Matching Market Prices, Analysts' Earnings and Target Price Forecasts, and Estimating the Implied Expected Rate of Return on Equity Capital

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Abstract

We suggest an alternative source of prices, which can be used in reverse engineering accounting based valuation models to obtain estimates of the implied expected rate of return. We replace market prices with the present value of analysts' forecasts of dividends and (target) prices; in other words, we estimate the expected rate of return that equates the present value of expected dividends and target prices and the present value of the pay-offs from earnings-based valuation models. We show that the positive correlation between errors in forecasts of earnings and errors in forecasts of target prices may be used in some sub-samples of Value Line forecasts to obtain estimates of the implied expected rate of return that are less affected by measurement error than estimates based on market prices (as in the extant literature). We provide a detailed analysis of Value Line forecast errors used in our paper and we find results that are contrary to those in Cheong and Thomas (2011); although bias in forecasts does not vary much with scale, the absolute magnitude of the errors varies considerably.

1. Introduction

A vast recent literature reverse engineers accounting-based valuation models to obtain estimates of the implied expected rate of return on equity capital. The inputs to these models are, generally, market prices and analysts' forecasts of earnings. The implied expected rate of return is the rate that equates market prices and the present value of the forecasted earnings-based payoffs. Yet analysts' forecasts may differ from the expectations implicit in the market prices and, if this is so, noise is introduced when market prices are matched to analysts' forecast of earnings. We circumvent this issue by replacing market prices with the present value of analysts' forecasts of dividends and (target) prices; in other words, we estimate the expected rate of return that equates the present value of expected dividends and target prices and the present value of the pay-offs from earnings-based valuation models. Thus, the inputs to our reverse-engineering exercise are expectations formed at the same time by the same person (the Value Line analyst). We show that, for some sub-samples of observations, our estimates of the implied expected rate of return based on target prices are less affected by measurement error than those based on observed market prices and forecasts.

We show that errors in forecasts of earnings, forecasts of earnings growth, and forecasts of target prices are significantly positively correlated. These correlations have two effects: (1) the correlation between errors in forecasts of earnings and errors in forecasts of earnings growth exacerbates the effect of errors in either one of these variables; whereas, (2) the correlation between errors in forecasted earnings and errors in forecasted target prices mitigates the effect of these errors because they tend to cancel one another.

We partition our sample into terciles based on the difference between the implied expected rate of return based on market prices and the implied expected rate of return based on target prices. We predict and find that, for the tercile of observations where the implied expected rate of return based on market prices is much *higher* than the implied expected rate of return based on target prices, the implied expected rates of return based on target prices are less affected by measurement error. On the other hand, when the implied expected rate of return based on market prices is much *lower* than the implied expected rate of return based on target prices, the estimates based on market prices are less affected by measurement error. The main point of these analyses is that researchers may use these straight-forward partitions of the data to obtain superior estimates of the implied expected rate of return.

We show that the superior performance of the target price based estimates for the sample where the implied expected rate of return based on market prices is much higher than the expected rate of return based on target prices is attributable to the facts that for this sample: (1) the errors and biases in forecasts of earnings, earnings growth, and target prices are greater than in the other terciles; (2) these errors in forecasts of earnings are of a similar magnitude to the errors in forecast of target prices; and, (3) the errors in forecasts of earnings are positively correlated with the errors in forecasts of target prices. These features of the forecasts suggest that: (1) noise introduced by matching market prices with forecasts of earnings is considerable; and, (2) the effect of errors in forecasts of earnings opposes, and therefore mitigates, the effect of the errors in forecasts of target prices when we reverse engineer to estimate the implied expected rate of return.

We show that the superior performance of the market price based estimates for the sample where the implied expected rate of return based on market prices is much lower than the expected rate of return based on target prices is primarily attributable to the fact that, for this tercile, the errors and biases in forecasts of earnings, earnings growth and target prices are smaller than in the other terciles. Thus, for this tercile, noise introduced by matching market prices with forecasts of earnings is low and, although the errors in forecasts of earnings are positively correlated with the error in forecast of target price, introducing this second source of error leads to inferior estimates of the implied expected rate of return.

Some of the extant methods of estimation of the implied expected rate of return are based on five years of forecasted earnings generally estimated as: (1) specific forecasts of earnings per share for the next two years; and, (2) growing the second-year earnings at the analysts' forecast of the long term earnings growth rate. The positive correlation between errors in forecasts of earnings and errors in forecasts of earnings growth exacerbates the effects of each of these errors; we show that use of just two years of forecasts (thus eliminating the error in the forecast of the long-term growth rate) reduces the effect of measurement error on these estimates. This suggests that researchers should only use two years of forecasted earnings thereby avoiding the extra effect of forecast errors introduced via the use of forecasts of the long-term growth rate.

The Value Line data used in this study have four features, which make them more suitable for evaluating expected return proxies than those of the more commonly used consensus earnings forecasts issued by sell-side equity analysts. First, target price forecasts are readily available for a long time period. Second, consensus sell-side earnings forecasts obtained from other often-used data such as I/B/E/S are averages of forecasts issued at different points in time by different analysts. The resulting "non-synchronicity" may lead to additional error in the expected return proxies. Third, the fact that revisions in forecasts may be due to changes in analyst coverage does not arise with Value Line forecasts because there is only one analyst issuing the forecast on any date. Finally, forecasts issued by sell-side analysts may be affected by pressure from investment banking relations and career concerns of the analyst (Lin and McNichols (1998)); Value Line forecasts are likely less affected by such considerations.

Overall, our paper contributes to the accounting and finance literature by suggesting an alternative source of prices, which can be used in reverse engineering accounting based valuation models to obtain estimates of the implied expected rate of return. We show that, for some partitions of the data, estimates based on this alternative are superior to extant estimates.

We analyze the errors in forecasts of earnings, earnings growth and target prices in considerable detail. This detailed analysis is motivated by: (1) the fact that the correlations among these errors are at the core of our point that, for some sub-samples of the data, target prices may yield superior estimates of the implied expected rate of return; and, (2) a recent paper by Cheong and Thomas (2011) concludes that forecasts errors do not vary with price per share; we penetrate and explain this somewhat surprising conclusion. Our key finding is that, although the average forecast error (i.e., bias) does not vary with scale (i.e., price per share), the average absolute forecast error varies substantially with scale particularly for longer run forecasts. The simple explanation for this, and the key result in Cheong and Thomas (2011), is the average analyst forecast error is small and varies little with price per share but the magnitude of the errors that comprise this average vary, as expected, considerably with price per share.

The remainder of the paper is organized as follows. Section 2 describes our methods of estimating the implied expected rate of return proxies, sources of data, and our sample selection procedure. Section 3 describes the data with a particular emphasis on the correlations among the magnitude of the bias and errors in forecasts of earnings, earnings growth, and target prices. This section also addresses the relation between forecast errors and scale. Section 4 examines the correlations among the forecast errors. Section 5 describes our method for evaluation of the estimates of the implied expected rate of return. Section 6 reports our estimates of the implied expected rate of return and presents the results of the evaluation of the estimates. Section 7 identifies sub-samples where we predict (and find) that use of target prices instead of market prices in the reverse engineering of the accounting-based valuation models leads to superior estimates of the implied expected rate of return. Section 8 demonstrates the effect of the positive correlation between the errors in the forecasts of earnings and the errors in the forecast of earnings growth on estimates of the implied expected rate of return. Section 9 concludes.

2. Methods of Estimating the Implied Expected Rate of Return, Sources of Data, and Sample Selection

2.1. Accounting-Based Estimates of the Implied Expected Rate of Return Using Market Prices

We examine seven expected return proxies that are commonly used in the accounting and finance literatures. The definitions of these proxies are presented in the left column of Table 2. In this section we describe the details of the reverse engineering exercise based on the valuation model that is similar to that in Claus and Thomas (2001) because this method has most requirements for data. When these data are used in estimating the other proxies, they are obtained from the same sources and the timing of the collection of each data item is the same.

Value Line provides forecasts of earnings in 13 week cycles such that a forecast is provided for each covered firm in each quarter of the year; a set of firms is covered in each weekly report and once covered the firm is generally not covered again until 13 weeks later. For each firm-year observation, we select the first Value Line forecast of earnings for the current year t that is made after the announcement of earnings of the prior year $t-1$. With this forecast, we also extract from Value Line the forecasts of earnings and dividends for year t, earnings and dividends for year *t+1*, forecasts of long-term earnings growth and long term dividend growth and target prices. The price at the close of trade two days after the forecasts are made are obtained from the CRSP daily price file. Book value per share is the book value as at the end of year *t-1* divided by number of shares used to calculate earnings per share and is obtained from the Compustat annual file.

When reverse engineering the model based on Claus and Thomas (2001), these data are combined as follows:

$$\frac{P_{in}}{(1+r)^{n/365}} = bps_{it-1} + \sum_{\tau=0}^{4} \frac{(ROE_{it+\tau} - r) \times bps_{it+\tau-1}}{(1+r)^{\tau}} + \frac{(ROE_{it+4} - r) \times bps_{it+3} \times (1+\gamma)}{(r-\gamma) \times (1+r)^4}$$

where *i* denotes firms, *t* and *τ* denote years and *n* denotes days, $ROE_{it+\tau} = eps_{it+\tau}/bps_{it+\tau-1}$, P_{in} is the CRSP closing price two days after the earnings forecast, *n* is the number of days between the fiscal year end and two days after the earnings forecast, bps_{it-1} is the book value per share at the end of year *t-1* (i.e., beginning of year *t*) obtained from Compustat, eps_{it} is the Value Line forecast of earnings per share for year *t*, eps_{it+1} is the Value Line forecast of earnings per share for year *t+1*, $eps_{it+\tau} = eps_{it+1} \times (1 + ltg_i)^{\tau-1} \; \forall \, \tau > 1$. ltg_i is the Value Line forecast of the growth rate in earnings per share, $bps_{it+\tau} = bps_{it+\tau-1} + eps_{it+\tau} - dps_{it+\tau}$, dps_{it} is the Value Line forecast of dividends per share for year *t*, dps_{it+1} is the Value Line forecast of dividends per share for year *t+1*, $dps_{it+\tau} = dps_{it+1} \times (1 + ltgdiv_i)^{\tau-1} \; \forall \, \tau > 1$. $ltgdiv_i$ is the Value Line forecast of the growth rate in dividends per share, γ is the yield on a ten-year government bond less 3 percent. *r* is numerically estimated. We denote this estimate of *r*, r_{ct_prc}.

Three proxies (r_{peg_prc}, r_{mpeg_prc}, and r_{gm_prc}) are each derived from the finite-horizon versions of the earnings, earnings growth model developed by Ohlson and Juettner-Naurouth

(2005), Gode and Mohanram (2003) and Easton (2004). Finally, we include a proxy, r_{pe_prc}, that is based on the assumption that expected cum-dividend aggregate earnings for the next two years are sufficient for valuation purposes; i.e., the expected return proxy is equal to the inverse of the two-year price-to-forward-earnings ratio.

2.2. Accounting-Based Estimates of the Implied Expected Rate of Return Using Target Prices

When expected return proxies are computed using market prices and contemporaneous analyst earnings forecasts, there are two potential problems, which will not arise if the proxy is based on target prices rather than market prices. First, analyst earnings forecasts may be incorrect and different from market expectations. As a result, earnings forecast errors, which do not appear in the market price, will, by construction, affect the estimate of the expected return proxies. Second, since the earnings forecasts and the market prices are often not observed at exactly the same point in time, the resulting "non-synchronicity" may lead to additional error in the expected return proxies.

A positive correlation between the errors in the forecasts of earnings and errors in the forecasts of target prices may mitigate the effect of each of these errors inasmuch as they affect the estimate of the expected rate of return in opposite directions (a negative error in the forecast of earnings – i.e., the market's expectation of earnings greater than the analysts forecast – will bias the estimate of the implied expected rate of return upward while a negative forecast error in target prices will tend to bias the estimate of the implied expected rate of return downward). The target-price-based implied expected rate of return can be viewed as the Value Line analyst's expected discount rate. The tradeoff in replacing the market price with the target price is that additional information in the market price will be discarded.

In the reverse engineering based on target prices, the LHS (market-price-based) variable, is replaced with:

$$\sum_{\tau=1}^{4} \frac{dps_{it+\tau-1}}{(1+r)^{\tau}} + \frac{TP_i}{(1+r)^4}$$

Where TP_i is the average of the Value Line forecast of the highest target price to be met between years 3 and 5 and the lowest estimate of this target price; we assume that this price is met at the end of year 4.

We delete any firm-year observation with implied cost of equity proxy missing, or smaller than 0.01%, or greater than 99.99%.

The next section of the paper is devoted to an analysis of forecast errors. Errors in forecast of eps_{it}, eps_{it+1} and eps_{it+2} are calculated as the difference between the corresponding actual earnings as reported by Value Line and the forecast; errors in the forecasts of dps_{it}, dps_{it+1} and dps_{it+2} are calculated as the difference between the corresponding actual dividends obtained from the Compustat and the forecast; and, the error in the forecast of target price is calculated as the difference between the end of year price reported on Compustat corresponding to the target price (i.e., the actual price is taken from Compustat at the end of the fourth year after the forecast) and the target price.

2.3. Description of the Data

Table 1 reports the descriptive statistics for our final sample. Overall, our final sample contains 7,861 firm-year observations from 1991 to 2006 and it covers approximately 462 stocks each year.[1] Although, in terms of number of stocks covered, our sample is small compared to the entire CRSP universe, we note that the stocks covered by Value Line are typically larger, with a

[1] All results are reported for this sample of observations. Our analyses require four years of realizations of earnings and prices; hence, although our data extends through 2010, we can complete our analyses only for years 1991 to 2006.

mean market capitalization of $8,210 million compared with $2,259 million for the entire CRSP universe. On average over the sample period, our sample covers 34 percent of the entire U.S. CRSP equity universe in terms of market capitalization. As a comparison, I/B/E/S covers more than twice the number of stocks on average and its average market capitalization coverage is 78 percent of the CRSP universe.

3. Bias and Errors in Forecasts

3.1. Bias in Forecasts

We first compute the error in analysts' forecasts of current-year earnings per share (eps_t), next-year ahead earnings per share (eps_{t+1}), and two-year year ahead earnings per share (eps_{t+2}), at the firm level in each year. Error is calculated as the difference between actual realized earnings (as reported by Value Line) and the $eps_{t+\tau}$ (τ = 0, 1, 2) forecast. Errors in dividend and target price forecasts are calculated similarly. We, initially, scale these errors by the stock price at the time of forecasts. These scaled forecasts are then sorted each year into deciles, where the lowest (highest) decile portfolio has the most pessimistic (optimistic) error and we calculate the mean and median error for each decile. We first analyze the average error (i.e., bias) in the forecasts. We then examine the magnitude of the errors via an analysis of mean and median absolute forecast errors.

Table 3 reports the average price-scaled error (i.e., bias) in forecasts of earnings, target prices and dividends. Two interesting observations emerge from Table 3. First, the mean (median) error (i.e., bias) in eps_t (scaled by stock price) is small (0.0 percent of stock price and 0.2 percent of stock price) as is the mean (median) error in forecasts of eps_{t+1} (-0.5 percent and 0.2 percent). These errors are smaller than those seen in studies based on I/B/E/S data (e.g., Easton and

Sommers (2005) report mean and median optimistic bias of 2 percent of price); a possible explanation is that the Value Line analysts are not sell-side analysts. Interestingly, however, forecasts of eps_{t+2} are optimistic (mean and median errors of -1.9 percent and -1.1 percent of stock price) reflecting optimism in analysts' forecasts of long run earnings growth. Forecasts of target prices are relatively quite optimistic (mean and median errors of -13.1 percent and -17.9 percent of stock price). The tendency for longer run forecasts of earnings to be optimistically biased is also seen in the forecasts of dividends (mean and median errors in forecasts of dps_{t+2} of -0.48 percent and -0.19 percent of stock price).

Second, the errors in eps_t, eps_{t+1}, eps_{t+2} and *TP* are positively and monotonically related to each other; the mean price-scaled error in forecasts of eps_{t+1}, eps_{t+2} and *TP* decrease monotonically from pessimistic (7.1 percent, 3.1 percent and 63.4 percent) for the decile of observations for which the forecast of eps_t is most pessimistic to optimistic (-8.2 percent, -7.3 percent and -84.2 percent) for the decile of stocks for which the forecast of eps_t is most optimistic. That is, a stock with a more optimistic (pessimistic) eps_t, is also likely to have more optimistic (pessimistic) eps_{t+1} and eps_{t+2} as well as more optimistic (pessimistic) forecasts of *TP*. These correlations suggest that basing estimates of the implied expected rate of return on these forecasts of both earnings and target prices may yield estimates that are superior to those based on earnings forecasts and market prices.

Although the pattern of dividend forecast errors is not monotonically related to the error in forecast of eps_t, the positive correlation is still evident. These dividends are discounted with the target price and hence also serve to potentially mitigate the effects of the errors in forecasts of earnings and earnings growth.

Since the correlation among the forecasts is a central issue in our paper, we dwell on these correlations and conduct three sets of further analyses. First, Cheong and Thomas (2011) make the observation that analysts' forecast error does not vary with price per share. If this is, indeed, so for our data, the results in Table 3 may (all) be due to deflation of the forecast error by price. We show that this is not so and that, although the bias does not vary with price per share, the magnitude of the errors is strongly related to price per share. In short, the average error in forecasts is small and invariant to price (or the magnitude of the forecast) but the magnitude of the errors (analyzed via mean and median absolute errors) in strongly correlated with price per share as well as with the magnitude of the forecasted fundamental. Second, we examine the correlation among the forecast errors at the firm (rather than at the decile) level. Third, we examine the relative magnitude of the errors and biases in the earnings forecasts and in the target prices (in other words, we ask the question: is there more/less forecast error and bias in the target prices than in the earnings forecasts?).

In Table 4, we report summary statistics (means and medians for each decile) of the unscaled forecast errors for the deciles formed as in Table 3. We also report the mean and median price (the scaler) for each of these deciles and the mean and median forecasts. Again we observe a monotonic change in the forecast errors from pessimistic to optimistic. Importantly, we observe that the price does not change much across these deciles. It follows that if we had sorted the observations based on price (as in Cheong and Thomas (2011)) we would have found little variation in forecast errors; note, however, that it is evident that correlation between the forecast errors observed in Table 3 is not due to a spurious effect of scaling. In order to further understand the features of these forecasts, we examine (also in Table 4) the mean and median values of the forecasts and we observe that these means and medians like the means and medians of prices are similar across the deciles. In other words, we extend the conclusion in Cheong and Thomas (2011) by showing that forecast errors are not only invariant to price, they are also invariant to the magnitude of the underlying fundamental that is being forecasted.

In order to further understand the conclusion of Cheong and Thomas (2011) and the possible implications for our sample of observations, we form deciles based on forecast-date price rather than on price-deflated forecast error. We report mean and median forecast errors for these deciles in Table 5. For forecasts of eps_t, eps_{t+1}, $eps_{t+2,}$ and *TP*, we, indeed, find similar results to Cheong and Thomas (2011).[2] At first glance, we found these results somewhat surprising; for example it is remarkable that the median error in the forecast of TP ($5.90) for the decile of observations with the lowest price (median of $9.20) is quite similar to the median error in the forecast of TP ($8.00) for the decile of observations with the highest price (median of $65.10). In other words, the optimistic bias in the forecast of TP is around $6 irrespective of the current price of the stock. In short, these results suggest that scaling by price may have a considerable affect on the results reported in Table 3; that is, the apparent correlation between scaled eps_t, eps_{t+1}, and eps_{t+2} and *TP* may be driven by the deflator. Further analyses suggest that this is not so.

3.2. Errors in Forecasts

We repeat the analyses on forecast errors across price deciles changing the focus to absolute forecast errors rather than signed forecast errors. This facilitates a comparison of the magnitude of the errors rather than bias in the errors (i.e., average errors). The results are summarized in Table 6. Now a much different pattern emerges. The median absolute error in forecasts of eps_t increases with price at least for the six highest price deciles and the median forecasts of eps_{t+1}

[2] Although the bias in forecasts of eps_t declines monotonically from a $0.27 cents for the highest price decile to -$0.19 cents for the lowest price decile, the fact that the average error for stocks with an average price of $80 is similar to the error for stocks with a price of $8.10 is essentially in line with the Cheong and Thomas (2011) results.

eps_{t+2} and *TP* increase monotonically with price across all ten deciles; for example the median error in forecast of eps_{t+1} (*TP*) for the highest price decile is \$1.44 (\$32.97) and the median error for the lowest price decile is \$0.64 (\$9.01). In other words, although bias is similar across all price deciles the magnitude of forecast error increases with price and the conclusion of Cheong and Thomas (2011) that analyst forecast error does not vary with price per share is invalid for our data.

4. Correlations among the Forecast Errors

Correlations among the forecast errors are summarized in Table 7. Correlations are calculated for each year of available data and then averaged across years. We report correlations among scaled and un-scaled forecast errors. The positive correlations that were seen in the analyses of deciles of observations are also seen in the correlations among the individual forecasts. Each of the errors in forecasts of earnings are correlated with each other; for example, the Pearson correlations between the unscaled error in forecast of eps_t and the unscaled error in forecast of eps_{t+1} (eps_{t+2}) are 0.51 (0.29) and the Pearson correlations between the unscaled error in the forecast of eps_t and the unscaled error in the forecast of *TP* are 0.43. The Spearman correlations are quite similar as are the correlations among the scaled forecasts errors. The positive correlation between the errors in the forecasts of eps_t (and eps_{t+1}) and the errors in the forecast of eps_{t+2} suggests that we are likely to find that using just two years of forecasted earnings in the reverse engineering exercise rather than adding extra years of forecasts by growing the eps_{t+1} forecasts by the forecast of long-term earnings growth is likely to reduce the effect of measurement errors on the forecasts. On the other hand, the positive correlation between the errors in the forecasts of eps_t (and eps_{t+1}) and *TP* suggests that replacing market price with target prices in the reverse engineering exercise may reduce the effect of measurement error on the resultant estimates of the implied expected rate of return.

5. Evaluating Expected Return Proxies

We follow the procedure developed in Easton and Monahan (2005) to evaluate the expected return proxies. We briefly describe the Easton and Monahan (2005) procedures below. Interested readers are referred to the details in Easton and Monahan (2005).

We start with the return loglinearization of Campbell and Shiller (1988) and Vuolteenaho (2002). The continuously compounded return in period $t+1$, r_{it+1}, can be decomposed into three components: (1) expected return, er_{it+1} (estimated at the beginning of the period); (2) changes in expectations about future cash flows (or cash flow news, cn_{it+1}); and, (3) changes in expectations about future discount rates (return news, rn_{it+1}):

$$r_{it+1} \approx er_{it+1} + cn_{it+1} - rn_{it+1}. \tag{1}$$

er_{it+1} corresponds to one of the expected return proxies. cn_{it+1} and rn_{it+1} can be estimated using Value Line forecasts as detailed in Table 2.

Equation (1) allows us to evaluate the relation between realized returns (r_{it+1}) and expected returns (er_{it+1}) after controlling for changes in expectations about future cash flows and future discount rates. We run annual Fama-MacBeth (1973) cross-sectional regressions of the following form:

$$r_{it+1} = \alpha_{0t+1} + \alpha_{1t+1} \times e\hat{r}_{it+1} + \alpha_{2t+1} \times c\hat{n}_{it+1} + \alpha_{3t+1} \times r\hat{n}_{it+1} + \varepsilon_{it+1}. \tag{2}$$

Parameter estimates are equal to the average of the annual regression coefficients. t-statistics are equal to the ratio of the parameter estimates to their temporal standard errors.

If er_{it+1}, cn_{it+1} and rn_{it+1} are measured without error, the estimate of α_{it+1} will be one because equation (1) is a tautology. In practice, however, measurement errors in all the regressors will result in a bias in α_{it+1}. Since the bias is unknown we cannot draw meaningful inferences from the parameter estimates in regression (2). Easton and Monahan (2005) isolate the portion of the bias in α_{it+1} that is solely attributable to the measurement error in er_{it+1}; a superior estimate of the implied expected rate of return has lower measurement error bias. The Easton and Monahan (2005) procedure is based on annual Fama-MacBeth (1973) cross-sectional regressions of the following form:

$$\upsilon^{M}_{Cit+1} = \delta_{0t+1} + \delta_{1t+1} \times \varepsilon^{A}_{1it+1} + \delta_{2t+1} \times \varepsilon^{A}_{2it+1} + \delta_{3t+1} \times \varepsilon^{A}_{3it+1} + \mu_{it+1}. \quad (3)$$

Variables specific to equation (3) are defined as follows:

$\upsilon^{M}_{Cit+1} = \upsilon_{Cit+1} - \{\sigma(e\hat{r}_{it+1}, c\hat{n}_{it+1}) + \sigma(e\hat{r}_{it+1}, r\hat{n}_{it+1})\} \times \varepsilon^{A}_{1it+1}$, where $\upsilon_{Cit+1} = r_{1t+1} - e\hat{r}_{it+1} - c\hat{n}_{it+1} - r\hat{n}_{it+1}$, and $\varepsilon^{A}_{1it+1} = \frac{\varepsilon_{1it+1} - \beta_{10t+1}}{\sigma^2(\varepsilon_{1it+1})}, \varepsilon^{A}_{2it+1} = \frac{\varepsilon_{2it+1} - \beta_{20t+1}}{\sigma^2(\varepsilon_{2it+1})}, \varepsilon^{A}_{3it+1} = \frac{\varepsilon_{3it+1} - \beta_{30t+1}}{\sigma^2(\varepsilon_{3it+1})}$. $\sigma(e\hat{r}_{it+1}, c\hat{n}_{it+1})$ $[\sigma(e\hat{r}_{it+1}, r\hat{n}_{it+1})]$ is the covariance between the expected return proxy and the cash flow news [return news] proxy. The β, ε, and $\sigma^2(\varepsilon)$ terms above are from the following first-stage regressions:

$$e\hat{r}_{it+1} = \beta_{10t+1} + \beta_{11t+1} \times c\hat{n}_{it+1} + \beta_{12t+1} \times r\hat{n}_{it+1} + \varepsilon_{1it+1}$$

$$c\hat{n}_{it+1} = \beta_{20t+1} + \beta_{21t+1} \times e\hat{r}_{it+1} + \beta_{22t+1} \times r\hat{n}_{it+1} + \varepsilon_{2it+1}$$

$$r\hat{n}_{it+1} = \beta_{30t+1} + \beta_{31t+1} \times e\hat{r}_{it+1} + \beta_{32t+1} \times c\hat{n}_{it+1} + \varepsilon_{31it+1}.$$

As discussed in detail in Easton and Monahan (2005), the expected return proxy with the smallest estimate of δ_1 likely contains the least measurement error and is the most reliable. We report only estimates of δ_1 since this is the focus of our interest.

6. Empirical Results

In this section, we evaluate the empirical performance of the expected return proxies.

6.1 Descriptive Statistics

Descriptive statistics for each of the proxies are reported in Table 8. Panel A describes the implied expected return proxies based on market prices and forecasts of earnings similar to those in the extant literature; Panel B describes the proxies based on target prices.

In each panel, the expected return proxies reported are slightly smaller compared to those reported in Easton and Monahan (2005). The patterns across the seven proxies are, however, very similar to those reported in Easton and Monahan (2005).[3] For example, in Panel A, the median estimate of r_{pe_prc} is 6.8 percent. When short-term earnings growth (r_{peg_prc}) and dividends (r_{mpeg_prc}) are taken into consideration, the median estimates of the implied expected rate of return increase to 9.7 percent and 11.0 percent, respectively. The estimates based on the method suggested by Gode and Mohanram (2003) rely on assumptions about growth in abnormal growth in earnings; since the assumed growth rate is positive on average, the median value of r_{gm_prc} (11.5 percent) exceeds the median value of other estimates of the implied expected rate of return that rely only on forecasts of earnings and dividends. The medians of r_{ct_prc} and r_{gls_prc}, which are based on the residual income valuation model, are both 9.3 percent. The estimate based on forecasted dividends and target-price r_{div_prc} has a median of 13.1 percent; the higher estimate most likely reflects optimism in analysts' forecasts of target price.

The implied expected return proxies based on earnings forecasts and target prices reported in Panel B show a very similar pattern to those reported in Panel A but the mean and median of all

[3] The average of seven expected return proxies in EM (2005) is 11.0 percent, and the average expected return proxies in this study is 10.6 percent. We believe this difference is mainly due to different sample composition between EM and this study. For example, EM covers the data from 1981 to 1998 while this study covers from 1991 to 2006. Moreover, EM relies on the sample from IBES data while this study makes use of Value Line data, which covers fewer firms, but larger firms.

estimates based on target prices are smaller than estimates based on market prices reflecting: (1) on the one hand matching of market prices and generally optimistically biased forecasts of earnings; and (2) matching target prices, which are more optimistically biased than earnings forecasts, with earnings forecasts, on the other hand.

6.2. Comparison of the Magnitude of the Bias and Errors in Forecasts of Earnings and Target Prices

The effect of replacing market prices with target prices when reverse engineering the accounting-based valuation models may be affected by the extent to which the magnitudes of the bias and errors in the forecasts of earnings are similar to the magnitudes of the bias and errors in the forecasts of target prices. If, for example, the magnitude of the bias in the forecasts of target prices is considerably greater than the magnitude of the bias in the forecast of earnings, the effectiveness of using target prices rather than market prices may be questionable. At first glance it may seem, from the results in Tables 3 through 6, that the bias and error in the forecasts of target prices are obviously greater than the bias and error in the forecasts of earnings. But some, perhaps most, of this difference in magnitude of the forecasts errors may simply be due differences in the magnitude of the variable that is being forecasted.

Comparing estimates of the implied expected rate of return determined by matching market prices to forecast of dividends and target prices with those based on market prices and forecasts of earnings and those based on target prices and forecasts of earnings provides some insight into this issue.

As noted in the previous section, the estimate of the implied expected rate of return based on market prices and forecasts of dividends and target prices r_{div_prc} (median of 13 percent) are always greater than those based on either market prices and forecasts of earnings or target prices and forecasts of earnings. This difference could be due to either a greater degree of bias in the forecast of target prices than in the forecast of earnings or due to the use of an assumed growth rate in the earnings beyond the earnings forecast horizon that is too low (Easton (2004), for example, shows that the assumed growth rate in the use of the PEG-based estimate of the implied expected rate of return (r_{peg_prc}) is 2.9 percent less than the growth rate implied by the data leading to an average estimate of the implied expected rate of return that is 1.7 percent lower than the rate implied by the data).[4] The median estimate of the implied expected rate of return based on the PEG model and market prices is 9.7 percent, which is 3.3 percent less than the estimate based on market prices and forecasts of dividends and target prices. This "back of the envelope" analysis suggests that the magnitudes of the errors in forecasts of target prices are by no means far different from the magnitude of the errors in forecasts of earnings.

6.3. Evaluation of Expected Return Proxies

6.3.1 Correlation with Realized Returns

Table 9 reports the correlations among all of the expected return proxies and the correlations between these proxies and realized returns over the year after the forecast date. Unlike the results in Easton and Monahan (2005), all of the correlations between the expected return proxies and realized returns are positive ranging from 0.034 for the proxy based market prices and the method in Claus and Thomas (2001) to 0.152 for the proxy based on market prices and the method based on Gebhardt et al. (2001). The correlations between each of the proxies based on target prices and realized returns are not always higher than the correlations for the corresponding proxy based on market prices. This result provides an initial indication that, for the entire sample of observations, using target prices instead of market prices, does not always result in superior estimates of the implied expected rate of return. We will show later that this result does not hold for some sub-samples of the data.

[4] We are currently replicating the analyses in Easton (2004) with our data.

6.3.2 Effects of Measurement Error

The estimates of the effects of measurement error for the estimates of the expected rate of return based on market prices are shown in Panel A of Table 10. The results confirm those in Easton and Monahan (2005); we find that the simplest proxy, r_{pe_prc}, has one of the smallest measurement errors (δ_1 = -0.0004), which is only slightly worse than that of r_{gls_prc} (δ_1 = -0.0006). It is also interesting to note that the proxy based on market prices, forecasts of dividends and the forecast of target prices r_{div_tp} has, by far, the highest measurement error variance (0.0028) suggesting that this proxy is much inferior to the other proxies.

The estimates of the effect of measurement error on the estimates of the expected rate of return based on target prices are shown in Panel B of Table 10. When compared to the estimates of the effect of measurement error on the proxies based on market prices, the estimate of the effect of measurement error is significantly higher for every one of the proxies based on target prices. This result suggests that, at least for the entire sample of observations, use of target prices instead of market prices does not improve estimates of the implied expected rate of return. Again we note that the proxy based on market prices, forecasts of dividends and the forecast of target prices has, by far, the highest measurement error effect (0.0028) when compared with any one of the estimates considered in Panel B; in other words, combining forecasts of target prices and earnings forecasts leads to estimates of the implied expected rate of return that out-perform estimates based on a combination of market prices and target prices.

7. Sub-samples of Observations where use of Target Price is Expected to Lead to Better Estimates of the Expected Rate of Return

We partition our sample into terciles based on the difference between the implied expected rate of return based on market prices and the implied expected rate of return based on target prices.[5]

For the tercile of observations where the implied expected rate of return based on market prices is much higher than the implied expected rate of return based on target prices, we predict that the implied expected rates of return based on target prices will be less affected by measurement error. The bases of this prediction are: (1) the errors and biases in forecasts of earnings, earnings growth, and target prices are expected to be greater than in the other terciles (the greater bias in the earnings forecasts will lead to higher estimates of the implied expected rate of return based on market prices relative to those based on target prices because the latter are also biased); and, (2) the errors in forecasts of earnings are expected to be positively correlated with the errors in forecasts of target prices as we observed for the entire sample of observations.

These features of the forecasts suggest that: (1) noise introduced by matching market prices with forecasts of earnings is high for this tercile of observations; and, (2) the effect of errors in forecasts of earnings opposes, and therefore mitigates, the effect of errors in forecasts of target prices, when we reverse engineer to estimate the implied expected rate of return.

For the tercile of observations where the estimate of the implied expected rate of return based on market prices is much lower than the implied expected rate of return based on target prices we predict that the estimates based on market prices will be less affected by measurement error. The basis of this prediction is that for this tercile, the errors and biases in forecasts of earnings, earnings growth, and target prices are expected to be smaller. It follows that noise introduced by

[5] Terciles are formed independently for each of the expected return proxies.

matching market prices with forecasts of earnings is lower and, although the errors in forecasts of earnings are expected to be positively correlated with the errors in forecast of target price (as we observed for the entire sample of stocks), introducing a second source of error (via the use of target prices) leads to inferior estimates of the implied expected rate of return.

7.1 Comparison of Forecast Errors and Correlations among the Forecast Errors across the Terciles

We describe the forecast errors and the correlations among the forecast errors in Table 11. Although the composition of the terciles differs across the accounting models, the patterns of forecast errors and the correlations among the forecast errors are so similar that we report descriptive statistics only for the terciles based on the difference between r_{pe_prc} and r_{pe_tp}. Panel A reports scaled and unscaled forecast errors. Panel B reports the correlations among these forecast errors. Two observations are apparent. First, the earnings forecast errors and the errors in forecasts of target price are much higher for the tercile of observations where the estimate of the implied expected rate of return based on target prices is much lower than the estimate based on market prices. For example, the median errors in forecast of eps_{t+1}, eps_{t+2} and TP are -\$0.03, -\$0.21 and -\$14.21 for the tercile where r_{pe_prc} - r_{pe_tp} is lowest and \$0.26, \$0.16, and \$1.27 for the tercile where r_{pe_prc} - r_{pe_tp} is highest. The correlations (see Panel B) between the earnings forecast errors and the errors in forecast of target price are similar across all terciles and similar to the correlations for the entire sample of observations.

The correlations between the estimates of the implied expected rate of return and the realized return over the 12 months following the forecast date are included in Table 11, Panel C. For almost every estimate, the correlation between the estimate and the realized return is higher for the tercile of observations where the estimate based on target prices is much lower than the estimate based on market prices. For example, for the tercile where r_{pe_prc} - r_{pe_tp} is lowest, the

Pearson correlation between r_{pe_prc} and realized return is 3.9 percent while it is 9.7 percent for the tercile where r_{pe_prc} - r_{pe_tp} is highest. This difference in correlations is also apparent for the correlations between r_{pe_tp} and realized returns. There is no obvious difference in the correlations with realized returns across the observations based on market prices and those based on target prices.

7.2 The Effects of Measurement Error

The results of the analyses of the effect of measurement error on the estimates of the implied expected rate of return for the tercile partitions are summarized in Table 12. Two observations are apparent: (1) for the lowest tercile using target prices rather than market prices always leads to estimates that are significantly less affected by measurement error (e.g., the estimate of the measurement error effect for the estimate of r_{ct_prc} is 0.0004 (t-statistic of 4.88) less than the estimate of r_{ct_tp}); and, (2) for the highest tercile using market prices rather than target prices always leads to estimates that are less affected by measurement error (e.g., the estimate of the measurement error effect for the estimate of r_{ct_prc} is 0.0010 (t-statistic of 5.08) greater than the estimate of r_{ct_tp}). These results confirm our predictions: (1) for the lowest tercile the effect of large errors in forecasts of earnings, which have a considerable effect on estimates of the implied expected rate of return based on market prices, tend to be mitigated when estimates are based on forecasts of target prices and forecasts of earnings because the errors in these forecasts are positively correlated; and, (2) for the highest tercile, the errors in forecasts of earnings are relatively small and introducing another error by using target prices rather than market prices results in inferior estimates

8. The Effect of the Positive Correlation in the Errors in the Forecasts of Earnings for the Next Two Periods and Long-term Earnings Growth

Our method for estimating the implied expected rate of return based on Claus and Thomas (2001) uses forecast of earnings for the next five years; the forecasts for the last three of these years is based on the forecast of earnings for the second year grown at the analysts' forecast of the long-term earnings growth rate. We have observed that the correlation between errors in forecasts of earnings and errors in forecast of earnings growth is positive. This positive correlation may exacerbate the effects of each of these errors. Our method for estimating the implied expected rate of return based on Gebhardt et al. (2001), however, relies on just two years of earnings forecasts and, thus, cannot be affected by the positive correlation between the errors in the forecasts of earnings and the errors in the forecasts of earnings growth. Consistent with this observation, the measurement error variance (δ_1) for the estimate based on Gebhardt et al. (2001) r_{gls_prc} and market prices is much lower (-0.0006) than the measurement error variance for the estimate based on Claus and Thomas (2001) r_{ct_prc} and market prices (0.0002); the t-statistic for the difference between these measurement error effects is 3.87 (see tables 12 and 13). This result is also seen in the comparison of these estimates based on target prices (-0.0003 compared with 0.0006); the t-statistic for the difference is 3.85.

We investigate this issue further by modifying both the Claus and Thomas (2001) estimate and the Gebhardt et al. (2001) estimate. We base the Claus and Thomas (2001) estimate on just two years of earnings forecasts rather than five, growing the earnings at the expected rate of inflation thereafter. Removing the forecast of earnings growth from our analyses may have two opposing effects: (1) the forecast of growth may, indeed, lead to earnings forecasts that improve our estimates of the implied expected rate of return, and (2) the observation that the errors in forecasts of earnings for the next two years and errors in forecasts of growth beyond year two are positively correlated may exacerbate the effect of each of these errors on our estimates of the implied expected rate of return. The net effect is that the estimate of the measurement error effect decreases from 0.0002 to -0.0001 (t-statistic for the difference is 3.87) for the estimates based on market prices and from 0.0006 to 0.0001 for the estimates based on target prices (t-statistic for the difference is 7.02; see Table 13).

We base the modified Gebhardt et al. (2001) estimate on five years of earnings forecast rather than two, fading to the industry median return of equity thereafter. The net effect of removing both the information in the forecast of earnings and the effect of the positive correlations among the forecast errors is that the estimate of the measurement error effect decreases from -0.0006 to -0.0007 for the estimates based on market prices and from -0.0003 to -0.0005 for the estimates based on target prices (these differences are not statistically different from zero).

The results of these analyses suggests that researchers should only use two years of forecasted earnings thereby avoiding the extra effect of forecast errors introduced via the use of forecasts of long-term growth.

9. Conclusions

We show that the positive correlation between errors in forecasts of earnings and errors in forecasts of target prices may be used in some sub-samples of Value Line forecasts to obtain estimates of the implied expected rate of return that are less affected by measurement error. These sub-samples are the observations where the errors in forecast of earnings are such that they lead to considerable measurement error effects on estimates of the implied expected rate of return that equates market prices and the present value of earnings based payoffs. For these observations, prices may be replaced by the present value of forecasts of target prices. The bias in the estimate due to errors in the forecasts of earnings is in the opposite direction to the bias due to the error in the forecast of target prices. On the other hand, we show that the positive correlation between forecasts of earnings and forecasts of earnings growth leads to estimates of the implied expected rate of return that are based on just two years of estimates of earnings that have less measurement error effects than those based on forecasts of earnings for a longer period (where the longer-run forecasts are calculated by growing the two-year forecast at the forecasted long-run earnings growth rate).

These results suggest that: (1) when estimates of the implied rate of return based on target prices and forecasted earnings are considerably less than the estimates based on market prices and forecasts of earnings, researchers should use estimates based on target prices; and, (2) researchers are likely to obtain better estimates of the implied expected rate of return is they use only forecast for the next two years rather than extending the forecast period using analysts' forecasts of the long-run earnings growth rate.

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Table 1
Descriptive Statistics

The table reports descriptive statistics for the sample used in the study from 1991 to 2006 with non-missing Value Line forecasts necessary to compute the implied expected rate of return and non-missing CRSP data required to calculate stock returns. We eliminate non-December fiscal year-end firms, and delete any firm-year observations with implied cost of equity proxy smaller than 0.01% and greater than 99.99%. Our final sample consists of 7,861 firm-years. Variables are defined as follows: Mean and Median of *Mktcap* are the pooled mean and median of the market capitalization in millions across all firm-year observations. Mean and Median of *BM* are the pooled mean and median of *Book-to-Market* ratio across all firm-year observations. % of stocks relative to the CRSP population is the percentage of the total market capitalization of sample observations relative to the total market capitalization of CRSP population.

year	Mean Mktcap (in million $)	Median Mktcap (in million $)	Mean BM	Median BM	Number of Observations	% of stocks relative to the CRSP population
1991	3629	872	0.63	0.59	104	9%
1992	3867	1316	0.57	0.54	498	42%
1993	4086	1437	0.53	0.52	514	40%
1994	3932	1336	0.58	0.56	485	36%
1995	4973	1753	0.53	0.49	492	34%
1996	6654	2257	0.51	0.46	493	37%
1997	9191	2767	0.42	0.38	491	39%
1998	9216	2731	0.44	0.41	465	30%
1999	11478	2724	0.52	0.45	426	27%
2000	11330	2574	0.52	0.43	533	35%
2001	11735	2557	0.48	0.43	544	43%
2002	8400	2143	0.56	0.51	572	42%
2003	11038	2814	0.45	0.42	614	45%
2004	11544	3183	0.44	0.41	570	38%
2005	12775	3565	0.45	0.41	523	36%
2006	14659	3793	0.42	0.40	526	37%
Mean	8210	2259	0.55	0.51	462	34%

Table 2
Summary of Empirical Proxies

The table reports the definition of empirical proxies used in the study. $e\hat{r}_{it+1}$ for a particular expected return proxy is equal to the natural log of 1 plus the implied cost of the equity from the valuation model underlying that proxy. For each firm-year observation, we select the first Value Line forecast of earnings for the current year *t* that is made after the announcement of earnings of the prior year *t-1*. With this forecast, we also extract from Value Line, the forecasts of earnings and dividends for year *t* (eps_{it} and dps_{it}), earnings and dividends for year *t+1* (eps_{it+1} and dps_{it+1}), forecasts of long-term earnings growth (ltg_i) and long term dividend growth ($ltgdiv_i$) and target prices (TP_i). We compute $eps_{it+\tau} = eps_{it+1} \times (1 + ltg_i)^{\tau-1} \ \forall \ \tau > 1$ and $dps_{it+\tau} = dps_{it+1} \times (1 + ltgdiv_i)^{\tau-1} \ \forall \ \tau > 1$.The prices at the close of trade two days after the forecasts (P_{in}) are made are obtained from the CRSP daily price file. Book value per share (bps_{it-1}) at the end of year *t-1* (i.e., beginning of year *t*) is obtained from Compustat. We adjust the price and target price to the end of year *t-1* (i.e., beginning of the year *t*) as follows:

$$P_{it-1} = \frac{P_{in}}{(1+r)^{n/365}} \ and \ TP4_{it-1} = \left(\sum_{\tau=1}^{4} \frac{dps_{it+\tau-1}}{(1+r)^{\tau}} + \frac{TP_i}{(1+r)^4}\right) / (1+r)^{n/365},$$

where *n* denotes the number of days from the beginning of the year to the observation of P_{in} . We define the market price-based expected return proxies below. To obtain target price-based expected return proxies, we simply replace P_{it-1} with $TP4_{it-1}$ in the left hand side of the valuation equations. All realized return, cash flow news and discount rate news are measured from June 1 in year t to May 31 in year t+1.

Expected Return Proxies

	Market Price-Based Expected Return Proxies
$e\hat{r}_{it+1}$	**Valuation Model**
r_{pe_prc}	$P_{it-1} = \frac{eps_{it} + r \times dps_{it} + eps_{it+1}}{(1+r)^2 - 1}$
r_{peg_prc}	$P_{it-1} = \frac{eps_{it+1} - eps_{it}}{r^2}$
r_{mpeg_prc}	$P_{it-1} = \frac{eps_{it+1} + r \times dps_{it} - eps_{it}}{r^2}$
r_{gm_prc}	$P_{it-1} = \frac{eps_{it}}{r} + \frac{eps_{it+1} + r \times dps_{it} - (1+r) \times eps_{it}}{r \times (r - \Delta agr)}$ Δagr is the yield on a ten-year government bond less 3 percent.

Table 2 (continued)

Market Price-Based Expected Return Proxies	
$e\hat{r}_{it+1}$	**Valuation Model**
r_{ct_prc}	$P_{it-1} = bps_{it-1} + \sum_{\tau=1}^{4} \frac{(ROE_{it+\tau} - r) \times bps_{it+\tau-1}}{(1+r)^{\tau}} + \frac{(ROE_{it+5} - r) \times bps_{it+4} \times (1+\gamma)}{(r-\gamma) \times (1+r)^{4}}$ $ROE_{it+\tau} = eps_{it+\tau}/bps_{it+\tau-1}$. γ is the yield on a ten-year government bond less 3 percent. *r* is numerically estimated.
r_{gls_prc}	$P_{it-1} = bps_{it-1} + \sum_{\tau=1}^{11} \frac{(ROE_{it+\tau} - r) \times bps_{it+\tau-1}}{(1+r)^{\tau}} + \frac{(ROE_{it+12} - r) \times bps_{it+11}}{r \times (1+r)^{11}}$ $ROE_{it+\tau} = eps_{it+\tau}/bps_{it+\tau-1}$ for τ=0,1. $ROE_{it+\tau} = ROE_{it+\tau-1} - fade\ \forall\ \tau > 2$. *fade* $=(ROE_{it+1} - HIROE_t)/10$, $HIROE_t$ is the historical industry median *ROE* for all firm-years in the same industry spanning year t-4 through year t with positive earnings and equity book values. The industry definitions shown in Fama and French (1997) are used. *r* is numerically estimated.
r_{ctmd_prc}	$P_{it-1} = bps_{it-1} + \sum_{\tau=1}^{2} \frac{(ROE_{it+\tau} - r) \times bps_{it+\tau-1}}{(1+r)^{\tau}} + \frac{(ROE_{it+3} - r) \times bps_{it+2} \times (1+\gamma)}{(r-\gamma) \times (1+r)^{2}}$ $ROE_{it+\tau} = eps_{it+\tau}/bps_{it+\tau-1}$.. γ is the yield on a ten-year government bond less 3 percent. *r* is numerically estimated.
r_{glsmd_prc}	$P_{it-1} = bps_{it-1} + \sum_{\tau=1}^{11} \frac{(ROE_{it+\tau} - r) \times bps_{it+\tau-1}}{(1+r)^{\tau}} + \frac{(ROE_{it+12} - r) \times bps_{it+11}}{r \times (1+r)^{11}}$ $ROE_{it+\tau} = eps_{it+\tau}/bps_{it+\tau-1}$ for τ=0,1. $ROE_{it+\tau} = ROE_{it+\tau-1} - fade\ \forall\ \tau > 4$. *fade* $=(ROE_{it+1} - HIROE_t)/8$, $HIROE_t$ is the historical industry median *ROE* for all firm-years in the same industry spanning year t-4 through year t with positive earnings and equity book values. The industry definitions shown in Fama and French (1997) are used. *r* is numerically estimated.

Table 2 (continued)

Market Price-Based Expected Return Proxies	
$e\hat{r}_{it+1}$	**Valuation Model**
r_{div_prc}	$P_{it-1} = \sum_{\tau=1}^{4} \frac{dps_{it+\tau-1}}{(1+r)^{\tau}} + \frac{TP_i}{(1+r)^4}$

Cash Flow News Proxy, and Return News Proxy

Formula	**Comments**
Cash flow news proxy: $c\hat{n}_{it+1} = (roe_{it+1} - froe_{it,t+1}) + \frac{\rho}{1-\rho \times \omega_t} \times (froe_{it+1,t+2} - froe_{it,t+2})$	$roe_{it} = \ln(1 + ROE_{it}), ROE_{it} = eps_{it}/bps_{it-1}$, $froe_{ij,k} = \ln(1 + ROE_{ij,k})$, $ROE_{ij,k}$ denotes the forecast of return on equity for fiscal year k and is based on the Value Line forecast made at the end of year j. The detailed discussion of estimating ρ is found in Easton and Monahan (2005). ω_t is estimated on an annual basis via the pooled, cross-sectional regression of $roe_{i\tau+1} = \omega_{0t} + \omega_t \times roe_{i\tau}$.
Return news proxy: $r\hat{n}_{it+1} = \frac{\rho}{1-\rho} \times (e\hat{n}_{it+2} - e\hat{n}_{it+1})$	$r\hat{n}_{it+1}$ varies across expected return proxies. The detailed steps of estimating ρ are discussed in Easton and Monahan (2005). In the multivariate analyses, return news proxy is defined as follows. $r\hat{n}_{it+1} = -\frac{\rho}{1-\rho} \times (e\hat{n}_{it+2} - e\hat{n}_{it+1})$

Table 3
Analysts' Bias in Earnings, Target Price, and Dividend Forecasts – Scaled by Price
Deciles based on Scaled Earnings Forecast Errors

The table reports the average error (i.e., bias) in Value Line earnings, target price, and dividend forecasts by earnings error decile. Panel A (Panel B) is based on the mean (median) forecast errors for the sample period from 1991 to 2006. The table is constructed in the following manner. We first compute analysts' forecast errors in current-year earnings per share (eps_t), one-year ahead earnings per share (eps_{t+1}), two-year ahead earnings per share (eps_{t+2}), three-to-five year ahead target price forecast (TP_t), and current and next three years of dividend forecasts (dps_t to dps_{t+3}) at the firm level in each year. eps_t (eps_{t+1} *and* eps_{t+2}) errors are computed by subtracting the eps_t (eps_{t+1} *and* eps_{t+2}) forecast from the actual earnings. The error is forecast of *TP* is computed by subtracting the realized four year ahead stock price from target price forecast. Forecast errors in dps_t (dps_{t+1} *to* dps_{t+3}) are calculated by subtracting the dps_t (dps_{t+1} *to* dps_{t+3}) forecast from the actual dividends paid. All forecasts errors are divided by the price at the time of forecasts. Each forecast error is then sorted into deciles based on the error in the price-scaled forecast of eps_t, where the lowest [highest] decile portfolio has the most optimistic [pessimistic] error each year. Finally, these firm-year year mean and median eps_t, eps_{t+1}, eps_{t+2}, *TP* and dps_t *to* dps_{t+3} errors are averaged across all years by eps_t error decile.

Panel A: Mean Forecast Error (i.e., Bias), Scaled by Price

eps_t error/price Decile	eps_t error	eps_{t+1} error	eps_{t+2} error	*TP* error	dps_t error	dps_{t+1} error	dps_{t+2} error	dps_{t+3} error
pessimistic	10.5%	7.1%	3.1%	63.4%	0.38%	0.32%	0.24%	0.17%
2	4.5%	3.2%	0.7%	36.6%	0.33%	0.27%	0.24%	0.02%
3	2.9%	1.7%	-0.4%	20.8%	0.35%	0.29%	0.21%	-0.01%
4	1.9%	0.5%	-1.4%	3.3%	0.32%	0.31%	0.23%	-0.05%
5	1.1%	-0.1%	-1.3%	-11.9%	0.26%	0.19%	0.05%	-0.19%
6	0.3%	-1.3%	-1.9%	-28.3%	0.19%	0.04%	-0.18%	-0.50%
7	-0.6%	-1.4%	-3.0%	-32.7%	0.09%	-0.10%	-0.37%	-0.76%
8	-1.9%	-2.3%	-3.0%	-39.1%	0.03%	-0.21%	-0.42%	-0.78%
9	-4.3%	-3.9%	-4.7%	-59.5%	-0.08%	-0.44%	-0.74%	-1.09%
optimistic	-14.6%	-8.2%	-7.3%	-84.2%	-0.46%	-0.93%	-1.26%	-1.59%
Average	0.0%	-0.5%	-1.9%	-13.1%	0.14%	-0.03%	-0.20%	-0.48%

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Table 3 (continued)

Panel B: Median Forecast Error (i.e., Bias) Scaled by Price

eps_t error/price Decile	eps_t error	eps_{t+1} error	eps_{t+2} error	*TP* error	dps_t error	dps_{t+1} error	dps_{t+2} error	dps_{t+3} error
pessimistic	8.9%	7.2%	2.9%	43.3%	0.19%	0.19%	0.15%	0.13%
2	4.5%	3.7%	1.8%	26.4%	0.23%	0.22%	0.22%	0.02%
3	2.8%	2.3%	0.6%	17.5%	0.27%	0.26%	0.25%	0.11%
4	1.9%	1.3%	-0.2%	0.9%	0.24%	0.24%	0.22%	0.03%
5	1.1%	0.5%	-0.4%	-15.1%	0.20%	0.20%	0.16%	0.01%
6	0.3%	-0.4%	-1.3%	-28.4%	0.15%	0.08%	0.02%	-0.26%
7	-0.5%	-1.1%	-1.9%	-33.9%	0.12%	0.06%	-0.03%	-0.28%
8	-1.8%	-2.0%	-2.6%	-41.0%	0.07%	0.01%	-0.09%	-0.36%
9	-4.0%	-3.1%	-3.8%	-61.7%	0.02%	-0.08%	-0.17%	-0.52%
optimistic	-11.7%	-6.3%	-5.8%	-87.5%	-0.01%	-0.22%	-0.45%	-0.84%
Average	0.2%	0.2%	-1.1%	-17.9%	0.15%	0.10%	0.03%	-0.19%

Table 4
Analysts' Bias in Earnings, Target Price, and Dividend Forecasts – Unscaled
Deciles based on Scaled Earnings Forecast Errors

The table reports the average error (i.e., bias) in Value Line earnings, target price, and dividend forecasts by earnings error decile. Panel A (Panel B) is based on the mean (median) forecast errors for the sample period from 1991 to 2006. The table is constructed in the following manner. We first compute analysts' forecast errors in current-year earnings per share (eps_t), one-year ahead earnings per share (eps_{t+1}), two-year ahead earnings per share (eps_{t+2}), three-to-five year ahead target price forecast (*TP*), and current and next three years of dividend forecasts (dps_t to dps_{t+3}) at the firm level in each year. eps_t (eps_{t+1} *and* eps_{t+2}) errors are computed by subtracting the eps_t (eps_{t+1} *and* eps_{t+2}) forecast from the actual earnings. The error is forecast of *TP* is computed by subtracting the realized four year ahead stock price from target price forecast. Forecast errors in dps_t (dps_{t+1} *to* dps_{t+3}) are calculated by subtracting the dps_t (dps_{t+1} *to* dps_{t+3}) forecast from the actual dividends paid. Each forecast error is then sorted into deciles based on the error in the forecast of eps_t, where the lowest [highest] decile portfolio has the most optimistic [pessimistic] error each year. Finally, these firm-year year mean and median eps_t, eps_{t+1}, eps_{t+2}, *TP*, and dps_t *to* dps_{t+3} errors are averaged across all years by eps_t error decile.

Panel A: Mean Forecast Error (i.e., Bias), Unscaled

eps_t error/price Decile	$Price_t$	eps_t error	eps_{t+1} error	eps_{t+2} error	*TP* error	eps_t Forecast	eps_{t+1} Forecast	eps_{t+2} Forecast	*TP* Forecast	dps_t error	dps_{t+1} error	dps_{t+2} error	dps_{t+3} error
pessimistic	$28.1	$2.67	$1.90	$0.72	$16.94	$1.6	$2.2	$3.0	$44.4	$0.11	$0.10	$0.08	$0.06
2	$33.6	$1.47	$0.98	$0.32	$12.89	$1.9	$2.4	$3.2	$49.1	$0.13	$0.12	$0.11	$0.03
3	$35.6	$0.97	$0.55	$(0.04)	$6.61	$2.0	$2.4	$3.2	$51.5	$0.13	$0.11	$0.09	$0.02
4	$37.1	$0.66	$0.27	$(0.31)	$1.16	$2.0	$2.4	$3.1	$53.1	$0.11	$0.11	$0.09	$0.00
5	$37.8	$0.41	$0.00	$(0.33)	$(4.43)	$2.0	$2.4	$3.0	$54.2	$0.10	$0.08	$0.03	$(0.06)
6	$33.0	$0.11	$(0.35)	$(0.55)	$(9.00)	$2.0	$2.3	$2.7	$49.0	$0.07	$0.02	$(0.05)	$(0.16)
7	$35.9	$(0.19)	$(0.48)	$(1.00)	$(11.31)	$2.1	$2.5	$3.0	$52.0	$0.04	$(0.02)	$(0.11)	$(0.25)
8	$36.4	$(0.64)	$(0.69)	$(0.95)	$(13.45)	$2.1	$2.5	$3.0	$51.8	$0.03	$(0.04)	$(0.12)	$(0.25)
9	$32.5	$(1.36)	$(1.07)	$(1.33)	$(17.66)	$2.1	$2.5	$3.0	$51.5	$(0.02)	$(0.11)	$(0.19)	$(0.30)
optimistic	$25.9	$(3.21)	$(1.78)	$(1.66)	$(19.56)	$1.9	$2.3	$2.8	$45.6	$(0.08)	$(0.20)	$(0.28)	$(0.38)
Average	$33.6	$0.09	$(0.07)	$(0.51)	$(3.78)	$2.0	$2.4	$3.0	$50.2	$0.06	$0.02	$(0.04)	$(0.13)

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Table 4 (continued)

Panel B: Median Forecast Error (i.e., Bias), Unscaled

eps_t error/price Decile	$Price_t$	eps_t error	eps_{t+1} error	eps_{t+2} error	*TP* error	eps_t Forecast	eps_{t+1} Forecast	eps_{t+2} Forecast	*TP* Forecast	dps_t error	dps_{t+1} error	dps_{t+2} error	dps_{t+3} error
pessimistic	$23.64	$2.26	$1.67	$0.65	$11.17	$1.3	$1.7	$2.5	$39.0	$0.05	$0.05	$0.04	$0.03
2	$29.16	$1.33	$1.01	$0.41	$7.46	$1.6	$2.1	$2.8	$44.0	$0.06	$0.06	$0.06	$0.01
3	$31.13	$0.86	$0.67	$0.19	$4.05	$1.8	$2.1	$2.9	$46.9	$0.08	$0.08	$0.07	$0.03
4	$32.16	$0.58	$0.37	$(0.06)	$0.19	$1.8	$2.2	$2.7	$48.0	$0.08	$0.08	$0.07	$0.02
5	$33.14	$0.35	$0.13	$(0.15)	$(5.14)	$1.9	$2.2	$2.7	$48.4	$0.06	$0.06	$0.05	$(0.01)
6	$30.82	$0.09	$(0.10)	$(0.37)	$(8.31)	$1.8	$2.1	$2.4	$43.2	$0.04	$0.03	$0.01	$(0.07)
7	$31.77	$(0.17)	$(0.31)	$(0.62)	$(10.20)	$2.0	$2.2	$2.7	$45.6	$0.04	$0.02	$(0.01)	$(0.09)
8	$30.46	$(0.54)	$(0.59)	$(0.76)	$(11.69)	$1.9	$2.2	$2.6	$46.7	$0.02	$0.00	$(0.03)	$(0.12)
9	$29.37	$(1.10)	$(0.77)	$(1.09)	$(16.64)	$1.8	$2.2	$2.6	$45.9	$0.01	$(0.02)	$(0.05)	$(0.16)
optimistic	$22.56	$(2.53)	$(1.38)	$(1.36)	$(19.09)	$1.6	$1.9	$2.3	$40.5	$(0.00)	$(0.04)	$(0.10)	$(0.18)
Average	$29.4	$0.11	$0.07	$(0.31)	$(4.82)	$1.8	$2.1	$2.6	$44.8	$0.04	$0.03	$0.01	$(0.05)

Table 5
Analysts' Bias in Earnings, Target Price, and Dividend Forecasts – Unscaled
Deciles Based on Price per Share

The table reports the average error (i.e., bias) in Value Line earnings, target price, and dividend forecasts by price decile. Panel A (Panel B) is based on the mean (median) forecast errors for the sample period from 1991 to 2006. The table is constructed in the following manner. We first compute analysts' forecast errors in current-year earnings per share (eps_t), one-year ahead earnings per share (eps_{t+1}), two-year ahead earnings per share (eps_{t+2}), three-to-five year ahead target price forecast (*TP*), and current and next three years of dividend forecasts (dps_t to dps_{t+3}) at the firm level in each year. eps_t (eps_{t+1} *and* eps_{t+2}) errors are computed by subtracting the eps_t (eps_{t+1} *and* eps_{t+2}) forecast from the actual earnings. The error is forecast of *TP* is computed by subtracting the realized four year ahead stock price from target price forecast. Forecast errors in dps_t (dps_{t+1} *to* dps_{t+3}) are calculated by subtracting the dps_t (dps_{t+1} *to* dps_{t+3}) forecast from the actual dividends paid. Each forecast error is then sorted into deciles based on $Price_t$ where the lowest [highest] decile portfolio has the lowest [highest] price each year. Finally, these firm-year year mean and median eps_t, eps_{t+1}, eps_{t+2}, *TP*, and dps_t to dps_{t+3} errors are averaged across all years within $Price_t$ deciles.

Panel A: Mean Forecast Error

$Price_t$ Decile	$Price_t$	eps_t error	eps_{t+1} error	eps_{t+2} error	*TP* error	dps_t error	dps_{t+1} error	dps_{t+2} error	dps_{t+3} error
highest	$80.0	$0.27	$0.10	$(0.27)	$(5.68)	$0.05	$(0.01)	$(0.12)	$(0.30)
2	$48.6	$0.26	$(0.08)	$(0.56)	$(7.31)	$0.05	$(0.00)	$(0.09)	$(0.27)
3	$40.2	$0.20	$(0.02)	$(0.58)	$(4.62)	$0.02	$(0.03)	$(0.11)	$(0.22)
4	$34.6	$0.17	$0.06	$(0.49)	$(4.03)	$(0.01)	$(0.06)	$(0.13)	$(0.27)
5	$30.1	$0.00	$(0.11)	$(0.62)	$(4.75)	$(0.02)	$(0.07)	$(0.13)	$(0.24)
6	$26.3	$0.04	$(0.11)	$(0.37)	$(4.78)	$(0.01)	$(0.06)	$(0.12)	$(0.20)
7	$22.8	$0.02	$(0.08)	$(0.52)	$(3.57)	$(0.04)	$(0.09)	$(0.14)	$(0.23)
8	$19.0	$(0.05)	$0.05	$(0.50)	$(1.34)	$(0.05)	$(0.07)	$(0.10)	$(0.15)
9	$14.9	$(0.03)	$(0.19)	$(0.52)	$(4.83)	$(0.04)	$(0.07)	$(0.10)	$(0.14)
lowest	$8.1	$(0.10)	$(0.05)	$(0.21)	$(3.65)	$(0.03)	$(0.04)	$(0.06)	$(0.07)
Average	$32.5	$0.08	$(0.04)	$(0.46)	$(4.46)	$(0.01)	$(0.05)	$(0.11)	$(0.21)

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Table 5 (continued)

Panel B: Median Forecast Error

$Price_t$ Decile	$Price_t$	eps_t error	eps_{t+1} error	eps_{t+2} error	*TP* error	dps_t error	dps_{t+1} error	dps_{t+2} error	dps_{t+3} error
highest	$65.1	$0.57	$0.26	$(0.05)	$(8.00)	$0.11	$0.09	$0.06	$(0.05)
2	$48.4	$0.43	$0.04	$(0.41)	$(10.09)	$0.09	$0.07	$0.03	$(0.10)
3	$40.1	$0.26	$0.10	$(0.35)	$(6.95)	$0.06	$0.04	$0.01	$(0.08)
4	$34.5	$0.22	$0.11	$(0.31)	$(5.21)	$0.04	$0.03	$0.01	$(0.07)
5	$30.1	$0.20	$0.07	$(0.32)	$(6.38)	$0.03	$0.02	$(0.01)	$(0.08)
6	$26.3	$0.18	$0.00	$(0.28)	$(5.98)	$0.02	$0.01	$(0.01)	$(0.07)
7	$22.8	$0.12	$0.01	$(0.38)	$(5.23)	$0.01	$(0.00)	$(0.02)	$(0.09)
8	$19.0	$0.04	$0.01	$(0.39)	$(3.97)	$0.00	$(0.00)	$(0.01)	$(0.05)
9	$14.9	$0.14	$0.02	$(0.34)	$(6.22)	$0.00	$(0.00)	$(0.01)	$(0.03)
lowest	$9.2	$0.03	$(0.04)	$(0.18)	$(5.90)	$0.00	$(0.00)	$(0.00)	$(0.01)
Average	$31.1	$0.22	$0.06	$(0.30)	$(6.39)	$0.04	$0.03	$0.01	$(0.06)

Table 6
Analysts' Absolute Errors in Forecasts of Earnings, Target Price, and Dividends

The table reports the average absolute errors in Value Line earnings, target price, and dividend forecasts by price decile. Panel A (Panel B) is based on the mean (median) absolute forecast errors for the sample period from 1991 to 2006. The table is constructed in the following manner. We first compute analysts' forecast errors in current-year earnings per share (eps_t), one-year ahead earnings per share (eps_{t+1}), two-year ahead earnings per share (eps_{t+2}), three-to-five year ahead target price forecast (*TP*), and current and next three years of dividend forecasts (dps_t to dps_{t+3}) at the firm level in each year. eps_t (eps_{t+1} *and* eps_{t+2}) errors are computed by subtracting the eps_t (eps_{t+1} *and* eps_{t+2}) forecast from the actual earnings. The error is forecast of *TP* is computed by subtracting the realized four year ahead stock price from target price forecast. Forecast errors in dps_t (dps_{t+1} *to* dps_{t+3}) are calculated by subtracting the dps_t (dps_{t+1} *to* dps_{t+3}) forecast from the actual dividends paid. Each absolute forecast error is then sorted into deciles based on $Price_t$ where the lowest [highest] decile portfolio has the lowest [highest] price each year. Finally, these firm-year year mean and median eps_t, eps_{t+1}, eps_{t+2}, *TP,* and dps_t to dps_{t+3} absolute forecast errors are averaged across all years $Price_t$ decile.

Panel A: Mean Absolute Forecast Error

$Price_t$ Decile	$Price_t$	eps_t Abs. error	eps_{t+1} Abs. error	eps_{t+2} Abs. error	*TP* Abs. error	dps_t Abs. error	dps_{t+1} Abs. error	dps_{t+2} Abs. error	dps_{t+3} Abs. error
highest	$80.0	$2.22	$2.24	$2.85	$41.30	$0.35	$0.48	$0.60	$0.80
2	$48.6	$1.60	$1.80	$2.22	$29.02	$0.30	$0.40	$0.53	$0.70
3	$40.2	$1.36	$1.44	$1.79	$24.99	$0.24	$0.29	$0.40	$0.51
4	$34.6	$1.15	$1.25	$1.70	$21.75	$0.23	$0.31	$0.41	$0.56
5	$30.1	$1.16	$1.33	$1.48	$19.79	$0.20	$0.26	$0.34	$0.46
6	$26.3	$1.06	$1.18	$1.43	$18.22	$0.17	$0.24	$0.32	$0.40
7	$22.8	$0.89	$1.05	$1.39	$16.82	$0.18	$0.25	$0.33	$0.41
8	$19.0	$1.05	$1.08	$1.37	$16.29	$0.17	$0.21	$0.27	$0.34
9	$14.9	$0.81	$1.05	$1.27	$13.99	$0.12	$0.16	$0.19	$0.24
lowest	$8.1	$0.87	$1.01	$1.18	$13.23	$0.08	$0.10	$0.12	$0.14
Average	$32.5	$1.22	$1.34	$1.67	$21.54	$0.21	$0.27	$0.35	$0.46

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Table 6 (continued)

Panel B: Median Absolute Forecast Error

$Price_t$ Decile	$Price_t$	eps_t Abs. error	eps_{t+1} Abs. error	eps_{t+2} Abs. error	*TP* Abs. error	dps_t Abs. error	dps_{t+1} Abs. error	dps_{t+2} Abs. error	dps_{t+3} Abs. error
highest	$65.1	$1.45	$1.44	$1.86	$32.97	$0.19	$0.26	$0.34	$0.47
2	$48.4	$1.04	$1.17	$1.49	$22.99	$0.15	$0.20	$0.27	$0.42
3	$40.1	$0.86	$0.90	$1.14	$19.61	$0.10	$0.13	$0.18	$0.30
4	$34.5	$0.68	$0.80	$1.05	$17.00	$0.09	$0.11	$0.17	$0.28
5	$30.1	$0.68	$0.77	$0.93	$15.47	$0.08	$0.10	$0.16	$0.25
6	$26.3	$0.61	$0.67	$0.91	$14.38	$0.06	$0.08	$0.13	$0.21
7	$22.8	$0.52	$0.63	$0.89	$12.96	$0.06	$0.08	$0.13	$0.21
8	$19.0	$0.65	$0.66	$0.87	$11.82	$0.05	$0.07	$0.11	$0.17
9	$14.9	$0.49	$0.61	$0.80	$11.16	$0.02	$0.04	$0.06	$0.10
lowest	$9.2	$0.50	$0.64	$0.75	$9.01	$0.00	$0.01	$0.02	$0.03
Average	$31.1	$0.75	$0.83	$1.07	$16.74	$0.08	$0.11	$0.16	$0.24

Table 7
Correlation among Forecast Errors in Earnings and Target Prices

The table reports the average Pearson (upper diagonal) and Spearman Rank (lower diagonal) correlations among Value Line forecasts errors in earnings and target prices for the sample period from 1991 to 2006. Panel A is based on the forecast errors scaled by price and Panel B is based on the raw (unscaled) forecast errors. The table is constructed in the following manner. We first compute analysts' forecast errors in current earnings per share (eps_t), one-year ahead earnings per share (eps_{t+1}), two-year ahead earnings per share (eps_{t+2}), and three-to-five year ahead target price forecast (*TP*) at the firm level in each year. eps_t (eps_{t+1} and eps_{t+2}) error is computed by subtracting the eps_t (eps_{t+1} and eps_{t+2}) forecast from the actual earnings. *TP* error is computed by subtracting the realized four year ahead stock price from target price forecast. Pearson and Spearman rank correlation coefficients are computed each year, then averaged across all years.

Panel A: Correlation Among Forecast Errors Scaled by Price

	eps_t error/price	eps_{t+1} error/price	eps_{t+2} error/price	*TP* error/price
eps_t error/price		*0.53*	*0.31*	*0.43*
eps_{t+1} error/price	*0.59*		*0.53*	*0.53*
eps_{t+2} error/price	*0.36*	*0.53*		*0.43*
TP error/price	*0.48*	*0.59*	*0.47*	

Panel B: Correlation Among Forecast Errors (Unscaled)

	eps_t error	eps_{t+1} error	eps_{t+2} error	*TP* error
eps_t error		*0.51*	*0.29*	*0.43*
eps_{t+1} error	*0.58*		*0.53*	*0.50*
eps_{t+2} error	*0.37*	*0.53*		*0.41*
TP error	*0.46*	*0.57*	*0.47*	

Table 8
Summary Statistics

The table reports summary statistics of expected return estimates from 1991 to 2006. Panel A (Panel B) reports expected return estimates based on the market price (Value Line target price). r_{pe} is the expected return estimate imputed from the price to forward earnings model. r_{peg} is the expected return implied by the PEG ratio. r_{mpeg} is the expected return implied by the modified PEG ratio. r_{gm} ,r_{ct} ,and r_{gls} are the expected return estimates from methods used in Gode and Mohanaram (2003), Claus and Thomas (2001), and Gebhardt et al. (2001), respectively . r_{div} is the expected return estimates using dividend forecasts (four years of forecasts) and Value Line target price forecast as a terminal value. See Table 2 for further details. The suffix *_prc* and *_tp* denote that underlying expected return estimates are based on the market price and target price, respectively. Expected return estimates that are smaller than 0.1% or greater than 99.9% are deleted from the sample.

Panel A: Implied expected rate of return proxies based on market prices

	Mean	Std	1st	25th	Median	75th	99th
r_{pe_prc}	7.0%	2.7%	1.5%	5.2%	6.8%	8.4%	15.0%
r_{peg_prc}	10.5%	3.9%	4.1%	8.0%	9.7%	12.2%	23.5%
r_{mpeg_prc}	11.8%	3.9%	5.7%	9.2%	11.0%	13.5%	24.8%
r_{gm_prc}	12.3%	4.1%	5.7%	9.6%	11.5%	14.1%	26.0%
r_{ct_prc}	9.6%	3.0%	3.9%	7.8%	9.3%	10.9%	20.0%
r_{gls_prc}	9.5%	2.8%	3.7%	7.8%	9.3%	11.1%	17.1%
r_{div_prc}	14.0%	7.4%	1.4%	9.0%	13.1%	17.8%	38.4%

Panel B: Implied expected rate of return proxies based on target prices

	Mean	Std	1st	25th	Median	75th	99th
r_{pe_tp}	5.3%	2.5%	0.9%	3.6%	5.0%	6.7%	13.1%
r_{peg_tp}	9.9%	4.4%	3.7%	7.3%	8.9%	11.3%	26.0%
r_{mpeg_tp}	11.5%	4.9%	5.1%	8.5%	10.3%	12.9%	30.2%
r_{gm_tp}	12.3%	5.3%	5.3%	9.1%	11.0%	13.9%	32.2%
r_{ct_tp}	8.7%	4.0%	3.1%	6.8%	8.4%	9.9%	21.2%
r_{gls_tp}	8.6%	3.3%	2.3%	6.6%	8.4%	10.3%	17.1%

Table 9
Correlation among Realized Returns and Empirical Proxies Expected Rate of Return

The table reports the average Pearson (upper diagonal) and Spearman Rank (lower diagonal) correlation coefficients among realized return (*ret(t+1)*) and empirical proxies of implied cost of capital. Panel A (Panel B) reports expected return estimates based on the market price (Value Line target price). Realized return is measured from June 1 in year t to May 31 in year t+1. r_{pe} is the expected return estimate imputed from the price to forward earnings model. r_{peg} is the expected return implied by the PEG ratio. r_{mpeg} is the expected return implied by the modified PEG ratio. r_{gm} ,r_{ct} ,and r_{gls} are the expected return estimates from methods used in Gode and Mohanaram (2003), Claus and Thomas (2001), and Gebhardt et al. (2001), respectively. See Table 2 for further details. The suffix *_prc* and *_tp* denote that underlying expected return estimates are based on the market price and target price, respectively. Expected return estimates that are smaller than 0.1% or greater than 99.9% are deleted from the sample. Pearson and Spearman rank correlation coefficients are computed each year, then averaged across all years.

Panel A: Correlation among Realized Returns and Implied Expected Rate of Return–Market Price Based

	ret(t+1)	r_{pe_prc}	r_{peg_prc}	r_{mpeg_prc}	r_{gm_prc}	r_{ct_prc}	r_{gls_prc}
ret(t+1)		0.085	0.057	0.070	0.066	0.034	0.152
r_{pe_prc}	0.085		0.141	0.271	0.199	0.737	0.647
r_{peg_prc}	0.054	0.124		0.940	0.944	0.368	0.283
r_{mpeg_prc}	0.069	0.292	0.915		0.995	0.421	0.298
r_{gm_prc}	0.065	0.217	0.921	0.994		0.374	0.248
r_{ct_prc}	0.056	0.757	0.366	0.452	0.401		0.499
r_{gls_prc}	0.154	0.638	0.295	0.317	0.265	0.514	

Panel B: Correlation among Realized Returns and Implied Expected Rate of Return–Target Price Based

	ret(t+1)	*rpe_tp*	*rpe_tp*	*rpe_tp*	*rpe_tp*	*rpe_tp*	*rpe_tp*
ret(t+1)		0.082	0.066	0.074	0.070	0.042	0.152
rpe_tp	0.076		-0.050	0.137	0.060	0.673	0.614
rpeg_tp	0.064	-0.052		0.925	0.932	0.190	0.134
rmpeg_tp	0.079	0.206	0.869		0.995	0.259	0.168
rgm_tp	0.074	0.114	0.884	0.992		0.209	0.117
rct_tp	0.054	0.753	0.163	0.314	0.249		0.428
rgls_tp	0.143	0.608	0.134	0.190	0.126	0.459	

Table 10
Measurement Error Variance of Empirical Proxies of Implied Rate of Return

The table reports results of measurement error analyses of thirteen estimates of implied expected rates of return. Separate regressions are estimated for each of the 15 annual cross-sections of data. Parameter estimates are equal to the average of the annual regression coefficients. t-statistics (in parentheses) are equal to the ratio of the parameter estimates to their temporal standard errors. R^2 is the mean R^2 from the annual regressions. Reported numbers based on the regression equation, $\upsilon^M_{Cit+1} = \delta_{0t+1} + \delta_{1t+1} \times \varepsilon^A_{1it+1} + \delta_{2t+1} \times \varepsilon^A_{2it+1} + \delta_{3t+1} \times \varepsilon^A_{3it+1} + \mu_{it+1}$. To alleviate measurement errors in estimating each proxy, each variable is also aggregated for two years or three years, then used as a regression input. We aggregate the regression variables as follows. r_{it+1}, $c\hat{n}_{it+1}$, and $r\hat{n}_{it+1}$ represent the realized return, the cash flow news proxy, and the return news proxy for year t+1, respectively. The detailed definition of each proxy is found in Table 1. Other variables defined as follows.

$\upsilon^M_{Cit+1} = \upsilon_{Cit+1} - \{\sigma(e\hat{r}_{it+1}, c\hat{n}_{it+1}) + \sigma(e\hat{r}_{it+1}, r\hat{n}_{it+1})\} \times \varepsilon^A_{1it+1}$,where $\upsilon_{Cit+1} = r_{1t+1} - e\hat{r}_{it+1} - c\hat{n}_{it+1} - r\hat{n}_{it+1}$, and

$$\varepsilon^A_{1it+1} = \frac{\varepsilon_{1it+1} - \beta_{10t+1}}{\sigma^2(\varepsilon_{1it+1})}, \varepsilon^A_{2it+1} = \frac{\varepsilon_{2it+1} - \beta_{20t+1}}{\sigma^2(\varepsilon_{2it+1})}, \varepsilon^A_{3it+1} = \frac{\varepsilon_{3it+1} - \beta_{30t+1}}{\sigma^2(\varepsilon_{3it+1})}$$

$\sigma(e\hat{r}_{it+1}, c\hat{n}_{it+1}), \sigma(e\hat{r}_{it+1}, r\hat{n}_{it+1})$ is the covariance between the expected return proxy, and the cash flow news and return news proxy. The β, ε, and $\sigma^2(\varepsilon)$ terms above are from the following first-stage regressions:

$$e\hat{r}_{it+1} = \beta_{10t+1} + \beta_{11t+1} \times c\hat{n}_{it+1} + \beta_{12t+1} \times r\hat{n}_{it+1} + \varepsilon_{1it+1}$$
$$c\hat{n}_{it+1} = \beta_{20t+1} + \beta_{21t+1} \times e\hat{r}_{it+1} + \beta_{22t+1} \times r\hat{n}_{it+1} + \varepsilon_{2it+1}$$
$$r\hat{n}_{it+1} = \beta_{30t+1} + \beta_{31t+1} \times e\hat{r}_{it+1} + \beta_{32t+1} \times c\hat{n}_{it+1} + \varepsilon_{31it+1}$$

The regression coefficients relating to the measurement error variance of $e\hat{r}_{it+1}$ are:
$\delta^M_{1t+1} = \sigma^2(\upsilon_{1it+1}) - \{\sigma(er_{it+1}, cn_{it+1}) + \sigma(er_{it+1}, rn_{it+1})\} - \{\sigma(\upsilon_{it+1}, cn_{it+1}) + \sigma(\upsilon_{it+1}, rn_{it+1})\}$

$\sigma^2(\upsilon_{1it+1})$ is the measurement error variance of the expected return proxy. $\sigma(er_{it+1}, cn_{it+1})$ [$\sigma(er_{it+1}, rn_{it+1})$] is the covariance between true expected returns and true cash flow news [return news], and $\sigma(\upsilon_{it+1}, cn_{it+1})$ [$\sigma(\upsilon_{it+1}, rn_{it+1})$] is the covariance between the measurement error in the expected return proxy and true cash flow news [return news].

(continued on next page)

Table 10 (continued)

Panel A: Market Price-Based Proxy for Expected Rate of Return

$$\upsilon^M_{Cit+1} = \delta_{0t+1} + \delta_{1t+1} \times \varepsilon^A_{1it+1} + \delta_{2t+1} \times \varepsilon^A_{2it+1} + \delta_{3t+1} \times \varepsilon^A_{3it+1} + \mu_{it+1}$$

$e\hat{r}_{it+1}$	δ_0	δ_1	δ_2	δ_3	R^2
r_{pe_prc}	0.11	-0.0004	0.02	0.49	0.88
	3.26	*-0.79*	*3.58*	*8.09*	
r_{peg_prc}	0.11	0.0004	0.08	1.44	0.96
	3.55	*1.52*	*9.91*	*10.33*	
r_{mpeg_prc}	0.10	0.0001	0.08	1.42	0.96
	3.15	*0.51*	*10.12*	*10.39*	
r_{gm_prc}	0.10	0.0003	0.08	1.55	0.96
	3.07	*0.95*	*10.61*	*11.00*	
r_{ct_prc}	0.13	0.0002	0.01	0.73	0.92
	2.45	*0.49*	*1.68*	*11.91*	
r_{gls_prc}	0.03	-0.0006	0.04	0.25	0.81
	0.91	*-1.60*	*8.39*	*7.66*	
r_{div}	0.17	0.0028	0.06	0.71	0.99
	7.47	*5.85*	*4.15*	*7.75*	

Panel B: Target Price-Based Proxy for Expected Rate of Return

$$\upsilon^M_{Cit+1} = \delta_{0t+1} + \delta_{1t+1} \times \varepsilon^A_{1it+1} + \delta_{2t+1} \times \varepsilon^A_{2it+1} + \delta_{3t+1} \times \varepsilon^A_{3it+1} + \mu_{it+1}$$

$e\hat{r}_{it+1}$	δ_0	δ_1	δ_2	δ_3	R^2
r_{pe_prc}	0.10	0.0000	0.03	0.17	0.74
	2.88	*-0.03*	*8.19*	*12.24*	
r_{peg_prc}	0.09	0.0009	0.08	1.55	0.96
	3.38	*3.24*	*10.62*	*15.08*	
r_{mpeg_prc}	0.10	0.0013	0.08	1.63	0.96
	3.65	*3.73*	*11.23*	*16.56*	
r_{gm_prc}	0.10	0.0016	0.08	1.85	0.97
	3.61	*4.15*	*11.91*	*18.01*	
r_{ct_prc}	0.09	0.0006	0.01	0.56	0.90
	1.93	*2.26*	*1.55*	*17.55*	
r_{gls_prc}	0.02	-0.0003	0.04	0.22	0.78
	0.66	*-0.89*	*11.30*	*10.88*	

Table 11
Comparison of Forecast Errors and Correlations among the Forecast Errors across the Terciles

The table reports summary statistics for sub-samples partitioned on the difference between the estimates of the implied expected rate of return based on the market prices *(r_{pe_prc})* and the estimates based on the target prices *(r_{pe_tp})*. Panel A reports the mean and median forecast errors for each subsample. Panel B reports the Pearson correlation coefficients between target price forecasts (*TP*) and earnings forecasts *(eps_t and eps_{t+1})* by each subsample. Panel C reports Pearson correlations between realized return and each estimate of the implied expected rate of return proxy by each subsample. Subsamples in Panel A and Panel B are based on the difference between r_{pe_tp} and r_{pe_prc} while subsamples in Panel C are based on each implied expected rate of return proxy. r_{pe} is the expected return estimate imputed from the price to forward earnings model. r_{peg} is the expected return implied by the PEG ratio. r_{mpeg} is the expected return implied by the modified PEG ratio. r_{gm} ,r_{ct} ,and r_{gls} are the expected return estimates from methods used in Gode and Mohanaram (2003), Claus and Thomas (2001), and Gebhardt et al. (2001), respectively. See Table 2 for further details. The suffix *_prc* and *_tp* denote that underlying expected return estimates are based on the market price and target price, respectively. Forecast errors are computed by the steps described in Tables 4 and 5

Panel A: Mean and Median Forecast Errors for r_{tp} - r_{prc} terciles

Mean

(r_{pe_tp} - r_{pe_prc}) Tercile	*$Price_t$*	*eps_t* error/price	*eps_{t+1}* error/price	*TP* error/price	*eps_t* error	*eps_{t+1}* error	*TP error*	*TP*
1 (low)	$26.3	-0.9%	-1.2%	-53.2%	$(0.18)	$(0.28)	$(13.43)	$51.9
2	$35.4	0.5%	0.2%	-13.4%	$0.15	$0.04	$(5.63)	$53.4
3(high)	$38.8	0.7%	0.5%	15.3%	$0.25	$0.15	$3.88	$44.5

Median

(r_{pe_tp} - r_{pe_prc}) Tercile	*$Price_t$*	*eps_t* error/price	*eps_{t+1}* error/price	*TP* error/price	*eps_t* error	*eps_{t+1}* error	*TP error*	*TP*
1 (low)	$23.4	-0.1%	-0.9%	-63.2%	$(0.03)	$(0.21)	$(14.21)	$46.9
2	$31.5	0.8%	0.4%	-24.9%	$0.25	$0.11	$(7.47)	$48.2
3(high)	$33.2	0.9%	0.5%	5.6%	$0.26	$0.16	$1.27	$38.7

Panel B: Pearson Correlation of Target Price Forecast Error and eps Forecast Error for r_{tp} - r_{prc} terciles

	Forecast Errors scaled by price		Forecast Errors - Unscaled	
(r_{pe_tp4} - r_{pe_prc}) Tercile	(*tp* error/price, *eps_t* error/price)	(*tp* error/price, *eps_{t+1}* error/price)	(tp error, *eps_t* error)	(tp error, *eps_{t+1}* error)
1 (low)	0.45	0.58	0.43	0.51
2	0.46	0.54	0.43	0.52
3(high)	0.43	0.54	0.45	0.56

(continued on next page)

Table 11 (Continued)

Panel C: Pearson Correlation of Realized Return and Each Implied Expected Rate of Return Proxy for r_{tp} - r_{prc} terciles

	Price Based Implied expected rate of return proxies			Target Price-Based Implied expected rate of return proxies		
(r_{tp} - r_{prc}) Tercile	1 (Low)	2	3 (High)	1 (Low)	2	3 (High)
r_{pe}	3.9%	8.0%	9.7%	4.0%	8.3%	10.1%
r_{peg}	5.9%	4.0%	7.4%	6.2%	4.1%	5.9%
r_{mpeg}	4.0%	7.8%	6.8%	4.7%	8.0%	4.7%
r_{gm}	4.0%	7.5%	6.1%	4.6%	7.5%	4.0%
r_{ct}	0.8%	2.6%	5.2%	1.2%	2.7%	4.1%
r_{gls}	16.6%	15.8%	13.9%	15.6%	16.0%	12.8%

Table 12
Measurement Error Variance of Implied Expected Rate of Return Proxy Within Each Subsample Classified by the Difference Between Market Based and Target Price-Based Implied Expected Rate of Return Proxies

The table reports results of analyses of twelve estimates of the implied expected rate of return for each tercile sub-sample grouped by the difference between market based and target price-based implied expected rate of return estimate. Separate regressions are estimated for each of the 15 annual cross-sections of data. Parameter estimates are equal to the average of the annual regression coefficients. t-statistics (in parentheses) are equal to the ratio of the parameter estimates to their temporal standard errors. A difference in δ_1 is based on the paired t-test across all years. Reported numbers based on the regression equation, $\upsilon^M_{Cit+1} = \delta_{0t+1} + \delta_{1t+1} \times \varepsilon^A_{1it+1} + \delta_{2t+1} \times \varepsilon^A_{2it+1} + \delta_{3t+1} \times \varepsilon^A_{3it+1} + \mu_{it+1}$. We only report δ_1 for each twelve proxy. The detailed definition of each proxy is found in Table 1. Other variables defined as follows.

$\upsilon^M_{Cit+1} = \upsilon_{Cit+1} - \{\sigma(e\hat{r}_{it+1}, c\hat{n}_{it+1}) + \sigma(e\hat{r}_{it+1}, r\hat{n}_{it+1})\} \times \varepsilon^A_{1it+1}$,where $\upsilon_{Cit+1} = r_{1t+1} - e\hat{r}_{it+1} - c\hat{n}_{it+1} - r\hat{n}_{it+1}$, and
$\varepsilon^A_{1it+1} = \dfrac{\varepsilon_{1it+1} - \beta_{10t+1}}{\sigma^2(\varepsilon_{1it+1})}, \varepsilon^A_{2it+1} = \dfrac{\varepsilon_{2it+1} - \beta_{20t+1}}{\sigma^2(\varepsilon_{2it+1})}, \varepsilon^A_{3it+1} = \dfrac{\varepsilon_{3it+1} - \beta_{30t+1}}{\sigma^2(\varepsilon_{3it+1})}$

$\sigma(e\hat{r}_{it+1}, c\hat{n}_{it+1}), \sigma(e\hat{r}_{it+1}, r\hat{n}_{it+1})$ is the covariance between the expected return proxy, and the cash flow news and return news proxy. The β, ε, and $\sigma^2(\varepsilon)$ terms above are from the following first-stage regressions:

$$e\hat{r}_{it+1} = \beta_{10t+1} + \beta_{11t+1} \times c\hat{n}_{it+1} + \beta_{12t+1} \times r\hat{n}_{it+1} + \varepsilon_{1it+1}$$
$$c\hat{n}_{it+1} = \beta_{20t+1} + \beta_{21t+1} \times e\hat{r}_{it+1} + \beta_{22t+1} \times r\hat{n}_{it+1} + \varepsilon_{2it+1}$$
$$r\hat{n}_{it+1} = \beta_{30t+1} + \beta_{31t+1} \times e\hat{r}_{it+1} + \beta_{32t+1} \times c\hat{n}_{it+1} + \varepsilon_{31it+1}$$

The regression coefficients relating to the measurement error variance of $e\hat{r}_{it+1}$ are:
$\delta^M_{1t+1} = \sigma^2(\upsilon_{1it+1}) - \{\sigma(er_{it+1}, cn_{it+1}) + \sigma(er_{it+1}, rn_{it+1})\} - \{\sigma(\upsilon_{it+1}, cn_{it+1}) + \sigma(\upsilon_{it+1}, rn_{it+1})\}$

$\sigma^2(\upsilon_{1it+1})$ is the measurement error variance of the expected return proxy. $\sigma(er_{it+1}, cn_{it+1})$ [$\sigma(er_{it+1}, rn_{it+1})$] is the covariance between true expected returns and true cash flow news [return news], and $\sigma(\upsilon_{it+1}, cn_{it+1})$ [$\sigma(\upsilon_{it+1}, rn_{it+1})$] is the covariance between the measurement error in the expected return proxy and true cash flow news [return news].

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Table 12 (Continued)

(r_{tp} - r_{prc}) *Tercile*	Lower Tercile			Middle Tercile			Upper Tercile		
$\hat{er}_{it+1}$	δ_1 (r_prc)	δ_1(r_tp)	diff in δ_1	δ_1 (r_prc)	δ_1(r_tp)	diff in δ_1	δ_1 (r_prc)	δ_1(r_tp)	diff in δ_1
r_{pe_prc}	0.0003	0.0001	-0.0002	-0.0001	-0.0001	0.0000	-0.0001	0.0001	0.0002
	1.35	0.50	-2.76	-0.19	-0.28	-1.23	-0.29	0.13	2.34
r_{peg_prc}	0.0007	0.0002	-0.0005	0.0005	0.0005	0.0000	0.0011	0.0023	0.0012
	3.65	0.87	-5.32	3.31	3.39	-0.14	2.62	3.76	5.11
r_{mpeg_prc}	0.0005	0.0001	-0.0004	0.0001	0.0001	0.0000	0.0010	0.0027	0.0017
	2.79	0.74	-4.44	0.39	0.43	0.15	2.48	4.77	6.08
r_{gm_prc}	0.0007	0.0003	-0.0004	0.0001	0.0001	0.00001	0.0011	0.0032	0.0020
	3.58	1.89	-3.96	0.45	0.52	0.38	3.05	5.47	6.63
r_{ct_prc}	0.0008	0.0004	-0.0004	0.0003	0.0003	0.0000	0.0005	0.0015	0.0010
	2.81	1.47	-4.88	0.99	0.97	-0.52	1.53	3.91	5.08
r_{gls_prc}	-0.0003	-0.0005	-0.0002	-0.0004	-0.0004	0.0000	0.0001	0.0004	0.0003
	-1.75	-2.78	-2.59	-1.41	-1.48	-0.38	0.14	0.53	2.55

Table 13
The Effect of the Positive Correlation in the Errors in the Forecasts of Earnings for the Next Two Periods and Long-term Earnings Growth

The table reports results of measurement error analyses of eight estimates of the implied expected rate of return (Panel A), and the difference between various pairs of estimates. r_{ct}, r_{gls}, and modified r_{ct} (r_{ctmd}) and modified r_{gls} (r_{glsmd}) are compared in the Panel B. The detailed definition of each proxy is found in Table 1. Separate regressions are estimated for each of the 15 annual cross-sections of data. Parameter estimates are equal to the average of the annual regression coefficients. t-statistics (in parentheses) are equal to the ratio of the parameter estimates to their temporal standard errors. A difference in δ_1 is based on the paired t-test across all years. Reported numbers based on the regression equation, $\upsilon^M_{Cit+1} = \delta_{0t+1} + \delta_{1t+1} \times \varepsilon^A_{1it+1} + \delta_{2t+1} \times \varepsilon^A_{2it+1} + \delta_{3t+1} \times \varepsilon^A_{3it+1} + \mu_{it+1}$. We only report δ_1 for each proxy. Other variables defined as follows.

$\upsilon^M_{Cit+1} = \upsilon_{Cit+1} - \{\sigma(e\hat{r}_{it+1}, c\hat{n}_{it+1}) + \sigma(e\hat{r}_{it+1}, r\hat{n}_{it+1})\} \times \varepsilon^A_{1it+1}$, where $\upsilon_{Cit+1} = r_{1t+1} - e\hat{r}_{it+1} - c\hat{n}_{it+1} - r\hat{n}_{it+1}$, and

$$\varepsilon^A_{1it+1} = \frac{\varepsilon_{1it+1} - \beta_{10t+1}}{\sigma^2(\varepsilon_{1it+1})}, \varepsilon^A_{2it+1} = \frac{\varepsilon_{2it+1} - \beta_{20t+1}}{\sigma^2(\varepsilon_{2it+1})}, \varepsilon^A_{3it+1} = \frac{\varepsilon_{3it+1} - \beta_{30t+1}}{\sigma^2(\varepsilon_{3it+1})}$$

$\sigma(e\hat{r}_{it+1}, c\hat{n}_{it+1}), \sigma(e\hat{r}_{it+1}, r\hat{n}_{it+1})$ is the covariance between the expected return proxy, and the cash flow news and return news proxy. The β, ε, and $\sigma^2(\varepsilon)$ terms above are from the following first-stage regressions:

$$e\hat{r}_{it+1} = \beta_{10t+1} + \beta_{11t+1} \times c\hat{n}_{it+1} + \beta_{12t+1} \times r\hat{n}_{it+1} + \varepsilon_{1it+1}$$
$$c\hat{n}_{it+1} = \beta_{20t+1} + \beta_{21t+1} \times e\hat{r}_{it+1} + \beta_{22t+1} \times r\hat{n}_{it+1} + \varepsilon_{2it+1}$$
$$r\hat{n}_{it+1} = \beta_{30t+1} + \beta_{31t+1} \times e\hat{r}_{it+1} + \beta_{32t+1} \times c\hat{n}_{it+1} + \varepsilon_{31it+1}$$

The regression coefficients relating to the measurement error variance of $e\hat{r}_{it+1}$ are:
$\delta^M_{1t+1} = \sigma^2(\upsilon_{1it+1}) - \{\sigma(er_{it+1}, cn_{it+1}) + \sigma(er_{it+1}, rn_{it+1})\} - \{\sigma(\upsilon_{it+1}, cn_{it+1}) + \sigma(\upsilon_{it+1}, rn_{it+1})\}$

$\sigma^2(\upsilon_{1it+1})$ is the measurement error variance of the expected return proxy. $\sigma(er_{it+1}, cn_{it+1})$ [$\sigma(er_{it+1}, rn_{it+1})$] is the covariance between true expected returns and true cash flow news [return news], and $\sigma(\upsilon_{it+1}, cn_{it+1})$ [$\sigma(\upsilon_{it+1}, rn_{it+1})$] is the covariance between the measurement error in the expected return proxy and true cash flow news [return news].

Panel A: Measurement errors (δ_1) of Market Based and Target Price-Based Implied Expected Rate of Return Proxy: r_{ct}, r_{gls}, and modified r_{ct} (r_{ctmd}) and modified r_{gls} (r_{glsmd})

$e\hat{r}_{it+1}$	δ1 (r_{prc})	δ1(r_{tp})
r_{ct}	0.0002	0.0006
(t-stats)	0.49	2.26
r_{gls}	-0.0006	-0.0003
(t-stats)	-1.6	-0.89
r_{ctmd}	-0.0001	0.0001
(t-stats)	-0.37	0.2
r_{glsmd}	-0.0007	-0.0005
(t-stats)	-1.97	-1.64

(continued on next page)

Table 13 (Continued)

Panel A: Difference in Measurement errors (δ_1) of Market Based and Target Price-Based Implied Expected Rate of Return Proxy: r_{ct}, r_{gls}, and modified r_{ct} (r_{ctmd})and modified r_{gls} (r_{glsmd})

comparison of $e\hat{r}_{it+1}$	diff in δ_1 (r_{prc})	diff in δ_1 (r_{tp})
r_{ct} cf. r_{gls}	0.0007	0.0008
(t-stats)	3.87	3.85
r_{ctmd} cf. r_{glsmd}	0.0006	0.0005
(t-stats)	3.43	3.35
r_{gls} cf. r_{glsmd}	0.0001	0.0002
(t-stats)	0.93	1.43
r_{ct} cf. r_{ctmd}	0.0003	0.0005
(t-stats)	3.87	7.02