*. The dividend payout ratio is computed as dividends paid during year *t*

[5] Similar results are obtained if the one-month T-bill rate is replaced with three-month T-bill rate or a 5% fixed annual rate.

deflated by the I/B/E/S actual earnings for year *t*. If the dividend payout ratio is negative due to negative earnings, we use a payout ratio of zero. Dividends are assumed to be reinvested to earn the one month T-bill rate at time *t* and are assumed to be paid half way through the year.[6]

3.3 Realized Stock Returns

Realized stock returns are computed as raw buy-hold returns inclusive of dividends and any liquidating distributions. The return cumulation period begins three months after the fiscal year-end. If a stock is delisted during the return window, the CRSP delisting return is included in the buy-hold return.

4. Results

We present our results in 4 subsections. In the first subsection, we examine the properties of realized yields. The second subsection examines the properties of prospective yields, where prospective yields are estimated using sell-side analysts' forecasts of future earnings. The third section employs our realized yield framework to evaluate alternative measures of value. The fourth subsection uses our return decomposition to examine the relative importance of fundamentals in determining stock returns and to explore the source(s) of some well-known return anomalies.

4.1. Properties of Realized Yields

The realized yield represents the construct that we propose for use in the *ex post* evaluation of value strategies. It is constructed by deflating aggregated realized future cum-dividend earnings per share by current stock price. We begin our examination of realized yields with the components making up the aggregate cum-dividend earnings. Table 2 reports with descriptive statistics on aggregate realized ex-dividend earnings (X_t^T), earnings on dividends ($\mathrm{d} \cdot \mathrm{r_f}$) and cum-dividend earnings (Z_t^T) for aggregation periods ranging from 1 to 5 years. Note that all amounts are computed on a per share basis. There are two important points to note from table 2. First, earnings on dividends constitute an insignificant part of aggregate cum-dividend earnings at the 1 year measurement interval, but become relatively larger at longer intervals. Nevertheless, the median values indicate that earnings on dividends constitute less than 1% of aggregate cum-dividend earnings even using a 5 year interval. Thus, as a purely practical matter, the dividend adjustment is generally insignificant for the aggregation periods that we consider. Second, the median values of aggregate cum-dividend earnings grow in approximate proportion to the length of

[6] Similar results are obtained if the one-month T-bill rate is replaced with three-month T-bill rate or a 5% fixed annual rate.

the measurement interval, but the mean values grow at a much faster rate. In particular, mean cum-dividend earnings grow from 0.108 at the 1 year interval to 1.668 at the 5 year interval. The difference between the mean and median results likely reflects the presence of a small number of firms with strong and persistent earnings growth rates. The presence of such firms highlights the importance of using an earnings aggregation interval that is sufficient to exhaust opportunities for predictable earnings growth.

Table 3 presents descriptive statistics for the realized yield computed by deflating the aggregate cum-dividend earnings realizations from table 2 by beginning of period price. The realized yields are annualized to facilitate comparability across different aggregation periods. Panel A of table 3 reports statistics on the distribution of the realized yields. The distributions are reasonably symmetrical and stable across aggregation periods. Using a 1-year measurement interval, the mean (median) prospective yield is 7.2% (6.4%). As the aggregation interval increases, the realized yields decrease slightly, reaching 6.3% (6.2%) using the 5 year measurement interval. This is suggestive of weak negative serial correlation in annual earnings, such that using longer aggregation periods eliminates negatively serially correlated noise from realized yields (see also Easton, Harris and Ohlson, 1992).

Panel B of table 3 provides an analysis of how the realized yield changes as we lengthen the aggregation period. It reports descriptive statistics for the change in the realized yield from adding an extra year to the aggregation period used to compute the realized yield. If the realized yield shows little change from adding more distant forecasts, short-term earnings must be sufficient for summarizing long-run earnings power. Our main focus on this table is therefore on measures of dispersion. The standard deviation of the change in yield in moving from a 1 year aggregation period to a 2 year aggregation period is 0.071. Given that the mean realized yield is around 0.070, a change of this magnitude is clearly significant. Adding successive years to the aggregation period gradually reduces the standard deviation to 0.028 when moving from a 4 year to a 5 year aggregation period. While much smaller, a change of this magnitude is economically significant. It is therefore clear that realized yields have not stabilized at a 5 year aggregation period. This result indicates that operating performance changes through time in ways that are not anticipated by short-term earnings.

Table 4 contrasts the properties of realized yields to those of realized stock returns. Recall that we propose using realized yields as an alternative to realized stock returns in the evaluation of value strategies. For realized yields to be useful, stock returns must contain superfluous factors that are irrelevant for evaluating value strategies. Since the realized return and the realized yield must converge in the long run, we therefore expect realized stock returns to be relatively more volatile over shorter aggregation periods. The results in table 4 are consistent with this expectation. Using a 1-year aggregation period, the standard deviation of realized stock returns is 0.574, as compared to 0.135 for realized earnings yields. As the aggregation period increases, realized returns become relatively less volatile. With a 5-year aggregation period, the standard deviation of realized returns has dropped to 0.190 as compared to 0.083 for realized yields. Moreover, the correlation between realized returns and realized yields is also monotonically increasing in the return measurement interval. The correlation is only 0.207 with 1-year aggregation, but jumps to 0.622 with 5-year aggregation.

The results in table 4 are consistent with the presence of significant superfluous factors in realized returns relative to realized yields. Moreover, the fact that the standard deviation of the realized return is still substantially larger than that of the realized yield using 5-year aggregation suggests these superfluous factors can take many years to reverse.

4.2. Properties of the Prospective Yields

The prospective yield represents the construct that we propose to use for the *ex-ante* evaluation of value strategies. We begin by noting that if one accepts the proposition that the relative value of an investment can be measured by its prospective yield, then the key hurdle that we face in measuring relative value is the estimation of the unobservable expected future cum-dividend earnings that make up the numerator of the prospective yield. In this paper, we use sell-side analyst consensus forecasts of future earnings to proxy for expected future earnings. To the extent that these forecasts are biased and inefficient, our results will be compromised. Since sell-side analyst forecasts are known to be biased and inefficient (e.g., Hughes, Liu and Su, 2008), we incorporate this caveat when interpreting our results. We can nevertheless answer some significant questions using analysts' forecasts to proxy for earnings expectations. First, we can provide direct evidence on the aggregation period that is required to exhaust available information about the prospective yield from analysts' forecasts of future earnings. Second, we can determine whether our estimates of the prospective yield are superior to existing measures of value in their ability to predict future realized yields and future stock returns. Third, we can use our proxies for the prospective yield as a starting point for a return decomposition.

Table 5 replicates the analysis in table 2 using analysts' forecasts of earnings and dividends in place of actual realizations of earnings and dividends. Note that the analysis in table 5 can only be performed on the subsample of firms for which analysts' forecasts are available. It is therefore restricted to the period from 1983 to 2012 and covers a subsample of relatively large and liquid firms. The mean and median values of the per-share earnings and dividend numbers are therefore much larger than in table 2. The standard deviations of the earning numbers in table 5, in contrast, tend to be smaller. There are at least two explanations for this result. First, much of the ex post variation in realized earnings is unpredictable. Second, analysts often exclude what they perceive to be 'transitory' components from their earnings forecasts (e.g., special items). The other point of note from table 5 is that there is stronger evidence of earnings growth using the forecasts in table 5 compared to the realizations in table 2. For example, median aggregate cum-dividend earnings grow from 1.020 over the one year interval to 2.260 over the two year interval, implying an annualized growth rate of 22%. This result can be attributed to the well-documented optimistic bias in sell-side analysts' longer-term earnings forecasts (e.g., Bradshaw, Richardson and Sloan, 2006). These results highlight a shortcoming of using sell-side analysts' long-term earnings forecasts to construct estimates of the prospective yield. To the extent that the underlying forecasts are optimistic, the corresponding estimates of the prospective yield will be upwardly biased.

Table 6 corresponds to table 3, but reports statistics on the prospective yield in place of the realized yield. The prospective yield estimates are computed by deflating the aggregate cum-dividend earnings estimates from table 5 by beginning of period price and annualizing the resulting yields. Panel A of table 6 reports statistics on the distribution of the prospective yield estimates. The distributions are reasonably symmetrical and stable across aggregation periods. Using a 1-year measurement interval, the mean (median) prospective yield is 7.0% (6.6%). As the aggregation interval increases, the prospective yield estimates gradually increase until they reach 8.6% (8.0%) using the 5 year measurement interval. The increases in the prospective yield estimates as we move to longer horizons are likely a consequence of the previously discussed optimism in analysts' longer-term earnings forecasts.

The interquartile range for the prospective yields spans an economically plausible range of values for expected equity returns. For example, using a one-year aggregation period, the lower quartile is 4.6% and the upper quartile is 9.0%. The corresponding interquartile range for the annualized 3 month T-bill rate over our sample period was 3.3% to 5.7%. Thus, this range allows for a positive but modest equity premium. The extreme tails of the distribution, however, look more implausible. The 1st percentile is -6.7%, while the 99th percentile 23.8%. These extreme tails likely reflect a small number of cases where analysts' short-term earnings forecasts deviate significantly from investors' expectations of long-run earnings power. Consistent with this explanation the range of prospective yield estimates narrows as we move to longer aggregation periods.

Panel B of table 6 provides an analysis of how our prospective yield estimates change as we lengthen the aggregation period. If analysts' short-term earnings' forecasts do a poor job of capturing their expectations of long-run earnings power, then we should observe significant changes in prospective yields as the earnings aggregation period is extended. In contrast, however, we observe that changes in annualized prospective yield from extending the aggregation period are very small. The mean change in going from a one to a two year aggregation is 0.005. This likely reflects the optimism in longer-term forecast discussed earlier. The interquartile range is only 0.005 and the standard deviation is only 0.011. The dispersion of the yield changes becomes even smaller for longer aggregation periods. Moving from a 4 to a 5 year aggregation period, the interquartile range is 0.003 and the standard deviation is 0.005. These results contrast with the much larger dispersion of the realized changes in table 3. These results tell us that while realized yields change as we aggregate earnings further into the future, most of these changes are not anticipated in analysts' earnings forecasts. There are two possible explanations for this finding. First, investors have little ability to forecast long-run earnings power over and above what is reflected in short-term earnings expectations. Second, analysts' forecasts of longer-term earnings may be simple extrapolations of their short-term earnings forecasts and are poor proxies for investors' actual long-term earnings expectations. But at least as far as analysts' earnings forecasts are concerned, these results suggest that aggregation periods of 4-5 years are sufficient to summarize relevant information about the prospective yield.

4.3. Evaluating Alternative Measures of Value

In this section, we evaluate several popular measures of relative value using our framework. We first look at the relation between each of the measures and realized returns over the next 5 years, R_t^5. We then look at the relation of the measures with the realized yield over the next 5 years, Y_t^5. Finally, we look at the relation between each of the measures and the component of the realized stock returns that is unrelated to the realized yield. A pure measure of relative value should only forecast the Y_t^5 component of R_t^5. But it is also possible that some existing measures of relative value could incidentally forecast other determinants of R_t^5. In this latter case, looking at their relation with R_t^5 alone overstates their effectiveness as a measure of relative value.

Table 7 reports descriptive statistics for common measures of relative value. Note that since these tests use five years of future returns data and employ analysts' earnings forecasts, the sample used in these tests is restricted to firm-years from 1993 to 2012 for which analysts' earnings forecasts are available, a total of 31,125 firm years. The measures of relative value we use are the prospective yield metric developed in this paper (*y*) book-to-market ratio (*B/M*), the trailing annual earnings-to-price ratio (*E/P*), the trailing annual dividend-to-price ratio (*Div/P*), the trailing annual sales-to-price ratio (*Sales/P*) and the trailing annual cash flow to price ratio (*CF/P*). We also include two additional measures that are well known to predict future stock returns but are not traditional measures of relative value. The first is the accounting accruals variable from Sloan (1996), *Accrual*, measured as the ratio of the change in non-cash working capital over the past year to average total assets. *Accrual* is interesting in our context, because the numerator is an important component of earnings, suggesting that it should be positively related to traditional measures of value. Yet at the same time, Sloan (1996) demonstrates that *Accrual* is negatively related to future stock returns because it is negatively related to predictable changes in future earnings that are not anticipated by investors. The second additional variable is the past 5 year stock return, R_{t-5}^{5}, motivated by the evidence of long-term return reversals in De Bondt and Thaler (1985). While this is a contrarian measure, it does not contain any fundamental information, and so it would be surprising to find that it has a strong relation with the future realized yield. Instead, its return predictability is more likely to arise from temporary dislocations in prospective yield (i.e., situations where the prospective yield has temporarily increases or decreased).

Panel B of table 7 reports correlations between the various measures. We include measures of the prospective yield employing forecast earnings aggregation periods from 1 year (y_{t-5}^{1}) to 5 years ($y_{t-5}^{5,ltg}$). The presence of '*ltg*' as a superscript in the prospective yield signifies the use of the analyst long-term earnings growth forecast to substitute for the lack of explicit earnings forecasts in years 2 through 5. Not surprisingly, the correlations between the prospective yield measures using different forecast horizons are all extremely high. These results follows directly from the finding in table 6 that using longer aggregation periods to estimate the prospective yield makes little difference. All the prospective yield measures are also positively correlated with both future realized stock returns and future realized yields. Consistent with future realized yield providing a more direct ex post diagnostic for value, we find that the correlations with the realized yield are uniformly higher than with the realized return.

If analysts' long-run earnings forecasts provide more information about long-run future earnings, we would expect the measures of the prospective yield to improve as we aggregate earnings expectations further into the future. As a practical matter, however, the correlations with both future realized returns and future realized yields are highest for y_{t-5}^{2}. This is the measure of the prospective yield that aggregates explicit forecasts of earnings for the next two years, but does not use the long-term growth rate forecast.

As discussed earlier, this likely reflects the fact that analysts' longer-term forecasts tend to be optimistic and inaccurate (see Easton and Monahan, 2005; Bradshaw, Drake , Myers and Myers, 2011). For brevity, we therefore report subsequent results using only y^2_{t-5} to measure the prospective yield. In doing so, we emphasize that we are not ruling out the possibility of a significant role for more efficient forecasts of long-run earnings in the computation of the prospective yield. This is a simply a pragmatic decision on our part, since sell-side analysts' longer-run earnings forecasts are inaccurate and add noise.

The correlations between the other measures of relative value are all significantly positive, and range from a low of 0.229 (Pearson correlation for *Div/P* and *Sales/P*) to a high of 0.629 (Spearman correlation between *B/M* and *Sales/P*). It is also interesting to see that *Accrual* is positively correlated with *E/P* even though it is negatively related to future stock returns. Finally, we see that R^5_{t-5} is particularly strongly negatively related to *B/M*. This is interesting because *B/M* is difficult to motivate as a yield proxy. Instead, it seems that it joins R^5_{t-5} in identifying temporary dislocations in the prospective yield, with a high B/M identifying a temporarily high prospective yield.

Panel A of table 8 reports results for regressions of the five year ahead cumulative stock return, R^5_t on the measures of relative value computed as of the beginning of the 5-year return measurement interval. We first report regressions for each measure and we then report multiple regressions using combinations of measures. All measures of relative value load with the predicted positive sign and are statistically significant. Considered individually, y^2_{t-5}, has the greatest association with future stock returns. *Accrual* and $R^5_{t-5}$are both significantly negatively related to future stock returns, as documented by prior research. The final row considers all measures together. y^2_{t-5} continues to load with a significantly positive coefficient and both *Accrual* and R^5_{t-5} continue to load with significant negative coefficients. All other variables are insignificant at the one percent level. These regression results demonstrate the superiority of the prospective yield, y^2_{t-5}, in predicting future stock returns. They also illustrate the relatively low explanatory power of value measures with respect to future stock returns. This low explanatory power is what makes realized returns a noisy diagnostic for the *ex post* evaluation of value measures.

Panel A of table 8 also reports results using combinations of value measures employed by 3 value index providers, Russell, S&P and Dow Jones. The Russell construct is the most parsimonious, simply relying on *B/M*. The S&P construct incorporates three additional metrics (*Div/P, Sales/*P and *CF/P*) as does the Dow Jones construct (*E/P*, $y^1_{t-5}$and *Div/P).* While the exact methodologies used by the index providers vary, they can be approximated by standardizing and equal weighting across the selected measures of relative value. We therefore report two regressions. The first regression simply includes the measures of value that are used to construct the index as explanatory variables. The second regression first standardizes the measures across the entire sample period and then constrains the regression coefficients to be equal across the standardized measures to approximate the methodologies used by the index providers.[7] The Dow Jones value construct has the highest explanatory power for future stock returns in the unconstrained regressions (adjusted R-square of 3.9%) and the constrained regressions (adjusted R-squared of 1.5%). Note that the superiority of Dow Jones construct arises from the heavy weight placed on y_{t-5}^{1}. The Russell value construct, which is also the simplest, has the weakest association with future stock returns.

The results in panel A of table 8 allow us to assess the association of each value measure with future stock returns. They do not, however, permit an unambiguous *ex post* evaluation of the extent to which the measure reflects value, because realized returns reflect a host of other factors that are unrelated to value (i.e. changes in expectations about future cash flows and changes in discount rates). Panel B of table 8 replicates the analysis in panel A after substituting Y_t^5 for R_t^5 as the dependent variable. Recall that Y_t^5 represents the future realized yield, thus providing a more direct *ex post* diagnostic for the evaluation of value measures. Consistent with Y_t^5 providing a more direct assessment of value, we see that most of the value measures load with increased statistical significance and explanatory power. For example, the R-square for y_{t-5}^{2} increases from 3.8% in panel A to 14.3% in panel B. *B/M* and *Sales/P* are notable exceptions in this respect. The explanatory power for *B/M* actually drops from panel A to panel B, while the explanatory power of *Sales/P* remains constant. These variables therefore provide less effective measures of value and their predictive ability with respect to future stock returns does not appear to be limited to value.

We next turn to *Accrual*s and R_{t-5}^{5}, the two signals that are not traditional measures of relative value. When Y_t^5 is employed as the dependent variable, the coefficient on *Accrual* is insignificant and the coefficient on R_{t-5}^{5} switches to a positive. It is therefore clear that the negative relation between each of these measures and future stock returns does not arise from their ability to measure relative value. It is also interesting to note that the statistical and economic significance of the coefficient on *Accrual* increases in the multiple regression. Sloan (1996) shows that accruals capture the least persistent component of earnings and Bradshaw, Richardson and Sloan (2001) show that analysts' earnings forecast fail to incorporate this information. Thus, the negative weighting on *Accrual* in the multiple regression

[7] We emphasize that these are our own imperfect approximations of the methodologies employed by the value index providers and so should not be used to evaluate the relative performance of the underlying indices.

serves to aid in the prediction of future realized earnings by lowering the implicit weight on the accrual component of earnings in other value signals. Turning finally to the index provider value constructs, we see a notable improvement for the Dow Jones construct and deterioration in the Russell construct. The former is primarily attributable to its use of y_{t-5}^{1}, while the latter is attributable to its exclusive reliance on *B/M*.

Panel C of table 8 replicates the analysis in panel A, but also includes Y_t^5 as an additional explanatory variable in all regressions. The objective of these regressions is to control for the component of realized returns that is attributable to value and investigate the ability of each of the value measures to explain the residual return. Recall that this residual component of stock returns reflects both non-fundamental factors and changes in expectations about fundamentals. The results indicate that the traditional value measures generally have an insignificant or even negative relation with this component of returns. Again, the only two exceptions are *B/M* and *Sales/P*. The results in panel C indicate that the predictive ability of these two variables with respect to future stock returns arises from sources other than the future realized yield. With respect to the non-value measures, both Accrual and R_{t-5}^{5} load more significantly negatively in panel C than they do in panel A. This corroborates prior research suggesting that they are not measures of relative value. Instead, *Accrual* identifies situations where investors have overestimated the persistence of earnings (see Sloan, 1996) and R_{t-5}^{5} identifies situations where investors have overreacted to information (see Debondt and Thaler, 1985). It is also noteworthy that in the multiple regression, *B/M* is the only value measure that loads significantly positively. Finally, R_{t-5}^{5} is the most important determinant of this residual component of realized returns.

To summarize, the results in this section demonstrate that most traditional value metrics forecast future stock returns via their ability to forecast the realized future yield. *B/M* and *Sales/P*, however, are important exception to this general result. Finally, the non-value metrics, *Accrual* and R_{t-5}^{5}, both derive their ability to predict future realized returns through their ability to forecast the component of returns that is unrelated to the realized yield. These results illustrate how the realized yield aids in distinguishing between value and non-value sources of return predictability.

4.4 Attributing the Returns to Investment Signals

This section illustrates how we can use our framework to decompose stock returns into expected returns, fundamental (i.e., cash flow) news and non-fundamental (i.e., discount rate) news. We can then use the resulting decomposition to attribute the returns to investment signals. One key requirement for our decomposition is that we have a suitable proxy for investors' consensus expectations of future earnings (as reflected in prices). Our empirical tests use analysts' consensus forecasts of earnings to proxy for investors' expectations. We acknowledge that analysts' forecasts are a noisy proxy for investors' expectations (see Hughes, Liu and Su, 2008). We seek to illustrate the application of our framework, while acknowledging that our use of analysts' forecasts to proxy for investors' earnings expectations is an important limitation in our empirical implementation.

Table 9 provides descriptive statistics and correlations for our return decomposition using various return measurement intervals. All variables are annualized to ease comparability. Recall that y_{t-T} measures the prospective yield using the forecasted earnings yield over the next two years and $F_t^T - y_{t-T}$ captures the component of returns attributable to fundamental news (i.e., percentage changes in forecast earnings yields). Focusing first on the one-year return measurement interval, while both y_{t-T} and $F_t^T - y_{t-T}$ are correlated with R_t^T, the correlations are quite low. The correlation between R_t^T and y_{t-T} is only 0.053, while the correlation between R_t^T and $F_t^T - y_{t-T}$ is 0.343. It is also noteworthy that the correlation between y_{t-T} and $F_t^T - y_{t-T}$ is -0.111. If analysts' forecasts were efficient, we would expect this correlation to be 0, because $F_t^T - y_{t-T}$ should be unexpected and hence not predictable based on information in y_{t-T}. This is likely a manifestation of the previously documented staleness in analysts' forecasts (see Hughes, Liu and Su, 2008). If some fundamental news is reflected in stock prices before it is reflected in analysts' forecasts, then both y_{t-T} and $F_t^T - y_{t-T}$ will be biased, and the induced correlation will be negative. For example, positive fundamental news that is reflected in price but not in analysts' earnings forecasts will lead to downward biased y_{t-T} and upward biased $F_t^T - y_{t-T}$.

As we increase the return measurement interval, the correlations of y_{t-T} and $F_t^T - y_{t-T}$ with R_t^T gradually increase. For example, using a 5-year return measurement, the correlation between R_t^T and each of y_{t-T} and $F_t^T - y_{t-T}$ respectively are 0.254 and 0.624. Note however, that the troubling negative correlation between y_{t-T} and $F_t^T - y_{t-T}$ remains. Given the negative correlations between y_{t-T} and $F_t^T - y_{t-T}$, it is difficult to assess their combined ability to explain variation in stock returns from pair-wise correlations alone. To address this issue directly, table 10 reports regressions of R_t^T on y_{t-T} and $F_t^T - y_{t-T}$, both individually and jointly. Again, the increasing importance of fundamentals over longer measurement intervals is evident. For example, using a 1-year return measurement interval gives a combined explanatory power of 12.9%, while increasing the return measurement interval to 5 years results in a combined explanatory power of 62.0%. Thus, there is clear evidence of convergence between realized stock returns and fundamentals as we increase the return measurement period, and much of this convergence has taken place using a 5 year measurement interval.

The magnitude of the regression coefficients in table 10 are also of interest. Our valuation framework suggests that the coefficients should be 1. The coefficients on $F_t^T - y_{t-T}$, are all positive and somewhat less than 1, moving gradually in the direction of 1 as the measurement period increases. This is consistent with analysts' forecasts measuring the earnings expectations reflected in stock prices with error. The coefficients on y_{t-T}, in contrast, exceed 1 in the multiple regressions over every measurement interval. There is a simple explanation for this latter result. The component of stock returns that is unrelated to fundamentals is omitted from these regressions. This component of returns must therefore be positively correlated with y_{t-T}, causing the coefficient on y_{t-5} to be upwardly biased. This is exactly what we would expect to see if prospective yields exhibit temporary dislocations. For example, a temporarily low prospective yield will increase in the future and the increasing yield will cause lower stock returns. Thus, a temporarily low a yield anticipates lower future stock returns resulting from mean reversion in the yield.[8]

To attribute the returns to investment signals, we run a series of three return regressions. In the first regression, realized 5-year stock returns, R_t^5 , are regressed on the signals, as in panel A of table 8. This regression identifies the signal's overall return predictability. In the second regression, y_{t-5} is included as an additional explanatory variable. The inclusion of y_{t-5} as an explanatory variable extracts variation in returns that is attributable to value investing. Thus, this regression identifies the ability of the signal to predict returns that are not attributable to value investing. In the third regression, both y_{t-5} and F_t^5 , are included as additional explanatory variables. The inclusion of both y_{t-5} and F_t^5 as explanatory variables extracts variation in returns attributable to both value and fundamental news. Thus, this regression identifies the ability of the signal to predict returns that are not attributable to value investing or fundamental news and so must be attributable to discount rate news.

The investment signals that we consider are the same as those employed in the previous subsection. Panel A of table 11 provides the results from regressing realized returns on the investment strategy variables. This table corresponds to panel A of table 8, but is limited to the subset of observations for which we can compute F_t^5 . The results are similar to those in panel A of table 8. All

[8] Speculative bubbles, such as the dot-com bubble of the late 1990s, can be viewed as extreme manifestations of this effect. Speculatively high prices drive yields to extreme lows, and then yields rise and stock returns are negative as prices revert to fundamentals.

of the traditional value signals load with the predicted positive coefficient and are statistically significant. *Accruals* and R_{t-5}^{5} also continue to load with negative coefficients, though the coefficient on accruals is statistically insignificant in this smaller and more recent sample of firm-years. Panel B of table 11 includes y_{t-5} as an additional explanatory variable to extract variation in returns attributable to value investing. The traditional value signals *E/P* and *D/P* become insignificant, indicating that their explanatory power for future returns can be primarily attributed to value investing. *B/M*, *Sales/P* and *CF/P* all remain statistically significant, though the coefficients are smaller than in panel A. The coefficients on *Accrual* and R_{t-5}^{5} remain statistically significant, indicating that their predictive ability with respect to future stock returns cannot be attributed to value investing. In fact, the magnitude and statistical significance of accruals increases. This indicates that *Accruals* has a positive relation to value (not surprising, since accruals are a major component of earnings) and controlling for accruals' value exposure increases the strength of its negative association with future stock returns.

Panel C of Table 11 includes both y_{t-5} and F_{t}^{5} as additional explanatory variables to extract variation in returns attributable to both value investing and the arrival of fundamental news. The only signal that remains significant is R_{t-5}^{5}. Notably, the coefficients on *B/M*, *Sales/P*, *CF/P* and *Accrual* all become insignificant. This result is perhaps not surprising in the case of accruals. Sloan (1996) hypothesizes that the predictive ability of accruals with respect to future stock returns arises from their ability to forecast future earnings surprises. The results for *B/M*, *Sales/P* and *CF/P* are more novel. It appears that in addition to providing information about relative value, these variables also help forecast future fundamental news. A possible explanation is that analysts tend to extrapolate short-term earnings and underweight the fact that earnings tend to revert toward long-term relations with fundamentals, such as book value, sales and cash flows. Finally, we note that the continued significance of R_{t-5}^{5} is consistent with prior research arguing that R_{t-5}^{5} reflects temporary dislocations in discount rates (e.g., Debondt and Thaler, 1985).

5. Conclusions

This paper provides a framework for defining, formulating and evaluating value investment strategies. We define the relative value of an investment in terms of the prospective yield implied by the ratio of the investment's expected cum-dividend aggregate earnings to its price. We then adapt our approach to construct a realized yield metric that can be used as a more direct alternative to realized security market returns in evaluating value strategies. We also show that our approach can be used to decompose realized security market returns into a ‘fundamental’ component (i.e., related to the investment’s underlying cash distributions) and a ’speculative’ component (i.e., related to changes in the prospective yield implied by the market price) and demonstrate the growing importance of the fundamental component over longer investment horizons. Finally, we use our approach to evaluate popular value metrics from academia and practice. We find that the forward earnings yield provides the best measure of relative value.

A key shortcoming of our analysis is that analysts’ forecasts are often untimely and inefficient forecasts of future earnings. Prior research shows that analysts’ forecasts are less timely than the forecasts embedded in stock returns (see Hughes, Liu and Su, 2008) and incorporate predictable biases that are also reflected in stock returns (see Bradshaw, Richardson and Sloan, 2001). We show that these limitations of analysts’ forecasts are also present in our data. Consequently, forecasts of the prospective yield using analysts’ earnings forecasts are noisy and our attempts to use analysts’ forecasts to decompose stock returns are also noisy. The use of improved forecasts of earnings should improve the practical application of our framework.

References

Bogle, J.C. and D.F. Swensen. 2009. Common sense on mutual funds. Hoboken, NJ: Wiley.

Bradshaw, M., M. Drake, J. Myers and L. Myers, 2012, A re-examination of analysts superiority over time-series forecasts of earnings, Review of Accounting Studies, forthcoming.

Bradshaw, M., S. Richardson and R.G. Sloan, 2001. Do analysts and auditors use information in accruals. Journal of Accounting Research 39, 45-74.

Bradshaw, M., S. Richardson and R.G. Sloan, 2006. The relationship between corporate financing activities, analysts' forecasts and stock returns. Journal of Accounting and Economics 42, 53-85.

Campbell, J.Y. 1991. A variance decomposition for stock returns. Economic Journal 101, 157-179.

Campbell, J.Y. and R.J. Shiller. 1988. Stock prices, earnings, and expected dividends. Journal of Finance 43, 661-676.

Chen, L. and X.S. Zhao. 2009. Return decomposition. Review of Financial Studies 22, 5213-5249.

Chen, L. and X.S. Zhao. 2008. What drives stock price movement? Working Paper.

Claus, J. and J. Thomas. 2001. Equity premia as low as three percent? Evidence from analysts' earnings forecasts for domestic and international stock markets. Journal of Finance 56, 1629-1666.

Cochrane, J.H. 2001. Asset Pricing. Princeton, NJ: Princeton University Press

Daniel, K. and S. Titman. 2006. Market reactions to tangible and intangible information. Journal of Finance 61, 1605-1643.

DeBondt, W.F.M. and R.H. Thaler. 1985. Does the stock market overreact? Journal of Finance 40, 793-805.

Easton, P.D., T.S. Harris, and J.A. Ohlson. 1992. Aggregate accounting earnings can explain most of security returns. Journal of Accounting and Economics 15, 119-142.

Easton, P.D. and S. Monahan. 2005. An evaluation of accounting-based measures of expected returns. The Accounting Review 80, 501-538.

Fama, E.F. and K.R. French. 1992. The cross-section of expected stock returns. The Journal of Finance 47, 427-465.

Gebhardt, W., C. Lee, and B. Swaminathan. 2001. Toward an implied cost of capital. Journal of Accounting Research 39, 135-176.

Graham, B., D. Dodd. 1934. Security analysis: Principles and techniques. New York, NY: McGraw-Hill.

Hughes, J., J. Liu and W. Su. 2008. On the relation between predictable market returns and predictable analyst forecast errors. Review of Accounting Studies 13, 266-291.

Keynes, J.M. 1936. The general theory of employment, interest and money. London: Macmillan.

Lakonishok, J., A. Shleifer and R.W. Vishny. 1994. Contrarian investment, extrapolation, and risk. Journal of Finance 49, 1541-1578.

Ohlson, J.A. 1995. Earnings, book values and dividends in security valuation. Contemporary Accounting Research 11, 661-687.

Shiller, R.J. 2000. Irrational Exuberance. Princeton, NJ: Princeton University Press.

Sloan, R.G., 1996, Do stock prices reflect information in cash flows and accruals about future earnings? The Accounting Review 71, 289-315.

Vuolteenaho, T. 2002. What drives firm-level stock returns? The Journal of Finance 57, 233-264.

Table 1: Variable Measurement

Each variable is measured on a per-share basis, adjusted for stock splits and stock dividends as of the end of sample period. Each variable except for stock return is truncated at 1% and 99%.

Variable	*Formula and Detailed Definition*	
Realized yield:		
Y_{t+T}^{T}	$\left(1+\frac{Z_{t+T}^{T}}{P_t}\right)^{\frac{1}{T}}-1$	Annualized realized yield measured over *T* periods ending in period *t+T* using cumulative cum-dividend earnings over *T* periods. Price is measured 3 months after the fiscal year-end of *t*.
X_{t+T}^{T}	$\sum_{\tau=1}^{T} X_{t+\tau}$	*T* period cumulative earnings before extraordinary item ending in period *t+T*. Deflated by common shares averaged over the earnings measurement interval.
Z_{t+T}^{T}	$\sum_{\tau=1}^{T} X_{t+\tau}+\sum_{\tau=1}^{T-1} d_{t+\tau}\prod_{\varphi=\tau}^{T-1}[(1+r_{f,t+1+\varphi})-1]$	T period cumulative cum-dividend earnings ending in period t+T. Dividends are assumed to be reinvested and earn the risk free rate, r_f. Realized one-month T-bill rates over the measurement period are used as r_f. Resulting cumulative cum-dividend earnings are deflated by common shares averaged over the earnings measurement period.
Prospective yield:		
y_t^T	$\left(\frac{E_t[Z_{t+T}^{T}]}{P_t}+1\right)^{\frac{1}{T}}-1$	Annualized prospective yield measured at *t* using analyst consensus earnings forecasts for the next T periods. Price is measured 3 months after the fiscal year-end of *t*.
$y_t^{T,ltg}$	$\left(\frac{E_t[Z_{t+T}^{T}]}{P_t}+1\right)^{\frac{1}{T}}-1$	Annualized prospective yield measured at *t* using earnings forecasts over the next T periods. If explicit earnings forecasts are not available, future earnings are estimated based on analyst long-term earnings growth forecast.
$E_t[X_{t+T}^{T}]$	The sum of I/B/E/S consensus forecasts of earnings for years *t+1* through *t+T*, measured 3 months after the fiscal year end of year t. For years without consensus forecast of earnings, we estimate future earnings based on analyst long-term earnings growth forecast.	

Variable	*Formula and Detailed Definition*	
$E_t[Z^T_{t+T}]$	$\sum_{\tau=1}^{T} E_t[X_{t+\tau}] + \sum_{\tau=1}^{T-1} E_t[d_{t+\tau}]\left[(1+r_{f,t})^{T-\tau+1} - 1\right]$	*T* period cumulative forecast cum-dividend earnings ending in period *t+T*. Dividend payout ratio is computed as dividends paid at time *t* deflated by the I/B/E/S actual earnings of the corresponding period. Dividends are assumed to be reinvested and earn the rate equivalent to the yield on the one month T-bill at time *t*. We also assume that dividends are paid half way through each fiscal year.

Components of realized stock return:

R^T_t	Annualized stock return measured over *T* periods ending in period *t*. Raw buy-hold returns inclusive of dividends and delisting returns. The return calculation period begins from 3 months after the fiscal year-end of *t-T* and extends for *T* periods. Missing delisting returns are replaced with -.55 for NASDAQ firms and -.3 for NYSE/AMEX firms.	
F^T_t	$\Delta E_t[Z^T_{t+T}] + \frac{\sum_{\tau=1}^{T} d_{t-T+\tau}}{P_{t-T}}$ where $\Delta E_t[Z^T_{t+T}] = \frac{E_t[Z^T_{t+T}] - E_{t-T}[Z^T_t]}{E_{t-T}[Z^T_t]}$	Fundamental return

Relative value measures: Price is measured 3months after the fiscal year end.

B/M_t	Book to market ratio at time *t*.
E/P_t	Earnings before interests and taxes to price ratio at time *t*.
$FY1/P_t$	Forecast EPS for year *t+1* to price ratio at time *t*.
Div/P_t	Dividend to price ratio at time *t*.
$Sales/P_t$	Sales to price ratio at time *t*.
CF/P_t	Cash flow to price ratio at time *t*.
$Accrual_t$	Accruals at time *t*, measured as net income minus cash flow from operations deflated by average total assets.

Table 2: Descriptive statistics for realized earnings($\boldsymbol{X_t^T}$) , reinvestment return on dividends ($\mathbf{d \cdot r_f}$), and cum-dividend earnings($\boldsymbol{Z_t^T}$)

Aggregation Period, T	*Variable*	*Mean*	*Std. Dev*	*P1*	*Q1*	*Median*	*Q3*	*P99*
1 year	X_t^T	0.102	4.713	-11.917	-0.035	0.354	1.049	5.249
	$\mathrm{d} \cdot \mathrm{r_f}$	0.006	0.014	0.000	0.000	0.000	0.005	0.068
	Z_t^T	0.108	4.716	-11.917	-0.035	0.356	1.056	5.281
2 years	X_t^T	0.240	8.940	-22.201	-0.104	0.694	2.045	9.861
	$\mathrm{d} \cdot \mathrm{r_f}$	0.024	0.058	0.000	0.000	0.000	0.022	0.280
	Z_t^T	0.264	8.951	-22.201	-0.100	0.704	2.077	9.980
3 years	X_t^T	0.527	11.477	-30.320	-0.134	1.041	3.043	14.299
	$\mathrm{d} \cdot \mathrm{r_f}$	0.058	0.137	0.000	0.000	0.000	0.054	0.641
	Z_t^T	0.585	11.507	-30.320	-0.128	1.062	3.118	14.677
4 years	X_t^T	0.925	13.603	-36.951	-0.107	1.424	4.062	18.496
	$\mathrm{d} \cdot \mathrm{r_f}$	0.109	0.258	0.000	0.000	0.003	0.106	1.180
	Z_t^T	1.035	13.668	-36.951	-0.092	1.468	4.195	19.131
5 years	X_t^T	1.486	15.253	-42.173	-0.005	1.858	5.109	22.971
	$\mathrm{d} \cdot \mathrm{r_f}$	0.182	0.432	0.000	0.000	0.013	0.183	1.902
	Z_t^T	1.668	15.376	-42.137	0.014	1.930	5.331	24.022

All variables are defined in Table 1. Each of the variables except for the stock return is truncated at 1% and 99% to mitigate outliers. Sample consists of 175,319 observations from 1962 to 2012 (t) for annual earnings, 163,325 observations from 1963 to 2012 (t) for 2 year aggregation period, 151,135 observations from 1964 to 2012 (t) for 3 year aggregation period, 138,884 observations from 1965 to 2012 (t) for 4 year aggregation period, and 126,653 observations from 1966 to 2012 (t) for 5 year aggregation period. Only those observations with more than 1,000 shares outstanding are included.

Table 3: Descriptive statistics for annualized realized yield and increases in realized yield as T increases. The sample consists of 109,094 observations from 1967 to 2012(t).

Panel A: Descriptive statistics for realized yield

Aggregation Period, T	*Mean*	*Std. Dev*	*P1*	*Q1*	*Median*	*Q3*	P99
1 year	0.072	0.165	-0.274	0.024	0.064	0.110	0.490
2 years	0.069	0.124	-0.220	0.021	0.063	0.110	0.430
3 years	0.068	0.109	-0.197	0.020	0.063	0.109	0.397
4 years	0.066	0.101	-0.185	0.018	0.063	0.108	0.366
5 years	0.063	0.097	-0.192	0.017	0.062	0.107	0.343

Panel B: Descriptive statistics for changes in annualized realized yield as forecasting period, T, increases.

Aggregation Period, T	*Mean*	*Std. Dev*	*P1*	*Q1*	*Median*	*Q3*	P99
1 to 2 years	-0.003	0.071	-0.202	-0.013	0.001	0.012	0.164
2 to 3 years	-0.002	0.040	-0.137	-0.010	0.001	0.010	0.106
3 to 4 years	-0.002	0.030	-0.112	-0.009	0.001	0.008	0.079
4 to 5 years	-0.003	0.028	-0.116	-0.008	0.000	0.007	0.061

All variables are defined in Table 1. Each of the variables is truncated at 1% and 99% to mitigate outliers.

Table 4: Descriptive statistics and correlations (autocorrelations down main diagonal) for realized stock returns and the realized yields. Realized stock returns and realized yields are annualized.

Aggregation Period, T	*Sample Period, t*	*Variable*	*Mean*	*Std. Dev*	*Q1*	*Median*	*Q3*	R_t^T	Y_t^T
1 year	1963 - 2012	R_t^T	0.152	0.574	-0.188	0.067	0.364	-0.077	0.207
	N=144,089	Y_t^T	0.041	0.135	0.011	0.058	0.100		0.514
2 years	1964 - 2012	R_t^T	0.093	0.335	-0.118	0.070	0.267	-0.074	0.408
	N=133,032	Y_t^T	0.047	0.110	0.009	0.057	0.101		0.481
3 years	1965 - 2012	R_t^T	0.079	0.261	-0.081	0.071	0.227	-0.108	0.498
	N=124,469	Y_t^T	0.051	0.098	0.011	0.058	0.101		0.436
4 years	1966 - 2012	R_t^T	0.073	0.217	-0.061	0.070	0.201	-0.090	0.580
	N=111,782	Y_t^T	0.055	0.089	0.013	0.059	0.101		0.394
5 years	1967 - 2012	R_t^T	0.075	0.190	-0.040	0.076	0.189	-0.113	0.622
	N=101,152	Y_t^T	0.059	0.083	0.017	0.061	0.103		0.341

All the correlation coefficient estimates are significant at a less than 1% level. All variables are defined in Table 1. Each of the variables except for the stock return is truncated at 1% and 99% to mitigate outliers.

Table 5: Descriptive statistics for expected earnings($\mathbf{E}[\boldsymbol{X_t^T}]$) , expected reinvestment return on dividends ($\mathbf{E}[\mathbf{d} \cdot \mathbf{r_f}]$), and expected cum-dividend earnings($\boldsymbol{E}[\boldsymbol{Z_t^T}]$)

Aggregation Period, T	*Variable*	*Mean*	*Std. Dev*	*P1*	*Q1*	*Median*	*Q3*	*P99*
1 year	$E_t[X_{t+T}^T]$	1.333	1.359	-0.770	0.500	1.020	1.780	6.620
	$E_t[\mathrm{d} \cdot \mathrm{r_f}]$	0.007	0.015	0.000	0.000	0.000	0.006	0.068
	$E_t[Z_{t+T}^T]$	1.339	1.364	-0.770	0.500	1.030	1.792	6.640
2 years	$E_t[X_{t+T}^T]$	2.932	2.856	-0.920	1.162	2.260	3.840	14.020
	$E_t[\mathrm{d} \cdot \mathrm{r_f}]$	0.028	0.065	0.000	0.000	0.000	0.027	0.286
	$E_t[Z_{t+T}^T]$	2.959	2.877	-0.920	1.170	2.281	3.880	14.080
3 years	$E_t[X_{t+T}^T]$	4.781	4.548	-0.620	1.974	3.710	6.200	22.286
	$E_t[\mathrm{d} \cdot \mathrm{r_f}]$	0.066	0.156	0.000	0.000	0.000	0.065	0.677
	$E_t[Z_{t+T}^T]$	4.847	4.597	-0.620	1.996	3.763	6.307	22.523
4 years	$E_t[X_{t+T}^T]$	6.914	6.488	-0.240	2.940	5.391	8.866	31.860
	$E_t[\mathrm{d} \cdot \mathrm{r_f}]$	0.124	0.296	0.000	0.000	0.000	0.122	1.284
	$E_t[Z_{t+T}^T]$	7.038	6.576	-0.240	2.975	5.497	9.062	32.311
5 years	$E_t[X_{t+T}^T]$	9.384	8.753	0.130	4.075	7.365	11.923	43.255
	$E_t[\mathrm{d} \cdot \mathrm{r_f}]$	0.205	0.493	0.000	0.000	0.000	0.202	2.117
	$E_t[Z_{t+T}^T]$	9.589	8.894	0.130	4.146	7.531	12.245	43.847

All variables are defined in Table 1. Each of the variables is truncated at 1% and 99% to mitigate outliers. Sample consists of 66,773 observations from 1983 to 2012 (t) for each aggregation period.

Table 6 : Descriptive statistics for annualized prospective yield and increases in prospective yield as T increases. The sample consists of 68,612 observations from 1983 to 2012(t).

Panel A: Descriptive statistics for prospective yield

Aggregation Period, T	*Mean*	*Std. Dev*	*P1*	*Q1*	*Median*	*Q3*	P99
1 year	0.070	0.053	-0.067	0.046	0.066	0.090	0.238
2 years	0.075	0.048	-0.030	0.051	0.071	0.094	0.235
3 years	0.079	0.045	-0.009	0.055	0.074	0.097	0.232
4 years	0.083	0.043	0.002	0.059	0.077	0.100	0.230
5 years	0.086	0.041	0.008	0.062	0.080	0.103	0.227

Panel B: Descriptive statistics for increases in annualized prospective yield as forecasting period, T increases.

Aggregation Period, T	*Mean*	*Std. Dev*	*P1*	*Q1*	*Median*	*Q3*	P99
1 to 2 years	0.005	0.011	-0.017	0.001	0.003	0.006	0.044
2 to 3 years	0.003	0.007	-0.012	0.001	0.003	0.005	0.026
3 to 4 years	0.003	0.005	-0.009	0.001	0.003	0.005	0.020
4 to 5 years	0.003	0.005	-0.007	0.001	0.002	0.004	0.019

All variables are defined in Table 1. Each of the variables is truncated at 1% and 99% to mitigate outliers.

Table 7 Panel A: Descriptive statistics and correlations for R, Y, R-Y and relative value measures. Each variable is annualized. The sample period is from 1993 to 2012 (t).

Panel A: Descriptive statistics

Variable	*N*	*Mean*	*Std. Dev*	*P1*	*Q1*	*Median*	*Q3*	*P99*
R_t^5	31,125	0.059	0.171	-0.378	-0.041	0.068	0.161	0.485
Y_t^5	31,125	0.047	0.061	-0.161	0.023	0.054	0.080	0.192
$R_t^5 - Y_t^5$	31,125	0.012	0.140	-0.344	-0.070	0.013	0.092	0.381
y_{t-5}^1	31,125	0.071	0.044	-0.024	0.047	0.066	0.088	0.217
y_{t-5}^2	27,182	0.073	0.040	-0.006	0.050	0.068	0.089	0.209
$y_{t-5}^{2,ltg}$	31,125	0.075	0.041	-0.002	0.052	0.070	0.092	0.213
$y_{t-5}^{3,ltg}$	30,961	0.079	0.038	0.012	0.056	0.074	0.096	0.210
$y_{t-5}^{4,ltg}$	30,949	0.083	0.037	0.017	0.060	0.077	0.099	0.207
$y_{t-5}^{5,ltg}$	30,945	0.086	0.036	0.020	0.063	0.080	0.102	0.207
B/M_{t-5}	31,124	0.535	0.533	0.044	0.277	0.448	0.676	1.966
E/P_{t-5}	31,125	0.052	0.084	-0.178	0.029	0.052	0.076	0.232
Div/P_{t-5}	31,105	0.016	0.030	0.000	0.000	0.005	0.024	0.110
$Sales/P_{t-5}$	31,125	1.414	1.640	0.073	0.483	0.931	1.733	7.950
CF/P_{t-5}	28,342	0.096	0.152	-0.165	0.036	0.076	0.135	0.510
$Accrual_{t-5}$	25,259	-0.045	0.071	-0.241	-0.081	-0.046	-0.011	0.152
R_{t-5}^5	24,518	0.147	0.166	-0.217	0.042	0.135	0.242	0.613

Table 7 Panel B: Correlation matrix—Pearson (above diagonal) and Spearman (below diagonal)

	R	Y	R-Y	y^{1}_{t-5}	y^{2}_{t-5}	$y^{2,ltg}_{t-5}$	$y^{3,ltg}_{t-5}$	$y^{4,ltg}_{t-5}$	$y^{5,ltg}_{t-5}$	B/M_{t-5}	E/P_{t-5}	Div/P_{t-5}	$Sales/P_{t-5}$	CF/P_{t-5}	$Accrual_{t-5}$	R^{5}_{t-5}
R^{5}_{t}		0.631	0.941	0.180	0.195	0.186	0.183	0.178	0.170	0.089	0.066	0.102	0.110	0.103	-0.067	-0.091
Y^{5}_{t}	0.680		0.331	0.369	0.377	0.350	0.315	0.292	0.267	0.044	0.209	0.190	0.112	0.158	-0.014	0.055
$R^{5}_{t} - Y^{5}_{t}$	0.934	0.426		0.058	0.075	0.074	0.086	0.090	0.091	0.089	-0.011	0.041	0.085	0.057	-0.075	-0.136
y^{1}_{t-5}	0.210	0.422	0.097		0.976	0.979	0.950	0.920	0.886	0.206	0.394	0.226	0.311	0.238	0.138	-0.025
y^{2}_{t-5}	0.218	0.416	0.111	0.976		1.000	0.990	0.971	0.944	0.211	0.349	0.233	0.324	0.238	0.126	-0.060
$y^{2,ltg}_{t-5}$	0.209	0.401	0.105	0.979	1.000		0.991	0.973	0.948	0.228	0.352	0.220	0.336	0.228	0.133	-0.061
$y^{3,ltg}_{t-5}$	0.202	0.374	0.109	0.951	0.989	0.990		0.994	0.979	0.243	0.304	0.205	0.341	0.204	0.126	-0.082
$y^{4,ltg}_{t-5}$	0.194	0.350	0.109	0.921	0.967	0.970	0.994		0.995	0.238	0.282	0.188	0.336	0.187	0.131	-0.084
$y^{5,ltg}_{t-5}$	0.183	0.324	0.105	0.885	0.938	0.943	0.976	0.994		0.229	0.262	0.167	0.324	0.167	0.138	-0.080
B/M_{t-5}	0.151	0.171	0.143	0.470	0.494	0.496	0.501	0.488	0.466		0.441	0.402	0.556	0.626	-0.004	-0.275
E/P_{t-5}	0.167	0.364	0.063	0.704	0.661	0.660	0.620	0.586	0.550	0.382		0.432	0.282	0.609	0.235	0.095
Div/P_{t-5}	0.179	0.315	0.090	0.365	0.369	0.343	0.309	0.273	0.232	0.271	0.371		0.229	0.454	-0.006	-0.066
$Sales/P_{t-5}$	0.167	0.265	0.117	0.548	0.574	0.568	0.561	0.543	0.518	0.629	0.415	0.273		0.397	0.027	-0.231
CF/P_{t-5}	0.209	0.316	0.137	0.435	0.447	0.421	0.392	0.361	0.325	0.432	0.521	0.410	0.407		-0.188	-0.121
$Accrual_{t-5}$	-0.076	-0.035	-0.080	0.121	0.114	0.119	0.119	0.124	0.131	0.018	0.214	-0.005	0.033	-0.361		0.108
R^{5}_{t-5}	-0.072	0.022	-0.123	-0.055	-0.091	-0.085	-0.096	-0.093	-0.085	-0.425	0.057	-0.046	-0.278	-0.181	0.099	

All variables are defined in Table 1. Each variable except for stock returns is truncated at 1% and 99% to mitigate outliers.

Table 8 Panel A: Ordinary least squares regressions of stock return on relative value measures. Stock return is measured over five years and annualized. The sample period is from 1993 to 2012 (t). Associated t-statics (*in italics*) are adjusted for overlapping samples.

$R_t^5 = \omega_0 + \omega_1$ *Relative Value Measures* $_{t-5} + \varepsilon_t^5$

	N	*Intercept*	y_{t-5}	*B/M*$_{t-5}$	*E/P* $_{t-5}$	*Div/P*$_{t-5}$	*Sales/P*$_{t-5}$	*CF/P*$_{t-5}$	*Accrual*$_{t-5}$	R_{t-5}^5	*Adj. R2*
y_{t-5}^2	27,182	-0.003	0.835								0.038
		-0.73	*14.67*								
	31,124	0.044		0.028							0.008
		14.41		*7.05*							
	31,125	0.052			0.135						0.004
		20.57			*5.23*						
	31,105	0.050				0.587					0.010
		20.11				*8.08*					
	31,125	0.043					0.011				0.012
		15.14					*8.75*				
	28,342	0.051						0.115			0.011
		19.20						*7.82*			
	25,259	0.051							-0.160		0.004
		17.91							*-4.74*		
	24,518	0.081								-0.087	0.008
		27.03								*-6.43*	
y_{t-5}^2	17,584	-0.001	0.886	-0.005	-0.055	0.237	0.000	0.045	-0.122	-0.062	0.050
		-0.10	*10.14*	*-0.64*	*-1.09*	*2.03*	*0.13*	*1.49*	*-2.61*	*-3.64*	
Russell Index											
	31,124	0.044		0.028							0.008
		14.41		*7.05*							
	31,124	0.059		0.014							0.006
		27.46		*6.30*							
S&P/ Salomon Smith Barney Index											
	28,327	0.040		-0.009		0.540	0.009	0.054			0.022
		12.31		*-1.47*		*5.84*	*5.26*	*2.73*			
	28,327	0.062		0.007		0.007	0.007	0.007			0.014
		27.78		*9.03*		*9.03*	*9.03*	*9.03*			
Dow Jones Index											
y_{t-5}^1	31,104	0.002	0.678	0.016	-0.107	0.375					0.039
		0.49	*12.94*	*3.48*	*-3.39*	*4.55*					
y_{t-5}^1	31,104	0.059	0.008	0.008	0.008	0.008					0.015
		27.58	*9.75*	*9.75*	*9.75*	*9.75*					

All variables are defined in Table 1. Each of the variables except for the stock return is truncated at 1% and 99% to mitigate outliers.

Table 8 Panel B: Ordinary least squares regressions of realized yield on relative value measures. Realized yield is measured over five years and annualized. The sample period is from 1993 to 2012 (t). Associated t-statics (*in italics*) are adjusted for overlapping samples.

$Y_t^5 = \omega_0 + \omega_1$ *Relative Value Measures* $_{t\text{-}5} + \varepsilon_t^5$

	N	*Intercept*	y_{t-5}	B/M_{t-5}	E/P_{t-5}	Div/P_{t-5}	$Sales/P_{t-5}$	CF/P_{t-5}	$Accrual_{t-5}$	R_{t-5}^5	*Adj. R2*
y_{t-5}^2	27,182	0.005	0.570								0.143
		3.45	*30.05*								
	31,124	0.045		0.005							0.002
		40.67		*3.47*							
	31,125	0.039			0.153						0.044
		44.19			*16.87*						
	31,105	0.041				0.393					0.036
		46.89				*15.28*					
	31,125	0.041					0.004				0.012
		40.72					*8.85*				
	28,342	0.042						0.063			0.025
		44.55						*12.07*			
	25,259	0.044							-0.011		0.000
		44.04							*-0.96*		
	24,518	0.049								0.019	0.003
		44.42								*3.86*	
y_{t-5}^2	17,584	0.007	0.497	-0.015	0.039	0.224	0.000	0.023	-0.044	0.012	0.133
		2.92	*17.41*	*-6.18*	*2.34*	*5.87*	*0.44*	*2.29*	*-2.90*	*2.12*	
Russell Index											
	31,124	0.045		0.005							0.002
		40.67		*3.47*							
	31,124	0.047		0.001							0.000
		61.04		*1.42*							
S&P/ Salomon Smith Barney Index											
	28,327	0.041		-0.022		0.451	0.004	0.058			0.071
		36.02		*-10.79*		*13.99*	*7.10*	*8.55*			
	28,327	0.048		0.003		0.003	0.003	0.003			0.021
		60.32		*10.94*		*10.94*	*10.94*	*10.94*			
Dow Jones Index											
y_{t-5}^1	31,104	0.014	0.464	-0.012	0.052	0.264					0.158
		9.77	*26.37*	*-7.96*	*4.89*	*9.53*					
y_{t-5}^1	31,104	0.047	0.006	0.006	0.006	0.006					0.063
		63.05	*20.44*	*20.44*	*20.44*	*20.44*					

All variables are defined in Table 1. Each variable is truncated at 1% and 99% to mitigate outliers.

Table 8 Panel C: Ordinary least squares regressions of stock returns on relative value measures after controlling for realized yield. Stock return and realized yield are measured over five years and annualized. The sample period is from 1993 to 2012 (t). Associated t-statics (*in italics*) are adjusted for overlapping samples.

$R_t^5 = \omega_0 + \omega_1$ *Relative Value Measures* $_{t\text{-}5} + Y_t^5 + \varepsilon_t^5$

	N	*Intcpt*	y_{t-5}	*B/M*	*E/P*	*D/P*	*Sales/P*	*CF/P*	*Accrual*	R_{t-5}^5	Y_t^5	*Adj. R2*
y_{t-5}^2	27,182	-0.013	-0.206								1.826	0.395
		-3.57	*-4.23*								*56.58*	
	31,124	-0.034		0.020							1.751	0.401
		-12.82		*6.25*							*63.98*	
	31,125	-0.019			-0.141						1.799	0.402
		-8.29			*-6.87*						*64.38*	
	31,105	-0.023				-0.108					1.768	0.398
		-10.19				*-1.86*					*63.30*	
	31,125	-0.029					0.004				1.746	0.399
		-11.80					*4.08*				*63.36*	
	28,342	-0.023						0.004			1.762	0.397
		-9.53						*0.35*			*60.27*	
	25,259	-0.027							-0.140		1.778	0.392
		-10.42							*-5.30*		*56.76*	
	24,518	-0.005								-0.121	1.750	0.419
		-1.70								*-11.62*	*58.83*	
y_{t-5}^2	17,584	-0.015	-0.055	0.023	-0.128	-0.187	0.000	0.002	-0.038	-0.085	1.893	0.414
		-2.42	*-0.77*	*4.04*	*-3.23*	*-2.03*	*-0.17*	*0.09*	*-1.03*	*-6.30*	*46.72*	
Russell Index												
	31,124	-0.034		0.020							1.751	0.401
		-12.82		*6.25*							*63.98*	
	31,124	-0.024		0.012							1.755	0.402
		-11.30		*6.97*							*64.23*	
S&P/ Salomon Smith Barney Index												
	28,327	-0.033		0.031		-0.269	0.001	-0.051			1.796	0.404
		-11.81		*6.69*		*-3.66*	*1.05*	*-3.32*			*60.30*	
	28,327	-0.022		0.002		0.002	0.002	0.002			1.752	0.398
		-9.84		*2.79*		*2.79*	*2.79*	*2.79*			*60.08*	
Dow Jones Index												
y_{t-5}^1	31,104	-0.024	-0.185	0.039	-0.203	-0.116					1.862	0.414
		-7.14	*-4.30*	*10.78*	*-8.25*	*-1.79*					*63.14*	
y_{t-5}^1	31,104	-0.025	-0.002	- 0.002	-0.002	-0.002					1.785	0.399
		-11.79	*-3.74*	*-3.74*	*-3.74*	*-3.74*					*63.05*	

All variables are defined in Table 1. Each of the variables is truncated at 1% and 99% to mitigate outliers.

Table 9: Descriptive statistics and Pearson correlations—autocorrelation (diagonal) for the components of realized stock returns. Common observations across different measurement periods are included. Each variable is annualized.

T	*Sample Period, t*	*Variable*	*Mean*	*Std. Dev*	*Q1*	*Median*	*Q3*	R_t^T	y_{t-T}	$F_t^T - y_{t-T}$
1 year	1984 - 2012	R_t^T	0.175	0.571	-0.138	0.104	0.368	-0.118	0.053	0.343
	N= 36,797	y_{t-T}	0.067	0.047	0.048	0.066	0.086		0.726	-0.111
		$F_t^T - y_{t-T}$	0.070	0.575	-0.139	0.053	0.232			0.072
2 years	1985 - 2012	R_t^T	0.120	0.305	-0.065	0.097	0.267	-0.159	0.174	0.580
	N= 32,395	y_{t-T}	0.070	0.044	0.049	0.067	0.087		0.698	-0.274
		$F_t^T - y_{t-T}$	0.053	0.308	-0.105	0.038	0.177			-0.147
3 years	1986 - 2012	R_t^T	0.103	0.231	-0.037	0.090	0.222	-0.199	0.199	0.618
	N= 29,676	y_{t-T}	0.071	0.044	0.050	0.067	0.088		0.653	-0.287
		$F_t^T - y_{t-T}$	0.032	0.234	-0.093	0.026	0.142			-0.189
4 years	1987 - 2012	R_t^T	0.088	0.186	-0.026	0.082	0.190	-0.097	0.221	0.639
	N= 27,199	y_{t-T}	0.070	0.043	0.050	0.067	0.087		0.632	-0.307
		$F_t^T - y_{t-T}$	0.020	0.188	-0.084	0.018	0.116			-0.109
5 years	1988 - 2012	R_t^T	0.085	0.163	-0.012	0.084	0.176	-0.114	0.254	0.624
	N= 25,385	y_{t-T}	0.071	0.044	0.049	0.067	0.088		0.598	-0.322
		$F_t^T - y_{t-T}$	0.016	0.164	-0.074	0.016	0.103			-0.087

All the correlation coefficient estimates are significant at a less than 1% level. All variables are defined in Table 1. Each variable is annualized and each of the variables except for the stock return is truncated at 1% and 99% to mitigate outliers.

Table 10: Ordinary least squares regressions of stock returns on prospective yields (y_{t-T}) and fundamental news ($F_t^T - y_{t-T}$). Associated t-statics (*in italics*) are adjusted for overlapping observations. Each variable is annualized and truncated at 1% and 99% except for stock returns.

T	*Sample Period, t*	*Intercept*	y_{t-T}	$F_t^T - y_{t-T}$	*Adj.* R^2
1 year	1984 - 2012	0.132	0.635		0.002
	N= 36,797	*25.66*	*10.13*		
		0.151		0.340	0.121
		53.61		*69.93*	
		0.076	1.107	0.350	0.129
		15.54	*18.73*	*71.90*	
2 years	1985 - 2012	0.035	1.214		0.030
	N= 32,395	*7.92*	*22.53*		
		0.089		0.574	0.336
		45.04		*90.58*	
		-0.091	2.511	0.672	0.456
		-25.99	*59.84*	*112.67*	
3 years	1986 - 2012	0.030	1.046		0.040
	N= 29,676	*6.86*	*20.22*		
		0.084		0.610	0.382
		45.40		*78.19*	
		-0.072	2.153	0.727	0.536
		-22.91	*57.38*	*102.94*	
4 years	1987 - 2012	0.020	0.956		0.049
	N= 27,199	*4.85*	*18.67*		
		0.075		0.630	0.408
		43.32		*68.49*	
		-0.067	1.990	0.769	0.600
		-23.38	*57.07*	*96.78*	
5 years	1988 - 2012	0.018	0.949		0.065
	N= 25,385	*4.32*	*18.73*		
		0.076		0.620	0.389
		42.26		*56.85*	
		-0.061	1.893	0.783	0.620
		-21.45	*55.52*	*86.10*	

Table 11 Panel A: Ordinary least squares regressions of stock returns on relative value measures. Stock return are measured over five years and annualized. The sample period is from 1988 to 2012 (t). Associated t-statics (*in italics*) are adjusted for overlapping observations.

$R_t^5 = \omega_0 + \omega_1$ *Relative Value Measures* $_{t-5}$ $+ \varepsilon_t^5$

N	*Intercept*	y_{t-5}	B/M_{t-5}	E/P_{t-5}	D/P_{t-5}	$Sales/P_{t-5}$	CF/P_{t-5}	$Accrual_{t-5}$	R_{t-5}^5	*Adj. R2*
24,229	0.019	0.936								0.061
	4.34	*17.81*								
24,229	0.054		0.063							0.021
	14.22		*10.13*							
24,229	0.072			0.267						0.012
	24.94			*7.64*						
24,179	0.078				0.415					0.005
	28.87				*4.84*					
24,229	0.063					0.017				0.020
	20.08					*10.06*				
22,041	0.068						0.198			0.019
	21.63						*9.13*			
20,371	0.079							-0.066		0.001
	24.85							*-1.70*		
19,625	0.099								-0.074	0.006
	30.08								*-5.07*	
16,103	0.010	0.916	0.019	-0.071	-0.106	0.002	0.067	-0.086	-0.040	0.068
	1.29	*11.13*	*1.85*	*-1.16*	*-0.83*	*0.73*	*1.73*	*-1.72*	*-2.24*	

All variables are defined in Table 1. Each of the variables except for the stock return is truncated at 1% and 99% to mitigate outliers.

Table 11 Panel B: Ordinary least squares regressions of R_t^5 (annualized) on relative value measures after controlling for the prospective yield. The sample period is from 1988 to 2012 (t). Associated t-statics (*in italics*) are adjusted for overlapping observations.

$R_t^5 = \omega_0 + \omega_1\, y_{t-5} + \omega_2\, Relative\ Value\ Measures_{t-5} + \varepsilon_t^5$

N	*Intercept*	y_{t-5}	*B/M*	*E/P*	*D/P*	*Sales/P*	*CF/P*	*Accrual*	R_{t-5}^5	*Adj. R2*
24,229	0.009	0.849	0.033							0.067
	1.88	*15.43*	*5.18*							
24,229	0.019	0.935		0.001						0.061
	4.34	*15.99*		*0.02*						
24,179	0.019	0.929			0.043					0.062
	4.25	*17.11*			*0.50*					
24,229	0.016	0.852				0.007				0.065
	3.52	*15.14*				*4.14*				
22,041	0.017	0.858					0.086			0.063
	3.75	*14.40*					*3.81*			
20,371	0.007	1.028						-0.131		0.064
	1.29	*16.56*						*-3.43*		
19,625	0.033	0.881							-0.064	0.063
	6.17	*15.43*							*-4.49*	
16,103	0.010	0.916	0.019	-0.071	-0.106	0.002	0.067	-0.086	-0.040	0.068
	1.29	*11.13*	*1.85*	*-1.16*	*-0.83*	*0.73*	*1.73*	*-1.72*	*-2.24*	

All variables are defined in Table 1. Each of the variables is truncated at 1% and 99% to mitigate outliers.

Table 11 Panel C: Ordinary least squares regressions of R_t^5 (annualized) on relative value measures after controlling for prospective yield and fundamental news (annualized). The sample period is from 1988 to 2012 (t). Associated t-statics (*in italics*) are adjusted for overlapping observations.

$R_t^5 = \omega_0 + \omega_1 y_{t-5} + \omega_2 F_t^5 + \omega_3$ *Relative Value Measures* $_{t-5} + \varepsilon_t^5$

N	*Intercept*	y_{t-5}	F_t	*B/M*	*E/P*	*D/P*	*Sales/P*	*CF/P*	*Accrual*	R_{t-5}^5	*Adj. R2*
24,229	-0.061	1.108	0.785	0.002							0.601
	-19.11	*30.85*	*80.31*	*0.50*							
24,229	-0.061	1.089	0.786		0.037						0.601
	-20.34	*28.71*	*80.68*		*1.49*						
24,179	-0.060	1.129	0.786			-0.097					0.601
	-20.14	*32.01*	*80.61*			*-1.74*					
24,229	-0.061	1.104	0.785				0.001				0.601
	-20.20	*30.12*	*80.42*				*0.76*				
22,041	-0.062	1.155	0.789					-0.012			0.601
	-19.43	*29.71*	*76.91*					*-0.84*			
20,371	-0.065	1.212	0.777						0.021		0.599
	-17.84	*29.89*	*73.52*						*0.83*		
19,625	-0.057	1.109	0.782							-0.016	0.611
	-15.61	*30.20*	*74.09*							*-1.80*	
16,103	-0.062	1.294	0.780	-0.005	0.070	-0.199	-0.001	-0.009	0.020	-0.023	0.607
	-12.25	*24.21*	*66.25*	*-0.75*	*1.79*	*-2.41*	*-0.35*	*-0.36*	*0.62*	*-2.01*	

All variables are defined in Table 1. Each of the variables except for the stock return is truncated at 1% and 99% to mitigate outliers.