Where does the investment value of target prices come from? *

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Abstract

Equity analysts' target price can be decomposed into two components: the earnings forecast and the price-to-earnings (P/E) ratio forecast, with the former containing short-term earnings news and the latter containing news about long-term earnings growth and discount rates. Using a large database of target prices from 1997 to 2004, we document that both components are important in driving target price revisions and that earnings forecasts are relatively more important for stocks with smaller market caps, higher book-to-market ratios, higher levels of capital expenditures, slower sales growth, and lower past returns. While earnings forecasts are clearly associated with the investment value of target prices, we show that the discount rates implied in P/E ratio forecasts are also valuable. A target-price-based trading strategy produces a significant risk-adjusted profit of above 1% per month even among stocks where target price revisions are mainly driven by revisions in discount rates. This evidence suggests that equity analysts also provide informative forecasts about discount rates.

1. Introduction

Academics and investors have long been interested in understanding the value of information provided by sell-side equity analysts. Equity analysts typically provide summary information in three forms: earnings forecasts, stock recommendations and target price forecasts. Compared to earnings forecasts and stock recommendations, the role of target prices in conveying information to market participants and market price formation has been less studied. In a few recent papers, target prices have been shown to have investment value even after controlling for contemporaneously issued stock recommendations and earnings forecast revisions (Brav and Lehavy 2003; Asquith et al. 2005). In addition, Da and Schaumburg (2010) show that target prices contain useful information about the relative valuation across different stocks in the same industry. Nevertheless, the formation process of target prices and the sources of their investment value have not been fully explored yet.

It is hard to know what model each analyst is using in firm valuation; however, we believe it is helpful to think of the target price (*TP*) as the product of two terms: a forecast of future earnings (*EF*) and a forecast of the price-to-earnings ratio (*PE*). In fact, according to street wisdom, "to arrive at a target price for the future, sell-side analysts often take their earnings projections and multiply them by a P/E ratio that's appropriate for the industry, or reasonable by the company's historical standards."[1] Such street wisdom is also consistent with the evidence reported by Asquith et al. (2005) who document that among equity research reports authored by Institutional Investor's All-America team members, 99% of these analysts mention earnings

[1] See "How fair value and target price differ?" by Debbie Wang at Morningstar, July 11, 2003.

multiples as a basis for generating price targets, but only 13% mention the use of the discounted cash flows model or its many variations.

This parsimonious valuation model that analysts are believed to use in delivering target price forecasts (i.e.,$TP = EF \times PE$) is a starting point of this study. Several interesting empirical questions naturally arise when we observe this target price formation process by analysts. First, what is driving the revision in target prices? Is it the revision in earnings forecasts or the revision in price-to-earnings ratio forecasts? Second, how does the relative importance of earnings forecasts in target price formation depend on the characteristics of the underlying stock? Third, is the investment value of target prices mainly driven by analysts' ability to forecast earnings and/or their ability to forecast future P/E ratios as well? Our paper attempts to address these questions.

It is well known that P/E ratios reflect the information about earnings growth rates and discount rates.[2] As a natural next step, we extend our investigation by further decomposing P/E ratio forecasts into growth rate and discount rate forecasts, which allows us to measure the relative importance of three components (i.e., earnings forecasts, growth rate forecasts, and discount rate forecasts) in target price formation and the investment value of target prices.

To determine the driving force behind the target price formation by analysts, we focus on revisions in target prices rather than the levels of target prices. We first decompose a revision in target prices into two parts: a revision in earnings forecasts and a revision in the implied P/E ratio forecasts. Using a variance decomposition approach, we find that both earnings forecast revisions and P/E ratio forecast revisions are

[2] For a firm that pays out earnings as dividends, the Gordon's (1962) constant growth model shows that $\mathrm{P/E} = 1/(r - g)$, where r and g denote a discount rate and an earnings growth rate, respectively.

important in driving the revisions in target prices. For example, at three-month revision horizon, about 42% (58%) of the variation in target price revisions is driven by revisions in earnings forecasts (revisions in P/E ratio forecasts). We also report that the relative importance of earnings forecast revisions increases with revision horizon. Interestingly, in the cross-section, the relative importance of earnings revisions and P/E ratio revisions are related to the characteristics of underlying stocks. For example, earnings forecast revisions are more important for stocks with smaller market caps, higher book-to-market ratios, and higher levels of capital expenditures, slower sales growth, and lower past returns.

In the three-component decomposition analysis, we find that the contribution of P/E ratio forecasts to the target price revisions is primarily driven by the revisions in discount rates, rather than by the revisions in growth rates. For example, at semiannual revision horizon, about 46% (5%) of the variation in target price revisions is driven by revisions in discount rates (earnings growth rates), while the remaining 49% is driven by earnings forecast revisions.

We next examine the profitability of investment strategies based on target prices. Consistent with Da and Schaumberg (2010), we find that the long-short trading strategy based on the expected returns implied by analyst target prices (*TPER*) is highly profitable: the *TPER* strategy produces a substantial four-factor alpha of 1.57% per month. We then relate the relative importance of earnings forecasts and P/E ratio forecasts in target price formation to the profitability of the *TPER* strategy. If the value of target prices only comes from analysts' superior ability to forecast earnings, we would expect such ability to be relevant and lead to a profitable *TPER* strategy only

among stocks where target price revisions are mainly driven by earnings forecast revisions. On the other hand, for stocks where target price revisions are mainly driven by revisions in implied P/E ratios, if the *TPER* strategy is profitable, it must be due to analysts' superior ability of forecasting earnings growth rates or discount rates. To test this conjecture, we examine the performance of the trading strategy for two sub-samples based on the relative importance of earnings forecast revisions for target price revisions, and find the *TPER* strategy to be profitable in both sub-samples suggesting that equity analysts are also good at forecasting future earnings growth rates and discount rates implied in P/E ratios.

As our final analysis, we separate out discount rates from the implied P/E ratios, which allows us to more directly investigate whether the perceived role of discount rates in target price formation carries over to the investment value of target prices. We find that the *TPER* strategy produces a significant alpha for the portfolio of stocks where target price revisions are mainly driven by revisions in discount rates, which confirms that the investment value of target price forecasts comes not only from analysts' superior ability of forecasting earnings, but also from their superior ability of forecasting discount rates.

This paper makes important contributions to the literature in two ways. First, our results provide insights into how analysts generate their target prices. While prior accounting research has explored the association between earnings forecasts and stock recommendations (Francis and Soffer 1997; Bradshaw 2004), little attention has been paid to the relation between earnings forecasts and target prices even though we believe target prices are a finer summary measure about firms' future perspective than stock

recommendations. A few prior studies suggest that analysts' earnings forecasts are important for establishing their target prices (Bandyopadhyay et al. 1995; Bradshaw 2002; Gleason et al. 2008). However, these studies ignore other important factors in target price formation. By including growth rate and discount rate forecasts in the analysis along with earnings forecasts, we are able to better understand analysts' target price formation process.

Second, while previous research has focused on evaluating the value associated with analysts' earnings forecasts, our results also highlight the investment value of discount rates forecasts. Since analysts are scrutinized on their earnings forecast and are rewarded for providing accurate earnings forecasts, it is generally believed that accurate earnings forecasts contain investment value which can lead to superior stock recommendations (Loh and Mian 2006; Ertimur, Sunder and Sunder 2007) or superior target price forecasts (Gleason, Johnson and Li 2008). However, relatively little is known about the investment value of their implied P/E ratio forecasts which contain their expectations on discount rates. To our best knowledge, this is the first study to examine contributing factors to the investment value of analyst target prices.

The remainder of the paper is structured as follows: We discuss related literature in Section 2. We examine what drives target price revisions in Section 3. Data sources and the key variables are discussed in Section 4. We discuss the empirical findings focusing on the main drivers of target prices in Section 5, and we discuss robustness tests in Section 6. We analyze the investment value of target prices in Section 7. We provide concluding remarks in Section 8.

2. Related Literature

In this section, we briefly review the relevant literature that examines the investment value of equity analyst research. The extant literature generally agrees that analyst research provides value-relevant information to the capital market.[3] Most prior research related to analysts' investment value focuses on earnings forecasts and stock recommendations. For earnings forecasts, earlier studies find that stock prices react to earnings forecast revisions and continue to drift in the direction of the revision for about six months (Givoly and Lakonishok 1979; Imhoff and Lobo 1984; Lys and Sohn 1990; Stickel 1991; Gleason and Lee 2003). For stock recommendations, Womack (1996) and Barber et al. (2001) document that the stocks with the most favorable recommendations tend to outperform the stocks with the least favorable recommendations. Jegadeesh et al. (2004) further document that analysts' recommendation revisions have more predictive power for future stock returns than the absolute levels of recommendations.[4]

The informativeness of analysts' target prices has been documented in more recent studies. Brav and Lehavy (2003), using a database of analyst target prices issued for more than 6500 firms during the years from 1997 to 1999, document *incremental* abnormal returns around target price revisions, even after controlling for stock recommendations and earnings forecast revisions. Asquith et al. (2005) examine equity analyst reports issued in years from 1997 to 1999, and document that target price revisions have a larger impact on stock returns than earnings forecast revisions. Da and Schaumburg (2010) recently analyze the short-term performance of a long-short trading strategy based on the

[3] See Ramnath et al. (2008) for a recent review of the role and value of equity analysts in capital markets.
[4] Evidence provided by other studies suggests that a combination of elements in analyst research adds more investment value than an individual element (Francis and Soffer 1997; Asquith et al. 2005). For example, Francis and Soffer (1997) document that analysts' earnings forecasts and stock recommendations contain distinct information content.

expected returns implied by analyst target prices (*TPER*) over the period from 1999 to 2004. They find that a sector-neutral strategy of buying the stocks with the highest *TPER* and short-selling the stocks with the lowest *TPER* among the set of S&P 500 stocks earns significant abnormal returns, suggesting the short-term informativeness of analyst target prices.

Despite the increasing evidence on the investment value of analyst target prices, evidence on the source of the investment value is limited. Asquith et al. (2005) report that most analysts construct their particular target price as the product of their earnings forecast and an earnings multiple.[5] This finding, combined with the voluminous evidence on the investment value of analysts' earnings forecasts (Givoly and Lakonishok 1979; Imhoff and Lobo 1984; Lys and Sohn 1990; Stickel 1991; Gleason and Lee 2003), suggests that the investment value of analysts' target prices is partly due to their superior ability to forecast earnings. However, no other study to date explicitly has examined where the investment value of analyst target prices comes from, and relatively little is known about the investment value of discount rates compared to the investment value of earnings forecasts.[6] This study attempts to fill the gap in the literature.

3. Target price decomposition

In this section, we describe two target price valuation models used in this study and how we decompose target prices into different components for each model.

[5] This finding is consistent with prior studies (Bandyopadhyay et al. 1995; Bradshaw 2002) suggesting that analysts' earnings forecasts are a key input for establishing their target prices.

[6] A recent study by Kecskes et al. (2010) analyzes the source of the value of analysts' stock recommendations. They document that earnings-based recommendation revisions should be more informative than discount rate-based recommendation revisions.

3.1 Decomposition I: earnings forecasts and P/E ratio forecasts

As evidenced by Asquith et al. (2005), the target price (*TP*) is often derived as the product of two terms: a forecast of future earnings (*EF*) and a forecast of the price-to-earnings ratio (*PE*):

$$TP_t = EF_t \times PE_t$$

Analysts' target prices (TP_t) and earnings forecasts (EF_t) are directly observable. We back out the "implied" forecasts of the price-to-earnings ratio as $PE_t = EF_t \,/\, TP_t$.

Take logarithm to get:

$$tp_t = ef_t + pe_t$$

It is well-known that the level of earnings forecasts can be "contaminated" by analysts' biases. As biases are likely to persist over short horizons, revisions in analysts' forecasts are less affected by biases and are usually more informative about changes in firms' fundamentals. Revisions in (log) target prices can be decomposed into revisions in (log) earnings forecasts and revisions in the implied (log) P/E ratio forecasts:

$$\Delta tp_t = \Delta ef_t + \Delta pe_t. \qquad (1)$$

The earnings forecast revisions reflect earnings news while revisions in P/E ratio forecasts reflect news about earnings growth rates and discount rate news. To measure their relative importance in driving the target price revision, we use a variance decomposition approach. Equation (1) implies:

$$Var(\Delta tp_t) = Cov(\Delta tp_t, \Delta ef_t) + Cov(\Delta tp_t, \Delta pe_t) \qquad (2)$$

Dividing both sides of equation (2) by $Var(\Delta tp_t)$, we obtain:

$$1 = \frac{Cov(\Delta tp_t, \Delta ef_t)}{Var(\Delta tp_t)} + \frac{Cov(\Delta tp_t, \Delta pe_t)}{Var(\Delta tp_t)}. \quad (3)$$

Each term on the right-hand side of equation (3) can be estimated by regressing Δef_t and Δpe_t on Δtp_t, respectively. The slope coefficient of the first regression, *CEF*, thus measures the percentage of total variation in target price revisions that is driven by earnings forecast revisions. Likewise, the slope coefficient of the second regression, *CPE*, measures the relative importance of revisions in P/E ratio forecasts in driving target price revisions. By construction, *CEF* and *CPE* sum up to one. Empirically, *CEF* serves as a lower bound on the relative importance of earnings news for two reasons. First, information about long-term earnings growth rates is contained in P/E ratios and will show up in *CPE*, as further discussed in Section 3.2. Second, since we define the difference between the target price revision and the earnings forecast revision as the revision in P/E ratio forecasts, noises associated with target price revisions (e.g., measurement error, analyst bias, etc.) will always be classified as revisions in P/E ratio forecasts. Thus, the importance of P/E ratio forecasts is overestimated in *CPE* while *CEF* underestimates the importance of earnings news.

3.2 Decomposition II: earnings forecasts, growth rates, and discount rates

Given that P/E ratios reflect the information about earnings growth rates and discount rates (Gordon 1962), it is a natural next step to further decompose P/E ratio forecasts into growth rate and discount rate forecasts. Since the parsimonious model in Section 3.1 does not provide any functional specifications of P/E ratios in terms of growth rates and discount rates, we employ a more general model of target price formation. This allows us to separate the three components of target prices (i.e.,

earnings forecasts, growth rate forecasts, and discount rate forecasts) and to examine the extent to which each component contributes to the investment value of target prices.

To the end, we use a dividend discount model (DDM), which is mentioned as an alternative model for target price formation by equity analysts (Asquith et al. 2005). Specifically, we use the following DDM specification:

$$TP_t = \sum_{t=1}^{\infty} \left(\frac{E(D_t)}{(1+R)^t} \right) \tag{4}$$

, where D_t, and R denote dividends at time *t* and discount rates, respectively. With a couple of assumptions on a firm's growth rate we can express equation (4) in a finite time horizon as follows.

$$TP_t = \sum_{t=1}^{10} \left(\frac{E(D_t)}{(1+R)^t} \right) + \frac{E(D_{t+11})}{(R-G) * (1+R)^{t+10}} \tag{5}$$

,where G denotes growth rates. We first assume that after year 10, the firm grows at a constant rate of the industry median return on equity (ROE_{Ind}). Second, we assume that growth rates gradually revert to the industry median return on equity from year 1 to year 11 at a constant rate.[7] Specifically, we assumed the following dynamics of dividend growth:

$$E_t[D_t] = E_t[D_0] * (1+G),$$

$$E_t[D_{t+1}] = E_t[D_t]\left(1 + G - (G - ROE_{ind}) * \frac{1}{10}\right),$$

$$E_t[D_{t+2}] = E_t[D_t]\left(1 + G - (G - ROE_{ind}) * \frac{2}{10}\right),$$

$$E_t[D_{t+3}] = E_t[D_t]\left(1 + G - (G - ROE_{ind}) * \frac{3}{10}\right),$$

[7] We conduct several sensitivity tests using 1) a constant growth assumption and 2) a five-year terminal value horizon, and find that our results are robust to these alternative model assumptions.

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$$E_t[D_{t+10}] = E_t[D_t]\left(1 + G - (G - ROE_{ind}) * \frac{10}{10}\right),$$

$$E_t[D_{t+10}] = E_t[D_{t+11}] \text{ for } n > 10.$$

By substituting dividends in equation (5) with earnings forecasts multiplied by a dividend payout ratio, we can express target prices in terms of earnings forecasts (*EF*), earnings growth rates (*G*), and discount rates (*R*).[8] Since *TP*, *EF* and *G* are available from the First Call and I/B/E/S databases, we are able to numerically estimate the implied discount rate, *R*.

Following Chen and Zhao (2009), who decompose the change in stock prices into changes due to cash flow news and discount rate news, we decompose the revision in target prices into revisions due to three components: earnings news, growth rate news, and discount rate news.

$$\begin{aligned} \Delta tp_{t,t+j} &= ln\left(\frac{TP_{t+j}}{TP_t}\right) \\ &= \Delta(ef)_{t,t+j} + \Delta(g)_{t,t+j} + \Delta(r)_{t,t+j} \end{aligned} \tag{6}$$

,where:

$$\Delta(ef)_{t,t+j} = ln\left[f\left(EF_{t+j}, G_t, R_t\right)\right] - ln[f(EF_t, G_t, R_t)],$$

$$\Delta(g)_{t,t+j} = ln\left[f\left(EF_{t+j}, G_{t+j}, R_t\right)\right] - ln\left[f\left(EF_{t+j}, G_t, R_t\right)\right],$$

$$\Delta(r)_{t,t+j} = ln\left[f\left(EF_{t+j}, G_{t+j}, R_{t+j}\right)\right] - ln\left[f\left(EF_{t+j}, G_{t+j}, R_t\right)\right].$$

[8] During the sample period, we use a constant payout ratio of 0.3765, which is a cross-sectional and across all-year average of each firm's five-year average dividend payout ratio. By holding the dividend payout ratio constant throughout the sample period, we make sure that the target price variations do not come from the variations in dividend payout ratio.

This approach enables us to estimate the revision in target prices due to the revision in each component by allowing the component to vary over time while holding the other components fixed. Note that $\Delta(x)_{t,t+j}$ does not denote the change of a variable *x* from *t* to *t* + *j*. It instead denotes the revision in log target prices from *t* to *t* + *j* that is attributed to the revision of a component *x* over the same time horizon.

The decomposition in equation (6) provides a convenient way to express the variance of target price revisions as the sum of three co-variances:[9]

$$Var(\Delta tp) = Cov[\Delta p, \Delta(ef)] + Cov[\Delta tp, \Delta(g)] + Cov[\Delta tp, \Delta(r)]. \quad (7)$$

Dividing both sides of equation (7) by $Var(\Delta tp)$, we obtain:

$$1 = \frac{cov[\Delta p, \Delta(ef)]}{var(\Delta tp)} + \frac{cov[\Delta tp, \Delta(g)]}{var(\Delta tp)} + \frac{cov[\Delta tp, \Delta(r)]}{var(\Delta tp)}. \quad (8)$$

As discussed in Section 3.1, each term on the right-hand-side of equation (8) can be estimated by regressing $\Delta(ef)$, $\Delta(g)$, and $\Delta(r)$ on Δtp respectively. The slope coefficient of each regression is labeled as *CEF*, *CG*, and *CR,* respectively. By construction, *CEF*, *CG*, and *CR* sum up to one, and each slope coefficient is interpreted as the percentage contribution of each component to the total variation in target price revisions.

4. Data description

The target price data for this study is provided by First Call. An important feature of the First Call database is that it contains accurate dating of analyst reports.[10] At the end

[9] For simplicity, we omit the time subscript *t*.

of each month from Nov 1996 to Mar 2005, we include stocks for which there is at least one (12-month-ahead) target price announcement during the month. It is important to note that, as a result, our sample includes no extremely small stocks that do not receive regular analyst coverage. We do not fill in the blanks using older target prices in order to avoid introducing an upward bias in the target prices which arises because analysts are more likely to issue a target price when they are in favor of a stock, as documented by Brav and Lehavy (2003).

Table 1 presents a summary of the resulting sample containing approximately 1700 stocks each month. For each stock, we have on average 2.2 target prices and 2.8 earnings forecasts per month. The sample on average covers about 80% of the CRSP stock universe in terms of market capitalization. Our sample contains large stocks. The median market capitalization of stocks in our sample, averaging over the sampling period, is $700 million – much larger than that of all NASDAQ stocks ($85 million), but slightly smaller than that of all NYSE stocks ($963 million).

A key variable of interest in this paper is the target price implied one-year-ahead expected return (*TPER*). *TPER* is defined as the consensus (split-adjusted) target price divided by the end-of-month stock price minus one (i.e., $TPER_t = TP_t/P_t - 1$), where the consensus target price TP_t is the simple average of all target prices received during the month. We do not make use of analyst identities in constructing the consensus forecast since several studies, including Bradshaw and Brown (2005) and Bonini et al. (2008), have found no systematic difference in analyst target price forecasting abilities. The mean (median) *TPER* during this sample period is 31% (21%), which is substantially higher than one would expect for the market as a whole. This is partly due

[10] See footnote 3 of Brav and Lehavy (2003) for a detailed discussion on the First Call database.

to the fact that analysts are far more likely to issue target prices when they favor the stock they cover. The mean (median) *TPER* was as high as 49% (32%) in year 2000 during the final stages of the NASDAQ bubble.

Following Da and Schaumburg (2010), we break down our sample into sectors according to the first two digits of Standard and Poor's GICS (Global Industry Classification Standard) codes. Using I/B/E/S data, Boni and Womack (2006) show that the GICS sector and industry definitions match well with the areas of expertise of most analysts as defined by the set of stocks covered by each analyst. The GICS codes are therefore a natural choice of sector definition. Throughout the study, we obtain target prices and earnings forecasts from First Call, stock prices and returns from CRSP and earnings growth rate from I/B/E/S. In computing various portfolio characteristics, we make use of data from COMPUSTAT.

5. Empirical findings

5.1 Decomposition I: earnings forecasts and P/E ratio forecasts

5.1.1 Variance decomposition

In order to examine the formation process of target prices, we first conduct the annual variance decomposition at the firm level, and the results are reported in Table 2. Several interesting findings arise from the table. First, independent of revision horizons, *CEF* is significantly greater than zero. Given that *CEF* serves as a lower bound on the relative importance of earnings news, positive *CEF* suggests that when we measure expectations from analysts' perspectives, earnings forecast revisions which proxy for news on future cash flows are important in determining expected changes in stock prices.

Second, we find that the relative importance of earnings forecast revisions in target price formation is increasing with revision horizons. At three-month revision horizon, on average about 42% of the variation in target price revisions is driven by the revision in earnings forecasts. At the semiannual (annual) horizon, revisions in earnings forecasts explain about 52% (61%) of the total variation in target price revisions. This finding is consistent with the notion that although price variation in the short term can be driven by sentiment or other factors unrelated to the "fundamentals" of the firm, over longer horizon, it is still tied to the expected change in future cash flows.[11] Another explanation is related to the "non-synchronicity" between the consensus earnings forecast and the consensus target price since earnings forecasts and target price forecasts might not be issued simultaneously. Such "non-synchronicity" problem can lead to noise that bias the estimate of *CEF* towards zero, but its impact should decrease as the revision horizon increases.

Third, we find *CPE* to be significantly positive as well. One hypothesis is that analysts are simply calculating target price using their earnings forecasts multiplied by a constant P/E ratio. If such hypothesis is true, the revision in target price forecasts will be almost entirely driven by earnings forecasts revisions, resulting in a close-to-zero *CPE*. This is not what we find. The values of *CPE*, ranging from 0.58 at three-month horizon to about 0.39 at annual horizon, imply that analysts are updating their P/E ratios forecasts as much as their earnings forecasts, if not more. A natural question that follows would be whether such implied P/E ratio revision has any investment value. We will take up that question in the next section.

[11] This result is consistent with the evidence in Easton et al. (1992) that the explanatory power of earnings for returns increases monotonically from 4 percent to 60 percent as the return interval increases from one to ten years.

Finally, the relative importance of earnings forecasts and implied P/E ratio forecasts for target prices changes over time. For instance, earnings forecasts are relatively less important in determining target prices during the 1999-2000 period surrounding the peak of the tech bubble.

Our findings are largely consistent with those obtained by Vuolteenaho (2002) at the firm level. Using actual market prices and actual earnings, he finds cash flow news to be more important in driving firm-level stock return. In this study, we examine the revisions in target price forecasts instead of changes in actual market prices. In other words, we are addressing the question – "are *analysts*' expected stock valuation in part driven by their expected future cash flows of the firm (captured by their earnings forecasts)?" We find the answer to be yes and that changes in analysts' earnings forecasts can explain at least half of the variation in their expected price revisions. Actual market prices can be more volatile since events such as liquidity shock can affect market prices but not analysts' expectations. Our results are comforting in the sense that at least equity analysts are incorporating news on future cash flows into their stock valuation.

5.1.2. Variance decomposition and stock characteristics

Having established the importance of earnings forecasts in driving target price revisions, we then extend our analysis and relate the relative importance of earnings forecast revisions (*CEF*) to various characteristics of the underlying stock. We do not report the results associated with *CPE* since $CPE = 1 - CEF$. In addition, since all estimates are very significant with the associated *t*-statistics all higher than 10 (in absolute terms), we only report point estimates from the variance decomposition. The

high levels of significance are expected because the underlying structure is a mathematical identity.

More specifically, we examine seven stock characteristics studied in Jegadeesh et al. (2004). *TAC* is total accruals computed as earnings before extraordinary items minus cash flow from operating income at each quarter end, scaled by the average total assets of year $t - 1$ and t. *SG* is sales growth computed as the percent change in sales from year $t - 1$ to t in a quarterly rolling basis. *CapExp* is annual total capital expenditures in a quarterly rolling basis scaled by the average total assets of $t - 1$ and t. *BP* is the ratio of book value of equity to the market capitalization at each quarter end. *MakCap* is the logarithm of market capitalization at quarter end. *Ret1* is a six-month size-adjusted return from month $t - 6$ to month $t - 1$. *Ret2* is a six-month size-adjusted return from month $t - 12$ to month $t - 7$. Each month, we sort our sample observations into five groups based on each of the seven characteristics, so overall 35 stock portfolios are constructed each month. We then repeat our variance decomposition exercise within each of the 35 portfolios. The estimates of *CEF* and their difference between extreme portfolios are reported in Table 3 for the revision horizon of three months (Panel A), six months (Panel B), and twelve months (Panel C).

Across all three revision horizons, we document that the relative importance of earnings forecasts for target prices (*CEF*) is significantly related to the market capitalization, the book-to-market ratio, capital expenditures, sales growth, and past returns. For example, the average *CEF* for small stocks is higher than large stocks by at least 0.15. This finding is consistent with the argument that discount rate news is more difficult to diversify across projects than earnings news (Vuolteenaho 2002). This

diversification argument thus suggests that for large firms holding a collection of many projects, earnings news are diversified and account for a smaller fraction of total variation in stock prices. In addition, the average *CEF* for value stocks with high book-to-market ratios is more than 0.2 higher than that for growth stocks with low book-to-market ratios. For a value stock, the asset-in-place accounts for a large portion of the stock value, so it is not too surprising that earnings forecast revisions are more important for target price revisions.

CEF is also higher for stocks associated with higher levels of capital expenditures, which is consistent with the view that earnings news become more important as firms convert their growth options into assets-in-place. *CEF* is lower for stocks with high sales growth since growth rate information is contained in implied P/E ratio forecasts. Johnson (2002) argues that higher past returns are an indication of higher future growth. Consistent with the argument, we find that *CEF* is lower for stocks with higher past returns. At longer revision horizons, *CEF* is higher for stocks with low levels of total accruals, which is consistent with the intuition that earnings news are more important for firms reporting higher quality of earnings.

5.2 Decomposition II: earnings forecasts, growth rates, and discount rates

The results reported in Table 2 suggest that both earnings forecast revisions and implied P/E ratio revisions are important in driving target price revisions. Gordon (1962) model suggests that P/E ratios contain information about growth rates and discount rates. In this section, we examine the relative importance of growth rates and discount rates in explaining target price revisions along with earnings forecasts.

To this end, we conduct the three-component variance decomposition using the dividend discount model for target price formation as specified in the equation (5). Since the model involves analysts' long-term growth rates, tests of the three-component variance decomposition are based on firms in the intersection of First Call and I/B/E/S databases.[12] The results reported in the Panel A of Table 4 are based on the two-component decomposition of target prices (i.e., $TP = EF \times PE$). We only report these results for comparison purpose. Panel A shows that the variation of P/E ratio forecast revisions (*CPE*) explains about 59%, 51% and 46% of the variation of target price revisions in 3-month, 6-month and 12-month revision horizons, respectively. These results are qualitatively similar to those reported in Table 2.

Panel B of Table 4 shows that the implied P/E ratio's explanatory power in accounting for the variation in target price revisions is mainly driven by the variation in discount rates, rather than the variation in earnings growth rates. Across all revision horizons, growth rate revisions explain only 4-5% of the variation in target price revisions (*CG*). Strikingly, revisions in discount rates explain almost half (41-54%) of the variation in target price revisions (*CR*), suggesting that analysts do make discount rate forecasts as well as earnings forecasts in generating target prices. These findings are consistent with the recent study by Kecskes et al. (2010), which document that analyst recommendation changes based on discount rate changes are informative while recommendation changes based on growth rate changes do not have a significant price impact.

[12] Restricting the sample to firms in the intersection of First Call and I/B/E/S results in a much smaller sample (with almost one-third of the original sample's observations).

In sum, the results reported in Table 4 provide evidence that the variation in target price revisions attributable to the variation in the implied P/E ratio revisions is primarily due to the revision in discount rates rather than the revision in earnings growth rates.

6. Robustness tests

6.1 Negative earnings forecasts

Earnings forecasts can be negative at the individual firm level. We have excluded firms with negative earnings forecasts (a little over 9% of the total stock-month observations) from our earlier analysis since earnings forecasts are log-transformed. We conduct two additional tests to include the firms with negative earnings forecasts back to our sample. First, we aggregate earnings forecasts at the market level because earnings forecasts are almost always positive once they are aggregated at the market level. Each month, we aggregate both target price forecasts and earnings forecasts at the market level and then decompose the revision in aggregate market target prices into the revision in aggregate earnings forecasts and the revision in aggregate P/E ratio forecasts according to equation (1). We report the results of the variance decomposition at the aggregate market level in Panel A of Table 5. The results are similar to those of the firm-level variance decomposition reported in Table 2. Both earnings forecast revisions and P/E ratio revisions are important at all revision horizons, and the importance of earnings forecast (P/E ratio forecast) revisions increases (decreases) as the revision horizon increases.

Second, since $(EF_t - EF_{t-1})/|EF_{t-1}|$ approximates Δef_t used in earlier section, we redefine Δef_t using the approximate expression. We report the results of the variance decomposition using this new definition of earnings forecast revisions in Panel B of Table 5. Once again the results are similar to those reported in Table 2. In sum, our results are robust to the inclusion of firms with negative earnings forecasts.

6.2 Two-component variance decomposition conditional on earnings growth rates

Based on the dividend discount model for target price formation, the results in Table 4 suggest that revisions in the implied P/E ratios that account for the variation in target price revisions are primarily due to revisions in discount rates rather than revisions in earnings growth rates. In this section, we try to confirm the findings reported in Table 4 with the two-component variance decomposition using the parsimonious model as specified in equation (1), conditional on earnings growth rates from the I/B/E/S.

The sample is grouped into quintiles based on the revisions in growth rates (Δg), with the lowest quintile divided further into two sub-groups: one with no revisions in growth rate (i.e., $\Delta g = 0$) and the other with all else. The results for each of three revision horizons are reported in Panel C of Table 5. Across all Δg quintiles, we observe similar levels of the importance of earnings forecast revisions (*CEF*) and P/E ratio forecast revisions (*CPE*) in driving target price revisions to those reported in Table 2. For example, on average earnings forecast revisions (P/E ratio forecast revisions) explain 40% (60%), 47% (53%), and 53% (47%) of the variation in target price revisions at 3-month, 6-month, and 12-month revision horizons, respectively. More importantly, the difference in *CPE* between the lowest and the highest Δg quintiles is not significant. For example, at three-month revision horizon, *CPE* is 0.6 in the lowest

Δg quintile while it is 0.54 in the highest Δg quintile, with a minor difference of 6%. At longer horizons, the *CPE* difference between the lowest and the highest Δg quintiles increase slightly to over 10%.

In addition, if analysts do not revise earnings growth rates while they revise P/E ratio forecasts, then the P/E ratio forecast revision should solely come from the revision in discount rate forecasts rather than earnings growth rate revisions. In a smaller sample of firms where $\Delta g = 0$, we find that *CPE* is almost the same as the average *CPE* across Δg quintiles, suggesting that the explanatory power of P/E ratio forecasts in driving target price revisions is barely driven by growth rate revisions. For example, at 6-month revision horizon, *CPE* is 0.5 for the sample of firms with zero Δg while the average *CPE* across all Δg quintiles is 0.53. We observe a similar pattern for other revision horizons.

Collectively, our results in Panel C of Table 5 suggest that earnings growth rates explain very little about the variation in target price revisions, but discount rates explains most of the variation in P/E ratio revisions and in turn explains almost half of the variation in target price revisions, which is consistent with the three-component decomposition results reported in Panel B of Table 4.

7. Investment value of target price components

7.1 Earnings forecasts versus discount rates implied in P/E ratio forecasts

Our earlier analysis of variance decomposition shows that both earnings forecasts and P/E ratio forecasts are important in determining target prices. Interestingly, it

further suggests target price revisions explained by P/E ratio revisions primarily come from revisions in discount rate, but very little from revisions in growth rates.

Prior studies that examine the investment value of target prices suggest that analysts provide value-relevant information to investors through their target price forecasts (Brav and Lehavy 2003; Da and Schaumburg 2010). In this section, we examine how each component of target prices drives the known investment value of target prices. The specific question we address is whether the investment value of target prices is driven by analysts' superior ability to predict earnings or discount rates implied by P/E ratio forecasts or both.

Following Brav and Lehavy (2003) and Da and Schaumburg (2010), we use target price implied expected returns (*TPER*) as an investment signal and implement a sector-neutral *TPER* strategy. *TPER* is defined as the return implied by the consensus 12-month-ahead target price of equity analysts and the current market price (i.e., $TPER = TP/P - 1$). For each month, we only consider stocks for which at least one analyst has announced a target price during the month. At the end of each month, we compute the *TPER* for each stock and sort stocks based on their *TPER* within each sector. We then construct an equally weighted portfolio that is long the highest *TPER* stocks from each sector and short the lowest *TPER* stocks from each sector.[13] The portfolio is held for the next month before rebalancing.

More importantly, in order to examine whether the investment value of target prices comes from analysts' ability to forecast earnings or their ability to forecast discount rates, we test cross-sectional relationships between the performance of our *TPER*

[13] Since the portfolio is equally weighted, it is by construction sector neutral, thereby isolating the relative strength information contained in analysts' price targets suggested by Da and Schaumburg (2010).

strategy and the relative importance of each component for target prices. To do so, we need to construct a firm-specific measure of the relative importance of earnings forecast revisions in explaining target price revisions (*CEF*).[14] For every firm in each month, we compute the firm-specific *CEF* by running the log earnings forecast revisions on the log target price revisions over the preceding 24 months, and sort stocks into two sub-samples: stocks with above-median *CEF* (*High EF-sensitive* sample) and stocks with below-median *CEF* (*Low EF-sensitive sample*).[15] We then look at the performance of the *TPER* strategy within each sub-sample of firms.

If the investment value of target prices comes solely from analysts' ability to forecast future earnings, we would expect to see the *TPER* strategy to be profitable in the sample where earnings forecasts are more important in explaining target prices (i.e., the sub-sample with above-median *CEF*) but not in the sample where earnings forecasts are less important in explaining target prices (i.e., the sub-sample with below-median *CEF*). On the other hand, if analysts also have a superior ability to forecast P/E ratios, we expect the *TPER* strategy to be profitable even among the stocks where the relative importance of earnings forecasts is low (*Low EF-sensitive sample* or where the relative importance of P/E ratios is high) in explaining target prices.

To account for the fact that stocks with different levels of *TPER* are associated with different risks, we compute risk-adjusted returns using a four-factor model that includes both the Fama and French (1993) three factors and the Carhart (1997) momentum factor. To account for the possibility that factor loadings are time varying, we also compute the characteristics-adjusted returns as in Daniel, Grinblatt, Titman and

[14] Note that, by construction, the measure of the relative importance of P/E ratio forecasts in target price formation, *CPE*, is obtained by the following identity: $CPE = 1 - CEF$.
[15] We require the minimum of eight observations for each regression.

Wermers (1997). Intuitively, characteristics-adjusted returns reflect the excess returns to our *TPER* portfolios in excess to those of a benchmark portfolio with similar characteristics in terms of size, book-to-market ratio and past returns.

Table 6 reports the profitability of the *TPER* strategy for the full sample as well as for the sub-samples by the relative importance of earnings forecasts in target price formation. Confirming the findings in Da and Schaumburg (2010), the *TPER* strategy is highly profitable: Panel A shows that, over the period from January 1999 to March 2005, the *TPER* strategy produces a substantial four-factor alpha of 1.57% per month for the full sample.[16] The alpha is also statistically significant with a *t*-value of 2.57. The characteristics-adjusted return to our *TPER* strategy is somewhat smaller (0.74% per month) but more significant (*t*-value of 2.84). At longer revision horizons (Panels B and C), the *TPER* strategy still proves to be profitable and reports similar excess returns in magnitude to those reported in Panel A.

By focusing on stocks whose target price revisions are mainly driven by earnings forecast revisions (*High EF-sensitive* sample), we examine whether the investment value of target price comes from analysts' superior ability to forecast earnings. Panel A of Table 6 reports that the *TPER* strategy produces a four-factor alpha of 1.58% per month in the *High EF-sensitive* sample. The alpha is statistically significant with a *t*-value of 2.28. The characteristics-adjusted return is also profitable, but somewhat smaller (0.89% per month with a *t*-value of 2.33), which is consistent with the notion

[16] In this section, we focus on a sampling period from January 1999 to March 2005 for two reasons. First, we want to relate the performance of our *TPER* strategy to the relative importance of earnings revisions (*CEF*), and *CEF* is estimated using a two-year rolling window which again prevents us from implementing the *TPER* strategy prior to 1999. Second, since the GICS codes were officially launched by Standard & Poor's and Morgan Stanley Capital International (MSCI) in 1999, implementing the strategy prior to 1999 suffers from a backfilling bias.

that the investment value of target prices largely comes from analysts' superior ability to forecast earnings.

More interestingly, the performance results of *TPER* strategy for the *Low EF-sensitive* sample provide evidence that equity analysts not only have a superior ability in forecasting earnings, but also have a superior ability in forecasting discount rates implied in P/E ratios. Specifically, the *TPER* strategy produces a four-factor alpha of 1.57% per month (with a *t*-value of 2.31) and characteristics-adjusted return of 0.58% per month (with a *t*-value of 1.66) in the *Low EF-sensitive* sample. The findings at longer revision horizons (Panels B and C) are qualitatively the same as the finding in Panel A that the *TPER* strategy proves to be profitable in both the *Low* and *High EF-sensitive* sub-samples. At longer revision horizons, the characteristics-adjusted returns to our *TPER* strategy for the *Low EF-sensitivity* sample become more significant.

As another way to single out the source of the investment value of target prices, we apply our performance tests of the *TPER* strategy to another set of two sub-samples: '*Supported*' and '*Unsupported*' revision sub-samples (Kecskes et al. 2010)[17]. The '*Supported'* revisions refer to the cases where analysts' target price revisions and earnings forecast revisions are in the same direction, that is, both target price and earnings forecasts are revised upward or both are revised downward. On the other hand, '*Unsupported'* revisions refer to the cases where analysts' target price revisions and earnings forecast revisions are in opposite directions, that is, one forecast is revised upward and the other is revised downward. It is thus reasonable to expect

[17] Kecskes et al. (2010) have made the first attempt in isolating analysts' discount rate forecasts by comparing the direction of stock recommendation revisions to that of earnings forecast revisions.

'*Unsupported*' target price revisions to be the ones that are mainly driven by revisions in the P/E ratios.

Table 7 reports the performance results of the *TPER* strategy for the supported and unsupported revision sub-samples at 3-month (Panel A), 6-month (Panel B), and 12-month (Panel C) revision horizon. The *TPER* strategy is profitable in the supported revision sub-sample at all revision horizons. For example, Panel A shows that it produces a four-factor alpha of 1.77% per month (with a *t*-value of 4.41) and characteristics-adjusted return of 1.85% per month (with a *t*-value of 7.63) for the supported revision sub-sample at 3-month revision horizon. And these risk-adjusted returns for the supported revision sub-sample are mostly higher than those for the unsupported revision sample, except for the characteristics-adjusted returns at 6-month revision horizon (third and fourth columns of Panel B). These findings are consistent with the notion that the investment value of analyst target prices mainly comes from their superior ability to forecast earnings.

More interestingly, the *TPER* strategy also produces significant risk-adjusted profits in the unsupported revision sub-sample. For example, at 3-month revision horizon, Panel A reports a net portfolio return of 0.96% per month after the four-factor risk adjustment and 1.52% per month after the characteristics adjustment, both statistically significant at least 5% level. The results at longer revision horizons (Panels B and C) are similar to those in Panel A. The results in the unsupported revision sub-sample provide another piece of evidence that equity analysts provide useful forecasts of discount rates and these forecasts are associated with the investment value.

In sum, our results in Tables 6 and 7 collectively provide strong evidence that the investment value of target prices is driven not only by analysts' ability to forecast future earnings but also by their superior ability to forecast discount rates.

7.2 Earnings forecasts versus a direct measure of discount rate forecasts

Our argument that analysts add investment value through their superior ability to forecast discount rates is based on our earlier finding that earnings growth rates alone explains very little about the variation in target price revisions reported in Section 5.2. However, given that earnings growth rates still explain a small variation in target price revisions, we conduct a more direct test to see whether analysts indeed have a superior ability to forecast discount rates and such forecasts lead to a profitability trading strategy. To this end, we use the dividend discount model in equation (5), which allows us to single out the discount rate component from the P/E ratio.

Using a procedure similar to that described in Section 7.1, we first divide the sample into two sub-samples based on the relative importance of discount rate news in explaining target price revisions (*CR*): stocks with above-median *CR* (*High r-sensitive* sample) and stocks with below-median *CR* (*Low r-sensitive* sample). The performance results of the *TPER* strategy applied to these two sub-samples are reported in Table 8.[18]

Panel A shows that, at the 3-month revision horizon, the *TPER* strategy generates a four-factor alpha of 1.87% per month and the characteristics-adjusted return of 1.07% per month for the *Low r-sensitive* sample, which comprises the stocks where earnings forecasts and/or growth rates are more important in driving target price revisions. At longer horizons (Panels B and C), the performance results are, albeit less significant in

[18] Using the same procedure that we compute a firm-specific *CEF* in Section 7.1, we estimate a firm-specific *CR* each month using the preceding 24-month observations with a minimum of eight observations.

the characteristics-adjusted return at 6-month horizon, qualitatively similar to those in Panel A, confirming the findings in Table 6.

More importantly, we also show that the *TPER* strategy generates significant risk-adjusted profits for the *High r-sensitive* sample across revision horizons, except for the characteristics-adjusted return at 3-month horizon. For example, Panel A shows that it produces a significant 1.37% four-factor alpha (with a *t*-value of 2.13) at 3-month revision horizon. At 6-month and 12-month revision horizons, the *TPER* strategy generates even higher four-factor alpha of 1.85% (Panel B) and 1.54% (Panel C) for the *High r-sensitive* sample, respectively.

In sum, our finding that the *TPER*-based trading strategy generates excess returns for the sub-sample of stocks where target price revisions are more sensitive to discount rate revisions provides another piece of evidence that the investment value of target prices comes not only from analysts' superior ability to forecast future earnings but also from their ability to forecast discount rates.

8. Conclusions

It is widely believed that sell-side equity analysts provide useful information to market participants as an information intermediary. However, very little is known about how equity analysts provide investment value to investors. By examining target price forecasts, earrings forecasts, and discount rates together, we document how equity analysts generate target prices and deliver the investment value to investors. While previous research has focused on evaluating the value associated with analysts'

earnings forecasts, our results also highlight the investment value of their discount rate forecasts.

For our empirical tests, we decompose equity analysts' target price into two components: the earnings forecast and the price-to-earnings ratio forecast, with the former containing short-term earnings news and the latter containing news about long-term earnings growth and discount rates. Using a large database of target prices from 1997 to 2004, we document that both components are important in driving target price revisions, and earnings forecast is relatively more important for stocks with smaller market caps, higher book-to-market ratios, more capital expenditures, slower sales growth, and lower past returns. While earnings forecasts are clearly associated with the investment value of target prices, we show that P/E ratio forecasts are also valuable.

Our further analysis shows that revisions in discount rate implied in the PE ratio primarily drive revisions in target price, not the growth rate. A target-price-based trading strategy produces a significant risk-adjusted profit of above 1% per month even among stocks where target prices are less driven by earnings forecasts (or alternatively among stocks where target prices are mainly driven by discount rates). This evidence suggests that equity analysts also provide informative forecasts about discount rates.

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Table 1
Descriptive Statistics of Analyst's Target Prices and Earnings Forecasts

The table reports descriptive statistics of individual target price forecasts and earnings forecasts (the union set of two forecasts) available at First Call database over the sample period from November 1996 to March 2005. The sample includes forecasts made by brokerage houses that provide both target price and earnings forecast. Variables are defined as follows. Number of *TP* (*EF*) is the average number of target prices (earnings forecasts) over all firms and months. Number of stocks is the average number of sample stocks over all months. Mean (Median) *Mktcap* is the pooled mean (median) of the market capitalization of sample firms over all firms and months. Mean (Median) *TPER* is the pooled mean (median) of the target price implied rate of return, calculated by subtracting one from the ratio of target price and the current stock price. Mktcap % is the proportion of the sample firms' market capitalization to the total market value of the CRSP population.

Year	Number of TP/ Mth	Number of EF/ Mth	Number of stocks/ Mth	Mean Mktcap (million $)	Median Mktcap (million $)	Mean *TPER*	Median *TPER*	Mktcap %
1996	0.94	1.44	796	3159	614	31.2%	22.6%	48.4%
1997	1.59	1.74	1441	3347	605	25.5%	19.7%	79.6%
1998	2.07	1.97	1971	3623	542	35.5%	24.4%	82.2%
1999	2.21	2.22	1865	4831	617	33.5%	25.5%	85.6%
2000	2.37	2.56	1862	5619	756	49.2%	31.6%	86.8%
2001	2.53	3.37	1736	4943	715	39.1%	23.5%	89.1%
2002	2.59	3.49	1631	4482	703	33.6%	21.4%	90.4%
2003	2.12	3.53	1448	4422	756	14.8%	12.0%	89.9%
2004	2.26	3.68	1606	5078	925	15.8%	12.8%	90.8%
2005	2.18	3.77	1559	5147	982	14.6%	12.2%	76.2%
Mean	2.09	2.78	1592	4465	722	29.3%	20.6%	81.9%

Table 2
Variance Decomposition of Target Price Revision into Earnings Forecast and Price-to-Earnings Forecast Revisions

The table reports how much of variations in earnings forecasts (*EF*) and price-to-earnings ratio (*PE*) explain the variation in target price forecasts (*TP*) in a variance decomposition framework. Each panel reports slope coefficients from two simple regressions each year: *CEF* and *CPE*. *CEF* is the percentage of variations in *EF* revisions that explains the variation in *TP* revisions estimated by the slope coefficient of regressing (log) earnings forecast revisions on (log) target price revisions. *CPE* is the percentage of variations in *PE* revisions that explains the variation in *TP* revisions estimated by the slope coefficient of regressing (log) price-to-earnings revisions on (log) target price revisions. *TP* is monthly median target price forecast. *EF* is monthly median earnings forecast. *PE* is a ratio of monthly median target price to monthly median earnings forecast. Revisions in log(*TP*), log(*EF*) and log(*PE*) are calculated in three horizons: at three-month (Panel A), six-month (Panel B), and twelve month (Panel C) intervals. *Obs* in Panels A, B, and C is the total firm-month observations used in each regression. Observations with a top and bottom 1% of *PE* are excluded from the sample. The average *t*-statistics from the annual OLS regressions are reported in brackets.

Panel A: Revision Horizon - 3 Months			
Year	CEF	CPE	Obs
1997	0.33	0.67	8509
1998	0.41	0.59	11580
1999	0.35	0.65	11330
2000	0.31	0.69	12186
2001	0.52	0.48	12053
2002	0.49	0.51	11702
2003	0.39	0.61	12740
2004	0.46	0.54	13801
2005	0.55	0.45	710
mean	0.42	0.58	10512
[t-stat]	[14.54]	[19.86]	

Panel B: Revision Horizon - 6 Months			
Year	CEF	CPE	Obs
1997	0.38	0.62	7303
1998	0.55	0.45	11029
1999	0.43	0.57	10912
2000	0.46	0.54	11731
2001	0.60	0.40	11665
2002	0.57	0.43	11381
2003	0.49	0.51	12215
2004	0.58	0.42	13320
2005	0.59	0.41	684
mean	0.52	0.48	10027
[t-stat]	[19.74]	[18.40]	

Panel C: Revision Horizon - 12 Months			
Year	CEF	CPE	Obs
1997	0.56	0.44	3332
1998	0.58	0.42	9827
1999	0.52	0.48	10285
2000	0.58	0.42	10850
2001	0.62	0.38	11094
2002	0.63	0.37	10728
2003	0.62	0.38	11742
2004	0.63	0.37	12396
2005	0.73	0.27	674
mean	0.61	0.39	8992
[t-stat]	[30.67]	[19.82]	

Table 3
Variance Decomposition of Target Price Revision into Earnings Forecast Revisions and Price-to-Earnings Forecast Revisions by Firm Characteristics

The table reports how much of variations in earnings forecasts (*EF*) explain the variation in target price forecasts (*TP*) in a variance decomposition framework by seven firm characteristics. Each panel reports slope coefficients from a simple regression: *CEF*. *CEF* is the percentage of variations in *EF* revisions that explains the variation in *TP* revisions estimated by the slope coefficient of regressing (log) earnings forecast revisions on (log) target price revisions. *TP* is monthly median target price forecast. *EF* is monthly median earnings forecast. Revisions in log(*TP*) and log(*EF*) are calculated in three horizons: at three-month (Panel A), six-month (Panel B), and twelve month (Panel C) intervals. *Obs* in Panels A, B, and C is the total firm-month observations used in each regression. Within each sector classified by Standard and Poor's GICS, all sample stocks are ranked into 5 groups based on firm characteristics (1 with the lowest and 5 with the highest). Firm characteristics are defined as follows. *TAC* is total accruals, computed as earnings before extraordinary income minus cash flow from operating income, scaled by the average total assets of year *t*-1 and *t* at each quarter-end. *SG* is sales growth defined as the percent change in total sales from year *t*-1 to *t* on a quarterly rolling basis. *CapExp* is an annual total capital expenditure on a quarterly rolling basis scaled by the average total assets of *t*-1 and *t*. *BP* is a book-to-market ratio, defined as the ratio of book value of equity to the market capitalization at each quarter end. *MakCap* is the logarithm of market capitalization at quarter-end. *Ret1* is a six-month size-adjusted return from month *t*-6 to month *t*-1. *Ret2* is a six-month size-adjusted return from month *t*-12 to month *t*-7. Observations with a top and bottom 1% of *PE* are excluded from the sample. The average *t*-statistics from the annual OLS regressions are reported in brackets.

Panel A: Variance Decomposition by Firm Characteristics - Revision Horizon:3 Months							
Portfolio	TAC	SG	BP	CapExp	MktCap	Ret1	Ret2
1 (Low)	0.432	0.478	0.292	0.402	0.527	0.463	0.434
2	0.398	0.408	0.323	0.392	0.380	0.387	0.434
3	0.382	0.413	0.375	0.408	0.402	0.342	0.392
4	0.414	0.373	0.430	0.423	0.349	0.333	0.364
5 (High)	0.412	0.379	0.532	0.435	0.322	0.330	0.409
Diff 5-1	-0.020	-0.099	0.239	0.033	-0.205	-0.134	-0.026
t-stat	[-1.5]	[-7.36]	[17.74]	[2.3]	[-15.51]	[-10.36]	[-1.94]

Panel B: Variance Decomposition by Firm Characteristics - Revision Horizon:6 Months							
Portfolio	TAC	SG	BP	CapExp	MktCap	Ret1	Ret2
1 (Low)	0.550	0.609	0.378	0.506	0.641	0.559	0.544
2	0.518	0.539	0.416	0.501	0.496	0.428	0.536
3	0.491	0.524	0.466	0.509	0.505	0.413	0.521
4	0.512	0.463	0.541	0.544	0.461	0.400	0.470
5 (High)	0.504	0.455	0.643	0.538	0.423	0.406	0.482
Diff 5 -1	-0.046	-0.154	0.264	0.031	-0.218	-0.152	-0.062
t-stat	[-3.61]	[-11.43]	[20.04]	[2.19]	[-16.7]	[-11.18]	[-4.68]

(continued)

Panel C: Variance Decomposition by Firm Characteristics - Revision Horizon:12 Months							
Portfolio	TAC	SG	BP	CapExp	MktCap	Ret1	Ret2
1 (Low)	0.642	0.713	0.476	0.580	0.707	0.620	0.624
2	0.597	0.623	0.501	0.586	0.620	0.545	0.587
3	0.563	0.583	0.566	0.594	0.606	0.600	0.566
4	0.598	0.502	0.637	0.644	0.561	0.572	0.500
5 (High)	0.614	0.493	0.707	0.645	0.511	0.551	0.526
Diff 5 -1	-0.028	-0.220	0.231	0.066	-0.196	-0.069	-0.098
t-stat	[-2.24]	[-16.84]	[18.31]	[4.87]	[-15.39]	[-5.14]	[-7.69]

Table 4
Variance Decomposition with an Alternative Valuation Model

The table reports how much of variation in target price (*TP*) forecasts revisions is explained by various target price valuation components in a variance decomposition framework. Panel A reports the results of the variance decomposition of *TP* forecast revisions based on the valuation model, *TP=EF*PE* where *EF* is earnings forecasts and *PE* is a price-to-earnings ratio. Panel B reports the variance decomposition of *TP* forecast revisions results based on the dividend discount model where *TP* is a function of *EF*, long-term growth rate (*g*), and discount rate (*r*). *CEF* (*CPE*) is the percentage of variations in *TP* revisions that is explained by the variations in *EF(PE)* revisions. *CG* is the percentage of variations in *TP* revisions that is explained by the variation in *growth rate* revisions *(*Δg*). CR* is the percentage of variations in *TP* revisions that is explained by the variation in discount rate revisions *(r)*. Revisions in log(*TP*), log(*EF*) log(*PE*), *g*, and *r* are calculated in three horizons: at three-month, six-month, and twelve month intervals. *Obs* in Panels A and B is the total firm-month observations used in each regression. Observations with a top and bottom 1% of *PE* are excluded from the sample.

Panel A: TP=EF*PE

Revision Horizons	CEF	CPE	Obs
3 Months	41%	59%	38744
6 Months	49%	51%	36422
12 Months	54%	46%	32585

Panel B: TP = Dividend Discount Model

Revision Horizons	CEF	CG	CR	Total	Obs
3 Months	41%	4%	54%	100%	38744
6 Months	49%	5%	46%	100%	36422
12 Months	54%	5%	41%	100%	32585

Table 5

Variance Decomposition of Target Price with Alternative Revision Measures and by Growth Rate Revisions

The table reports how much of earnings forecasts (*EF*) and price-to-earnings ratio (*PE*) explain the variation in target price forecasts (*TP*) in a variance decomposition framework using variables at the aggregate market level (Panel A), and at the firm level with the inclusion of negative earnings forecasts (Panel B), and conditional on revisions in earnings growth rate (Panel C). Each panel reports slope coefficients from two simple regressions: *CEF* and *CPE*. In all panels *CEF* (*CPE*) is the percentage of variations in *EF* (*PE*) revisions that explains the variation in *TP* revisions estimated by the slope coefficient of regressing *EF* (*PE*) revisions on revisions in *TP*. The way that revisions in *EF* and *PE* are computed is different in each Panel. In Panel A, each month all target prices and earnings forecasts are aggregated, and these log revisions in the aggregated *TP* and *EF* (*PE*) are used to compute *CEF* (*CPE*). In Panel B, a revision in *EF* is computed as $\left(\frac{EF_t - EF_{t-1}}{|EF_{t-1}|}\right)$, a revision in *TP* as $\left(\frac{TP_t - TP_{t-1}}{|TP_{t-1}|}\right)$, and a revision in *PE* as $\left(\frac{TP_t - TP_{t-1}}{|TP_{t-1}|}\right) - 1$. In Panel C, *CEF* (*CPE*) are computed by revisions in log(*TP*), log(*EF*), and log(*PE*). *g* is a firm's long-term growth forecasts available from I/B/E/S summary file. In Panel C, all sample stocks are ranked into five groups based on its Δg (1 being the lowest and 5 being the highest quintiles). The lowest quintile is further divided into two sub-samples: one group with Δg = 0 (i.e., no changes in long-term growth rate), and the other group with the rest of the quintile one sample. All revisions are calculated in three time horizons: at three-month, six month, and twelve-month intervals. Observations with a top and bottom 1% of PE are excluded from the sample.

Panel A: Variance Decomposition at the Aggregate Market Level

Revision Horizon: 3 Months			Revision Horizon: 6 Months			Revision Horizon: 12 Months		
CEF	CPE	Obs	CEF	CPE	Obs	CEF	CPE	Obs
0.60	0.40	98	0.69	0.31	95	0.75	0.25	89
[4.56]	[3.08]		[5.98]	[2.73]		[7.76]	[2.64]	

Panel B: Variance Decomposition with the Inclusion of Negative Earnings Forecasts

Revision Horizon: 3 Months			Revision Horizon: 6 Months			Revision Horizon: 12 Months		
CEF	CPE	Obs	CEF	CPE	Obs	CEF	CPE	Obs
0.38	0.62	12265	0.51	0.49	11805	0.58	0.42	10654
[5.03]	[8.34]		[7.47]	[7.21]		[5.80]	[4.16]	

(continued)

Panel C: Variance Decomposition Conditional on Revisions in Earnings Growth Rate (Δg)									
	Revision Horizon: 3 Months			Revision Horizon: 6 Months			Revision Horizon: 12 Months		
Portfolio	CEF	CPE	Obs	CEF	CPE	Obs	CEF	CPE	Obs
Δg = 0	0.36	0.64	2932	0.50	0.50	2719	0.53	0.47	2747
Low Δg	0.40	0.60	4472	0.43	0.57	4230	0.48	0.52	4054
2	0.39	0.61	8015	0.43	0.57	7532	0.52	0.48	6758
3	0.39	0.61	8010	0.45	0.55	7570	0.54	0.46	6775
4	0.40	0.60	7990	0.47	0.53	7535	0.56	0.44	6729
High Δg	0.46	0.54	7556	0.55	0.45	7076	0.57	0.43	6353
Mean	0.40	0.60	6493	0.47	0.53	6110	0.53	0.47	5569

Table 6
Risk-Adjusted Returns of TPER-Sorted Portfolios:
By Target Price Revision Sensitivity to Earnings Forecast Revision

The table reports average monthly risk-adjusted *alpha*s using a four-factor model and characteristic-based benchmark portfolio adjusted returns during the first month after portfolio formation for portfolios sorted by target price implied rate of return (*TPER*). The results are also presented for subset of stocks sorted by how much of the target price (*TP*) variation is explained by the variation of earnings forecast (*EF*) revisions. When the *TP* revision is explained more by the *EF* revision [*PE* revision], the firm is grouped in the '*High [Low] EF Sensitive*' sample. The *TP* sensitivity to EF is measured by the magnitude of regression coefficients ($CEF_{i,,t}$), a slope coefficient of the time series regression of monthly log(*EF*) revision on log(*TP*) revision for firm *i* using previous 24 month *TP* revisions and *EF* revisions, with a minimum of 8 observations at each month *t*. Stocks with *CEF* value above (below) median are classified into '*High [Low] EF Sensitive'* sample. *TP* and *EF* revisions are measured with three intervals: three-month (Panel A), six-month (Panel B), and twelve-month (Panel C) intervals. *TPER* is a target price implied rate of return, calculated by subtracting one from the ratio of target price and the current stock price. The four factors are three Fama-French factors and a momentum factor. For each stock, the post-formation first month factor adjusted excess return is computed, and the excess returns in each portfolio are equally-weighted to compute monthly portfolio returns. Characteristics-based benchmark portfolio is based on 125 portfolios of size, book-to-market and momentum following Daniel, Grinblatt, Titman, and Wermers (1997) [DGTW]. At the end of each month from January 1999 to March 2005 and within each sector, all sample stocks are classified into one of 5 portfolios by the current month *TPER* (1 as the lowest *TPER* and 5 as the highest *TPER*). *t*-statistics are reported in brackets.

Panel A: Revision Horizon: 3 Months

	Four-Factor Alpha			DGTW Excess Return		
TPER portfolio	Full Sample	Low EF Sensitive Sample	High EF Sensitive Sample	Full Sample	Low EF Sensitive Sample	High EF Sensitive Sample
1 (Low)	-0.17%	-0.41%	0.07%	0.16%	0.03%	0.30%
	[-0.55]	[-1.30]	[0.18]	[1.12]	[0.15]	[1.31]
2	-0.04%	0.19%	-0.27%	0.23%	0.43%	0.04%
	[-0.22]	[0.75]	[-1.07]	[1.74]	[2.34]	[0.20]
3	0.59%	0.20%	0.95%	0.54%	0.23%	0.84%
	[2.20]	[0.69]	[2.82]	[3.68]	[1.17]	[3.88]
4	1.09%	0.73%	1.44%	0.85%	0.58%	1.11%
	[3.59]	[2.14]	[3.86]	[5.20]	[2.69]	[4.55]
5 (High)	1.40%	1.16%	1.64%	0.90%	0.61%	1.19%
	[2.65]	[1.93]	[2.80]	[4.20]	[2.05]	[3.85]
High - Low	1.57%	1.57%	1.58%	0.74%	0.58%	0.89%
t-stat	[2.57]	[2.31]	[2.28]	[2.84]	[1.66]	[2.33]

(continued)

Panel B: Revision Horizon: 6 Months

	Four-Factor Alpha			DGTW Excess Return		
TPER portfolio	Full Sample	Low EF Sensitive Sample	High EF Sensitive Sample	Full Sample	Low EF Sensitive Sample	High EF Sensitive Sample
1 (Low)	-0.11% [-0.36]	-0.35% [-1.27]	-0.58% [0.34]	0.24% [1.64]	0.03% [0.18]	0.44% [1.97]
2	-0.03% [-0.13]	-0.01% [-0.03]	0.22% [-0.18]	0.21% [1.54]	0.18% [0.96]	0.24% [1.21]
3	0.64% [2.50]	0.41% [1.58]	0.53% [2.74]	0.57% [3.88]	0.42% [2.16]	0.71% [3.27]
4	0.93% [3.24]	0.78% [2.36]	1.36% [3.12]	0.73% [4.56]	0.62% [2.91]	0.84% [3.51]
5 (High)	1.46% [2.89]	1.39% [2.49]	0.84% [2.74]	0.97% [4.51]	0.80% [2.73]	1.14% [3.61]
High - Low	1.56%	1.74%	1.43%	0.73%	0.77%	0.70%
t-stat	[2.67]	[2.79]	[2.03]	[2.81]	[2.19]	[1.82]

Panel C: Revision Horizon: 12 Months

	Four-Factor Alpha			DGTW Excess Return		
TPER portfolio	Full Sample	Low EF Sensitive Sample	High EF Sensitive Sample	Full Sample	Low EF Sensitive Sample	High EF Sensitive Sample
1 (Low)	-0.14% [-0.51]	-0.58% [-2.03]	0.30% [0.93]	0.20% [1.36]	-0.17% [-0.95]	0.56% [2.46]
2	0.19% [0.87]	0.22% [0.83]	0.16% [0.52]	0.35% [2.57]	0.41% [2.17]	0.30% [1.5]
3	0.61% [2.36]	0.53% [2.08]	0.68% [2.02]	0.52% [3.43]	0.49% [2.41]	0.54% [2.45]
4	1.19% [3.70]	1.36% [4.24]	1.02% [2.63]	0.87% [5.27]	0.97% [4.39]	0.77% [3.16]
5 (High)	1.34% [2.60]	0.84% [1.68]	1.83% [2.9]	0.82% [3.83]	0.40% [1.38]	1.23% [3.89]
High - Low	1.48%	1.43%	1.53%	0.62%	0.57%	0.67%
t-stat	[2.55]	[2.47]	[2.16]	[2.40]	[1.68]	[1.73]

Table 7
Excess Returns on Within-Sector TPER-Sorted Portfolios by Types of Target Price Revisions

The table reports average monthly risk-adjusted *alpha*s using a four-factor model and characteristic-based benchmark portfolio adjusted returns during the first month after portfolio formation for portfolios sorted by target price implied rate of return (*TPER*) by types of target price (*TP*) revisions. *TPER* is a target price implied rate of return, calculated by subtracting one from the ratio of target price and the current stock price. The sample is divided into two groups based on *TP* revision types: Unsupported and Supported samples. The unsupported *TP* revision sample includes firms whose *TP* and earnings forecasts (*EF*) revisions are in opposite direction. The supported TP revision sample includes firms whose *TP* and *EF* revisions are in the same direction. *TP* is a monthly median target price forecast and *EF* is a monthly median earnings forecast. *TP* and *EF* revisions are measured with three intervals: three-month (Panel A), six-month (Panel B), and twelve-month (Panel C). The four factors are three Fama-French factors and a momentum factor. For each stock, the post-formation first month factor adjusted excess return is computed, and the excess returns in each portfolio are equally-weighted to compute monthly portfolio returns. Characteristics-based benchmark portfolio is based on 125 portfolios of size, book-to-market and momentum following Daniel, Grinblatt, Titman, and Wermers (1997) [DGTW]. At the end of each month from January 1999 to March 2005 and within each sector, all sample stocks are classified into one of 5 portfolios by the current month *TPER* (1 as the lowest *TPER* and 5 as the highest *TPER*). *t*-statistics are reported in brackets.

Panel A: Revision Horizon: 3 Months

	Four-Factor Alpha		DGTW Excess Return	
TPER portfolio	Unsupported Revisions Sample	Supported Revisions Sample	Unsupported Revisions Sample	Supported Revisions Sample
1 (Low)	-0.55%	-0.01%	-0.31%	0.14%
	[-2.18]	[-0.03]	[-1.71]	[1.04]
2	-0.20%	0.37%	-0.03%	0.44%
	[-0.74]	[1.7]	[-0.20]	[3.62]
3	0.21%	0.95%	0.21%	0.70%
	[0.78]	[4.05]	[1.12]	[5.06]
4	0.39%	1.17%	0.52%	1.07%
	[1.36]	[4.21]	[2.36]	[7.02]
5 (High)	0.41%	1.77%	1.21%	1.99%
	[0.90]	[5.30]	[4.06]	[9.98]
High - Low	0.96%	1.77%	1.52%	1.85%
t-stat	[1.85]	[4.41]	[4.35]	[7.63]

(continued)

Panel B: Revision Horizon: 6 Months

	Four-Factor Alpha		DGTW Excess Return	
TPER portfolio	Unsupported Revisions Sample	Supported Revisions Sample	Unsupported Revisions Sample	Supported Revisions Sample
1 (Low)	-0.57%	0.04%	-0.50%	0.28%
	[-2.04]	[0.13]	[-2.76]	[2.10]
2	0.11%	0.35%	0.08%	0.41%
	[0.40]	[1.90]	[0.49]	[3.42]
3	0.55%	1.01%	0.29%	0.77%
	[1.82]	[4.16]	[1.51]	[5.93]
4	0.28%	1.03%	0.44%	1.06%
	[0.89]	[3.80]	[1.99]	[7.16]
5 (High)	0.90%	1.61%	1.31%	1.79%
	[2.04]	[4.76]	[4.53]	[9.27]
High - Low	1.47%	1.58%	1.81%	1.51%
t-stat	[2.81]	[3.64]	[5.30]	[6.40]

Panel C: Revision Horizon: 12 Months

	Four-Factor Alpha		DGTW Excess Return	
TPER portfolio	Unsupported Revisions Sample	Supported Revisions Sample	Unsupported Revisions Sample	Supported Revisions Sample
1 (Low)	0.06%	-0.09%	0.23%	0.05%
	[0.22]	[-0.37]	[1.11]	[0.42]
2	0.26%	0.25%	0.22%	0.25%
	[0.99]	[1.23]	[1.21]	[2.15]
3	0.42%	0.80%	0.37%	0.68%
	[1.14]	[3.55]	[1.76]	[5.39]
4	0.39%	0.98%	0.25%	0.84%
	[1.08]	[3.81]	[1.09]	[5.97]
5 (High)	1.04%	1.81%	1.35%	1.91%
	[2.13]	[4.84]	[4.27]	[10.41]
High - Low	0.98%	1.90%	1.13%	1.85%
t-stat	[1.74]	[4.25]	[2.99]	[8.26]

Table 8
Risk-Adjusted Returns on TPER-Sorted Portfolios:
By Target Price Revision Sensitivity to Discount Rate Revision

The table reports average monthly risk-adjusted *alpha*s using a four-factor model and characteristic-based benchmark portfolio adjusted returns during the first month after portfolio formation for portfolios sorted by target price implied rate of return (*TPER*). The table also reports the portfolio excess returns for subset of stocks sorted by how much of variations in target price (*TP*) revisions is explained by the variations in discount rate (*r*) revisions. All firm-month stocks are sorted based on the *TP* sensitivity to the *r* variation (*CR*), and if *CR* is above [below] the median of all *CR*'s each year, then the firm is classified into the '*High [Low] r-Sensitive'* sample. *TP* and *r* revisions are measured with three different intervals: three-month (Panel A), six-month (Panel B), and twelve-month (Panel C) intervals. *TPER* is a target price implied rate of return, calculated by subtracting one from the ratio of target price and the current stock price. The four factors are three Fama-French factors and a momentum factor. For each stock, the post-formation first month factor adjusted excess return is computed, and the excess returns in each portfolio are equally-weighted to compute monthly portfolio returns. Characteristics-based benchmark portfolio is based on 125 portfolios of size, book-to-market and momentum following Daniel, Grinblatt, Titman, and Wermers (1997) [DGTW]. At the end of each month from January 1999 to March 2005 and within each sector, all sample stocks are classified into one of 5 portfolios by the current month *TPER* (1 as the lowest *TPER* and 5 as the highest *TPER*). *t*-statistics are reported in brackets.

Panel A: Revision Horizon: 3 Months

	Four-Factor Alpha			DGTW Excess Return		
TPER portfolio	Full Sample	Low *r*-Sensitive Sample	High *r*-Sensitive Sample	Full Sample	Low *r*-Sensitive Sample	High *r*-Sensitive Sample
1 (Low)	-0.16%	0.09%	-0.41%	0.15%	0.32%	-0.02%
	[-0.51]	[0.24]	[-1.34]	[1.00]	[1.37]	[-0.12]
2	-0.06%	-0.25%	0.14%	0.18%	0.07%	0.29%
	[-0.28]	[-0.89]	[0.68]	[1.39]	[0.36]	[1.68]
3	0.55%	0.78%	0.33%	0.59%	0.79%	0.39%
	[2.04]	[2.3]	[1.18]	[4.08]	[3.64]	[2.05]
4	1.06%	1.37%	0.77%	0.82%	1.08%	0.56%
	[3.54]	[3.74]	[2.32]	[5.00]	[4.36]	[2.61]
5 (High)	1.46%	1.96%	0.97%	0.91%	1.39%	0.45%
	[2.72]	[3.26]	[1.70]	[4.27]	[4.28]	[1.61]
High - Low	1.62%	1.87%	1.37%	0.77%	1.07%	0.47%
t-stat	[2.61]	[2.64]	[2.13]	[2.95]	[2.67]	[1.41]

(continued)

Panel B: Revision Horizon: 6 Months

	Four-Factor Alpha			DGTW Excess Return		
TPER portfolio	Full Sample	Low *r*-Sensitive Sample	High *r*-Sensitive Sample	Full Sample	Low *r*-Sensitive Sample	High *r*-Sensitive Sample
1 (Low)	-0.12% [-0.41]	0.15% [0.39]	-0.38% [-1.33]	0.25% [1.73]	0.54% [2.40]	-0.04% [-0.19]
2	0.05% [0.27]	0.09% [0.38]	0.01% [0.04]	0.20% [1.51]	0.29% [1.45]	0.12% [0.66]
3	0.56% [2.09]	0.93% [2.61]	0.20% [0.79]	0.52% [3.58]	0.84% [3.81]	0.21% [1.09]
4	0.92% [3.33]	0.95% [2.68]	0.89% [3.08]	0.73% [4.52]	0.85% [3.43]	0.61% [2.94]
5 (High)	1.53% [2.99]	1.60% [2.93]	1.46% [2.64]	1.00% [4.64]	1.07% [3.35]	0.92% [3.21]
High - Low t-stat	1.65% [2.79]	1.45% [2.18]	1.85% [2.95]	0.74% [2.86]	0.53% [1.34]	0.96% [2.79]

Panel C: Revision Horizon: 12 Months

	Four-Factor Alpha			DGTW Excess Return		
TPER portfolio	Full Sample	Low *r*-Sensitive Sample	High *r*-Sensitive Sample	Full Sample	Low *r*-Sensitive Sample	High *r*-Sensitive Sample
1 (Low)	-0.21% [-0.78]	0.14% [0.43]	-0.55% [-1.96]	0.13% [0.92]	0.51% [2.21]	-0.23% [-1.30]
2	0.30% [1.37]	0.34% [1.12]	0.25% [1.06]	0.43% [3.13]	0.34% [1.72]	0.51% [2.74]
3	0.62% [2.47]	0.80% [2.32]	0.46% [1.80]	0.59% [3.98]	0.79% [3.57]	0.40% [2.00]
4	1.06% [3.30]	1.06% [2.58]	1.05% [3.38]	0.70% [4.19]	0.77% [3.03]	0.63% [2.91]
5 (High)	1.40% [2.70]	1.82% [2.83]	0.99% [1.97]	0.86% [4.06]	1.23% [3.87]	0.50% [1.78]
High - Low t-stat	1.61% [2.76]	1.68% [2.33]	1.54% [2.67]	0.73% [2.83]	0.72% [1.83]	0.74% [2.20]