What Value Analysts?

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1. Introduction

The activities and product of financial analysts – the major capital market intermediaries – are the subject of intensive research in the accounting and finance literature. Among the questions addressed are: the accuracy of analysts' forecasts of earnings, systematic biases (e.g., optimism, under-reaction or over-reaction to information) of such forecasts, investors' response to forecast revisions, analysts' underlying incentives (e.g., furthering their firms' investment banking activities), portfolio returns from following analysts' recommendations, and public information (e.g., patterns in quarterly earnings) that appears to be ignored by analysts. Given the dynamics of capital markets, it is not surprising that the evidence keeps evolving. The findings so far indicate that analysts make biased forecasts and misinterpret certain types of information (e.g., Brown 1998, Easterwood and Nutt, 1999).

While specific attributes of analysts' activities, such as forecast biases or analysts' incentives, receive considerable research attention, the ***overall*** contribution of financial analysts' forecasts to investors' decisions has received little notice. Are analysts' forecasts of earnings an important source of information to investors? The fact that there are many highly paid analysts and that their services are not required by regulation (like auditors' services) is not by itself a proof that analysts' forecasts contribute to investors' decisions. It may be, for example, that analysts are compensated for services they render to their firms, such as assistance in marketing stocks and initial public offerings (IPOs). Assessing the contribution of analysts' forecasts is also relevant to research. Obviously, the continued research of an economic activity, such as analysts' forecasts, is worthwhile only if such activity is in some sense important or relevant. Furthermore, identifying the circumstances where the activity is particularly relevant, such as specific types of firms or economic conditions, will better focus the attention of researchers.

We evaluate the contribution of analysts' earnings forecasts to investors' decisions by comparing the association between annual excess returns and a broad set of information items derived from financial statements with the association between excess returns and that information set ***plus*** the present value of five-year ahead analysts' earnings forecasts. We thus bring to a sharp focus the incremental contribution (over financial statement information) of the major product of analysts – near and medium-term earnings forecasts – to investors' decisions as reflected by annual excess returns. Large differences in explanatory power between the regressions with and without analysts' forecasts are evidence in favor of analysts' contribution to investors' decisions.

However, in assessing analysts' contribution from associations with stock returns care should be taken to account for the inherent simultaneity – analysts not only contribute (possibly) to investors, they also observe stock price behavior and ***learn*** from investors' decisions. We are therefore using a system of simultaneous equations to control for the endogeneity of both excess returns and analysts' forecasts, allowing us to isolate the ***net*** contribution of analysts' forecasts to capital markets.

Our findings, based on cross-sectional regressions covering the period 1982-1997, indicate:

(a) Over the sample period, analysts add a hefty 40 percent (in Adj-R^2 terms) to the explanatory power of financial information with respect to stock returns. However, when simultaneity (i.e., analysts' learning from returns) is accounted for, their contribution is estimated as a modest 12 percent. This result suggests that analysts' mostly react to changes in market values rather than cause them.

(b) In conformity with available evidence (e.g., Lev and Zarowin 1999), the explanatory power of the broad-based financial statement information set decreased significantly over the examined period, while the explanatory power of the model including analysts' forecasts decreased at a lower rate. Analysts, therefore, mitigate to some extent the decrease in the informativeness of financial statements.

(c) The incremental contribution of analysts in firms that report losses is substantially larger than in profitable companies. We find that the direct contribution of analysts to valuation is 11% in profitable firms and 40% in loss firms. Once more, when financial statements fail to provide value-relevant information (i.e., losses are poor indicators of permanent earnings) analysts fill to some extent the gap.

(d) The incremental contribution of financial analysts is largest in high-tech industries (direct contribution of 36%) followed by low-tech industries (direct contribution of 28%), and regulated firms (a mere 2.4%). Again, the contribution of analysts is larger in sectors where the informativeness of financial reports is low.

(e) In line with the above, analysts' contribution to valuation in firms with substantial research and development (*R&D*) capital is relatively larger than in firms without such *R&D* capital.

(f) For reasons, which are not fully clear to us, the incremental contribution of analysts during economic boom periods is higher than during recessions (e.g., the early 1990s).

(g) Finally, based on a firm-specific measure of analysts' incremental contribution, we find that this contribution decreases with firm size, systematic risk, and earnings persistence, and increases with the firm's *R&D* capital.

All in all, we find the direct contribution of analysts' forecasts of earnings to investors' decision to be quite modest. However, this contribution is substantial in firms, sectors and circumstances where the informativeness of financial statements is relatively low. Furthermore, analysts rely more heavily on non-financial information in high-tech industries, loss firms, and companies with high *R&D* intensity.

The study proceeds as follows: The next section develops empirical models that highlight the contribution of financial analysts to equity valuation and the determinants of earnings forecasts. In section 3, we discuss the variable definitions and the various data sources. In section 4, we describe the empirical tests and provide the results of our analyses. We present results for the contribution of analysts to valuation over different time periods, in profitable and loss firms, in different industries, different levels of R&D capital, and in the context of different economic environments. Section 5 contains some concluding remarks.

2. The Model

Most previous studies that addressed the value-relevance of accounting information use a common methodology – an examination of the association between accounting measures and equity market values.[1] In doing so, these studies attempt to draw conclusions from intertemporal levels and changes in the R^2s. These studies suffer from a serious limitation: They do not account for "other" accounting information beyond earnings and book values, and ignore non-accounting information thereby, precluding an evaluation of the relevance of financial reporting relative to other information sources.

[1] See for example, Collins et al. (1997), Francis and Schipper (1996), Lev and Zarowin (1999).

An exception is Liu and Thomas (1999). They use a return valuation model, where abnormal stock returns are equal to the change in the present value of abnormal earnings. They show that including expected abnormal earnings derived from analysts' forecasts increases the explanatory power of the model (R^2) to about 30%. They also demonstrate that controlling for unexpected earnings eliminates non-linearity in the return-earnings relation, and increases the earnings response coefficients for loss firms and high growth firms. Liu and Thomas, however, do not account for the simultaneity between earnings forecasts and returns.

In an attempt to capture a broad set of current financial variables we consider as independent variables, in addition to earnings, the various signals identified by Lev and Thiagarajan (1993) as value-relevant to analysts and investors (hereafter, the LT signals).[2] We selected the following signals:

1. *INV* – Percentage change in inventory minus the percentage change in sales. A positive value indicates an inventory buildup and therefore higher inventory holding costs.
2. *AR* – Percentage change in Accounts Receivable minus the percentage change in sales. A positive value indicates difficulties in collecting cash from customers as a result of a sluggish economy.
3. *GM* – Percentage change in sales minus the percentage change in gross margin. A positive value suggests that the company is less efficient in generating gross profits. Consequently, earnings may be less persistent.
4. *SNA* – Percentage change in Selling and Administration expenses minus the percentage change in sales. A positive value suggests that the firm is less efficient in generating sales.

[2] Abarbanell and Bushee (1997) and Francis and Schipper (1996) have adopted similar indicators.

5. *ETR* – Change in the effective tax rate relative to the average effective tax rate in the last three years, multiplied by the change in earnings per share. Effective tax rate is defined as tax expense divided by pretax income adjusted for amortization. A decrease in the effective tax rate indicates lower earnings persistence.

A substantial body of literature argues that residual income or economic-value-added (*EVA*) is superior to reported earnings in measuring firm performance, and thus should be used in valuation (Makelainen 1997; Stewart 1990, 1993). Many advocates of *EVA* claim that the two most significant shortcomings of earnings are the lack of adjustment to the cost of internally used capital and the use of overly conservative accounting standards (i.e., the expensing of *R&D* expenditures). Accordingly, in addition to current earnings and the LT signals we include in the model the level of *EVA* deflated by lagged share price, where *EVA* is measured as earnings after capitalizing and amortizing *R&D* costs and after subtracting the cost of equity capital.

The broad set of financial variables (earnings, signals, EVA) provides a benchmark against which the contribution of financial analysts is assessed. By adding the present value of earnings forecasts up to five years to the financial variables, we can estimate from changes in Adj-R^2 the incremental value-relevance of analysts' forecasts. The full model is thus:

$$ABRET_{it} = \alpha_{0t} + \alpha_{1t}EPSLEV_{it} + \alpha_{2t}EVALEV_{it} + \alpha_{3t}INV_{it} + \alpha_{4t}AR_{it} + \alpha_{5t}GM_{it} + \alpha_{6t}SNA_{it} + \alpha_{7t}ETR_{it} + \alpha_{8t}PVELEV_{it} + \varepsilon_{it} \quad (1)$$

Where $ABRET_{it}$ denotes firm i's annual abnormal stock return (measured as raw return minus beta times an average risk premium) during period t. $EPSLEV_{it}$ is earnings per share deflated by lagged share price. $EVALEV_{it}$ denotes the level in EVA. The five LT signals (INV_{it}, AR_{it}, GM_{it}, SNA_{it}, and ETR_{it}) appear next and the coefficients on these variables are expected to be negative by construction. Finally, $PVELEV_{it}$ denotes the present value of forecasted earnings deflated by lagged price.

Model (1), however, potentially overstates the incremental contribution of analysts' forecasts to investors, since it ignores the information analysts derive from observing stock price behavior. For example, analysts may increase (decrease) forecasted earnings for firms that experience share price increases (decreases). We accordingly construct a model of the determinants of earnings forecasts, which includes as independent variables proxies for the financial information available to them, along with current and lagged stock returns:

$$PVELEV_{it} = \boldsymbol{b}_{0t} + \boldsymbol{b}_{1t}ABRET_{it} + \boldsymbol{b}_{2t}ABRET_{it-1} + \boldsymbol{b}_{3t}\,EPSLEV_{it} + \boldsymbol{b}_{4t}EVALEV_{it} + \boldsymbol{b}_{5t}INV_{it} + \boldsymbol{b}_{6t}AR_{it} + \boldsymbol{b}_{7t}GM_{it} + \boldsymbol{b}_{8t}SNA_{it} + \boldsymbol{b}_{9t}ETR_{it} + \boldsymbol{h}_{it} \qquad (2)$$

Equations (1) and (2) should be solved ***simultaneously*** to determine the contribution of financial analysts. Given that analysts observe financial information and stock returns and investors observe financial information and analysts' earnings forecasts simultaneously, the contribution of earnings forecasts to the explanatory power of abnormal returns relative to a set of financial information can be ascertained by solving (1) and (2) simultaneously. Put differently, we ask: What is the contribution of earnings forecasts after controlling for the fact that analysts observe and react to excess returns when forecasting those earnings. We thus estimate (1) and (2) using two-stage-least-squares (2SLS):

$$ABRET_{it} = a_{0t} + a_{1t}EPSLEV_{it} + a_{2t}EVALEV_{it} + a_{3t}INV_{it} + a_{4t}AR_{it} + a_{5t}GM_{it} + a_{6t}SNA_{it} + a_{7t}ETR_{it} + a_{8t}PVELEV_{it} + e_{it} \quad (3a)$$

$$PVELEV_{it} = b_{0t} + b_{1t}ABRET_{it} + b_{2t}ABRET_{it-1} + b_{3t} EPSLEV_{it} + b_{4t}EVALEV_{it} + b_{5t}INV_{it} + b_{6t}AR_{it} + b_{7t}GM_{it} + b_{8t}SNA_{it} + b_{9t}ETR_{it} + h_{it} \quad (3b)$$

To use the 2SLS estimation method, we must identify the endogenous variables and the instrumental variables. The endogenous variables are $ABRET_{it}$ and $PVELEV_{it}$. The instrumental variables used to estimate the first stage are the firms book-to-market at the beginning of the return period (BTM_{it-1}), as well as $EVALEV_{it}$, $EVALEV_{it-1}$, $EPSLEV_{it}$, $EPSLEV_{it-1}$, $PVECHA_{it}$, INV_{it}, AR_{it}, GM_{it}, SNA_{it}, ETR_{it}, and $ABRET_{it-1}$. In addition, since we use yearly dummy variables in our cross-sectional estimation, we use yearly dummies as instruments as well.[3]

3. Data and Variables

We retrieved stock returns from the *CRSP* database, financial information from *Compustat*, and analysts' earnings forecasts from *IBES*. We measure annual stock returns over the period starting four months after the beginning of the year and ending four months after fiscal year-end. This way we ensure that financial information is available to both investors and financial analysts. To control for firm-specific systematic risk, we use abnormal return calculated as $ABRET_{it} = RETURN(FYE\text{-}8 \text{ to } FYE\text{+}4)_{it} - R_{Ft} - BETA_{it}\text{x}0.03$, where beta is calculated based on firm-specific market models, the risk-free rate is assumed to be equal to the return on 20-year government bonds, and the risk premium is assumed fixed at 3 percent.

Earnings levels ($EPSLEV_{it}$) are measured as earnings per share (*Compustat* item 58) divided by share price eight months prior to fiscal year-end (adjusted for stock splits and stock dividends). EVA_{it} is calculated using the following 4-step procedure:

1. We calculate research and development (R&D) capital ($RNDCAP_{it}$) as follows:

$$RNDCAP_{it} = 0.9RND_{it} + 0.7RND_{i,t\text{-}1} + 0.5RND_{i,t\text{-}2} + 0.3RND_{i,t\text{-}3} + 0.1RND_{i,t\text{-}4}$$

This assumes that R&D is spent in the middle of the year, that it has a useful life of five years, and that it is amortized using a straight-line method. Annual amortization of $RNDCAP_{it}$ is calculated as follows:

$$RNDAMT_{it} = 0.1(RND_{it} + RND_{i,t\text{-}5}) + 0.2(RND_{i,t\text{-}1} + RND_{i,t\text{-}2} + RND_{i,t\text{-}3} + RND_{i,t\text{-}4})$$

2. We adjust book value of equity per share and earnings per share as follows:

$$ABVPS_{it} = (BV_{it} + RNDCAP_{it}) / SHO_{it}$$

$$AEPS_{it} = EPS_{it} + (0.6RND_{it} - 0.6RNDAMT_{it}) / SHO_{it}$$

Where SHO_{it} is the number of shares outstanding and the tax rate is assumed to be 40% (one minus the tax rate equals 0.6).

3. We calculate EVA per share as:

$$EVAPS_{it} = AEPS_{it} - (\boldsymbol{r}_{it} - 1)\, ABVPS_{i,t\text{-}1}$$

[3] Note that changes in EVA, EPS, and PVE were not used as main effect variables in the main equations to make the system over-identified, that is to increase the power of the system (i.e., to find simultaneity). Nevertheless, the power

Where ρ_{it} denotes one plus the firm-specific risk-adjusted cost of equity capital, measured as

$$r_{it} = 1 + R_{ft} + 0.03 BETA_{it}$$

4. $EVALEV_{it}$ is measured as $EVAPS_{it}$ deflated by share price eight months prior to fiscal year-end.

The present value of forecasted earnings (*PVE*) is calculated using analysts' earnings forecasts in three stages: First, we obtain the closest earnings forecasts made for each firm/year to the end of the fourth month after fiscal year-end, to assure that analysts observe both financial information and stock returns. Then, we calculate for each firm/year the future value of earnings assuming a five-year horizon and the discount rate ρ, where $E(e_n)$ denotes the *IBES* consensus expectation (median forecast) of earnings per share n periods from now (firm subscripts are understood).

$$E_0[\textit{Future Earnings}] = (1 + r)^4 E(e_1) + (1 + r)^3 E(e_2) + (1 + r)^2 E(e_3) + (1 + r) E(e_4) + E(e_5)$$

Analysts' earnings forecasts for all five years are available for only 5% of the firms. In case long-term forecasts are missing, we replace them with the forecasted long-term growth in earnings per share (*GR*). For example, the future value of earnings for a company with available forecasts for one and two years ahead is calculated as follows:

$$E_0[\textit{Future Earnings}] = (1 + r)^4 E(e_1) + (1 + r)^3 E(e_2) + (1 + r)^2 E(e_2) GR$$
$$+ (1 + r) E(e_2) GR^2 + E(e_2) GR^3$$

of a simultaneous equation system depends on obtaining a set of powerful instruments.

In the second stage, we calculate the future value of dividends assuming a fixed dividends policy, i.e., no changes in dividends are expected in the next five years.

$$E_0[Future\ Dividends] = [(1 + r)^4 + (1 + r)^3 + (1 + r)^2 + (1 + r) + 1]\ d_0$$

In the third stage, we add together future earnings and future dividends and discount them back using the firm estimated discount rate. Finally, we deflate this present value figure by share price eight months prior to fiscal year-end (i.e., 12 months prior to the forecasting month).

$$PVELEV_{it} = (1 + r)^{-5}\{E_t[Future\ Earnings] + E_t[Future\ Dividends]\} / P_{i,t\text{-}1}$$

The change in *PVE* ($PVECHA_{it}$) is calculated as the difference between $PVELEV_{it}$ and $PVELEV_{i,t\text{-}1}$ deflated by beginning of period share price.

4. Empirical Results

Table 1 presents descriptive statistics (Panel A) and a correlation matrix (Panel B) for selected variables. Data are available for 1977-97, however, we use the first five years of data to calculate *R&D* capital, so that we have 18,903 firm/year observations for the period 1982-97. This number is reduced to 12,892 observations with full data, as will be shown later.

Panel A indicates that the mean and median abnormal stock returns (0.07 and 0.02) are slightly positive reflecting the above average risk of the sample firms (mean and median betas are 1.06 and 1.03, respectively), and perhaps a certain understatement of the assumed risk premium (3%).[4] The average present value of 5-year analysts' forecasts of earnings scaled by price (*PVELEV*) is 0.55; thus, predicted earnings for the next five years account, on average, to 55% of share prices.

As Panel B reports, *PVELEV* has the highest correlation with abnormal returns among the examined variables (*Pearson* = 0.43, *Spearman* = 0.48). Earnings also have a substantial correlation with EVA, as reflected by the *Pearson* and *Spearman* correlations of 0.81 and 0.58, respectively, between *EVALEV* and *EPSLEV*. These high correlations may cause a multicollinearity problem in our regressions, potentially causing the regression coefficients to be unstable.

(Table 1 about here)

4.1 Intertemporal Analysis

As several recent studies focus on intertemporal changes in the value relevance of financial information, it is only natural that our first analysis focuses on intertemporal changes in the contribution of financial analysts to equity valuation. We divided our data to three time periods: 1982-1987, 1988-1992, and 1993-1997. For each time period, we report the results of estimating four OLS models and one system of two equations (2SLS). Table 2 includes 5 panels – the total sample over 1982-97 (Panel A), 1982-87 (Panel B), 1988-92 (Panel C), 1993-97 (Panel D), and summary of analysts' contribution measures (Panel E).

From the top two lines of Table 2 it appears that the incremental contribution of analysts' five-year forecast in terms of increased adj-R^2 is substantial. The Adj-R^2 increases from 17% (reduced form

[4] The historical (from the 1920s to present) risk premium is about 7%. However, most observers believe that risk premiums have declined significantly in the last two decades to levels between 3-5%.

of equation 1 – without analysts' forecasts) to 24% (equation 1, with the forecasts) – an increase of 41.2%. This 41% "incremental contribution" includes the feedback from stock returns to analysts' forecasts. Equation 3a, estimated by 2SLS, yields as Adj-R^2 of 19%; compared with the 17% Adj-R^2 of equation 1's reduced form (without analysts' forecasts), it indicates a very modest contribution of analysts forecasts – roughly 12% increment in Adj-R^2. Thus, accounting for simultaneity yields a different appreciation of analysts' contribution to investors, more in line with the general skepticism about analysts' independence and the thoroughness of their research.[5]

In conformity with available evidence (e.g., Lev and Zarowin 1999), the explanatory power of the broad-based financial statement information set (reduced form of equation 1) decreased significantly over the examined period, as reflected by the decrease in Adj-R^2 from 29% in the early (1982-87) period to 15% in the middle period (1988-92) and further to 8% in the most recent (1993-97) one (panel E). Note that analysts are not very successful in arresting the deterioration in the informativeness of financial information. Regression 3a, accounting for simultaneity, has an Adj-R^2 of 31% in the early period, decreasing to 17% and 11% in the middle and recent periods, a similar percentage decrease to that of equation 1's reduced form.

Comparing R^2s of equation 2's full and reduced forms in the three sub-periods is revealing. Over the last 15 years, analysts are learning less from financial data (R^2 of equation 2's reduced form sharply decreasing), and learn more from stock returns (differences between equation 2's reduced and full form are increasing).

[5] Notice that 1.118 (one plus analysts' contribution) times 1.263 (one plus the market feedback) equals 1.412 (one plus the perceived contribution.

Notice also that the coefficients on the LT (1993) signals in the models are generally negative as expected, and statistically significant, highlighting the importance of traditional financial statement analysis in equity valuation.[6] These signals are much stronger in explaining abnormal returns in the reduced form of equation 1 - the return model that excludes $PVELEV$. Overall, the EVA numbers do not contribute much beyond financial variables.

We conclude that for the entire sample, the contribution of analysts to investors' decisions is modest, at best. While this contribution has increased slightly over the last 15 years, it was not sufficient to halt in a significant way the deterioration in the informativeness of financial statement information.

(Table 2 about here)

4.2 Loss versus Profitable Companies

Reported losses are problematic for valuation purposes – no reasonable multiple can be assigned to negative earnings and negative earnings cannot persist. It is interesting, therefore, to examine whether analysts' contribution is enhanced when they cover loss-reporting companies. We thus compare the contribution of financial analysts to investors in profitable companies to that in loss-reporting companies. The results of this analysis are presented in panel A (profitable firms), panel B (loss firms) and panel C (analysts' contribution measures) of table 3.[7] About 12% of the total observations have negative EPS. Profitable firms earn, on average, 7% excess returns versus the -9% earned by loss firms, on average. Profitable firms tend to be larger in size, and have larger market-to-book ratios (not reported in the table).

[6] Notice that the GM, SNA and ETR signals are strongly associated with forecasted earnings, whereas the INV and AR signals are generally ignored by analysts.

Consistent with prior studies (Hayn 1995, Amir and Lev 1996), financial statements of profitable firms convey relatively more information to investors than financial statements of loss-reporting firms, as reflected by the Adj-R^2 in eq. 1's reduced form: 0.18 vs. 0.10. However, analysts' contribution in profitable firms is minimal – an increase in Adj-R^2 of 11.1% (from 0.18 to 0.20 in eq. 3a). In loss-reporting firms (panel B), analysts' contribution is 40% (from 0.10 to 0.14), implying that analysts' step in, to some extent, when financial information (loss) is deficient for valuation purposes.

Consider the estimation results of eq. 2's reduced forms in panels A and B. The association between current financial data and the present value of forecasted earnings is much stronger in companies with positive EPS (Adj-R^2 = 0.52) than in companies with negative EPS (Adj-R^2 = 0.06). The difference in association level is also reflected in the magnitude of the coefficient on EPSLEV, which is much larger in profitable companies (3.67) than in loss companies (0.44).

Also, the inclusion of current and lagged abnormal returns in eq. 2 increases the model's Adj-R^2 from 0.52 to 0.55 for profitable firms (increase of 6% only) and from 0.06 to 0.16 for loss companies (an increase of 167%). This result highlights the weakness of financial information relative to non-financial information in explaining earnings forecasts of loss-reporting companies.

(Table 3 about here)

4.3 Industry Analysis

Proceeding with our contextual analysis, we investigate the contribution of analysts to valuation in different industries. We divided our sample to four groups of companies according to the following

[7] From table 3 onwards we omit eq. 1's full model and eq. 3b because they do not play a major role in our analysis. Recall that the full model of eq. 1 is replaced by eq. 3a, which is estimated using a 2SLS procedure.

procedure: First, we identified 21 3-digit SIC codes that are represented in our sample by more than 200 firm/year observations. Then, we classified each of these 21 SIC codes into one of the following four groups:

(1) Regulated Industries (financial institutions and public utilities) – firms with 1-digit SIC code of 6 and firm/years with 2-digit SIC code of 48 and 49;

(2) Low-Tech Manufacturing – firms with 3-digit SIC codes of 131, 262, 291, 331, and 356;

(3) High-Tech Manufacturing – firms with 3-digit SIC codes of 283, 284, 357, 366, 367, 371, 382, 384, and 737.

(4) All remaining firms.

Table 4 presents the results of estimating the five equations for each of the four groups in a separate panel (panel A through D).[8] Panel E presents a summary of analysts' contribution in each industry group.

Panel E indicates that the explanatory power of current financial information (eq. 1's reduced form) is 41% in regulated industries, 18% in low-tech manufacturing and 14% in high-tech manufacturing. This is a clear reflection of the impact of change and its main driver – innovation – on the informativeness of financial reports (Lev and Zarowin 1999). In relatively stable industries (financial institutions and utilities) the accounting system works reasonably well. However, in fast changing, innovative sectors, high tech in particular, the informativeness of financial reports is rather low.

Consistent with the performance of the accounting system, the contribution of analysts in regulated industries is a mere 2.4% while the indirect contribution is 2.4% (from 0.41 to 0.42 in panel

[8] Many of the public utilities have missing data due to the LT (1993) signals. For Example, there are only 178 observations with full data in the Utilities industry. Excluding the LT (1993) signals, we obtain 2,047 observations for Utilities. We repeated the analysis without the LT signals and with the public utilities as a separate group. The results are very similar. In particular, the results for the financial institutions and for the public utilities are very similar.

A). The contribution of financial analysts is larger in manufacturing companies: 28% and 36% in low tech and high tech companies, respectively (comparing R^2s of equation 1's reduced form and eq. 3a in panels B and C of table 4).

The results of estimating eq. 2's (both reduced form and full model) by industry groups confirms that the role of current financial information is much larger in stable industries than in growth industries. For example, adding current and lagged abnormal returns to eq. 2 increases the Adj-R^2 from 61% to 63% in regulated industries. Adding abnormal returns contribute significantly more in low-tech manufacturing companies (Adj-R^2 increases from 34% to 43%), and even more in high-tech manufacturing companies (Adj-R^2 increases from 28% to 36%). Overall, we conclude that analysts contribute more to investors in fast-changing industries.

(Table 4 about here)

4.4 Analysis by Levels of R&D Capital

Several recent studies focus on the role of intangibles in equity valuation. Lev and Zarowin (1999) argue that the increased intensity of intangible assets is partially responsible for the decline in the value-relevance of financial statements. In line with this argument, we examine the contribution of financial analysts in companies with large investments in research and development (*R&D* capital) and compare this contribution to that in companies with little or no *R&D* capital. Based on our previous findings, we expect that analysts' contribution to valuation will be larger in companies with large *R&D* capital than in companies with little *R&D* capital.

The procedure of calculating *R&D* capital was already described as part of the procedures to calculate EVA. We measure *R&D* intensity as follows:

%R&D = R&D Capital / (Reported Book Value of Equity + R&D Capital)

We classify our sample into (1) companies with zero *R&D* capital (5,739 firm/years); (2) companies with *%R&D* between zero and 15% (3,898 firm/years); and companies with large *R&D* capital, defined as companies with *%R&D* above 15% (3,254 firm/years). We estimate eq. 1-3 for each of the three categories, and report the results in panels A-C of table 5. Panel D of table 5 summarizes the contribution of analysts to valuation by level of R&D intensity.

The informativeness of financial statements decreases with the intensity of *R&D*. The Adj-R^2 of eq. 1's reduced form is 20% in companies without *R&D* capital, 18% in companies with medium *R&D* capital and 15% in companies with high *R&D* capital. In addition, the coefficient on current earnings levels decreases with *R&D* capital from 1.37 to 1.22 and to 0.84.

The contribution of analysts to valuation shows the opposite pattern. According to our measure of contribution, analysts contribute 20% to valuation in companies with high *R&D* capital, 11.1% in companies with medium *R&D* capital, and 10% in companies without R&D capital (panel C of table 5). We obtain yet additional evidence that analysts contribute to valuation when financial statements fail to do so, for example, in companies that expense a significant portion of their assets.

The results of estimating the reduced and full forms of eq. 2 show that the association between forecasted earnings and current financial information becomes weaker with *R&D* intensity. The Adj-R^2 of eq. 2's reduced form decreases from 0.45 in companies without *R&D* capital (panel A) to 0.41 in companies with medium *R&D* intensity (panel B) and further down to 0.24 in companies with high *R&D* intensity. Second, the coefficient on current earnings (*EPSLEV*) decreases with *R&D* intensity, highlighting the poor association between current and future earnings in high-tech companies. Third, the contribution of current and lagged abnormal returns increases with *R&D* intensity, as reflected by the percentage change in Adj-R^2 from the reduced form of eq. 2 to the full model.

(Table 5 about here)

4.5 Analysts' Contribution in Periods of High and Low GDP Growth

Completing the contextual analysis, we investigate whether the contribution of financial analysts varies with macro-economic conditions. In particular, we examine whether analysts' contribution to valuation is different in periods of high economic growth than in periods of low economic growth. Although it is difficult to predict the outcome of this analysis, it is quite obvious that the number of analysts following companies is larger in high-growth periods than in low-growth ones. This might increase their contribution relative to periods with low economic growth.

We limit this investigation to the 1990s to increase the power of our tests, as analysts' contribution increases over time. Pooling together years from different time-periods is likely to obscure the results due to intertemporal changes. Based on annual changes in Gross Domestic Product (GDP), we classified the years 1990-92 as years with low growth and the years 1994-97 as years with high economic growth. We report the results in table 6 in a format similar to that used earlier. In particular, panel A contains results for low growth years, panel B presents results for high-growth years, and panel C summarizes analysts' contribution.[9]

As panel C of table 6 suggests, financial statements convey relatively more information to investors in periods of low GDP growth than in periods of high GDP growth. This is reflected by the Adj-R^2 of eq. 1's reduced form, which is 14% in periods of low growth and only 8% in periods of high growth. This result is intuitive since periods of high growth are generally characterized by rapid technological changes, which reduce the informativeness of financial statements. Analysts' contribution is larger in the high growth period (from Adj-R^2 of 0.07 to 0.10) than in the low growth period (from Adj-R^2 of 0.14 to 0.16). Notice that in periods of low GDP growth most of analysts' contribution is achieved by reacting to market trends, as reflected by the percentage of market feedback of 31.2 compared with a contribution of 14.3%. In high growth years, on the other hand, analysts' contribution increases the Adj-R^2 by 42.9% and market feedback causes an additional increase in Adj-R^2 of 40.0%.

(Table 6 about here)

4.6 Systematic Factors Affecting Analysts' Contribution

What determines the contribution of financial analysts to investors? To examine this question we need a firm-specific measure of the quality of analysts' forecasts. We employ a simple measure reflecting the distance between the present value of forecasted earnings over a five-year horizon and current earnings extrapolated to the next five years. We thus compare analysts' forecasts with a naïve model, which assumes that current earnings will grow at the cost of capital for the next five years. Therefore, current earnings need not be discounted. The distance measure is:

$$DIFF_{it} = \text{Absolute Value } [PVELEV_{it} - 5\text{x}EPSLEV_{it}].$$

We use four independent variables to explain the information provided by analysts: systematic risk (Beta), firm size (logarithm of market value of equity), *R&D* intensity indicator (*RNDIND*), and earnings changes (*EPSCHA*). The *R&D* intensity indicator is set equal to "0" if the company has zero

[9] Mean (median) abnormal returns over 1990-92 is 0.029 (-0.010), whereas mean abnormal returns over 1994-97 is 0.065 (0.021). Furthermore, market-to-book ratios are much larger in periods of high GDP growth than in periods of low GDP

R&D capital, "1" if the company's *R&D* capital is between 0% and 15%, and "2" if *R&D* capital exceeds 15% of book value of equity.

$$DIFF_{it} = f_{0t} + f_{1t}Beta_{it} + f_{2t}Size_{it} + f_{3t}RNDIND_{it} + f_{4t}EPSCHA_{it} + h_{it} \tag{4}$$

We expect analysts to provide more information in riskier companies because investors in those companies require better analysis than in low-risk stable companies (i.e., $f_1 > 0$). We also expect analysts to provide more information in larger companies because earnings of these firms tend to be more stable over time (i.e., $f_2 < 0$). Furthermore, we expect analysts to provide more information in firms with larger *R&D* capital (i.e., $f_3 > 0$). Finally, we expect analysts' contribution to be larger for firms with large earnings changes. The rationale is that larger earnings changes reflect a more significant change in the company's financial performance, which requires a more careful analysis of future earnings (i.e., $f_4 > 0$).

We estimate eq. 4 for three time periods as before (1982-87, 1988-92, and 1993-97) after eliminating observations with negative earnings. We also control for fixed year and industry (2-digit SIC codes) effects. The results are reported in table 7.

In contrast to our expectations, the coefficients on Beta are generally negative, suggesting that the distance between analysts' earnings forecasts and current earnings is smaller the more risky is the company. Consistent with our expectations, analysts' contribution to investors is smaller for large companies as reflected by the negative coefficients on firm size. In addition, analysts' contribution is larger in firms with larger *R&D* capital, as reflected by the positive coefficients on *RNDIND.*

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growth. These intuitive findings support our classifications of the years 1990-97 into high and low growth.

Furthermore, the coefficients on *RNDIND* increase in magnitude and statistical significance over time suggesting that unrecorded intangible assets play a more significant role in valuation and in analysts' forecasts in recent years than in earlier periods. Finally, we find a positive association between earnings changes and analysts' contribution to valuation and, moreover, this association becomes stronger over time. Our interpretation of this result is that larger earnings changes indicate lower earnings persistence, i.e., a weaker association between current and future earnings. These are the particular cases in which analysts' earnings forecasts play a more significant role in equity valuation.

(Table 7 about here)

5. Summary

We consider the role of financial analysts in equity valuation by comparing the association between excess returns and a broad set of information items derived from financial statements with the association between excess returns and that information set plus the present value of analysts' five-year earning forecasts. We thus focus on the incremental contribution (over financial statement information) of earnings forecasts to investors' decisions as reflected by annual excess returns.

We find that over the entire sample period, the incremental contribution of analysts' forecast in terms of increased Adj-R^2 is about 10%; a very modest contribution in our opinion. This contribution increase somewhat in recent years, as the association between stock returns and financial information has sharply decreased. Financial analysts, presumably with access to extensive nonfinancial information, were obviously unable to arrest the decline in financial statement informativeness.

We also examine analysts' contribution to valuation under several different circumstances. We find that the contribution of analysts in loss-reporting firms is substantially larger than in profitable companies. We also find that the incremental contribution of financial analysts is most pronounced in high-tech industries, followed by low-tech industries, and regulated companies (financial services and utilities). Thus, the contribution of analysts is larger in sectors where the informativeness of financial reports is low. Furthermore, analysts' contribution in firms with substantial *R&D* capital is relatively larger than in firms without such *R&D* capital. In addition, the contribution of analysts during economic boom periods is higher than during recessions. Finally, based on a firm-specific measure of analysts' incremental contribution, we find that this contribution decreases with firm size and systematic risk, and increases with the firm's *R&D* capital and earnings changes.

These findings may provide a rational explanation to why financial analysts call for the immediate expensing of *R&D* expenditures and other intangibles. As information on the value of intangibles, and in particular on *R&D* capital, is critical for valuation, disclosing more information about the value of intangible assets in the financial statements may reduce the value of analysts' earnings forecasts and increase the value of financial statements. Analysts' arguments about accounting for intangibles may be just an attempt to protect their own product – forecasts of earnings.

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Table 1
Descriptive Statistics (1982-97)

Variable	Mean	Median	Std. Dev.	1st Quartile	3rd Quartile	N
ABRET	0.07	0.02	0.44	-0.18	0.25	18,903
Beta	1.06	1.03	0.47	0.74	1.33	18,903
ρ	1.11	1.11	0.02	1.10	1.13	18,903
EPSLEV	0.06	0.07	0.11	0.04	0.10	18,903
EVALEV	-0.03	0.00	0.13	-0.05	0.03	18,903
PVELEV	0.55	0.52	0.30	0.38	0.68	18,903
INV Signal	0.01	-0.02	0.43	-0.17	0.12	16,027
AR Signal	0.01	0.00	0.26	-0.10	0.11	18,250
GM Signal	-0.01	-0.01	0.24	-0.07	0.06	18,686
SNA Signal	0.00	0.01	0.16	-0.06	0.07	14,795
ETR Signal	-0.00	0.00	0.05	-0.00	0.00	18,568

Variable	ABRET	EPS LEV	PVE LEV	EVA LEV
ABRET		0.26	0.43	0.16
EPSLEV	0.41		0.53	0.81
PVELEV	0.48	0.70		0.27
EVALEV	0.26	0.58	0.27	

Variables are defined as follows:

1. ABRET – Abnormal Stock Return, measured as annual stock returns minus the annual risk free rate and minus Beta times the risk premium. Stock returns are taken from CRSP. The return period is from eight months prior to fiscal year-end to four months after fiscal year-end (FYE-8 to FYE+4). Risk premium is assumed to be 3%.

2. EPS_LEV – Earnings per share (item 58) divided by share price eight months prior to FYE.

3. PVE_LEV – Present value of expected earnings per share (assuming dividends are reinvested) over a five-year horizon divided by share price eight months prior to fiscal year-end. We use all available analysts' earnings forecasts (EPS_t+1 to EPS_t+5) and forecasted long-term growth (GR) in our analysis. Expected earnings per share n periods from now are calculated as the median IBES forecast made four months after fiscal year-end. We discount expected earnings using a firm-specific discount rate (ρ), calculated as risk free rate plus Beta times a risk premium of 3%.

4. EVA is calculated as follows:

a. We calculate Research and Development capital (R&D capital) as follows: RNDCAP = $0.9RND_t + 0.7RND_{t-1} + 0.5RND_{t-2} + 0.3RND_{t-3} + 0.1RND_{t-4}$. This assumes that RND is spent in the middle of the year, that it has a useful life of five years, and that it is amortized using a straight-line method.
b. Amortization of RND is calculated as follows: $RNDAMT = 0.1(RND_t + RND_{t-5}) + 0.2(RND_{t-1} + RND_{t-2} + RND_{t-3} + RND_{t-4})$.
c. We adjust book value of equity and earnings as follows: $ABVPS_t = (BV_t + RNDCAP_t)/SHO_t$. $AEPS_t = EPS_t + (0.6RND_t – 0.6RNDAMT_t)/ SHO_t$, where SHO is shares outstanding.
d. EVA per share is calculated as $EVAPS_t = AEPS_t - ((\rho_t - 1) * ABVPS_{t-1})$, where ρ denotes one plus the firm specific risk-adjusted cost of equity capital. This variable is calculated as: $\rho = 1 + R_f + (BETA * 0.03)$. R_f is taken from 20-year income bonds.
e. EVALEV is measured as EVAPS deflated by lagged share price. EVALEV is winsorized at 2 and –2. That means that values above 2 are set to 2 and values below -2 are set to -2. This procedure affected about 20 observations out of 18,000.

5. LT (1993) signals are measured as follows: INV Signal – Percentage change in inventory minus the percentage change in sales; AR Signal – Percentage change in Accounts Receivable minus the percentage change in sales; GM Signal – Percentage change in sales minus the percentage change in gross margin; SNA Signal – Percentage change in selling and administration expenses minus the percentage change in sales; ETR – Change in the effective tax rate relative to the average effective tax rate in the last three years, multiplied by the change in earnings per share.
6. BETA – is a firm-specific beta calculated from CRSP at the end of the third month following fiscal year-end. This variable was winsorized at 3.0 (values above 3 are set to 3).
7. RHO – One plus the firm specific risk-adjusted cost of equity capital. This variable is calculated as $RHO = 1 + R_f + (BETA * 0.03)$. R_f is taken from 20-year income bonds.

Table 2
Intertemporal Analysis of Analysts' Contribution

Panel A: Total sample (1982-1997)

Model	Dependent Variable	ABRET	Lag ABRET	EVA LEV	EPS LEV	INV	AR	GM	SNA	ETR	PVE LEV	R^2 N	RSS MSS
1 – Full	ABRET			0.01	0.15	-0.03	0.02	-0.10	-0.11	-0.02	0.41	0.24	
	OLS			0.26	2.60	-4.75	1.96	-6.18	-5.41	-0.40	33.57	12,891	
1 – Reduced	ABRET			-0.44	1.12	-0.03	0.03	-0.17	-0.15	-0.09		0.17	
	OLS			-10.54	20.73	-5.02	2.18	-9.52	-7.34	-1.50		12,891	
2 – Full	PVELEV	0.20	0.07	-1.03	2.10	-0.00	0.00	-0.10	-0.06	-0.14		0.42	
	OLS	34.35	11.95	-36.97	57.83	-0.08	0.25	-8.47	-4.20	-3.49		12,891	
2 – Reduced	PVELEV			-1.11	2.35	-0.01	0.01	-0.15	-0.11	-0.16		0.37	
	OLS			-38.07	63.03	-1.66	1.07	-12.52	-7.52	-3.95		12,891	
3a – System	ABRET			0.09	-0.04	-0.03	0.02	-0.10	-0.12	-0.02	0.51	0.19	1,388.30
	2SLS			1.63	-0.50	-4.52	1.72	-5.52	-5.63	-0.25	17.11	12,891	330.36
3b – System	PVELEV	1.43	0.13	-0.45	0.64	0.04	-0.03	0.14	0.18	-0.01		0.14	2,883.19
	2SLS	20.54	10.45	-6.46	5.65	4.24	-1.74	4.91	5.49	-0.07		12,891	474.18

Panel B: Early Period (1982-87)

Model	Dependent Variable	ABRET	Lag ABRET	EVA LEV	EPS LEV	INV	AR	GM	SNA	ETR	PVE LEV	R^2 N	RSS MSS
1 – Full	ABRET			0.24	-0.10	-0.05	0.06	-0.05	-0.08	0.04	0.42	0.34	
	OLS			3.34	-0.91	-3.96	2.63	-1.44	-2.07	0.39	17.95	3,831	
1 – Reduced	ABRET			-0.34	1.06	-0.06	0.07	-0.11	-0.11	0.04		0.29	
	OLS			-4.97	12.21	-4.33	3.01	-3.23	-2.62	0.40		3,831	
2 – Full	PVELEV	0.19	0.08	-1.32	2.51	-0.01	0.01	-0.11	-0.02	-0.00		0.53	
	OLS	18.51	8.00	-30.64	44.01	-0.73	0.64	-5.14	-0.88	-0.03		3,831	
2 – Reduced	PVELEV			-1.38	2.77	-0.02	0.03	-0.15	-0.06	0.01		0.48	
	OLS			-30.65	47.72	-1.90	1.74	-6.61	-2.26	0.09		3,831	
3a – System	ABRET			0.26	-0.13	-0.05	0.06	-0.05	-0.08	0.04	0.43	0.31	377.57
	2SLS			2.75	-0.81	-3.93	2.61	-1.35	-2.05	0.39	8.68	3,831	173.88
3b – System	PVELEV	1.87	0.16	-0.76	0.65	0.09	-0.11	0.09	0.18	-0.07		0.13	1,313.50
	2SLS	10.11	5.65	-5.57	2.54	3.46	-2.57	1.40	2.31	-0.38		3,831	204.64

Panel C: Middle Period (1988-92)

Model	Dependent Variable	ABRET	Lag ABRET	EVA LEV	EPS LEV	INV	AR	GM	SNA	ETR	PVE LEV	R^2 N	RSS MSS
1 – Full	ABRET			0.10	0.12	-0.04	-0.00	-0.18	-0.08	-0.09	0.41	0.22	
	OLS			1.38	1.22	-3.70	-0.11	-5.67	-2.21	-0.81	19.12	3,933	
1 – Reduced	ABRET			-0.18	0.89	-0.04	-0.00	-0.24	-0.13	-0.20		0.15	
	OLS			-2.49	9.49	-2.96	-0.11	-7.16	-3.46	-2.01		3,933	
2 – Full	PVELEV	0.21	0.07	-0.66	1.67	0.03	0.00	-0.07	-0.08	-0.26		0.35	
	OLS	19.58	6.26	-13.54	26.21	3.24	0.01	-3.14	-2.95	-3.69		3,933	
2 – Reduced	PVELEV			-0.67	1.86	0.02	-0.00	-0.14	-0.12	-0.31		0.29	
	OLS			-13.12	28.11	2.00	-0.01	-5.89	-4.59	-4.24		3,933	
3a – System	ABRET			0.10	0.11	-0.04	-0.00	-0.18	-0.08	-0.08	0.42	0.17	397.02
	2SLS			1.31	0.88	-3.70	-0.11	-5.55	-2.18	-0.79	8.50	3,933	83.66
3b – System	PVELEV	0.93	0.12	-0.55	1.03	0.05	0.00	0.11	0.03	-0.10		0.20	417.16
	2SLS	12.86	6.97	-7.67	9.20	4.38	0.08	2.95	0.81	-0.99		3,933	106.10

Panel D: Late Period (1993-97)

Model	Dependent Variable	ABRET	Lag ABRET	EVA LEV	EPS LEV	INV	AR	GM	SNA	ETR	PVE LEV	R^2 N	RSS MSS
1 – Full	ABRET			-0.54	0.67	-0.01	0.02	-0.09	-0.17	-0.03	0.47	0.15	
	OLS			-5.78	5.33	-0.95	0.87	-3.19	-5.28	-0.29	21.19	5,127	
1 – Reduced	ABRET			-1.13	1.79	-0.02	0.02	-0.16	-0.23	-0.11		0.08	
	OLS			-12.12	15.21	-1.74	0.89	-5.59	-6.78	-0.94		5,127	
2 – Full	PVELEV	0.18	0.05	-1.07	2.07	-0.02	-0.00	-0.11	-0.07	-0.14		0.34	
	OLS	21.54	5.83	-19.41	29.58	-2.49	-0.13	-6.34	-3.26	-2.01		5,127	
2 – Reduced	PVELEV			-1.26	2.41	-0.02	0.00	-0.15	-0.12	-0.17		0.26	
	OLS			-22.22	33.65	-2.90	0.19	-8.83	-5.99	-2.32		5,127	
3a – System	ABRET			-0.31	0.22	-0.01	0.02	-0.06	-0.15	-0.00	0.65	0.11	607.81
	2SLS			-2.77	1.30	-0.61	0.85	-2.09	-4.48	-0.02	12.44	5,127	77.18
3b – System	PVELEV	1.32	0.11	0.22	-0.01	0.01	-0.02	0.10	0.22	0.00		0.11	1,077.08
	2SLS	13.63	5.84	1.38	-0.04	0.44	-0.88	2.41	4.41	0.01		5,127	132.43

Panel E: Analysts Contribution – Intertemporal Analysis

Sample	Adj-R^2 - Eq. 1's Reduced Form	**%Analysts' Contribution**	Adj-R^2 Eq. 3a	% Market Feedback	Adj-R^2 - Eq. 1's full model	% Perceived Contribution
Total Sample – 1982-97	0.17	**11.8**	0.19	26.3	0.24	41.2
Early Period – 1982-87	0.29	**6.9**	0.31	9.7	0.34	17.2
Middle Period – 1988-92	0.15	**13.3**	0.17	29.4	0.22	46.7
Late Period - 1993-97	0.08	**37.5**	0.11	36.4	0.15	87.5

Table 3

Analysts Contribution in Profitable and Loss-Reporting Companies (Positive versus Negative Earnings)

Panel A: Companies with Positive Earnings Per Share

Model	Dependent Variable	ABRET	Lag ABRET	EVA LEV	EPS LEV	INV	AR	GM	SNA	ETR	PVE LEV	R^2 N	RSS MSS
1 – Reduced	ABRET			-0.26	1.64	-0.04	0.03	-0.12	-0.14	-0.06		0.18	
	OLS			-4.74	22.68	-5.32	2.16	-5.66	-6.21	-0.65		11,384	
2 – Full	PVELEV	0.14	0.05	-0.92	3.41	-0.00	0.01	-0.04	-0.02	0.14		0.55	
	OLS	29.19	9.58	-32.43	87.73	-1.20	1.62	-3.34	-1.27	2.76		11,384	
2 – Reduced	PVELEV			-0.94	3.67	-0.01	0.02	-0.07	-0.05	0.14		0.52	
	OLS			-32.02	93.12	-2.72	2.27	-6.14	-4.09	2.62		11,384	
3a – System	ABRET			0.28	-0.46	-0.03	0.02	-0.08	-0.12	-0.14	0.57	0.20	1,157.93
	2SLS			4.32	-2.72	-4.62	1.50	-3.83	-5.08	-1.52	13.65	11,384	284.61

Panel B: Companies with Negative Earnings Per Share

Model	Dependent Variable	ABRET	Lag ABRET	EVA LEV	EPS LEV	INV	AR	GM	SNA	ETR	PVE LEV	R^2 N	RSS MSS
1 – Reduced	ABRET			-0.41	0.57	-0.00	0.03	-0.20	-0.17	-0.02		0.10	
	OLS			-4.06	4.18	-0.21	0.72	-5.19	-2.83	-0.17		1,507	
2 – Full	PVELEV	0.27	0.10	-0.08	0.27	0.01	0.01	-0.07	-0.14	-0.07		0.16	
	OLS	12.69	4.12	-0.96	2.37	0.79	0.41	-2.17	-2.84	-0.81		1,507	
2 – Reduced	PVELEV			-0.18	0.44	0.01	0.02	-0.13	-0.20	-0.09		0.06	
	OLS			-2.11	3.73	0.77	0.73	-4.00	-3.94	-1.05		1,507	
3a – System	ABRET			-0.34	0.39	-0.01	0.02	-0.15	-0.09	0.02	0.41	0.14	217.80
	2SLS			-3.46	2.95	-0.50	0.48	-3.89	-1.49	0.20	6.79	1,507	37.82

Panel C: Analysts' Contribution in Companies with Positive and with Negative Earnings

Sample	Adj-R^2 - Eq. 1's Reduced Form	**%Analysts' Contribution**	Adj-R^2 Eq. 3a	% Market Feedback	Adj-R^2 - Eq. 1's full model	% Perceived Contribution
Positive Earnings	0.18	**11.1**	0.20	15.0	0.23	27.8
Negative Earnings	0.10	**40.0**	0.14	28.6	0.18	80.0

Table 4

Analysts' Contribution in Different Industries

Panel A: Regulated Industries (Banks and Utilities)

Model	Dependent Variable	ABRET	Lag ABRET	EVA LEV	EPS LEV	INV	AR	GM	SNA	ETR	PVE LEV	R^2 N	RSS MSS
1 – Reduced	ABRET			-0.51	1.19	-0.02	0.04	-0.11	-0.11	0.01		0.41	
	OLS			-4.22	8.32	-2.60	1.05	-3.18	-2.07	0.07		1,248	
2 – Full	PVELEV	0.15	0.05	-1.79	3.15	0.00	-0.07	0.08	0.08	-0.36		0.63	
	OLS	7.56	2.42	-20.37	30.01	0.25	-2.31	3.26	1.94	-3.61		1,248	
2 – Reduced	PVELEV			-1.85	3.34	-0.00	-0.06	0.06	0.06	-0.38		0.61	
	OLS			-20.82	31.97	-0.56	-1.93	2.27	1.56	-3.64		1,248	
3a – System	ABRET			-0.05	0.36	-0.02	0.06	-0.13	-0.13	0.10	0.25	0.42	68.95
	2SLS			-0.26	1.05	-2.55	1.42	-3.63	-2.39	0.72	2.73	1,248	51.88

Panel B: Low-Tech Manufacturing

Model	Dependent Variable	ABRET	Lag ABRET	EVA LEV	EPS LEV	INV	AR	GM	SNA	ETR	PVE LEV	R^2 N	RSS MSS
1 – Reduced	ABRET			-0.65	1.31	0.01	0.01	-0.07	0.05	-0.35		0.18	
	OLS			-4.32	7.15	0.36	0.22	-1.76	0.93	-2.31		1,160	
2 – Full	PVELEV	0.26	0.08	-1.20	2.08	0.03	-0.03	-0.03	0.01	0.14		0.43	
	OLS	12.51	4.38	-11.31	15.87	1.31	-1.27	-1.13	0.31	1.36		1,160	
2 – Reduced	PVELEV			-1.36	2.45	0.03	-0.03	-0.06	0.01	0.04		0.34	
	OLS			-12.10	17.95	1.40	-1.16	-1.88	0.34	0.40		1,160	
3a – System	ABRET			0.28	-0.37	-0.01	0.03	-0.03	0.04	-0.38	0.68	0.23	83.44
	2SLS			1.55	-1.40	-0.37	0.85	-0.83	0.79	-2.62	8.62	1,160	26.71

Panel C: High Tech Manufacturing

Model	Dependent	ABRET	Lag	EVA	EPS	INV	AR	GM	SNA	ETR	PVE	R^2	RSS
	Variable		ABRET	LEV	LEV						LEV	N	MSS
1 – Reduced	ABRET			-0.50	1.11	-0.04	0.00	-0.34	-0.23	-0.12		0.14	
	OLS			-4.51	7.31	-2.32	0.08	-5.58	-4.18	-0.75		2,685	
2 – Full	PVELEV	0.20	0.06	-0.98	1.78	-0.03	0.01	-0.19	-0.17	-0.07		0.36	
	OLS	17.55	5.73	-15.94	20.85	-2.52	0.51	-5.59	-5.49	-0.84		2,685	
2 – Reduced	PVELEV			-1.05	2.00	-0.03	0.01	-0.29	-0.25	-0.11		0.28	
	OLS			-16.14	22.22	-3.07	0.72	-8.15	-7.52	-1.16		2,685	
3a – System	ABRET			0.23	-0.27	-0.02	-0.01	-0.14	-0.06	-0.04	0.69	0.19	
	2SLS			1.71	-1.26	-1.10	-0.22	-2.20	-1.10	-0.29	8.82	2,685	

Panel D: All Other Industries

Model	Dependent	ABRET	Lag	EVA	EPS	INV	AR	GM	SNA	ETR	PVE	R^2	RSS
	Variable		ABRET	LEV	LEV						LEV	N	MSS
1 – Reduced	ABRET			-0.39	1.07	-0.05	0.03	-0.18	-0.20	-0.03		0.18	
	OLS			-7.05	15.16	-3.87	2.09	-7.29	-7.08	-0.35		7,799	
2 – Full	PVELEV	0.18	0.07	-0.81	1.90	-0.02	0.01	-0.12	-0.06	-0.18		0.42	
	OLS	25.69	9.40	-23.22	41.83	-3.11	1.15	-7.52	-3.12	-3.43		7,799	
2 – Reduced	PVELEV			-0.87	2.14	-0.03	0.02	-0.17	-0.12	-0.19		0.37	
	OLS			-24.07	45.84	-4.02	1.73	-10.70	-6.22	-3.44		7,799	
3a – System	ABRET			-0.00	0.13	-0.03	0.02	-0.10	-0.15	0.05	0.44	0.20	787.80
	2SLS			-0.07	1.27	-2.79	1.64	-4.21	-5.42	0.67	11.79	7,799	205.75

Panel E: Analysts' Contribution in Different Industries

Sample	Adj-R^2 - Eq. 1's Reduced Form	**%Analysts' Contribution**	Adj-R^2 Eq. 3a	% Market Feedback	Adj-R^2 - Eq. 1's full model	% Perceived Contribution
Regulated Industries	0.41	**2.4**	0.42	2.4	0.43	4.9
Low-Tech Manufacturing	0.18	**27.8**	0.23	17.4	0.27	50.0
High-Tech Manufacturing	0.14	**35.7**	0.19	21.1	0.23	64.3
Other Industries	0.18	**11.1**	0.20	20.0	0.24	33.3

Table 5

Analysts' Contribution as a Function of R&D Intensity

Panel A: Companies with Low R&D Capital

Model	Dependent Variable	ABRET	Lag ABRET	EVA LEV	EPS LEV	INV	AR	GM	SNA	ETR	PVE LEV	R^2 N	RSS MSS
1 – Reduced	ABRET			-0.45	1.37	-0.02	0.02	-0.13	-0.14	-0.14		0.20	
	OLS			-6.75	16.22	-2.73	0.99	-5.64	-4.85	-1.52		5,739	
2 – Full	PVELEV	0.17	0.05	-1.09	2.48	0.01	-0.00	-0.04	-0.02	-0.22		0.49	
	OLS	20.54	6.10	-25.92	45.63	1.52	-0.46	-2.89	-0.84	-3.76		5,739	
2 – Reduced	PVELEV			-1.16	2.74	0.00	-0.00	-0.08	-0.05	-0.24		0.45	
	OLS			-26.73	49.91	0.64	-0.11	-5.06	-2.61	-4.02		5,739	
3a – System	ABRET			0.11	0.04	-0.03	0.02	-0.09	-0.12	-0.02	0.49	0.22	573.61
	2SLS			1.31	0.24	-3.03	1.06	-4.12	-4.14	-0.26	9.88	5,739	169.37

Panel B: Companies with Medium R&D Capital

Model	Dependent Variable	ABRET	Lag ABRET	EVA LEV	EPS LEV	INV	AR	GM	SNA	ETR	PVE LEV	R^2 N	RSS MSS
1 – Reduced	ABRET			-0.53	1.22	-0.04	0.12	-0.15	-0.15	-0.08		0.18	
	OLS			-6.28	11.24	-2.91	4.85	-4.25	-3.80	-0.59		3,898	
2 – Full	PVELEV	0.17	0.07	-1.20	2.33	-0.02	0.02	-0.13	-0.04	0.11		0.46	
	OLS	18.12	7.64	-23.81	35.58	-2.02	1.23	-6.39	1.60	1.41		3,898	
2 – Reduced	PVELEV			-1.28	2.56	-0.03	0.04	-0.18	-0.09	0.09		0.41	
	OLS			-24.33	38.04	-2.98	2.67	-8.40	-3.80	1.08		3,898	
3a – System	ABRET			0.09	-0.04	-0.03	0.10	-0.06	-0.10	-0.12	0.49	0.20	343.36
	2SLS			0.86	-0.20	-2.07	4.18	-1.68	-2.72	-0.96	8.54	3,898	87.77

Panel C: Companies with High R&D Capital

Model	Dependent Variable	ABRET	Lag ABRET	EVA LEV	EPS LEV	INV	AR	GM	SNA	ETR	PVE LEV	R^2 N	RSS MSS
1 – Reduced	ABRET			-0.40	0.84	-0.07	-0.05	-0.34	-0.23	-0.03		0.15	
	OLS			-4.74	7.56	-3.55	-1.60	-6.64	-4.64	-0.27		3,254	
2 – Full	PVELEV	0.22	0.08	-0.78	1.44	-0.03	0.02	-0.17	-0.15	-0.15		0.33	
	OLS	19.29	7.15	-14.47	20.19	-2.26	0.97	-5.15	-4.66	-2.00		3,254	
2 – Reduced	PVELEV			-0.84	1.64	-0.04	0.01	-0.28	-0.24	-0.19		0.24	
	OLS			-14.83	22.00	-3.06	0.48	-8.21	-6.92	-2.29		3,254	
3a – System	ABRET			0.02	0.01	-0.05	-0.06	-0.20	-0.12	0.06	0.50	0.18	444.48
	2SLS			0.26	0.10	-2.63	-1.85	-3.90	-2.35	0.53	9.90	3,254	103.70

Panel D: Analysts' Contribution in Companies with Low, Medium, High R&D Capital

Sample	Adj-R^2 - Eq. 1's Reduced Form	**%Analysts' Contribution**	Adj-R^2 Eq. 3a	% Market Feedback	Adj-R^2 - Eq. 1's full model	% Perceived Contribution
Low R&D Capital	0.20	**10.0**	0.22	18.2	0.26	30.0
Medium R&D Capital	0.18	**11.1**	0.20	20.0	0.24	33.3
High R&D Capital	0.15	**20.0**	0.18	27.8	0.23	53.3

Table 6
Analysts' Contribution in Periods of Low versus High GDP Growth

Panel A: 1990s With Low GDP Growth (1990-92)

Model	Dependent Variable	ABRET	Lag ABRET	EVA LEV	EPS LEV	INV	AR	GM	SNA	ETR	PVE LEV	R^2 N	RSS MSS
1 – Reduced	ABRET			-0.36	1.03	-0.03	0.01	-0.35	-0.29	-0.18		0.14	
	OLS			-3.32	7.40	-2.00	0.44	-7.10	-5.39	-1.17		2,492	
2 – Full	PVELEV	0.19	0.10	-1.18	2.23	0.04	0.04	-0.02	-0.09	-0.45		0.39	
	OLS	15.33	7.91	-17.41	25.55	3.86	1.97	-0.52	-2.69	-4.79		2,492	
2 – Reduced	PVELEV			-1.18	2.40	0.03	0.04	-0.12	-0.18	-0.51		0.32	
	OLS			-16.59	26.29	2.86	1.95	-3.56	-5.22	-5.20		2,492	
3a – System	ABRET			0.14	0.01	-0.04	-0.00	-0.30	-0.21	0.04	0.43	0.16	290.27
	2SLS			1.06	0.04	-2.89	-0.11	-6.27	-3.97	0.29	5.94	2,492	57.10

Panel B: 1990s with High GDP Growth (1994-1997)

Model	Dependent Variable	ABRET	Lag ABRET	EVA LEV	EPS LEV	INV	AR	GM	SNA	ETR	PVE LEV	R^2 N	RSS MSS
1 – Reduced	ABRET			-0.91	1.53	-0.02	0.00	-0.16	-0.25	-0.11		0.07	
	OLS			-8.35	11.28	-1.42	0.15	-5.05	-6.89	-0.81		4,175	
2 – Full	PVELEV	0.16	0.04	-0.95	2.02	-0.02	-0.00	-0.11	-0.08	-0.20		0.32	
	OLS	18.18	4.04	-14.93	25.12	-2.67	-0.28	-5.77	-3.67	-2.58		4,175	
2 – Reduced	PVELEV			-1.10	2.29	-0.02	-0.00	-0.14	-0.14	-0.23		0.27	
	OLS			-16.70	27.86	-2.99	-0.19	-7.70	-6.13	-2.81		4,175	
3a – System	ABRET			-0.15	-0.04	-0.00	0.00	-0.06	-0.16	0.05	0.69	0.10	509.15
	2SLS			-1.25	-0.20	-0.18	0.23	-1.84	-4.35	0.36	11.69	4,175	59.51

Panel C: Analysts' Contribution in Periods of High and Low GDP Growth

Sample	Adj-R^2 - Eq. 1's Reduced Form	**%Analysts' Contribution**	Adj-R^2 Eq. 3a	% Market Feedback	Adj-R^2 - Eq. 1's full model	% Perceived Contribution
Low GDP Growth (1990-92)	0.14	**14.3**	0.16	31.2	0.21	50.0
High GDP Growth (1994-97)	0.07	**42.9**	0.10	40.0	0.14	100.0

Table 7
Factors Associated with the Contribution of Analysts to Valuation

1. The dependent variable is the absolute value of the difference between the present value of forecasted earnings over a five year horizon and five times current earnings, as follows: $DIFF_{it}$ = ABS[$PVELEV_{it}$ – 5x$EPSLEV_{it}$].
2. Explanatory variables include: *Beta* - Firm specific systematic risk; *Size* – Log of market value of equity; *R&D* Indicator – 0 if the firm has zero *R&D* capital, 1 if *R&D* capital is positive, and 2 if *R&D* capital exceeds 15% of book value of equity.
3. The model: $DIFF_{it} = \beta_{0t} + \beta_{1t}Beta_{it} + \beta_{2t}Size_{it} + \beta_{3t}RNDIND_{it} + \eta_{it}$
4. Negative earnings are eliminated. T-statistics are below the coefficients.
5. Pooled Models – Each model includes industry (2-digit SIC code) and year dummies, which are not reported.

Panel A: Descriptive Statistics

Variable	N	Mean	Median	Std. Dev.	25th Percentile	75th Percentile
DIFF	16,667	0.180	0.14	0.15	0.08	0.23
Beta	16,667	1.050	1.02	0.46	0.74	1.31
Size	16,659	6.45	6.36	1.58	5.31	7.50
R&D Indicator	16,667	0.60	0.00	0.77	0.00	1.00
EPSCHA	16,667	0.02	0.01	0.09	-0.00	0.01

Sample	Beta	Size	*R&D* Indicator	EPS CHA	R^2 N
82-87	-0.02	-0.01	0.01	0.14	0.11
	-3.52	-3.44	1.02	4.90	4,766
88-92	0.01	-0.01	0.02	0.17	0.10
	1.81	-5.90	3.69	7.88	5,080
93-97	-0.01	-0.01	0.02	0.33	0.11
	-1.37	-4.54	4.25	16.43	6,813
Pooled 82-97	-0.01	-0.01	0.01	0.24	0.10
	-3.02	-8.09	5.63	18.52	16,659