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The Role of Analysts' Forecasts in Accounting-based Valuation: A Critical Evaluation

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Abstract. This paper critically evaluates the use of analysts' forecasts in accounting-based valuation. Specifically, I assess the usefulness and the limitation of analysts' forecasts in predicting future earnings and in explaining the market-to-book ratio, in light of a comprehensive set of twenty-two explicit information items, including: economic rent proxies, conservative accounting proxies, earnings quality signals, transitory earnings proxies, industry characteristics, and risk and growth proxies. While analysts' forecasts capture 45-83% of the information from these sources depending on model specifications, they do not appear to fully incorporate certain information items. In particular, proxies for conservative accounting and transitory earnings are incrementally useful in predicting future earnings; proxies for economic rents, conservative accounting, and risk are incrementally useful in explaining the market-to-book ratio. Collectively, these results validate the use of analysts' forecasts as a parsimonious proxy for forward-looking information in accounting-based valuation and suggest how to improve on their use.

Keywords: accounting-based valuation, earnings, analysts' forecasts, market-to-book ratios

JEL Classification: D4, G12, M4

The use of analysts' earnings forecasts has become common in empirical studies involving accounting-based valuation models.[1] The popularity of these forecasts is understandable, because they capture forward-looking information in a form that can be easily incorporated into various models.[2] However, the use of analysts' forecasts is subject to at least two important limitations. First, most prior studies treat these forecasts as a "black box", and prior research has provided little assurance as to what information these forecasts are based on (Beaver 1999). Second, analysts' forecasts might not fully incorporate certain types of public information.[3] Thus, simple reliance on these forecasts can yield noisy value estimates or biased inferences. While prior studies recognize these limitations, they provide little evidence on the efficacy of analysts' forecasts for valuation purposes.

This paper evaluates the use of analysts' forecasts in accounting-based valuation by investigating the extent to which these forecasts incorporate a comprehensive set of twenty-two explicit information items that have been shown to be useful in valuation. These explicit information items fall into six categories: economic rent proxies, conservative accounting proxies, earnings quality signals, transitory earnings proxies, industry characteristics, and risk and growth proxies (Lev and Thiagarajan 1993; Fairfield, Sweeney, and Yohn 1996; Abarbanell and Bushee 1997, 1998; Cheng 2005). My overall goal is to critically assess the usefulness and the limitation of analysts' forecasts in valuation in light of these other information sources.

I evaluate the efficacy of analysts' forecasts in two complementary settings: (1) predicting future earnings, i.e., one-year-ahead return on equity (ROE), and (2) explaining the current market-to-book ratio. Forecasting future earnings is central to valuation, as the accuracy of the forecasts ultimately determines the accuracy of value estimates. However, one-year-ahead earnings are unlikely to fully capture expected earnings in *all* future years. Therefore, I also analyze the usefulness of analysts' forecasts in explaining the market-to-book ratio. While only analysts' one-year-ahead earnings forecasts are used in the first setting, their two-year-ahead and long-term earnings forecasts are added in the second setting.[4]

In each setting, I decompose the incremental explanatory power (i.e., the increase in adjusted R^2) of analysts' forecasts and explicit information items into three components: (a) the information common to

both sources, (b) the information unique to analysts' forecasts, and (c) the information unique to explicit information items. While component (a) captures the information in explicit information items that analysts incorporate into their forecasts, component (c) captures the information that analysts do not incorporate. The ratio of (a) to (a) + (c) is therefore the proportion of the explicit information that analysts incorporate into their forecasts.

My analysis yields three main results. First, I find that analysts integrate a substantial amount of the information contained in explicit information items into their forecasts. In predicting future earnings, information common to analysts' forecasts and explicit information items contributes an increase in adjusted R^2 of 0.047, representing 45% of the total contribution of explicit information items. Analysts' forecasts fare even better in explaining the market-to-book ratio with the inclusion of two-year-ahead and long-term earnings forecasts. In this setting, the common information contributes an increase in adjusted R^2 of 0.272, representing 83% of the total contribution of explicit information items. Evidently, analysts' forecasts can capture 45-83% of the information available from the other information sources examined.

Second, analysts' forecasts also incorporate unique information beyond the explicit information items examined. The incremental explanatory power of analysts' forecasts is 0.046 in predicting future earnings and 0.220 in explaining the market-to-book ratio. I find that this unique contribution is more important for firms with less informative earnings, such as those with high R&D capital, with high accruals, or in high-tech industries. These results are consistent with analysts' forecasts providing timely and contextual information that is not readily available from other sources.

Third, analysts' forecasts do not incorporate all of the information contained in explicit information items. These items have a unique contribution in predicting future earnings and in explaining the market-to-book ratio. In both cases, the increase in adjusted R^2 is about 0.060. I provide evidence that the inefficiency of analysts' forecasts is largely due to their underestimating or ignoring the effects of conservative accounting and transitory earnings when predicting future earnings, and the effects of economic rents, conservative accounting, and risk when explaining the market-to-book ratio.

I also conduct additional analyses of analysts' forecast errors. The tests rely on the idea that if

analysts' forecasts fail to correctly reflect the information in a variable, then this variable should predict analysts' forecast errors. Moreover, the estimated coefficient on the variable can shed light on how analysts misinterpret the information. As found in the primary analyses, these tests confirm that analysts appear to underreact to the effects of market share, conservative accounting, and transitory earnings. These variables incrementally explain 9 - 12% of the cross-sectional variation in forecast errors.

Overall, this paper contributes to the literature in two ways. First, the analysis documents a substantial overlap between analysts' forecasts and the twenty-two explicit information items examined for valuation purposes. This finding improves our understanding of the nature of analysts' forecasts by "remove[ing] some of the mystery surrounding analysts' forecasts (Beaver 1999, 41)." Combined with the evidence on the unique contribution of analysts' forecasts, it validates the use of analysts' forecasts as a parsimonious proxy for forward-looking information.

Second, this paper sheds light on the type of information that financial analysts do not fully incorporate into their forecasts. Therefore, the results have implications for financial analysts and researchers concerned with improving forecasts and valuations. One direct implication for studies using analysts' forecasts to implement valuation is to include those variables that analysts do not fully incorporate.[5] In particular, this paper implies that one should include proxies for conservative accounting and transitory earnings when forecasting one-year-ahead earnings, and proxies for economic rents, conservative accounting, and risk when explaining the market-to-book ratio.

The remainder of the paper is organized as follows. Section 1 discusses the motivation for and the measurement of explicit information items. Section 2 describes the sample and the measurement of analysts' forecasts. Section 3 presents the primary empirical results. Section 4 reports the results from additional analyses and Section 5 concludes.

1. Explicit Information Items

The choice of which information items to include involves a tradeoff between parsimony and

comprehensiveness. Parsimony can simplify the model specification and sharpen the implications of the empirical analyses, but an incomplete set of useful information items can bias upward the apparent efficacy of analysts' forecasts. With this tradeoff in mind, I chose six groups of variables whose usefulness in valuation has strong theoretical and empirical support: 1) economic rent proxies, 2) conservative accounting proxies, 3) earnings quality signals, 4) transitory earnings proxies, 5) industry characteristics, and 6) risk and growth proxies.[6] This section focuses on the motivation for choosing these variables and the Appendix describes their measurement in detail.

1.1. Economic Rent Proxies

An important component of accounting earnings is economic rents. To the extent that economic rents persist, their proxies can help predict future earnings (Feltham and Ohlson 1996). Industrial economic theory shows that economic rents mainly arise from imperfect competition, under which firms can charge higher prices relative to costs. This theory also suggests that the extent of imperfect competition increases with market share and barriers to entry, such as capital intensity and R&D intensity. Prior empirical research supports these theoretical predictions (Lev 1983; Mueller 1986; Cheng 2005, among others). Thus, this paper uses *market share*, *capital intensity*, and *R&D intensity* to capture expected economic rents in future earnings. These variables are predicted to be positively correlated with future earnings and the market-to-book ratio.

1.2. Conservative Accounting Proxies

Another factor that affects accounting earnings is conservatism (Feltham and Ohlson 1996). The accounting treatment of investment activities with uncertain payoffs is one prominent example of conservatism. When investments are undertaken and accounted for conservatively (e.g., fully expensed), the accounting book value is lower and the market-to-book ratio is higher than if one were to use unbiased accounting. Defining the difference in book value between unbiased and conservative accounting as the

estimated reserve, one can expect that the market-to-book ratio is positively correlated with this reserve (Penman and Zhang 2002; Cheng 2005).

In contrast, the association between the estimated reserve and future earnings is less clear. Conservatism has two opposing effects on earnings. While higher current expenses reduce income in period *t*, the reversal of conservatism in prior periods results in higher income in period *t*. Thus, the association between the current estimated reserve and future earnings depends on whether the positive impact of previous investments outweighs the negative impact of investments undertaken in the future.[7] If so, the association is positive; otherwise, it is negative. (See Penman and Zhang (2002) and Cheng (2005) for more discussions.)

One important conservative accounting policy is the expensing of research and development (R&D) investments. Thus, this paper uses the *R&D estimated reserve* to capture conservative accounting effects. The *R&D estimated reserve* is the unamortized R&D assets if R&D investments were capitalized and amortized over their useful life. It is predicted to be positively correlated with the market-to-book ratio, but its cross-sectional correlation with future earnings is ambiguous.

1.3. Earnings Quality Signals

Lev and Thiagarajan (1993) and Abarbanell and Bushee (1997, 1998) find that earnings quality signals, derived from detailed financial statement information, can help predict future earnings. This paper relies on these prior studies to identify accounting-based earnings quality signals. To simplify the model specification, this paper only includes the signals that have been found to be significant and that do not overlap variables in the other five groups. These signals are related to *inventory*, *gross margin*, *SG&A expenses*, *effective tax rate*, *LIFO earnings*, *labor efficiency*, and *change in assets turnover*.[8]

The motivations for including each variable as an earnings quality signal have been discussed in prior studies and are briefly summarized here. A disproportionate increase in *inventory* relative to sales signals difficulties in generating sales. A disproportionate decrease in *gross margin* or a disproportionate

increase in *SG&A expenses* relative to sales suggests negative effects of operating leverage, competition, and fixed costs on earnings. An increase in *effective tax rate* signals persistent earnings. *LIFO earnings* are regarded as having higher quality because they are more aligned with economic earnings. An increase in *labor efficiency*, i.e., sales per employee, suggests an improvement in efficiency from wage-related cost management strategies. A positive *change in assets turnover* reflects an improvement in a firm's efficiency in utilizing assets (Mueller 1986). All these signals are measured such that larger values represent higher earnings quality and thus are predicted to be positively correlated with future earnings and the market-to-book ratio.

1.4. Transitory Earnings Proxies

Prior research suggests several transitory earnings proxies that can help predict future earnings. Fairfield, Sweeney, and Yohn (1996) find that disaggregating earnings into operating income, non-operating income and income taxes, and special items improves forecasts of future earnings, because the latter two components are less persistent than operating income. Similarly, Sloan (1996) finds that total accruals are less persistent than operating cash flows. Extreme performance, i.e., extremely high or low earnings, is also less likely to persist because it can induce firms to enter or exit an industry (Brooks and Buckmaster 1976). Based on these studies, this paper uses *non-operating income and income taxes*, *special items*, *total accruals*, and *extreme ROE* to capture transitory earnings. These variables are predicted to be negatively correlated with future earnings and the market-to-book ratio.

1.5. Industry Characteristics

Economic theory suggests that industry concentration and industry level barriers to entry are important determinants of firm profitability. Empirically, Dechow, Hutton, and Sloan (1999) and Cheng (2005) find that industry characteristics help predict future earnings. This paper includes *industry ROE* to capture the effects of these characteristics. Since industry characteristics are more stable than firm characteristics,

industry earnings are arguably more persistent than firm earnings. Hence, *industry ROE* is expected to have a positive coefficient when predicting future earnings and explaining the market-to-book ratio.

1.6. Risk and Growth Proxies

The market-to-book ratio is a function of the discount rate and expected earnings in *all* future years. Thus, explaining the market-to-book ratio requires additional variables that can capture risk and growth. To capture risk, I include the *industry cost of equity* and *firm financial leverage*. The *industry cost of equity* is estimated using the three-factor model in Fama and French (1997). The firm cost of equity is not used because it contains more measurement errors than the *industry cost of equity* (Fama and French 1997). Because debt financing increases risk, *firm financial leverage* can capture the variation in risk within an industry. It is measured as the ratio of long-term debt over total assets, adjusted for its industry average.

Sales growth is used to capture earnings growth in the future. High *sales growth* suggests that the firm has successfully tapped into a niche in the market place, or that the firm is operating in a fast growing business and has more opportunities to innovate and to differentiate its products relative to a firm in a stagnant industry (Mueller 1986). Both cases could contribute to high future earnings growth. *Sales growth* is measured as the percentage change in sales.

The market-to-book ratio is expected to increase with *sales growth* and decrease with the *industry cost of equity* and *firm financial leverage*. However, these variables are not expected to affect one-year-ahead earnings and so are not used in that analysis.

2. Sample and Data

The sample includes all firm-years in the period 1991-2000 with analysts' consensus earnings forecasts from I/B/E/S, financial statement information from Compustat, and prices and returns data from CRSP. Regulated firms, including financial institutions (SICs between 6000 and 6999) and utilities (SICs between 4900 and 4999), are excluded because their operations are markedly different from other firms.

Observations with book value of equity less than $1 million or with |*ROE*| greater than 100% are dropped to reduce the influence of extreme values.

In this paper, I use two dependent variables: one-year-ahead ROE (ROE_{t+1}) and the current market-to-book ratio, to evaluate the use of analysts' forecasts in valuation. ROE_{t+1} is measured as the ratio of net income before extraordinary items available for common equity in year $t+1$ to book value of equity at the beginning of year $t+1$. The market-to-book ratio is measured as market value of equity divided by book value of equity in year t. To ensure that the capital markets can incorporate the information in analysts' forecasts, market value is measured at the end of the month in which I/B/E/S publishes the first consensus forecasts of year $t+1$'s earnings after year t's earnings announcements.[9] In addition, to ensure that market value has the same equity basis as book value, I calculate it as market value at the end of fiscal year t multiplied by the cumulated returns from the fiscal-year-end to the month of analysts' forecasts. For example, IBM announced its earnings for year 1998 on January 21, 1999. The first consensus earnings forecast for year 1999 after this announcement was published on February 18, 1999. Market value is then measured at the end of February 1999, calculated as market value on December 31, 1998 multiplied by the stock returns in January and February of 1999.

This paper evaluates the use of three types of commonly used earnings forecasts from financial analysts: one-year-ahead earnings, two-year-ahead earnings, and long-term growth.[10] While only one-year-ahead earnings forecasts are used in predicting one-year-ahead ROE, the other two types of forecasts are added in explaining the market-to-book ratio. As shown in Begley and Feltham (2002), additional forecasts can incrementally capture expected future earnings if the earnings dynamic is richer than an AR(1) process.

Because analysts' forecasts for different horizons (and current earnings) contain common information, direct use of these forecasts in the regression analyses can lead to multicollinearity and complicate interpretation of the results (see Begley and Feltham 2002 for more discussions.) Therefore, I construct forecast variables to capture the incremental information in each type of forecasts. First, as in Dechow, Hutton, and Sloan (1999), forward-looking information in one-year-ahead ROE forecast (*FY1*)

is measured as:

$$FY1_t = AF_t^{t+1} / BV_t - \omega ROE_t ,$$

where AF_t^{t+1} denotes the first consensus forecast of year $t+1$'s earnings disclosed after year t's earnings announcements, BV_t is book value of equity at the end of year t, and ω is the persistence of *ROE*, estimated from an AR(1) process.[11] The second term captures the information that is already in current ROE. Second, two-year-ahead change in ROE (*FY2*) is measured as the difference between two-year-ahead and one-year-ahead earnings forecasts, scaled by the current book value of equity. Lastly, long-term change in ROE (*LTG*) is measured as two-year-ahead earnings forecasts multiplied by long-term growth forecasts. *LTG* is also scaled by the current book value of equity.[12]

The sample for predicting one-year-ahead *ROE* includes 8,246 firm-years, and that for explaining the market-to-book ratio includes 6,737 firm-years. The smaller sample size for the market-to-book ratio analysis is due to the requirement for additional forecast data.

Table 1 presents descriptive statistics.[13] The mean future *ROE* is 0.10. The mean market-to-book ratio is 3.22. The average *market share* is 0.07, and the average *capital intensity* and *R&D intensity* are 0.04 and 0.05, respectively. The *R&D estimated reserve* has a mean of 0.20. Since earnings quality signals are generally defined as changes or relative changes, they have means around zero. Transitory earnings components (*non-operating income and income taxes*, *special items*, and *total accruals*) are generally negative. *Industry ROE* averages 0.12, slightly higher than the mean *industry cost of equity* (0.11). By construction, *firm financial leverage* (industry-adjusted) has a mean of zero. *Sales growth* is on average 0.22.

[Insert Table 1 Here]

Analysts' earnings forecasts generally increase with the forecast horizon. The forward-looking information contained in one-year-ahead ROE forecasts has a mean of 0.06. Two-year-ahead ROE forecasts are on average 0.03 higher than one-year-ahead ROE forecasts, and long-term ROE forecasts are on average higher than two-year-ahead ROE forecasts by 0.04.

3. Primary Results

This section reports the primary results for each dependent variable (one-year-ahead *ROE* and the market-to-book ratio). For each dependent variable, the regression analyses proceed in three steps. First, only current *ROE* is used to explain the dependent variable. Second, explicit information items (*ExItem*) and analysts' forecasts (*AF*) are *added* separately as explanatory variables. Third, both sources are *added* in the analyses. For convenience, R^2_j denotes the adjusted R^2 associated with information set *j* (*j* = *ROE*, *ExItem*, *AF*, or *ExItem&AF*).

To evaluate the efficacy of analysts' forecasts for valuation purposes, I decompose the incremental explanatory power of *ExItem* and *AF* beyond current *ROE* into three components, as summarized in Figure 1:

(a) The explanatory power of the information common to the two sources. Nonzero common information suggests that analysts incorporate, at least partially, the information in explicit information items into their forecasts.
(b) The explanatory power of the information unique to analysts' forecasts. If not zero, this component indicates that analysts provide unique information, such as contextual and timely information, beyond explicit information items.
(c) The explanatory power of the information unique to explicit information items. If not zero, this component indicates that analysts do not fully integrate the information in these items.

Since component (*b*) captures the incremental explanatory power of analysts' forecasts *beyond* explicit information items and current *ROE*, it is calculated as $R^2\_ExItem\&AF - R^2\_ExItem$. Component (*c*) is calculated similarly: $R^2\_ExItem\&AF - R^2\_AF$. Component (*a*) is just the difference between the total incremental explanatory power of the two sources, $R^2\_ExItem\&AF - R^2\_ROE$, and the sum of (*b*) and (*c*).[14] The ratio of the common information component (*a*) to the total information in explicit information items (the sum of *a* and *c*) measures the proportion of the information contained in these items that is reflected in analysts' forecasts.

[Insert Figure 1 Here]

To address potential cross-sectional correlations of error terms, I estimate the regressions yearly and report the average coefficients and the accompanying t-statistics computed using the time-series

standard errors (Fama and MacBeth 1973). Wald tests are used to test the significance level of the unique information in each source (components *b* and *c*). The significance level of the common information (component *a*) is based on t-tests of its average over the sample period. To examine whether analysts fully incorporate the information in each group of explicit information items, I also perform Wald tests of the unique explanatory power of each group. For all Wald tests, I report the median p-value of yearly tests and the number of years with a p-value less than 0.05.

3.1. Predicting Future ROE

The basic model for predicting future *ROE* is:

$$ROE_{t+1} = \alpha_0 + \alpha_1 ROE_t + \xi_{t+1} . \quad (1)$$

Column A of Panel A, Table 2 reports the yearly regression results. The coefficient on *ROE* is significantly positive, as expected, and the adjusted R^2 is 0.257.

[Insert Table 2 Here]

The full model that includes both explicit information items ($ExItem_t$) and forward-looking information in one-year-ahead ROE forecasts (FYI_t) is:

$$ROE_{t+1} = \alpha_0 + \alpha_1 ROE_t + \sum_{r=1}^{16} \delta_r ExItem_{t,r} + \beta_1 FYI_t + \xi_{t+1} . \quad (2)$$

Column B reports the results when only explicit information items are added. The impact of explicit information items on future *ROE* is significant and consistent with theoretical predictions, except that of *capital intensity* (insignificant), *effective tax rate* (insignificant), and *labor efficiency* (significantly negative, as in prior research). The *R&D estimated reserve* has a negative coefficient, suggesting that the negative impact of the conservative treatment of next year's R&D investments outweighs the positive impact of previous R&D investments. Overall, these variables increase the adjusted R^2 to 0.361. Column C reports the results when only analysts' forecasts are added. The forecast variable has a significantly positive coefficient and increases the adjusted R^2 to 0.350.

Column D reports the results for the full model. The adjusted R^2 is 0.407; that is, the two sources together contribute an increase in adjusted R^2 of 0.150 (*=0.407-0.257*). Panel B of Table 2 reports the three components of this increase. The information unique to analysts' forecasts contributes 0.046 (*=0.407-0.361*), the information unique to explicit items contributes 0.057 (*=0.407-0.350*), and the common information contributes 0.047 (*=0.150-0.046-0.057*). All these components are significant at the 0.0001 level. Together, these results suggest that analysts' forecasts reflect some unique information beyond explicit items and that there is considerable overlap between the information contained in these forecasts and that contained in explicit items. However, such forecasts do not fully reflect the information in these items; they reflect only 45% (*=0.047/[0.047+0.057]*) of that information.

To find out what specific information analysts fail to fully incorporate, one can compare the coefficients on explicit information items in the full model (Column D) with those in the model that does not include analysts' forecasts (Column B). The coefficients on *R&D intensity* and *non-operating income and income taxes* become insignificant in the full model, suggesting that analysts' forecasts fully reflect the information in these variables. In contrast, the coefficients on *market share*, *labor efficiency*, *change in assets turnover*, *special items*, *total accruals*, *extreme ROE*, and *industry ROE* become smaller in magnitude but remain significant in the same directions, suggesting that analysts underreact to these variables. Further, analysts appear to ignore the information in several variables. The coefficients on the *R&D estimated reserve* and several earnings quality signals (*inventory*, *gross margin*, *SG&A expenses*, and *LIFO earnings*) remain approximately the same or even become bigger in magnitude.

Overall, analysts underreact to or ignore the information in certain variables. Based on Wald tests of the incremental explanatory power of each group (Panel B), conservative accounting proxies and transitory earnings proxies contribute most to the unique information in explicit information items.

3.2. Explaining the Market-to-Book Ratio

Assuming that accounting satisfies the clean surplus relation (the change in book value of equity equals

net income minus net dividends) and that equity value equals the present value of future net dividends, one can represent equity value by the residual income valuation model:

$$V_t = BV_t + E_t[\sum_{\tau=1}^{\infty} \frac{(ROE_{t+\tau} - r_t) \cdot BV_{t+\tau-1}}{(1+r_t)^{\tau}}],$$

where V_t is the intrinsic value of equity; BV_t is book value of equity; $E_t(.)$ is the expectation at time t; ROE_t is return on equity; and r_t is the cost of equity, which is used to discount all future payoffs to equity holders. Scaling both sides of the above equation by BV_t and assuming market efficiency indicate that the market-to-book ratio (*MTB*) is a function of expected ROEs in future years, risk, and growth. Accordingly, besides the explicit information items examined in the future ROE analyses, I add the *industry cost of equity*, *firm financial leverage*, *sales growth*, and their interactions with current ROE to capture risk and growth effects. With respect to analysts' forecasts, I add forecasts of two-year-ahead change in ROE (*FY2*) and forecasts of long-term change in ROE (*LTG*). Thus, the full model for explaining the market-to-book ratio is:

$$MTB_t = \alpha_0 + \alpha_1 ROE_t + \sum_{r=1}^{22} \delta_r ExItem_{t,r} + \beta_1 FY1_t + \beta_2 FY2_t + \beta_3 LTG_t + \xi_t . \quad (3)$$

Panel A of Table 3 reports the yearly regression results for the full model and three simpler specifications. Column A reports the results when only current *ROE* is included. The coefficient on current *ROE* is significantly positive, and the adjusted R^2 is 0.190. Column B reports the results when explicit information items are added. The adjusted R^2 increases to 0.517.[15] The coefficients on explicit information items are significant and consistent with theoretical predictions, except those on *capital intensity* (insignificant) and earnings quality signals (mostly insignificant).[16] Column C includes current *ROE* and analysts' forecasts. All forecast variables have significantly positive coefficients; together they increase the adjusted R^2 to 0.682.

[Insert Table 3 Here]

Column D reports the results for the full model. The adjusted R^2 increases to 0.737, an increase of 0.547 from Column A. Panel B of Table 3 reports the three components of this increase. The information

unique to analysts' forecasts contributes 0.220 *(=0.737-0.517*), the information unique to explicit information items contributes 0.055 (*=0.737-0.682*), and the common information contributes 0.272 (*=0.547-0.220-0.055*). All these components are significant at the 0.0001 level. These results suggest that analysts' forecasts reflect about 83% (*=0.272/[0.272+0.055]*) of the information contained in explicit information items. Thus, as in predicting future earnings, although analysts incorporate some unique information *beyond* the explicit information items examined, their forecasts do not subsume the information in these items.

Again, comparing the coefficients on explicit information items before and after analysts' forecasts are included sheds light on whether analysts fully reflect the information in each variable. First, the coefficients on *labor efficiency*, *non-operating income and income taxes*, *special items*, *extreme ROE*, the *industry cost of equity*, the interactions between *firm financial leverage*, *sales growth* and *ROE* become insignificant, suggesting that analysts' forecasts fully reflect the information in these variables. Second, analysts appear to underreact to or ignore the information in *market share*, *R&D intensity*, the *R&D estimated reserve*, *effective tax rate*, *total accruals*, *industry ROE*, the interaction between the *industry cost of equity* and *ROE*, *firm financial leverage*, and *sales growth*. The coefficients on these variables remain in the same directions but become smaller in magnitude. Third, analysts also seem to incorrectly interpret the information in several earnings quality signals (*inventory*, *SG&A expenses*, and *change in assets turnover*), whose coefficients change from insignificant to significant after controlling for analysts' forecasts.

Panel B reports Wald tests of the incremental explanatory power of each group of explicit information items. The tests suggest that proxies for economic rents, conservative accounting, and risk contribute most to the unique information in explicit information items. Thus, the major limitation of analysts' forecasts seems to be their underreaction to these variables.

3.3. Summary of Primary Results

The primary results can be summarized as follows. First, analysts' forecasts reflect a significant portion of the value relevant information in explicit information items: 45% based on the one-year-ahead earnings analysis and 83% based on the market-to-book ratio analysis. Second, analysts' forecasts provide incremental information beyond explicit items, suggesting that these forecasts reflect other contextual and timely information. Third, analysts' forecasts do not fully reflect the effects of economic rents, conservative accounting, and transitory earnings. Accordingly, proxies for these effects complement analysts' forecasts in predicting future earnings and in explaining the market-to-book ratio.[17]

4. Additional Analyses

4.1. Predicting Forecast Errors

If analysts' forecasts do not correctly incorporate the information in a variable that is useful for predicting future earnings, this variable could explain analysts' forecast errors. Moreover, the coefficient on the variable and the accompanying t-statistic can shed light on whether analysts under- or over-react to it and the significance level of the under- or over-reaction.

This section examines two types of forecast errors: forecast errors of one-year-ahead earnings (FE_{t+1}) and forecast errors of two-year-ahead earnings (FE_{t+2}). Forecast errors are calculated as the difference between realized future earnings and analysts' consensus forecasts of future earnings (the first ones after the current year's earnings announcement), scaled by the current book value of equity. As in prior research, analysts' forecasts reflect an optimistic bias: the mean FE_{t+1} is -0.04, and the mean FE_{t+2} is -0.06.

The model specification follows that for predicting future earnings (equation 2):

$$FE_{t+1},\, FE_{t+2} = \alpha_0 + \alpha_1 ROE_t + \sum_{r=1}^{16} \delta_r ExItem_{t,r} + \xi_{t+1}, \xi_{t+2}\,. \tag{4}$$

If analysts correctly interpret the implication of a variable for future earnings, the coefficient on the variable should be zero. However, if analysts underestimate the implication, it follows from the definition

of forecast errors that the coefficient on the variable should have the same sign as that in predicting future earnings. For example, if an increase in market share of 10% on average increases the next year's ROE by 0.5% but analysts predict an average increase of 0.2%, then the associated forecast error is 0.3%. Similarly, if analysts overestimate the implication of a variable, its coefficient should have an opposite sign to that in predicting future earnings.

Panel A of Table 4 reports the yearly regression results, columns A and B for one-year-ahead forecast errors and columns C and D for two-year-ahead forecast errors. For each type of forecast errors, the table first presents the results when only current *ROE* is included and then the results for the full model. The positive coefficients on current *ROE* suggest that financial analysts underestimate the persistence of earnings, consistent with the finding in prior research (e.g., Abarbanell and Bernard 1992). Including explicit information items increases the explanatory power from 0.032 to 0.121 for one-year-ahead forecast errors and from 0.006 to 0.122 for two-year-ahead forecast errors.[18] Both increases are significant at the 0.0001 level. That is, analysts do not fully incorporate the information in explicit information items, as found in the primary analyses.

[Insert Table 4 Here]

The coefficients on explicit information items suggest that analysts generally underreact to these variables: the coefficients, if significant, have the same signs as those in predicting future earnings (except that on *non-operating income and income taxes*). For example, the coefficients on *market share* and earnings quality signals are significantly positive, and the coefficients on the *R&D estimated reserve*, *total accruals*, *extreme ROE* are significantly negative, suggesting that analysts underestimate the positive and negative effects of these variables on future earnings, respectively. Panel B of Table 4 reports the significance levels of the incremental contribution of each group of information items. All these groups except industry characteristics significantly contribute to explaining future forecast errors, although the contribution of economic rent proxies and conservative accounting proxies in explaining two-year-ahead forecast errors is marginal.

Overall, analysts appear to underreact to the implications of certain explicit information items,

including: *market share*, the *R&D estimated reserve*, earnings quality signals, *total accruals*, and *extreme ROE*. As a result, these variables explain future forecast errors and complement analysts' forecasts in predicting future earnings and in explaining the market-to-book ratio.

4.2. Analysis of Firms without Analysts' Forecasts

One obvious limitation of relying only on analysts' forecasts in valuation is data availability. For firms without analysts' forecasts, researchers can rely on explicit information items to improve valuation. An analysis of these firms, 5,531 firm-years in the period 1991-2000, suggests that the explanatory power for the market-to-book ratio (i.e., the adjusted R^2) when explicit information items are included, 0.462, is 19 times that of relying on current *ROE* alone (0.024). Similar improvements exist for predicting future earnings. Thus, explicit information items are important for firms not followed by financial analysts and simple reliance on analysts' forecasts unnecessarily reduces the sample size.

4.3. Contextual Analyses

Prior research finds that the informativeness of current earnings is lower for high-tech firms (Amir, Lev, and Sougiannis 2000), for firms with high R&D capital due to conservative treatments of R&D investments (Penman and Sougiannis 1998), and for firms with high accruals due to managerial discretion in taking accruals to manage earnings (Healy 1985, among others). For these firms, forward-looking information should be more useful in valuation. In this section, I present contextual analyses to examine whether the inferences from the primary analyses hold in different contexts and whether the usefulness of analysts' forecasts varies across contexts in a systematic way.

The analyses are conditional on industry classification (high- vs. low-tech), the magnitude of the R&D capital (high vs. low R&D capital), and the absolute value of total accruals (high vs. low accruals). As in Amir, Lev, and Sougiannis (2000), high-tech firms are firms with three-digit SICs of 283, 284, 357, 366, 367, 371, 382, 384, or 737. Firms with high (low) R&D capital are those with higher (lower) *R&D*

estimated reserve than the sample median. Similarly, firms with high (low) total accruals are those with absolute value of total accruals (|*total accruals*|/*lagged book value of equity*) higher (lower) than the sample median. For each sub-sample, Figure 2 reports the four components of the explanatory power of the full model for the market-to-book ratio (equation 3): the explanatory power of current *ROE*, that of the information common to analysts' forecasts and explicit information items, and that of the information unique to each source. The results based on predicting future earnings are similar.

[Insert Figure 2 Here]

As expected, the explanatory power of ROE is significantly lower for firms in high-tech industries, for firms with high R&D capital, and for firms with high accruals.[19] The contribution of analysts' forecasts, both the common information and the information unique to analysts' forecasts, is higher for firms with less informative earnings, significant at the 0.05 level or lower (except for the difference in the common information between low-tech and high-tech firms). This suggests that analysts provide forecasts that can mitigate the problems associated with less informative earnings. At the same time, the limitation of analysts' forecasts in valuation persists: in each context, the unique contribution of explicit information items is significant at the 0.01 level.

Overall, these results suggest that the inferences from the primary analyses hold across contexts and analysts' forecasts are relatively more useful for firms with less informative earnings.

4.4. Analysis Based on Abnormal ROE

Earnings enjoy a prevalent position in extant accounting-based valuation studies. To be consistent with, and to facilitate comparisons to, prior studies, the analyses in this paper are based on earnings or *ROE*. A closer look at the residual income valuation model suggests that abnormal *ROE* (the difference between *ROE* and the cost of equity) can be viewed as a more direct construct. Indeed, because abnormal *ROE* is the immediate subject of theories on economic rents, one can argue that analyzing abnormal *ROE* is more direct and intuitive. For example, Ahmed (1994) argues that, "expected earnings are equal to i) the cost of

equity capital commensurate with the riskiness of the firms' assets and ii) expected economic rents or above-normal profits generated by factors such as inelastic demand, scale economies, and legal barriers-to-entry … abstracting from changes in the riskiness of firms' current investments, these revisions [in earnings] imply a revision in future rents and thus a change in firm value (381)."

I replicate the analyses using abnormal *ROE* instead of *ROE*. The inferences remain the same: analysts' forecasts reflect a significant portion, but not all, of the value relevant information in explicit information items.

5. Conclusion

In this paper, I evaluate the efficacy of analysts' earnings forecasts in valuation. Specifically, I investigate the extent to which these forecasts reflect the value relevant information in a comprehensive set of twenty-two explicit information items, including: economic rent proxies, conservative accounting proxies, earnings quality signals, transitory earnings proxies, industry characteristics, and risk and growth proxies. This investigation is important given the popularity of analysts' forecasts in implementing accounting-based valuation and the limitations of these forecasts.

The analysis yields three major results. First, analysts' forecasts reflect a significant amount of the information in the above-listed variables, about 45% when predicting one-year-ahead earnings and about 83% when explaining the market-to-book ratio. Second, the use of analysts' forecasts results in an incremental increase in adjusted R^2 of 0.046 in the future earnings analysis and of 0.220 in the market-to-book ratio analysis. The increases are larger in contexts where earnings are less informative, consistent with analysts' forecasts containing contextual and timely information that is not readily available from other sources. Third, analysts do not fully incorporate the effects of economic rents, conservative accounting, and transitory earnings. Explicit information items incrementally contribute an increase in adjusted R^2 of about 0.060 when predicting future earnings or explaining the market-to-book ratio.

Overall, the results validate the use of analysts' forecasts as a parsimonious proxy for forward-

looking information in accounting-based valuation. At the same time, the results indicate that valuation can be improved by augmenting analysts' forecasts with explicit information items. In particular, the R&D estimated reserve and transitory earnings proxies are important for predicting future earnings, and economic rent proxies, the R&D estimated reserve, and risk proxies are useful for explaining stock prices.

Moreover, the findings suggest that simple reliance on analysts' forecasts can yield biased inferences if the variables of interest are correlated with the information items that analysts do not fully incorporate. For example, consider a researcher examining the relation between certain accounting variables, say earnings quality signals, and the cost of equity that is derived from equity prices and analysts' forecasts using accounting-based valuation models.[20] The underlying assumption is that analysts' forecasts correctly interpret the implications of these variables for future earnings, so that any relation between these variables and the estimated cost of equity is due to their effect on the cost of equity. However, if this assumption does not hold, then analysts' misinterpretation of earnings quality signals can lead to biased estimates of the cost of equity. That bias would then induce a spurious correlation between earnings quality signals and the estimated cost of equity. In short, future researchers should be aware of the limitations of simple reliance on analysts' forecasts and complement these forecasts with other information sources to improve the accuracy of valuation.

Appendix Measurement of explicit information items and analysts' forecasts

(Compustat data item numbers are provided in the parentheses.)

Variable	Measurement
1) Economic rent proxies	
Market share	Sales $(\#12)_t$ /[Σ(Sales) $_t$ over the industry]
Capital intensity	Depreciation, depletion, and amortization expenses $(\#14)_t$ / Sales $_t$
R&D intensity	R&D expenditures $(\#46)_t$ / Sales $_t$
2) Conservative accounting proxies	
R&D estimated reserve	The unamortized portion of R&D assets generated by current and past R&D expenditures if these expenditures were capitalized. R&D assets are amortized using the coefficients reported in Lev and Sougiannis (1996).[a] This variable is scaled by book value of equity.
3) Earnings quality signals	
Inventory	Δ Sales $_t$ - Δ Inventory $(\#78 \text{ or } \#3)_t$ [b, c]
Gross margin	Δ Gross margin $(\#12\text{-}\#41)_t$ - Δ Sales $_t$
SG&A expenses	Δ Sales $_t$ - Δ SGA $(\#189)_t$
Effective tax rate	$[ETR_t - (\frac{1}{3}\sum_{\tau=1}^{3} ETR_{t-\tau})] \times CHGEPS_t$ [d] where ETR_t = Tax expense $(\#16)_t$ / Pretax income $(\#170)_t$
LIFO earnings	1 for LIFO and 0 for FIFO or others (#59)
Labor efficiency	$\frac{Sales_t}{\#Employees(\#29)_t} / \frac{Sales_{t-1}}{\#Employees_{t-1}} - 1$
Change in assets turnover	Sales $_t$ / Assets $(\#6)_t$ - Sales $_{t-1}$ / Assets $_{t-1}$

[a] To relax data restrictions, the amortization period is chosen to be 5 years and the coefficients are adjusted proportionally such that they add up to one over the five years. The coefficients for "other industries" are used for an industry, unless Lev and Sougiannis (1996) report coefficients for the industry. See Lev and Sougiannis for the magnitude and estimation of the coefficients.

[b] The Δ operator represents a percentage change in a variable from its average over the past two years. For example, Δ Sales $_t$ = Sales $_t$ / [(Sales $_{t-1}$ + Sales $_{t-2}$)/2] – 1.

[c] Inventory is "finished goods" (#78) when this item is available, and "total inventory" (#3) otherwise.

[d] CHGEPS denotes the change in EPS between year t-1 and year t, deflated by book value of equity per share at the end of year t-1.

Variable	Measurement
4) Transitory earnings proxies	
Non-operating income and income taxes	Non-operating income and income taxes $(\#237-\#178-\#17)_t$ / Book value of equity $_{t-1}$
Special items	Special items $(\#17)_t$ / Book value of equity $_{t-1}$
Total accruals	Total accruals $(\#18-\#308)_t$ / Book value of equity $_{t-1}$
Extreme ROE	$\lvert ROE_t \rvert * ROE_t$ [e]
5) Industry characteristics	
Industry ROE	The weighted average of firm ROE over the industry (industries are classified based on three-digit SICs and book value of equity $_{t-1}$ is used as the weight.)
6) Risk and growth proxies	
Industry cost of equity	Annualized T-bill rate + industry equity premium from the three-factor model, as reported in Fama and French (1997).
Firm financial leverage	Long term debt $(\#9)_t$ / Assets $_t$ – industry financial leverage, where industry (three-digit SICs) financial leverage is the weighted average of firm financial leverage (assets $_t$ is used as the weight.)
Sales growth	Sales $_t$ / [(Sales $_{t-1}$ + Sales $_{t-2}$)/2] – 1
Analysts' forecasts	
Forward-looking information in one-year-ahead ROE (*FY1*)	$AF_t^{t+1} / BV_t - \omega ROE_t$, where AF_t^{t+1} denotes the first consensus forecast of year *t+1*'s earnings disclosed after year *t*'s earnings announcements, BV_t is book value of equity at the end of year t, and ω is the persistence of ROE, estimated from an AR(1) process of ROE.
Two-year-ahead change in ROE (*FY2*)	The difference between two-year-ahead earnings forecasts and one-year-ahead earnings forecasts, scaled by book value of equity at the end of year t.
Long-term change in ROE (*LTG*)	Two-year-ahead earnings forecasts multiplied by long-term earnings growth forecasts, scaled by book value of equity at the end of year t.

[e] The interaction between |ROE| and ROE captures the lower persistence of extremely positive or extremely negative ROE (i.e., the non-linearity of the association between future ROE and current ROE).

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Notes

[1] For examples, see Frankel and Lee (1998); Dechow, Hutton, and Sloan (1999); Lee, Myers, and Swaminathan (1999); Francis, Olsson, and Oswald (2000); Liu and Thomas (2000); Begley and Feltham (2002), among others.

[2] Incorporating forward-looking information in addition to including book value and earnings is important because the latter two are transaction-based and insufficient for valuation purposes (Ohlson 1995; Feltham and Ohlson 1995; Lee 1999; Hand 2001, among others).

[3] See Abarbanell (1991); Frankel and Lee (1998); Mikhail, Walther, and Willis (1999); Dechow, Hutton, and Sloan (2000); and Kim, Lim, and Shaw (2001) for detailed discussions on the limitations of analysts' forecasts in reflecting various types of public information.

[4] Relatedly, because the market-to-book ratio is a function of the discount rate and expected earnings in all future years, proxies for risk and growth are used in the second setting. These proxies are not used in the first setting.

[5] Tse and Yannsah (1999) find that realized future earnings are incrementally useful in valuation beyond analysts' forecasts, but realized future earnings are not available at the valuation date.

[6] Including more variables, such as the interactions between the above variables and current earnings, does not change the inferences qualitatively.

[7] The current estimated reserve results from previous investments; at the same time, it is positively correlated with future investments if investments are positively serially correlated.

[8] Adding the remaining earnings quality signals to the analyses does not change the inferences. As in prior research, those signals are generally insignificant.

[9] One might be concerned that explicit information items are not available when analysts' forecasts and market value are measured. This is unlikely to be a serious concern. Francis, Schipper, and Vincent (2001) find that firms disclosed more detailed information than earnings at earnings announcements in the 1990s. To further address this concern, I replicate the analyses using analysts' forecasts and market value four months after the fiscal-year-end when financial statements are publicly available (Alford, Jones, and Zmijewski 1994). All inferences remain the same.

[10] These forecasts are examined because they are widely available and can be easily incorporated into valuation models. Financial analysts also provide information in other forms, such as other types of forecasts (cash flow forecasts and revenue forecasts for some firms), stock recommendations, and target prices. These information items might be incrementally useful in valuation beyond the forecasts studied here.

[11] The estimation is based on all available ROE since 1988 and until year t, assuming that the same coefficient applies to all firms, as in Dechow, Hutton, and Sloan (1999). Year 1988 is chosen so that at least three years' data are available for reliable estimation, given that the sample period starts in 1991. Assuming ω to be one does not affect the inferences.

[12] Two-year-ahead earnings forecasts and long-term growth forecasts are generally made at the same time as one-year-ahead earnings forecasts, sometimes slightly later.

[13] The correlation analysis (not tabulated) suggests that the explicit information items and analysts' forecasts are generally correlated with future ROE and the market-to-book ratio in the predicted directions. The correlations between independent variables are usually low.

[14] For example, in the future ROE analysis, R^2_ROE, R^2_ExItem, R^2_AF, and $R^2\_ExItem\&AF$ are 0.257, 0.361, 0.350, 0.407, respectively. Thus, component (b) is 0.046 *(=0.407-0.361)*, component (c) is 0.057 *(=0.407-0.350)*, and component (a) is 0.047 (*=0.407-0.257-0.046-0.057*).

[15] Due to measurement errors in the cost of equity estimates, the incremental explanatory power of other explicit information items might be partially due to their usefulness in explaining the differences in the cost of equity.

[16] The weak results on earnings quality signals suggest that these signals are less useful for predicting long-term earnings than for predicting short-term earnings.

[17] Out-of-sample forecasts of future earnings and the market-to-book ratio yield similar inferences.

[18] Frankel and Lee (1998) use four variables: sales growth, the book-to-market ratio, and two variables based on analysts' forecasts, to explain future forecast errors. Because the purpose here is to investigate whether analysts' forecasts fully incorporate the value relevant information in explicit information items, using the book-to-market ratio or analysts' forecasts is inappropriate. Adding sales growth to the model does not change the inferences.

[19] The significance level is based on t-tests of the difference in the mean explanatory power over time between the two sub-samples (i.e., low- vs. high-tech firms, low vs. high R&D firms, and low vs. high accrual firms). Z-tests for the difference in the medians yield similar inferences.

[20] An increased number of studies, including Botosan (1997), Claus and Thomas (2001), Gebhardt, Lee, and Swaminathan (2001), and Easton et al. (2002), estimate the cost of equity this way.

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Table 1. Descriptive statistics on ROE, the market-to-book ratio, explicit information items, and analysts' forecasts.

	Mean	Std.	1Q	Median	3Q
Dependent variables					
Future ROE	0.10	0.22	0.03	0.13	0.20
Market-to-book ratio	3.22	4.26	1.40	2.21	3.63
Economic rent proxies					
Market share	0.07	0.13	0.00	0.01	0.07
Capital intensity	0.04	0.03	0.03	0.04	0.05
R&D intensity	0.05	0.07	0.00	0.02	0.07
Conservative accounting proxies					
R&D estimated reserve	0.20	0.27	0.01	0.12	0.28
Earnings quality signals					
Inventory	-0.01	0.47	-0.15	0.02	0.19
Gross margin	0.00	0.14	-0.05	0.01	0.05
SG&A expenses	0.00	0.18	-0.07	0.00	0.07
Effective tax rate	0.01	0.04	0.00	0.00	0.01
LIFO earnings	0.07	0.25	0.00	0.00	0.00
Labor efficiency	0.06	0.18	-0.03	0.04	0.12
Change in assets turnover	-0.01	0.20	-0.10	0.00	0.08
Transitory earnings proxies					
Non-operating income and income taxes	-0.11	0.12	-0.16	-0.10	-0.04
Special items	-0.03	0.09	-0.03	0.00	0.00
Total accruals	-0.10	0.21	-0.19	-0.09	-0.00
Extreme ROE (|ROE|*ROE)	0.03	0.11	0.00	0.02	0.05
Industry characteristics					
Industry ROE	0.12	0.08	0.08	0.12	0.17
Risk and growth proxies					
Industry cost of equity	0.11	0.03	0.09	0.11	0.12
Firm financial leverage (industry adjusted)	0.00	0.13	-0.09	-0.03	0.07
Sales growth	0.22	0.32	0.03	0.15	0.33
Analysts' forecasts					
Forward-looking information in one-year-ahead ROE	0.06	0.13	0.01	0.04	0.08
Two-year-ahead change in ROE	0.03	0.09	-0.01	0.01	0.04
Long-term change in ROE	0.04	0.03	0.02	0.03	0.05

Descriptive statistics on all variables, except those noted below, are based on the sample used to predict future ROE – 8,246 firm-years in the period 1991-2000. Descriptive statistics on the market-to-book ratio, risk and growth proxies, and analysts' forecasts of two-year-ahead change in ROE and long-term change in ROE are based on the sample used to explain the market-to-book ratio – 6,737 firm-years in the same period. See the Appendix for variable measurement.

Table 2. Predicting future ROE.

$$ROE_{t+1} = \alpha_0 + \alpha_1 ROE_t + \sum_{r=1}^{16} \delta_r ExItem_{t,r} + \beta_1 FY1_t + \xi_{t+1} \quad (2)$$

ROE_t (ROE_{t+1}) is firm *ROE* in year t ($t+1$), $ExItem_{t,r}$ is the r^{th} explicit information item, $FY1_t$ is forward-looking information in one-year-ahead ROE forecasts. See the Appendix for variable measurement.

Panel A: Yearly regression results

	Predicted	Column A		Column B		Column C		Column D	
	signs	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Intercept	?	0.031	3.01	-0.040	-3.29	-0.055	-4.19	-0.071	-5.62
ROE	+	0.557	19.38	0.924	18.03	0.904	21.01	1.088	19.06
Economic rent proxies									
Market share	+			0.052	4.13			0.035	4.37
Capital intensity	+			-0.084	-0.56			0.006	0.04
R&D intensity	+			0.120	2.92			0.057	0.76
Conservative accounting proxies									
R&D estimated reserve	?			-0.064	-5.30			-0.082	-7.07
Earnings quality signals									
Inventory	+			0.014	2.61			0.014	2.68
Gross margin	+			0.030	1.86			0.042	1.77
SG&A expenses	+			0.048	2.54			0.053	3.01
Effective tax rate	+			-0.069	-0.59			-0.058	-0.49
LIFO earnings	+			0.012	1.92			0.014	2.47
Labor efficiency	+			-0.051	-2.49			-0.036	-1.80
Change in assets turnover	+			0.063	4.34			0.038	2.38
Transitory earnings proxies									
Non-operating income and income taxes	-			-0.070	-2.87			0.022	0.84
Special items	-			-0.531	-9.58			-0.232	-3.66
Total accruals	-			-0.115	-7.19			-0.099	-7.30
Extreme ROE	-			-0.501	-5.44			-0.349	-3.74
Industry characteristics									
Industry ROE	+			0.142	4.18			0.084	2.40
Analysts' forecasts									
Forward-looking information in one-year-ahead ROE	+					0.730	14.72	0.608	10.44
Adjusted R^2		0.257		0.361		0.350		0.407	

Table 2. Continued.

Panel B: Incremental explanatory power of explicit information items and analysts' forecasts beyond current earnings

	Incremental explanatory power	Median p-value	Number of years with p-value<0.05, out of 10
Common information	0.047	0.0001	n/a
Information unique to analysts' forecasts	0.046	0.0001	10
Information unique to explicit information items	0.057	0.0001	10
Economic rent proxies		0.3166	4
Conservative accounting proxies		0.0011	9
Earnings quality signals		0.0291	6
Transitory earnings proxies		0.0001	8
Industry characteristics		0.2523	1
Total: Explicit information items and analysts' forecasts	0.150	0.0001	10

The analyses are based on 8,246 firm-years in the period 1991-2000. Regressions are estimated yearly. Panel A reports the average coefficients, the accompanying t-statistics, and the average adjusted R^2 (Fama and MacBeth 1973). Panel A also reports the predicted signs for columns A, B, and C. Yearly Wald tests are used to test the significance level of the incremenal explanatory power, except that of the common information. Panel B reports the median p-value of yearly Wald-tests and the number of years with a p-value less than 0.05. The significance level of the common information is based on t-tests of its average over the sample period.

Table 3. Explaining the market-to-book ratio.

$$MTB_t = \alpha_0 + \alpha_1 ROE_t + \sum_{r=1}^{22} \delta_r ExItem_{t,r} + \beta_1 FY1_t + \beta_2 FY2_t + \beta_3 LTG_t + \xi_t \quad (3)$$

MTB_t is the market-to-book ratio, $ExItem_{t,r}$ is the r^{th} explicit information item, ROE_t is firm *ROE*, $FY1_t$ is forward-looking information in one-year-ahead ROE forecasts, $FY2_t$ is analysts' forecasts of two-year-ahead change in ROE, LTG_t is analysts' forecasts of long-term change in ROE. See the Appendix for variable measurement.

Panel A: Yearly regression results

	Predicted	Column A		Column B		Column C		Column D	
	signs	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Intercept	?	2.419	16.06	0.885	2.38	-0.248	-2.30	-0.275	-2.12
ROE	+	5.071	26.38	14.503	10.58	10.430	6.91	12.452	7.26
Economic rent proxies									
Market share	+			0.644	3.01			0.877	3.98
Capital intensity	+			-2.021	-1.20			0.806	0.76
R&D intensity	+			5.498	2.32			3.213	1.83
Conservative accounting proxies									
R&D estimated reserve	+			2.259	6.79			0.721	3.20
Earnings quality signals									
Inventory	+			0.064	0.99			0.125	1.95
Gross margin	+			0.068	0.21			-0.203	-1.11
SG&A expenses	+			-0.215	-0.96			-0.469	-6.44
Effective tax rate	+			-2.351	-1.72			-2.200	-2.21
LIFO earnings	+			-0.070	-0.83			0.066	1.31
Labor efficiency	+			-0.848	-4.51			-0.047	-0.29
Change in assets turnover	+			0.189	0.97			-0.531	-3.95
Transitory earnings proxies									
Non-operating income and income taxes	-			-2.137	-3.84			-0.359	-0.79
Special items	-			-7.497	-8.86			-0.325	-0.72
Total accruals	-			-0.964	-2.69			-0.656	-2.99
Extreme ROE	-			-1.766	-4.31			1.189	1.16
Industry characteristics									
Industry ROE	+			1.123	2.75			0.392	1.69
Risk proxies									
Industry cost of equity	-			-3.753	-2.58			-2.539	-1.44
× ROE	-			-54.248	-4.69			-30.344	-2.38
Firm financial leverage	-			-1.316	-4.54			-1.141	-8.19
× ROE	-			-4.978	-7.07			-1.656	-0.79

Table 3. Continued.

Panel A: Yearly regression results (continued)

	Predicted signs	Column A Coef.	Column A t	Column B Coef.	Column B t	Column C Coef.	Column C t	Column D Coef.	Column D t
Growth proxies									
Sales growth	+			0.869	3.95			0.299	1.92
× ROE	+			0.973	2.61			-0.318	-0.50
Analysts' forecasts									
Forward-looking information in one-year-ahead ROE	+					11.020	6.48	9.948	6.74
Two-year-ahead change in ROE	+					9.079	4.48	4.473	2.10
Long-term change in ROE	+					30.200	3.41	29.500	4.87
Adjusted R^2		0.190		0.517		0.682		0.737	

Panel B: Incremental explanatory power of explicit information items and analysts' forecasts beyond current earnings

	Incremental explanatory power	Median p-value	Number of years with p-value<0.05, out of 10
Common information	0.272	0.0001	n/a
Information unique to analysts' forecasts	0.220	0.0001	10
Information unique to explicit information items	0.055	0.0001	10
Economic rent proxies		0.0110	6
Conservative accounting proxies		0.0156	7
Earnings quality signals		0.0730	4
Transitory earnings proxies		0.0654	5
Industry characteristics		0.3581	0
Risk proxies		0.0001	9
Growth proxies		0.2134	4
Total: Explicit information items and analysts' forecasts	0.547	0.0001	10

The analyses are based on 6,737 firm-years in the period 1991-2000. Regressions are estimated yearly. Panel A reports the average coefficients, the accompanying t-statistics, and the average adjusted R^2 (Fama and MacBeth 1973). Panel A also reports the predicted signs for columns A, B, and C. Yearly Wald tests are used to test the significance level of the incremenal explanatory power, except that of the common information. Panel B reports the median p-value of yearly Wald-tests and the number of years with a p-value less than 0.05. The significance level of the common information is based on t-tests of its average over the sample period.

Table 4. Predicting forecast errors.

$$FE_{t+1},\ FE_{t+2} = \alpha_0 + \alpha_1 ROE_t + \sum_{r=1}^{16} \delta_r ExItem_{t,r} + \xi_{t+1}, \xi_{t+2} \quad (4)$$

FE_{t+1} (FE_{t+2}) is forecast error of one-year-ahead (two-year-ahead) earnings, $ExItem_{t,r}$ is the r^{th} explicit information item, ROE_t is firm ROE. Forecast errors are calculated as the difference between realized future earnings and analysts' consensus forecasts of future earnings (the first ones after the current year's earnings announcement), scaled by the current book value of equity. See the Appendix for variable measurement.

Panel A: Yearly regression results

	Predicted signs if underreaction (overreaction)	One-year-ahead forecast errors				Two-year-ahead forecast errors			
		Column A		Column B		Column C		Column D	
		Coef.	t	Coef.	t	Coef.	t	Coef.	t
Intercept		-0.044	-14.11	-0.049	-7.44	-0.065	-7.29	-0.059	-8.49
ROE	+ (-)	0.079	4.72	0.222	7.27	0.032	1.84	0.155	2.51
Economic rent proxies									
Market share	+ (-)			0.030	4.80			0.034	4.09
Capital intensity	+ (-)			0.041	0.43			-0.055	-0.42
R&D intensity	+ (-)			-0.026	-0.66			-0.109	-1.05
Conservative accounting proxies									
R&D estimated reserve	- (+)			-0.038	-7.22			-0.038	-2.81
Earnings quality signals									
Inventory	+ (-)			0.009	3.78			0.019	3.15
Gross margin	+ (-)			0.034	2.62			0.003	0.18
SG&A expenses	+ (-)			0.025	2.19			0.004	0.17
Effective tax rate	+ (-)			0.082	1.41			-0.119	-1.04
LIFO earnings	+ (-)			0.006	2.81			0.017	1.47
Labor efficiency	+ (-)			-0.017	-2.21			-0.003	-0.19
Change in assets turnover	+ (-)			0.020	3.39			0.010	0.62
Transitory earnings proxies									
Non-operating income and income taxes	- (+)			0.098	4.88			0.104	2.12
Special items	- (+)			-0.027	-0.95			-0.005	-0.13
Total accruals	- (+)			-0.071	-9.73			-0.076	-3.09
Extreme ROE	- (+)			-0.188	-3.36			-0.153	-2.13
Industry characteristics									
Industry ROE	+ (-)			0.013	0.75			0.010	0.31
Adjusted R^2		0.032		0.121		0.006		0.122	
ΔAdj. R^2 compared with the previous column (median p-value)				0.089 (0.0001)				0.116 (0.0001)	

Table 4. Continued.

Panel B: Incremental explanatory power of each group of explicit information items beyond current ROE

	One-year-ahead forecast errors		Two-year-ahead forecast errors	
	Median p-value	Number of years with p-value<0.05, out of 10	Median p-value	Number of years with p-value<0.05, out of 10
Economic rent proxies	0.0267	7	0.0548	6
Conservative accounting proxies	0.0085	8	0.0976	5
Earnings quality signals	0.0244	8	0.0352	7
Transitory earnings proxies	0.0001	10	0.0001	9
Industry characteristics	0.3810	1	0.3207	2

The one-year-ahead forecast error analysis is based on 8,246 firm-years in the period 1991-2000, and the two-year-ahead forecast error analysis is based on 5,946 firm-years in the period 1991-1999. Regressions are estimated yearly. Panel A reports the average coefficients, the accompanying t-statistics, and the average adjusted R^2 (Fama and MacBeth 1973). Yearly Wald tests are used to test the significance level of the incremenal explanatory power. Panel B reports the median p-value of yearly Wald-tests and the number of years with a p-value less than 0.05.

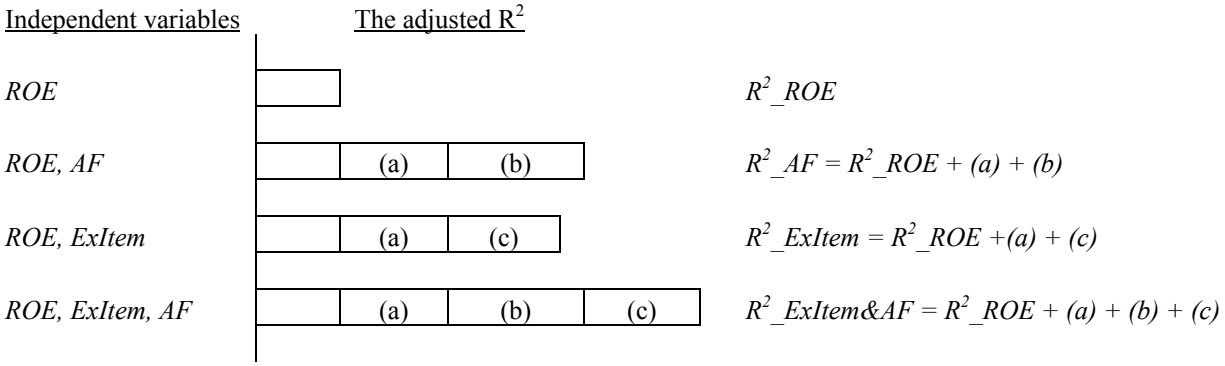

Figure 1. Decomposition of the explanatory power of explicit information items and analysts' forecasts. This figure illustrates the decomposition of the explanatory power of explicit information items (*ExItem*) and analysts' forecasts (*AF*) for firm valuation (one-year-ahead ROE or the market-to-book ratio). Each row presents the independent variables, the accompanying adjusted R^2, and its decomposition. The components include R^2_*ROE* and the following:

(a): the explanatory power common to both *ExItem* and *AF*, calculated as (R^2_*ExItem&AF* - R^2_*ROE*) – (*b*+*c*),

(b): the explanatory power unique to *AF*, calculated as R^2_*ExItem&AF* - R^2_*ExItem*,

(c): the explanatory power unique to *ExItem*, calculated as R^2_*ExItem&AF* - R^2_*AF*.

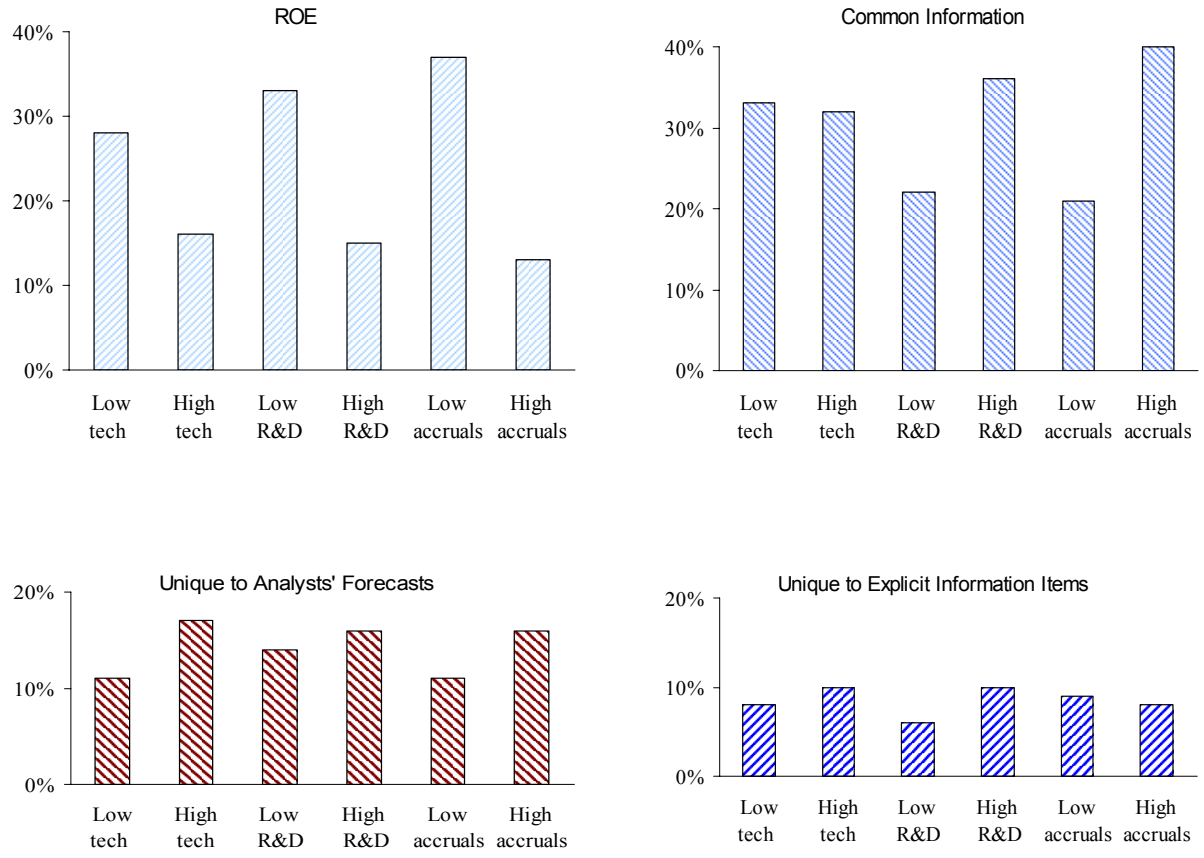

Figure 2. Contextual analyses of the explanatory power for the market-to-book ratio. This figure reports the four components of the explanatory power (i.e., the adjusted R^2) of the full model for the market-to-book ratio (equation 3): the explanatory power of current ROE, that of the information common to analysts' forecasts and explicit information items, and that of the information unique to each source. The analyses are based on 6,737 firm-years in the period 1991-2000. High-tech firms are firms with three-digit SICs of 283, 284, 357, 366, 367, 371, 382, 384, or 737. Firms with high (low) R&D capital are those with higher (lower) R&D estimated reserves than the sample median. Similarly, firms with high (low) total accruals are those with absolute value of total accruals (|*total accruals*|/*lagged book value of equity*) higher (lower) than the sample median.