Can Analysts Detect Earnings Management: Evidence from Firm Valuation

By

Lucie Courteau[a]

Jennifer L. Kao[b]

and

Yao Tian[c]

July 2011
(Preliminary version, please do not quote without the authors' permission)

a. School of Economics and Management, Free University of Bolzano, Bolzano, Italy, Tel: +39 0471 013130; Email: Lucie.Courteau@unibz.it

b. Department of AMIS, University of Alberta, Edmonton, Alberta, Canada, Tel: (780) 492-7972; Email:Jennifer.Kao@ualberta.ca

c. Department of AMIS, University of Alberta, Edmonton, Alberta, Canada, Tel: (780) 492-8008; Email:yao.tian@ualberta.ca

---

Acknowledgments. We would like to thank Gord Richardson, workshop participants at the University of Bocconi and participants at the Annual Conference of the European Accounting Association, in Rome, for their helpful comments on an earlier version of the paper. Financial support for this project is provided by the University of Alberta (SSHRC 4A and Canadian Utilities fellowship) and the Free University of Bolzano.

Can Analysts Detect Earnings Management: Evidence from Firm Valuation

Abstract: In this paper, we present empirical evidence on whether financial analysts can see through earnings management and whether their earnings and cash flow forecasts take into account the effect of accrual manipulations. Prior studies looking into analyst behaviour vis-à-vis earnings management have typically drawn inferences from the direction or magnitude of analyst earnings forecast errors. Interpreting low earnings forecast errors as absence of accrual manipulations is nonetheless problematic. As well, lower earnings forecast errors do not necessarily imply higher forecast quality.

We overcome these methodological difficulties by employing an alternative research design that focuses on the valuation usefulness of analyst earnings and cash flow forecasts, measured by the absolute value of percentage valuation errors under the RIM and DCF models, using three- or five-year *ex-post* intrinsic value as the benchmark. Large valuation errors imply that a model is less useful for valuation purposes. Regressing valuation errors on the extent of accrual manipulations (DACC), we find that the coefficient estimate on DACC is positive and significant in the RIM regression, but insignificantly different from zero in the DCF regression. Results continue to hold when we re-define valuation benchmark as stock price at the forecast date, implying that analysts can see through earnings management but choose to forecast managed earnings while adjusting cash flow forecasts to reflect earnings management. Taken together, these results suggest that analysts issue earnings forecasts strategically and that large valuation errors do not reflect analysts' inability to detect and incorporate the consequences of earnings management in their earnings forecasts.

JEL Classification: M41

Key Words: Analyst Forecasts; Earnings Management; Valuation Errors

1. Introduction

Earnings are used extensively to evaluate firm performance and estimate firm value. The majority of the 400 CFOs surveyed by Graham, Harvey and Rajgopal (2005) believe that earnings, not cash flows, are the key metric used by outside stakeholders. However, evidence suggests that earnings are often subject to managerial manipulations. Such manipulations, driven by the pressure to meet or beat earnings expectations, are believed to have eroded the quality of earnings and led to highly publicized corporate scandals such as Enron and WorldCom in the early 2000s. The perceived erosion of financial reporting quality in turn prompted the US Congress to pass the Sarbanes-Oxley Act (SOX) on July 30, 2002 with the stated objective of restoring investor confidence in financial and public reporting. The role earnings management plays in the capital market depends on whether at least some of the market participants can detect such practice. Research has shown that the accrual component of earnings is not as persistent as the cash flow component of earnings (Sloan 1996) and that the lack of persistence is driven mainly by the discretionary component of the accruals (Xie 2001). However, investors do not seem to recognize the difference in the persistence of different income components – they overreact to the accrual component of earnings and underreact to the cash flow component.

The purpose of this study is to examine whether sophisticated market participants, such as financial analysts, can detect accrual manipulations and if so whether they take into consideration accrual manipulations in their forecasts. Evidence from prior research in this area is mixed (Givoly, Hayn and Yoder 2008). On one hand, several studies have shown that firms with unusually large accruals have large negative earnings forecast errors, defined as the difference between realized earnings and forecasted earnings (Abarbanell and Lehavy 2003; Bradshaw, Richardson and Sloan 2001). Ahmed, Nainar and Zhou (2005) also find that analysts give discretionary accruals the same weight as non-discretionary accruals when

forecasting future earnings, even though the former is less persistent. Finally, Hribar and Jenkins (2004) report that analysts do not anticipate the consequence of earnings management that leads to restatements later on. Collectively, results from these studies suggest that analysts cannot detect earnings management, or at least do not fully account for its effect on firm future performance in their forecasts. Other researchers however show that analysts can detect and account for accrual manipulations. Burgstahler and Eames (2003) for example find that analysts have some ability to identify firms that may have engaged in earnings management to avoid small earnings declines. Liu (2004) also reports that analyst forecasts are on average below (above) the level obtained when strategic incentives are not at play for firms with negatively (positively) skewed earnings. The observed patterns of analyst forecasts reported in these two studies support the notion that financial analysts are able to anticipate the prospect of accrual manipulations and that they take into account that expectation in their forecasts to avoid large optimistic or large pessimistic forecast errors.

The aforementioned studies draw inferences about how analysts deal with accrual manipulations from the direction or magnitude of analyst earnings forecast errors. However, since earnings forecast errors can be artificially reduced if analysts choose to forecast managed earnings, looking at analyst earnings forecast errors alone cannot tell us whether analysts can detect accrual manipulations and choose to forecast managed earnings, or they cannot detect accrual manipulations and simply follow management's earnings guidance to achieve higher forecast accuracy. Further complications arise from uncertainty about whether financial analysts forecast managed or unmanaged earnings in practice given their economic incentives and reputation concerns. Burgstahler and Eames (2003) show that the distribution of analyst earnings forecasts has a 'kink' around zero, much like that for the distribution of earnings documented in Dechow, Richardson and Tuna (2003), implying that analysts forecast *managed* earnings. Evidence from the expectations management literature suggests a

complex interplay between managers and financial analysts. To meet or beat analyst forecasts, managers have a strong incentive to guide the forecasts downward from the beginning to the end of the year (Richardson, Teoh and Wysocki 2004; Bartov, Givoly and Hayn 2002). From analysts' perspective, it may be rational to issue optimistic earnings forecasts even if they are aware of the manager's incentive to manage earnings, as such forecasts will yield smaller forecast errors (Beyer 2008). Another problem with looking at analyst forecast errors is that lower earnings forecast errors do not necessarily imply higher forecast quality. O'Brien (1988) argues that forecast quality should ultimately depend on the context in which forecasts are used.

In light of the difficulties in inferring analyst behaviour *vis-à-vis* earnings management from analyst earnings forecast errors, we employ a different research design that focuses on the valuation usefulness of analyst earnings and cash flow forecasts in this study. We define valuation usefulness as the valuation errors between firm value computed from the residual income (RIM) or discounted cash flows (DCF) model that uses earnings or cash flow forecasts as inputs and *ex-post* measure of intrinsic firm value (calculated as the sum of actual dividends over a three-year (or five-year) horizon and market price at the horizon, discounted at the industry cost of equity (Subramanyam and Venkatachalam 2007)). Following O'Brien (1988), we view forecast quality as the ability of analyst forecasts to incorporate information, such as accrual manipulations, that is relevant for firm valuation.

Our research design calls for comparing the valuation usefulness of analyst earnings (or cash flow) forecasts in a setting where there is earnings management versus where there is not. We consider the following three scenarios: First, analysts can see through earnings management, but choose to forecast managed earnings in order to minimize earnings forecast errors. In this case, analysts would apply their knowledge about earnings management to

adjust their cash flow forecasts because they also want to minimize cash flow forecast errors.[1] Thus, using earnings forecasts in firm valuation based on RIM will yield relatively larger valuation errors for accrual manipulators, whereas using cash flow forecasts based on DCF will result in similar valuation errors with or without the presence of reporting bias. Second, analysts can see through earnings management and choose to forecast pre-managed earnings even though doing so will produce larger earnings forecast errors. In this scenario, earnings management is not expected to affect valuation errors for either RIM or DCF model, as both earnings and cash flow forecasts are based on the persistent part of reported earnings. Third, analysts cannot see through earnings management and use reported earnings as a basis for their earnings and cash flow forecasts. For accrual manipulators, part of the current earnings that serve as a basis for forecasts is managed and hence is purely transitory. Yet analysts incorporate the transitory component as if it were persistent, resulting in higher valuation errors under both RIM and DCF, compared to the case when there is no earnings management.

To carry out the analysis, we use earnings and cash flow forecasts provided by Value Line (VL) analysts because VL provides both types of forecasts for all firms that it follows. Moreover, VL analysts are in-house and, unlike analysts contributing forecasts to IBES, they are not subject to investment banking relations, thus limiting VL analysts' incentives to play the earnings management game in cooperation with management (Brav, Lehavy and Michaely 2005). Our sample is drawn from an eleven-year (1990–2000) period that pre-dates major corporate scandals and the ensuing legislative events, allowing us to better isolate the effect of earnings management on the earnings and cash flow forecasts. In our main analysis, the final sample consists of 4,586 firm-year observations with complete annual financial/stock price information and forecast data. We measure the extent of accrual

[1] Call, Chen and Tong (2009) for example show that more accurate cash flow forecasts can yield favourable career outcomes for analysts and reduce the likelihood of their being fired.

management by the absolute value of the discretionary accruals estimated from a version of the Dechow et al.'s (2003) forward-looking modified Jones model (FLMJ).

Results indicate that the ability of the RIM model to predict firm value is diminished by the presence of earnings management, whereas the valuation usefulness of the DCF model remains unchanged. These results are consistent with the predictions of the first scenario, referred to above. That is, analysts can see through earnings management, but choose to forecast managed earnings while at the same time take earnings management into consideration in their cash flow forecasts. This behaviour suggests that analyst earnings forecasts are strategic in nature and that large valuation errors associated with using such forecasts as inputs in the RIM model do not reflect analysts' inability to detect, and incorporate the consequences of, earnings management in their earnings forecasts.

Our study sheds light on the role played by financial analysts in interpreting and disseminating financial information. We present evidence that analysts' ability to detect earnings management and incorporate such information into their forecasts can directly affect firm valuation when there is reporting bias. We also contribute to the valuation literature, which has traditionally used analyst forecasts as part of the inputs for firm valuation. While including analyst forecasts in valuation models has been shown to improve the ability of these models to predict firm value (Lee, Myers and Swaminathan 1999; Frankel and Lee 1998), we show that the valuation usefulness of analyst earnings forecasts may be greatly diminished during a time when a non-trivial number of firms are believed to have engaged in earnings management practice. Finally, our study is of practical relevance. Earnings are used extensively to evaluate firm performance and estimate firm value in practice (Skinner and Sloan 2002). However, when earnings are managed, heavy reliance on this number in firm valuation may result in inaccurate assessment, undesirable investment decisions and misallocation of resources. We quantify this effect and raise awareness among investors and

practitioners about the pitfalls of taking managed earnings at face value and using them directly in firm valuation.

The remainder of the paper is organized as follows: Section 2 reviews the relevant literature and develops the hypotheses; Section 3 discusses the research methodology, along with variable definitions and measurements; Section 4 summarizes our sample selection procedure; Section 5 presents the main empirical findings; and Section 6 concludes the study.

2. Literature Review

Earnings Management

Healy and Wahlen (1999) remark that "... earnings management occurs when managers use judgment in financial reporting and structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers." Studies have shown that firms often manage their earnings in advance of IPOs and seasoned equity offerings (Erickson and Wang 1999; Teoh, Welch and Wong 1998a; Teoh, Welch and Wong 1998b; Dechow, Sloan and Sweeney 1996) and that firms involved in earnings manipulations or singled out by the SEC for accounting enforcement actions generally have weak internal governance (Farber 2005; Bédard, Marrakchi-Chtourou and Courteau 2004; Klein 2002; Beasley 1996; Dechow et al. 1996).

Several factors have been cited as contributing to a firm's motivation to meet or beat earnings targets by managing reported earnings. First, the stock market tends to punish firms for falling short of earnings expectations (Skinner and Sloan 2002). In particular, firms maintaining strings of steadily increasing earnings are rewarded with market premiums and are severely punished as soon as the strings are broken (Myers, Myers and Skinner 2006;

Barth, Elliott and Finn 1999). Second, meeting or beating earnings targets allows executives to enhance their reputation with stakeholders, enjoy better terms of trade and achieve higher bonus compensations (DeGeorge, Patel and Zeckhauser 1999; Burgstahler and Dichev 1997; Bowen, DuCharme and Shores 1995; Healy 1985). Failing to meet earnings expectations could result in reputation loss and pay cuts for CEOs (Matsunaga and Park 2001).

Countering these incentives to meet or beat earnings targets are the capital market consequences that firms face when their alleged earnings manipulations become public (Dechow et al. 1996). If the market is efficient, then its participants should be able to spot earnings management practices and undo manipulations to reflect real economic earnings for use in firm valuation. However, corporate disclosures often do not contain sufficient information for the investors to infer accounting accruals, limiting their ability to account for earnings management (Gleason and Mills 2008; Baber, Chen and Kang 2006; Balsam, Bartov and Marquardt 2002).

Analysts' Reaction to Earnings Management

Empirical evidence on whether sophisticated users of accounting information, such as financial analysts, can see through earnings management and include its future effects in their forecasts is mixed. Bradshaw, Richardson and Sloan (2001) for example find large negative earnings forecast errors (optimism) for firms with unusually large accruals. Abarbanell and Lehavy (2003) report a similar association between analyst optimism and three types of accruals: large income-decreasing accruals used in a loss year to accumulate reserves for future years; small income-decreasing accruals to bring the earnings down to the target level in profitable years and replenish accrual reserves; income-increasing accruals to meet or just beat earnings targets. Regressing earnings and earnings forecasts on previous year's earnings components, Ahmed, Nainar and Zhou (2005) show that discretionary accruals are given the

same weight as non-discretionary accruals by analysts in forecasting future earnings even though they are less persistent. Finally, for 259 of their 292 restatement observations Hribar and Jenkins (2004) find that at least one analyst revised his earnings forecasts downwards following restatements and that the average revisions were -14.7% for the one-year ahead forecasts and -7.8% for two years ahead. Taken together, the results of these studies are consistent with the notion that analysts cannot detect earnings management or fully reflect its implications for future performance in their forecasts.

However, it is possible that analysts can see through earnings management, but for strategic reasons choose to forecast *managed* rather than *pre-managed* earnings. The strategic incentives arise because most analysts are rewarded, financially or reputationally, for their ability to issue accurate earnings forecasts (Hong and Kubik 2003; Mikhail, Walther and Willis 1997). Thus, analysts may be motivated to minimize forecast errors by strategically adjusting their earnings forecasts upwards or downwards to fit the managed, rather than the pre-managed, earnings. Evidence from the expectations management literature supports this view. According to Richardson et al. (2004) and Bartov et al. (2002), analysts cooperate with management in the earnings game by issuing optimistic forecasts at the beginning of the year to demonstrate their confidence in the firm. This is then followed by downward forecast revisions during the year at the management's guidance, allowing the firm to meet or beat earnings expectation and the analysts to lower their forecast errors at the end of the year - a win-win situation for both parties.

3. Research Methodology

Accrual Management

We measure the extent of accrual management by the absolute value of the discretionary accruals, estimated by year for each two-digit SIC code based on the following modified version of the Dechow et al.'s (2003) FLJM model:[2]

$$TA_{i,t} / A_{i,t-1} = \alpha_t \left[\frac{1}{A_{i,t-1}} \right] + \beta_{1t} \left[\frac{(1+k)\Delta Sales_{i,t} - \Delta AR_{i,t}}{A_{i,t-1}} \right] + \beta_{2t} \left[\frac{PPE_{i,t}}{A_{i,t-1}} \right] + \beta_{3t} \left[\frac{TA_{i,t-1}}{A_{i,t-1}} \right] + \varepsilon_{i,t}, \qquad (1)$$

where total accruals (*TA*) are defined as the difference between net income before extraordinary items (COMPUSTAT variable *IB*) and cash flows from operations (COMPUSTAT variable *OANCF*); parameter *k* represents the slope coefficient from a regression of change in sales on change in receivables, and captures the expected change in receivables for a given change in sales; $\Delta Sales_{i,t}$ and $\Delta AR_{i,t}$ represent the annual change in revenue and in accounts receivables, respectively; $PPE_{i,t}$ is current year gross property, plant and equipment; $TA_{i,t-1}$ is lagged total accruals.[3] We include lagged total accruals in the model to capture the portion of accruals that are predictable based on the prior year's level of accruals, including the extent to which accruals are reversible. All terms are scaled by lagged total assets ($A_{i,t-1}$). $\varepsilon_{i,t}$ is a zero-mean random error and forms our estimate of the discretionary component of accruals.

Valuation Usefulness

We use RIM (DCF) as the representative earnings- (non-earnings-) based valuation model and estimate intrinsic values (IV) for each firm-year observation on the valuation date t as indicated below:

[2] Dechow et al. (2003) show empirically that this model performs better than other versions of the Jones (1991) model in terms of explanatory power.

[3] We do not include the final term of the FLJM, i.e., expected sales growth, typically calculated as the difference between current and next period sales scaled by current sales because we do not want to use forward-looking information that is not available to the analyst at the time of estimating the model.

$$\mathrm{IV}_{\mathrm{t}}^{\mathrm{RIM}} = B_t + \sum_{\tau=1}^{T} R^{-\tau} E_t\left(X_{t+\tau}^{a}\right) + R^{-T}(R-1-g)^{-1} E_t\left(X_{t+T+1}^{a}\right); \tag{2}$$

$$\begin{aligned}\mathrm{IV}_{\mathrm{t}}^{\mathrm{DCF}} = {} & FA_t + \sum_{\tau=1}^{T} R^{-\tau} E_t\left(C_{t+\tau} - I_{t+\tau} + i_{t+\tau} - (R-1)FA_{t+\tau-1}\right) \\ & + R^{-T}(R-1-g)^{-1} E_t\left(C_{t+T+1} - I_{t+T+1} + i_{t+T+1} - (R-1)FA_{t+T}\right).\end{aligned} \tag{3}$$

The valuation date t is defined as the first VL forecast date made after Year t's earnings announcement, but not more than 30 days after the first quarterly earnings announcement for Year t+1. The variable R is one plus the cost of equity capital. In Equation 2, B_t denotes current book value[4] and $X_{t+\tau}^{a}$ the residual income for forecast year t+τ. In Equation 3, FA_t denotes current net financial assets, $C_{t+\tau}$ the expected cash flows, $I_{t+\tau}$ the expected investments, $i_{t+\tau}$ the expected return on the previous year's financial assets and $C_{t+\tau} - I_{t+\tau} + i_{t+\tau} - (R-1)FA_{t+\tau-1}$ the residual free cash flows to common for forecast year t+τ.[5]

Assuming that residual income ($X_{t+\tau}^{a}$) and free cash flows ($C_{t+\tau} - I_{t+\tau} + i_{t+\tau} - (R-1)FA_{t+\tau-1}$) grow in simple perpetuity at a constant rate of g beyond the forecast horizon t+T, we estimate terminal values for Equations 2 and 3 as $X_{t+T+1}^{a} = (1+g)\left[X_{t+T} - (R-1)B_{t+T}\right]$ and $\left(C_{t+T+1} - I_{t+T+1} + i_{t+T+1} - (R-1)FA_{t+T}\right) = (1+g)\left[\left(C_{t+T} - I_{t+T} + i_{t+T}\right) - (R-1)FA_{t+T}\right]$, respectively, where the constant growth rate is set at 2%, which approximates the rate of inflation during our sample period (Penman and Sougiannis 1998).

Valuation usefulness is measured by the absolute value of percentage valuation errors, defined as the difference between estimated intrinsic value for each firm-year observation calculated according to Equation 2 (Equation 3) for the RIM (DCF) model and a valuation

[4] We use the first year's earnings and dividend forecasts to update book value B_t to the forecast date.
[5] This version of the DCF model, proposed by Penman (1997), avoids measurement problems associated with estimating the weighted average cost of capital under an equivalent version of DCF model discussed in many valuation textbooks.

benchmark, scaled by the latter. Larger absolute percentage valuation errors imply that a model is less useful for valuation purposes. We use *ex post* intrinsic value (IV) as the valuation benchmark, calculated as the sum of actual dividends over a three-year (or five-year) horizon and market price at the horizon, discounted at the industry cost of equity (Subramanyam and Venkatachalam 2007).[6]

Research Model

We use the following multivariate regression models:

$$AE\_RIM = a_0 + a_1 DACC + a_2 BM + a_3 ES + a_4 Std\_ROE + \varepsilon_1, \quad (4)$$

$$AE\_DCF = b_0 + b_1 DACC + b_2 BM + b_3 ES + b_4 Std\_ROE + \varepsilon_2, \quad (5)$$

where the dependent variable *AE_RIM (AE_DCF)* denotes the absolute percentage valuation errors for each firm-year observation under RIM (DCF); *DACC* is the test variable given by the absolute value of the residuals from Equation 1. Equations 4 and 5 also include three control variables found to affect the predictability of earnings in prior literature:[7] (1) Book-to-Market ratio (*BM*), defined as book value per share over stock price, measured at the end of Year t; (2) Earnings shock (*ES*), defined as the absolute value of the change in net income from Year t–1 to Year t, scaled by opening total assets; (3) Standard deviation of return on equity (*Std_ROE*) over a 5-year period immediately preceding the end of Year t.

The estimated coefficient a_1 (b_1) captures the impact of accrual manipulations on the valuation usefulness of analyst earnings (cash flow) forecasts in firm valuation based on the RIM (DCF) model. A positive and significant a_1 (b_1) implies that the RIM (DCF) model is less useful for firm valuation in the presence of reporting bias. On the other hand, if the

[6] The ex-post intrinsic value is based on stock prices at the end of three-year horizon, as studies have found that the anomalous pricing of accruals and cash flows does not persist beyond two years (Xie 2001; Sloan 1996).
[7] See Lang and Lundholm (1996), Kross, Ro and Schroeder (1990) and Brown, Richardson and Schwager (1987).

coefficient estimate on the test variable *DACC* (i.e., a_1 or b_1) is insignificantly different from zero, then the valuation usefulness is said to be unaffected by accrual manipulations for the model in question.

Predictions

Our interest in this study is to investigate the ability of financial analysts to detect accrual manipulations and whether they incorporate such information into their earnings and cash flow forecasts. To address these two research questions, we consider the following three scenarios: (1). Analysts can see through earnings management, but choose to forecast managed earnings in order to minimize earnings forecast errors. (2). Analysts can see through earnings management and choose to forecast pre-managed earnings. (3). Analysts cannot see through earnings management and use managed earnings to construct their earnings and cash flow forecasts.

Under Scenario 1, we expect the valuation usefulness of the RIM model to be lower for accrual manipulators, i.e., firms with higher discretionary accruals. Since the incentive to minimize forecast errors likely extends to cash flow forecasts, analysts will try to correct such forecasts in order to eliminate the effect of earnings management, resulting in no difference in the valuation usefulness of the DCF model for accrual manipulators and non-manipulators. Evidence that a_1 is positive and significant in Equation 4, whereas b_1 is insignificantly different from zero in Equation 5, is consistent with Scenario 1. In Scenario 2, we expect both RIM and DCF models to have similar valuation usefulness for firms with high vs. those with low discretionary accruals, as analysts consistently base their forecasts on the persistent part of reported earnings. Thus, both a_1 and b_1 are predicted to be insignificantly different from zero. Finally, under Scenario 3 the valuation usefulness of both RIM and DCF models is expected to be lower for firms with high discretionary accruals than for firms with low

discretionary accruals. This is because analyst earnings and cash flows forecasts are both based on managed earnings which are partly transitory in nature. In this case, both a_1 and b_1 are predicted to be positive and significant.

To address the question of whether financial analysts can detect accrual manipulations, we focus on the contrasting predictions on b_1 under Scenarios 1 and 3. The notion that analysts can (cannot) see through accrual manipulations is consistent with a positive and significant coefficient estimate on a_1 and an insignificant (positive and significant) coefficient estimate on b_1. To address the question of whether financial analysts incorporate their knowledge of accrual manipulations into forecasts, we compare the contrasting predictions on a_1 under Scenarios 1 and 2. The notion that analysts remove (do not remove) the effects of accrual manipulations from their forecasts is consistent with an insignificant (positive and significant) coefficient estimate on a_1 and an insignificant coefficient estimate on b_1.

We do not offer directional predictions for any of the control variables. While unpredictable earnings due to high growth, large earnings shocks and highly volatile past returns can reduce RIM's ability to estimate a firm's intrinsic value, analyst forecasts of future cash flows may not be completely independent of these factors.

4. Sample Selection

Our initial sample consists of 39,826 annual earnings announcements made between January 1, 1990 and December 31, 2000 by publicly traded US firms with complete financial and stock price information on COMPUSTAT and CRSP, respectively, during the announcement year. Following the convention of prior literature, we exclude observations in the Financial (SIC codes 6022–6200) and Insurance (SIC codes 6312–6400) industries because they use

special accounting rules, making them unsuitable for comparison with firms in other industries.

We then apply the following four filters to the initial sample: (1) Forecasted valuation attributes are available from the Datafile and Historical Reports published by Value Line Investor Services.[8] (2) Financial data and stock price information required to compute the *ex post* intrinsic value over a three-year (or five-year) period following the fiscal year-end, are available from COMPUSTAT and CRSP, respectively. (3) Data required to construct all regression variables are available. (4) Observations in the top and bottom 1% of the distribution for each input into the valuation models and each independent variable in Equations 4-5 are considered extreme and hence are deleted from the analysis.[9] The above filters reduce the initial sample by 33,233, 1,409, 68 and 530 firm-year observations, respectively, resulting in a final sample of 4,586 firm-year observations summarized in Panel A of Table 1.

Panel B of Table 1 presents the distribution of our sample by year. With the exception of 1990, the observations are fairly evenly distributed over the eleven-year (1990-2000) sample period, ranging from a low 7.52% in 2000 to a high of 10.68% in 1994. As is evident in Panel C of Table 1, the industry distribution shows quite an even representation across most sectors, as defined in Fama and French (1993), except for the Utilities industry which accounts for 12.54% of the firms included in the sample. This is a reflection of the deregulation of the energy sector in the 1990s.

[8] We choose not to use IBES forecast data in this study because, compared to VL, IBES provides a more limited range of forecasted valuation attributes that excludes cash flow forecasts for a large proportion of the firms covered (Givoly, Hayn and Lehavy 2009). Moreover, unlike VL whose forecasts are provided by a single in-house analyst, analysts contributing to IBES generally have investment banking relationships with the firms they follow, potentially affecting their incentives to issue unbiased forecasts. Finally, recent studies find that analyst earnings forecasts are more accurate when accompanied by cash flow forecasts (Call et al. 2009) and target price forecasts (Gell, Homburg and Klettke 2010). VL analysts provide all three for all the firms that they follow.

[9] All the regression results without trimming (not reported) are qualitatively similar.

[Insert Table 1 about Here]

5. Empirical Results

5.1 Descriptive Statistics

Panel A of Table 2 reports the descriptive statistics on all the model variables in Equations 4 and 5. The mean (median) market value of our sample firms is $3.13 billion ($1.13 billion). While firms followed by Value Line are in general large, some smaller firms are also included in the coverage, as evidenced in large standard deviation of market value (i.e., $8.73 billion). The mean absolute discretionary accruals represent 4% of total assets (*DACC*). The overall mean (median) absolute percentage valuation errors are 0.412 (0.386) for the earnings-based RIM model and 0.484 (0.427) for the non earnings-based DCF model. These figures are also in line with those documented in the valuation literature. [10]

Panel B of Table 2 presents pair-wise Pearson (Spearman) correlations among our model variables in Equations 4 and 5, appearing above (below) the diagonal. The Pearson correlation between the level of discretionary accruals (*DACC*) and *AE_RIM* is significantly positive at the 1% level (0.070), whereas that between *DACC* and *AE_DCF* is insignificantly different from zero. These pair-wise correlations offer preliminary evidence at the univariate level that discretionary accruals adversely affect valuation usefulness of RIM, but not DCF model (Scenario 1). Two of the control variables, *ES* and *Std_ROE*, have positive Pearson correlations with *AE_RIM* (*AE_DCF*), i.e., 0.111 and 0.111 (0.029 and 0.092), significant at the 5% level or better. The correlation between *AE_DCF* and the remaining control variable *BM* is also significantly positive (0.055), while *AE_RIM* is negatively correlated with *BM* (-0.065). The Spearman correlations show a similar pattern, except that the positive correlation between *AE_DCF* and *BM* becomes negative but insignificant. These descriptive statistics

[10] Courteau, Kao and Richardson (2001) for example report that over a five-year sample period (1992-1996) the mean absolute percentage pricing errors for their DCF and RIM models are 0.397 and 0.372, respectively.

point to the need to control for all three variables in the analysis of valuation accuracy of RIM and DCF, as we do in a multivariate setting.[11]

[Insert Table 2 about Here]

5.2 Univariate Analysis

Table 3 presents the mean and median absolute valuation errors, compared across three groups of firms based on their level of absolute discretionary accruals. Three-year (five-year) absolute percentage valuation errors are based on ex-post intrinsic values computed from dividends and stock prices over a period of three (five) years after the current fiscal year-end. The three-year RIM valuation errors show a progressive increase between the low-DACC and the high-DACC groups of firms, from 0.397 to 0.408 to 0.430, suggesting that the errors increase with the level of earnings management. The difference in mean valuation errors between the High and the Low DACC groups is significantly positive, at the 1% level (0.033, t=3.26). The DCF valuation errors don't seem to follow the same pattern, however. The mean errors are 0.489, 0.475 and 0.488 for the Low, Medium and High groups, respectively. Moreover, the small difference between the valuation errors of the High and the Low groups is not statistically significant (-0.001, t=-0.11). Hence, the performance of the earnings-based valuation model seems to be adversely affected by the level of earnings management, while the cash flow-based model seems unaffected. Together, these results are consistent with Scenario 1 described in Section 3: the VL analysts can see through earnings management and use this knowledge to prepare their cash flow forecasts, but choose to forecast *managed* rather than *pre-managed* earnings.

The second part of Panel A shows the results of the same tests using *ex-post* dividends and stock prices over a five-year horizon as a benchmark for measuring valuation errors.[12]

[11] The variance inflation factors of the regressions are all close to 1, indicating no serious problems of collinearity among the control variables.

While the RIM errors do not show the same progressive increase as for the three-year benchmark, they are still significantly higher for the High-DACC than for the Low-DACC firms (0.445 vs. 0.477, t=2.56). The difference in mean DCF errors is again non significant. Hence, the five-year *ex-post* values yield results that are consistent with Scenario 1, although the support is somewhat weaker than with the three-year horizon benchmark.

Panel B of Table 3 presents the comparison of median absolute valuation errors across the three groups of firms. The non-parametric tests are used as a robustness check because of the deviation of our sample's distribution from normality. The results are as in Panel A: RIM median absolute errors are significantly higher for firms with high DACC than for those of the Low-DACC group, whereas the difference is not significant for the errors of the DCF model.

Taken together, the results of the univariate analysis of absolute valuation errors are consistent with the scenario where analysts can detect earnings management in the current year and are aware of the fact that the bias in current earnings can affect the future performance of the firm, but choose to forecast *managed* earnings, to maintain their record of forecast accuracy.

[Insert Table 3 about Here]

5.3 Multivariate Analysis

The quality of analyst forecasts may be influenced by several factors other than earnings management. In Table 4, we present the results of regression analyses that control for factors which are likely to affect the association between valuation errors and earnings management. As in the univariate analysis, we consider *ex-post* intrinsic values from both a three-year and

[12] The sample size is reduced from 4,585 to 4,096 firm-year observations because of the attrition that occurs when requiring five years of dividends and prices, instead of three, to compute *ex-post* intrinsic values

a five-year horizon as benchmarks for computing valuation errors. The results are presented in Panel A and Panel B, respectively.

The results in Panel A show that even when controlling for factors that may affect earnings and cash flow predictability, the relationship between RIM valuation errors and DACC is positive and significant at the 5% level (a_1=0.263, t=2.35). When we move to the AE_DCF regression, on the other hand, the coefficient on DACC is not significantly different from zero (a_1=0.075, t=0.51). These results are again consistent with Scenario 1. The control variables are all significant in the RIM regression: The fact that the firm has an earnings shock in the current year (ES), highly volatile performance (Std_ROE) or negative earnings (Loss) all make it more difficult to predict its future performance, increasing the valuation error. The variable BM, which is an inverse measure of firm growth, has a significantly negative coefficient in the RIM regression, indicating that valuation errors are higher for high-growth firms. In the DCF regression, the presence of an earnings shock in the current period (ES) does not seem to affect the valuation error, while the coefficient on growth is significantly positive. The adjusted R^2 of the two regressions are quite low (0.025 and 0.014 for the RIM and the DCF models, respectively).

In Panel B, the five-year horizon valuation benchmark is used to compute the dependent variables of the two regressions. In both models, the coefficient on DACC is positive but not significantly different from zero (a_1=0.202, t=1.47 for RIM and a_1=0.039, t=0.22 for DCF). Here, earnings management seems to affect neither the RIM nor the DCF valuation errors. This is consistent with Scenario 2: the analysts see through earnings management, but they choose to forecast *pre-managed* earning, using all the information available to them to improve the quality of both their earnings and cash flow forecasts.

This result is surprising and raises the question as to why an analyst would choose to act non-strategically and make earnings forecasts that he knows will not be accurate because of the probable bias that managers will introduce in future earnings. This may be explained by the fact that Value Line analysts may not be as sensitive to incentives related to forecast accuracy as other analysts. In fact, Value Line does not provide any data on the *ex-post* accuracy of its analysts' forecast.

[Insert Table 5 about Here]

5.4 Pricing Errors

Until now, we have followed Subramanyam and Venkatachalam's (2007) suggestion to use *ex-post* intrinsic values as valuation benchmarks. The alternative, which has been used extensively in the studies comparing the performance of valuation models, is to use the stock price of the firm at the valuation date as a benchmark. This proxy is based on the assumption that, at least on average, the market is efficient and that the market value of a firm is the best estimate available of its intrinsic value.

Table 5 presents the results of the univariate (Panel A) and multivariate analyses (Panel B) using current price as valuation benchmark. In Panel A, both mean and median absolute errors show a progressive increase between the Low-DACC and the High-DACC groups for RIM with a significant difference between the two extreme groups. The mean absolute pricing errors are 0.296, 0.312 and 0.330 for the Low, Medium and High groups, respectively, and the difference of 0.034 between High and Low is significantly different from zero at the 1% level. The median errors show a similar pattern and a significant difference in valuation performance between the groups of firms with the highest and the lowest levels of discretionary accruals.

Panel B of Table 5 shows the results of the regression estimation of Equations (4) and (5). The results are similar to those obtained with the three-year *ex-post* value benchmarks. The coefficient on DACC is significantly positive for the RIM regression but not significantly different from zero for the DCF regression. Hence, the results of Table 5 are consistent with Scenario 1.

[Insert Table 5 about Here]

Overall, the results of our analyses are consistent with either Scenario 1 or Scenario 2, although there is more support for the former. In both scenarios, the analysts are assumed to see through the bias introduced by managers into reported earnings and take this into account in formulating their cash flow forecasts. The difference between the two scenarios is whether the analysts act strategically and forecast *managed* earnings to minimise their short-term forecast errors and maintain their reputation of accuracy or focus more on the long-term valuation attributes and forecast *pre-managed* earnings.

6. Conclusion

In this paper, we have presented empirical evidence on whether sophisticated market participants, such as the financial analysts, can see through accrual manipulations and if their forecasts remove the effects of accrual manipulations. Earnings are increasingly subject to managerial manipulations at a time when management faces intense pressure to meet or beat earnings expectations. The impact earnings management has on the market depends on whether at least some of the market participants can detect such practice. Prior studies in this area have typically drawn inferences about this issue from the direction or magnitude of analyst earnings forecast errors. Evidence to date is mixed, due in large part to difficulties in relating low earnings forecast errors with the absence of accrual manipulations. Low earnings forecast errors may imply that either analysts can detect accrual manipulations but choose to

forecast managed earnings or they cannot detect accrual manipulations and simply follow management's earnings guidance to achieve forecast accuracy. As pointed out by O'Brien (1988), low earnings forecast errors also do not necessarily suggest high forecast quality.

We contribute to the analyst forecast literature by employing an alternative research design that focuses on the valuation usefulness of analyst earnings and cash flow forecasts, measured by the absolute percentage valuation errors (*AE_RIM* or *AE_DCF*). Larger absolute percentage valuation errors imply that a model is less useful for valuation purposes. Our research design calls for comparing the valuation usefulness of analyst earnings (or cash flow) forecasts used in the RIM (DCF) model in a setting where there is earnings management versus where there is not. Specifically, we regress *AE_RIM* (*AE_DCF*) on the extent of accrual manipulations, *DACC*, and several covariates for the RIM (DCF) model. Contrasting signs on *DACC* in these two regressions allows us to distinguish among the following three scenarios: First, analysts can see through earnings management, but choose to forecast managed earnings in order to minimize earnings forecast errors. Since analysts also have an incentive to minimize cash flow forecast errors, they would apply that knowledge to adjust their cash flow forecasts. Second, analysts can see through earnings management and choose to forecast pre-managed earnings. Under this scenario, both earnings and cash flow forecasts are based on the persistent part of reported earnings. Third, analysts cannot see through earnings management and hence base their earnings and cash flow forecasts on reported earnings.

Using three-year *ex post* intrinsic value as the valuation benchmark, we find that the coefficient estimate on *DACC* is positive and significant in the RIM regression, but insignificantly different from zero in the DCF regression. These results continue to hold when we re-define the valuation benchmark as five-year *ex post* intrinsic value or the stock price at

the forecast date. They are also consistent with univariate comparisons of *AE_RIM* or *AE_DCF* across terciles of firms partitioned on the levels of discretionary accruals. Regardless of the choice of valuation benchmarks, we find that the RIM model has the largest mean *AE_RIM*, and hence is least useful in firm valuation, among firms with the highest levels of discretionary accruals, whereas it is most useful with the smallest mean *AE_RIM* for firms with the lowest levels of discretionary accruals. In contrast, the DCF model has similar valuation usefulness, as measured by mean *AE__DCF*, across the two extreme terciles. Taken together, our results are consistent with the predictions of Scenario 1, i.e., analysts can see through earnings management, but choose to forecast managed earnings while removing the effect of earnings management from their cash flow forecasts.

Approaching analyst forecast behaviour from the valuation perspective allows us to get around methodological difficulties encountered by researchers interested in analyst forecast behaviour vis-à-vis earnings management. We conclude that large valuation errors associated with the RIM model do not reflect analysts' inability to detect and incorporate the consequences of earnings management in their earnings forecasts. Rather, they suggest that analysts issue earnings forecasts strategically. A major insight from our study is that sophisticated investors are capable of detecting accrual manipulations. However, even Value Line analysts, who do not have strong incentives to cooperate with management, tend to forecast managed earnings. These findings provide justification for the continued popularity of DCF model for firm valuation in practice.

There are several limitations associated with our study: (1). Our sample period ends in 2000 and hence the results may not be generalizable to more recent years. (2). While we have used Dechow et al.'s (2003) forward-looking modified Jones model (FLMJ) to measure discretionary accruals, the association between *AE_RIM* (or *AE_DCF*) and *DACC* identified in the study may still reflect measurement errors. As a direction for future research, it will be

interesting to see if analysts' strategic incentives to forecast managed earnings have been curtailed by the SOX regulations. It will also be interesting to see if the Regulation Fair Disclosure (Reg FD), eliminating selective management's disclosures to analysts, has adversely affected analysts' ability to detect accrual manipulations. Both extensions will require comparing the valuation usefulness of the RIM (or DCF) model across two sample periods (i.e., pre- vs. post-SOX period or pre- vs. post-Reg FD).

References

Abarbanell, J. and R. Lehavy. 2003. Can stock recommendations predict earnings management and analysts' earnings forecast errors? Journal of Accounting Research 41 (1): 1–31.

Ahmed Anwer S., S. M. Khalid Nainar, Jian Zhou, 2005. Do analysts' forecasts fully reflect the information in accruals? *Canadian Journal of Administrative Science* 22 (4): 329-342.

Baber, W.R., S.P. Chen and S.H. Kang. 2006. Stock price reaction to evidence of earnings management: Implications for supplementary financial disclosure. *Review of Accounting Studies* 11: 5–19.

Balsam, S., E. Bartov and C. Marquardt. 2002. Accruals management, investor sophistication, and equity valuation: Evidence from 10-Q filings. *Journal of Accounting Research* 40 (4): 987–1012.

Barth, M.E., J.A. Elliott and M.W. Finn. 1999. Market rewards associated with patterns of increasing earnings. *Journal of Accounting Research* 37 (2): 387–413.

Bartov, E., D. Givoly and C. Hayn, 2002. The rewards to meeting or beating earnings expectations. *Journal of Accounting and Economics* 33: 173-204.

Beasley, M. 1996. An empirical analysis of the relation between the board of director composition and financial statement fraud. *The Accounting Review* 71 (4): 443–465.

Bédard, J.S., S. Marakchi-Chtourou and L. Courteau. 2004. The effect of audit committee expertise, independence, and activity on aggressive earnings management. *Auditing: A Journal of Practice and Theory* 23 (September 2004): 13–35.

Beyer, A. 2008. Financial Analysts' Forecast Revisions and Managers' Reporting Behavior. *Journal of Accounting & Economics* 46 (2-3): 334-348.

Bowen, R.M., L. DuCharme and D. Shores. 1995. Stakeholders' implicit claims and accounting method choice. *Journal of Accounting and Economics* 20: 255–295.

Bradshaw, M.T., S.A. Richardson and R.G. Sloan. 2001. Do analysts and auditors use information in accruals? *Journal of Accounting Research* 39 (1): 45–74.

Brav, A., R. Lehavy and R. Michaely. 2005. Using Expectations to Test Asset Pricing Models *Financial Management* 34 (3): 31-64.

Brown, L., G. Richardson and S. Schwager. 1987. An information interpretation of financial analyst superiority in forecasting earnings. *Journal of Accounting Research* (Vol. 25, No. 1): 49–67.

Burgstahler, D. and M. Eames. 2003. Earnings management to avoid losses and earnings decreases: Are analysts fooled? *Contemporary Accounting Research* (Summer): 253–294.

Burgstahler, D. and I. Dichev. 1997. Earnings management to avoid earnings decreases and losses. *Journal of Accounting and Economics* 24: 99–126.

Call, A.C., S. Chen and Y.H. Tong. 2009. Are analysts' earnings forecasts more accurate when accompanied by cash flow forecasts? *Review of Accounting Studies* 14: 358–391.

Courteau, L., J. Kao and G. Richardson. 2001. Equity valuation employing the ideal *vs.* ad hoc terminal value expressions. *Contemporary Accounting Research* 18 (4): 625–661.

Dechow, P., R. Sloan and A. Sweeney. 1996. Causes and consequences of earnings manipulations: An analysis of firms subject to enforcement actions by the SEC. *Contemporary Accounting Research* 13 (1): 1–36.

Dechow, P., S. Richardson and I. Tuna. 2003. Why are Earnings Kinky? An examination of the earnings management explanation. *Review of Accounting Studies* 8:355–384.

DeGeorge, F., J. Patel and R. Zeckhauser. 1999. Earnings management to exceed thresholds. *Journal of Business* 72 (1): 1–33.

Erickson, M. and S.W. Wang. 1999. Earnings management by acquiring firms in stock for stock mergers. *Journal of Accounting and Economics* 27 (April): 149–176.

Fama, E. and K. R. French. 1993. Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics* 33 (1): 3–56.

Farber, D. 2005. Restoring trust after fraud: Does corporate governance matter? *The Accounting Review* 80 (2): 539–561.

Francis, J., P. Olsson and D. Oswald. 2000. Comparing the accuracy and explainability of dividend, free cash flow and abnormal earnings equity value estimates. *Journal of Accounting Research* 38 (1): 45–70.

Frankel, R. and C.M.C Lee. 1998. Accounting valuation, market expectation, and cross-sectional stock returns. *Journal of Accounting and Economics* 25: 283–319.

Gell, S., C. Homburg and T. Klettke. 2010. Are analysts better earnings forecasters when they also set target prices or/and issue stock recommendations?. Working paper. University of Cologne.

Givoly, D., C. Hayn and R. Lehavy. 2009. The quality of analysts' cash flow forecasts. *The Accounting Review* 84 (6): 1877–1911.

Givoly, D., C. Hayn and T. Yoder. 2008. What do analysts really predict? Inferences from earnings restatements and managed earnings. Working paper. Pennsylvania State University.

Gleason, C. and L. Mills. 2008. Evidence of differing market responses to beating analysts' targets through tax expense decreases. *Review of Accounting Studies* 13: 295–318.

Graham, J.R., C.R. Harvey and S. Rajgopal. 2005. The economic implications of corporate financial reporting. *Journal of Accounting and Economics* 40: 3–73.

Healy, P. 1985. The effect of bonus schemes on accounting decisions. *Journal of Accounting and Economics* 7: 85–107.

Healy, P. and J. Wahlen. 1999. A review of earnings management literature and its implications for standard setting. *Accounting Horizon* 13 (4): 365–383.

Hong H. and J. Kubik. 2003. Analyzing the analysts: Career concerns and biased earnings forecasts. *Journal of Finance* 58: 313–351.

Hribar, P. and N. Jenkins. 2004. The Effect of Accounting Restatements on Earnings Revisions and the Estimated Cost of Capital. *Review of Accounting Studies* 9: 337–356.

Klein, A. 2002. Audit committee, board of director characteristics and earnings management. *Journal of Accounting and Economics* 33: 375–400.

Kross, W., B. Ro and D. Schroeder. 1990. Earnings expectations: The analysts' information advantage. *The Accounting Review* (Vol. 65, No. 2): 461–476.

Lang, M. and R. Lundholm. 1996. Corporate disclosure policy and analyst behaviour. *The Accounting Review* 71 (4): 467–492.

Lee, C.M.C., J. Myers and B. Swaminathan. 1999. What is the intrinsic value of the Dow? *The Journal of Finance* 54 (5): 1693–1741.

Liu, X. 2004. Analysts' response to earnings management. PhD Dissertation, Northwestern University.

Matsunaga S. and C. Park. 2001. The effect of missing a quarterly earnings benchmark on the CEO's annual bonus. *The Accounting Review* 76: 313–332.

Mikhail, M.B., B.R. Walther and R.H. Willis. 1997. Do security analysts exhibit persistent differences in stock picking ability? *Journal of Financial Economics:* 74: 67–91.

Myers, J.N., L.A. Myers and D.J. Skinner. 2006. Earnings momentum and earnings management. *Journal of Accounting, Auditing and Finance* 22 (2): 249–284.

O'Brien, P. 1988. Analyst forecasts as earnings expectations. *Journal of Accounting and Economics* 10: 53-83.

Penman, S. 1997. A synthesis of equity valuation techniques and the terminal value calculation for the Dividend Discount Model. *Review of Accounting Studies* (4): 303–323.

Penman, S. and T. Sougiannis. 1998. A comparison of dividend, cash flow, and earnings approaches to equity valuation. *Contemporary Accounting Research* 15 (3): 343–383.

Richardson, S., S. Teoh and P. Wysocki. 2004. The walk-down to beatable analyst forecasts: the role of equity issuances and insider trading incentives. *Contemporary Accounting Research* 21: 885-924.

Skinner, D.J. and R.G. Sloan. 2002. Earnings surprises, growth expectations, and stock returns: Don't let an earnings torpedo sink your portfolio. *Review of Accounting Studies* 7: 289–312.

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

Subramanyam, K.R. and M. Venkatachalam. 2007. Earnings, cash flows, and *ex post* intrinsic value of equity. *The Accounting Review* 82 (2): 457–481.

Teoh, S., I. Welch and T. Wong. 1998a. Earnings management and the long run market performance of initial public offerings. *Journal of Finance* 50 (6): 1935–1974.

Teoh, S., I. Welch and T. Wong. 1998b. Earnings management and the underperformance of the seasoned equity offerings. *Journal of Financial Economics* 50: 63–99.

Xie, H. 2001. The mispricing of abnormal accruals. *The Accounting Review* 76 (3): 357-373.

Table 1. Sample Selection and Distributions by Year and Industry

Panel A: **Sample Selection**

Number of earnings announcements (1990–2000)	39,826
Less: Filter 1. Missing VL forecasts and historical data for t_0	(33,233)
Less: Filter 2. Missing VL financial/stock data	(1,409)
Sub-total	5,184
Less: Filter 3. Missing data to construct regression variables	(68)
Less: Filter 4. Top and bottom 1% of each regression variable	(530)
Final sample	4,586

Panel B: **Sample Distribution by Year**

Year	No. of Firms	Percent
1990	120	2.62
1991	469	10.23
1992	464	10.12
1993	484	10.55
1994	490	10.68
1995	480	10.47
1996	447	9.75
1997	435	9.49
1998	426	9.29
1999	426	9.29
2000	345	7.52
Total	4,586	100.00

Table 1. (continued)

Panel C: Sample Distribution by Industry

Industry	No. of Firms	Percent	Industry	No. of Firms	Percent
Agriculture	3	0.29	Automobiles and Trucks	25	2.41
Food Production	31	2.99	Aircraft	18	1.74
Candy and Soda	6	0.58	Shipbuilding, Railroad Equip.	1	0.10
Alcoholic Beverages	4	0.39	Precious Metals	6	0.58
Tobacco Products	2	0.19	Nonmetallic Mining	13	1.25
Recreational Products	8	0.77	Petroleum and Natural Gas	46	4.44
Entertainment	11	1.06	Utilities	130	12.54
Printing and Publishing	25	2.41	Telecommunications	20	1.93
Consumer Goods	36	3.47	Personal Services	8	0.77
Apparel	18	1.74	Business Services	60	5.79
Health Care	27	2.60	Computers	33	3.18
Medical Equipment	26	2.51	Electronic Equipment	48	4.63
Drugs	19	1.83	Measuring and Control Equip.	29	2.80
Chemicals	51	4.92	Business Supplies	36	3.47
Rubber and Plastic Products	7	0.68	Shipping Containers	11	1.06
Textiles	14	1.35	Transportation	35	3.38
Construction Materials	33	3.18	Wholesale	26	2.51
Construction	4	0.39	Retail	36	3.47
Steel Works, Etc.	31	2.99	Restaurants, Hotels, Motels	28	2.70
Fabricated Products	6	0.58	Insurance Services	5	0.48
Machinery	42	4.05	Real Estate	2	0.19
Electrical Equipment	12	1.16	Trading	2	0.19
Miscellaneous	2	0.19	**Total**	**1,036**	**100.0**

Table 2. Summary Statistics

Panel A: **Distribution of Model Variables: Overall Sample**

Variables	N	1st Quartile	Mean	Median	3rd Quartile	Std Dev
Market value ($M)	4,586	411.6	3,130.1	1,130.7	3,120.0	8,727.4
DACC	4,586	0.013	0.040	0.027	0.054	0.038
BM	4,586	0.309	0.511	0.472	0.660	0.271
ES	4,586	0.008	0.034	0.020	0.044	0.040
Std_ROE	4,586	0.036	0.143	0.068	0.128	0.274
AE_RIM	4,586	0.200	0.412	0.386	0.573	0.279
AE_DCF	4,586	0.230	0.484	0.427	0.639	0.362

Panel B: **Pearson (Spearman) Correlation Coefficients: Overall Sample**

	DACC	***BM***	***ES***	***Std_ROE***	***AE_RIM***	***AE_DCF***
DACC	1.000	-0.061 <.0001	0.268 <.001	0.072 <.001	0.070 <.001	0.019 0.189
BM	*-0.091* *<.001*	1.000	-0.113 <.001	-0.112 <.001	-0.065 <.001	0.055 0.000
ES	*0.253* *<.001*	*-0.193* *<.001*	1.000	0.134 <.001	0.111 <.001	0.029 0.046
Std_ROE	*0.160* *<.001*	*-0.103* *<.001*	*0.317* *<.001*	1.000	0.111 <.001	0.092 <.001
AE_RIM	*0.066* *<.001*	*-0.147* *<.001*	*0.140* *<.001*	*0.155* *<.001*	1.000	0.627 <.001
AE_DCF	*0.009* *0.522*	*-0.022* *0.135*	*0.030* *0.041*	*0.085* *<.001*	*0.601* *<.001*	1.000

Table 2. (continued)

Market value is the market capitalization at the forecast date.; *DACC* (discretionary accruals) is defined as the absolute value of the residual from the modified Forward-looking Modified Jones Model (FLMJ), estimated every year for each 2-digit SIC code industry; *BM* (book-to-market ratio) is defined as book value per share over stock price per share, measured at fiscal year-end; *ES* (earnings shock) is defined as the absolute value of changes in net income from Year t–1 to Year t, scaled by opening total assets; *Std_ROE* (standard deviation of return on equity) is measured over a 5-year period immediately preceding the annual report date.

AE_RIM (*AE_DCF*) is defined as the absolute value of the difference between estimated intrinsic value calculated under RIM (or DCF) according to Equation 1 (or Equation 2) and the 3-year *ex-post* intrinsic value, scaled by the latter.

Table 3. Absolute Percentage Valuation Errors by Levels of Discretionary Accruals

Panel A: **Mean Absolute Percentage Valuation Errors**

Three-year Horizon *Ex-post* Intrinsic Value					
	Level of Discretionary Accruals			**Test of Difference High vs. Low**	
	Low	**Medium**	**High**	**High-Low**	**t-stat**
N	1,528	1,529	1,529		
AE_RIM	0.397	0.408	0.430	0.033	3.26***
AE_DCF	0.489	0.475	0.488	-0.001	-0.11
Five-year Horizon *Ex-post* Intrinsic Value					
	Low	**Medium**	**High**	**High-Low**	**t-stat**
N	1,356	1,357	1,356		
AE_RIM	0.445	0.433	0.477	0.032	2.56**
AE_DCF	0.527	0.494	0.529	0.002	0.18

Panel B: **Median Absolute Percentage Valuation Errors**

Three-year Horizon *Ex-post* Intrinsic Value					
	Low	**Medium**	**High**	**High-Low**	**Wilcoxon Score**
N	1,528	1,529	1,529		
AE_RIM	0.362	0.393	0.397	0.035	3.90***
AE_DCF	0.420	0.434	0.428	0.008	0.19
Five-year Horizon *Ex-post* Intrinsic Value					
	Low	**Medium**	**High**	**High-Low**	**Wilcoxon Score**
N	1,356	1,357	1,356		
AE_RIM	0.419	0.411	0.447	0.028	2.42**
AE_DCF	0.466	0.437	0.469	0.003	0.30

Table 3. (continued)

Ex post intrinsic value = the sum of future dividends over a three (five)-year horizon and market price at the end of the horizon, discounted at the industry cost of equity.

Absolute percentage valuation errors for each firm-year observation under RIM (or DCF) = the absolute value of the difference between estimated intrinsic value calculated according to Equation (1) (or Equation (2)) and the ex post intrinsic value, scaled by the latter.

Low, Medium and High levels of discretionary accruals (*DACC*) are defined as the terciles of the distribution of *DACC* computed as the absolute value of the residuals from Dechow et al.'s (2003) forward-looking modified Jones model (FLMJ), estimated every year for each 2-digit SIC code industry.

t-statistic (Wilcoxon score) for the difference in means (medians) between high and low discretionary accruals.

***, **,* significant at the 1%, 5% and 10% levels, respectively (two-sided).

Table 4. Regression Analysis – Absolute Valuation Errors

Model: *AE_RIM (or AE_DCF)* = $a_0 + a_1 DACC + a_2 BM + a_3 ES + a_4 Std\_ROE + a_5 Loss$

Panel A: Three-year Horizon *Ex-post* Intrinsic Value

	Valuation Model			
	AE_RIM		***AE_DCF***	
Variables	**Coefficient Est.**	**t-stat.**	**Coefficient Est.**	**t-stat.**
Intercept	0.393	36.30***	0.414	29.35***
DACC	0.263	2.35**	0.075	0.51
BM	-0.050	-3.19***	0.081	4.03***
ES	0.511	4.45***	0.053	0.35
Std_ROE	0.094	6.22***	0.126	6.41***
Loss	0.028	1.86*	0.052	2.62***
Adjusted R2	0.025		0.014	
N	4,585		4,585	

Table 4. (continued)

Panel B: **Five-year Horizon *Ex-post* Intrinsic Value**

	Valuation Model			
	AE_RIM		***AE_DCF***	
Variables	**Coefficient Est.**	**t-stat.**	**Coefficient Est.**	**t-stat.**
Intercept	0.422	32.19***	0.424	25.64***
DACC	0.202	1.47	0.039	0.22
BM	-0.024	-1.28	0.121	5.07***
ES	0.632	4.46***	0.380	2.12**
Std_ROE	0.071	3.79***	0.091	3.86***
Loss	0.044	2.30**	0.053	2.23**
Adjusted R2	0.017		0.013	
N	4,068		4,068	

Ex post intrinsic value = the sum of future dividends over a three (five)-year horizon and market price at the end of the horizon, discounted at the industry cost of equity.

AE_RIM (*AE_DCF*) is defined as the absolute value of the difference between estimated intrinsic value calculated under RIM (or DCF) according to Equation (1) (or Equation (2)) and the ex post intrinsic value, scaled by the latter.

DACC computed as the absolute value of the residuals from Dechow et al.'s (2003) forward-looking modified Jones model (FLMJ), estimated every year for each 2-digit SIC code industry; *BM* (book-to-market ratio) is defined as book value per share over stock price per share, measured at fiscal yearend; *ES* (earnings shock) is defined as the absolute value of changes in net income from Year t-1 to Year t, scaled by opening total assets; *Std_ROE* (standard deviation of return on equity) is measured over a 5-year period immediately preceding the annual report date; *Loss* is equal to one if the net income in Year t is negative.

***, **,* significant at the 1%, 5% and 10% levels, respectively (two-sided).

Table 5. Further Analysis based on Absolute Percentage Pricing Errors

Panel A: **Absolute Percentage Pricing Errors by Levels of Discretionary Accruals**

Mean Absolute Percentage Pricing Errors					
	Level of Discretionary Accruals			**Test of Difference High vs. Low**	
	Low	**Medium**	**High**	**High-Low**	**t-stat**
N	1,528	1,529	1,529		
AE_RIM	0.296	0.312	0.330	0.034	4.65***
AE_DCF	0.385	0.378	0.383	-0.002	-0.17
Median Absolute Percentage Pricing Errors					
	Low	**Medium**	**High**	**High-Low**	**Wilcoxon Score**
N	1,528	1,529	1,529		
AE_RIM	0.275	0.296	0.318	0.043	4.53***
AE_DCF	0.341	0.326	0.345	0.003	0.50

Table 5. (continued)

Panel B: **Regression Analysis – Absolute Percentage Pricing Errors**

Model: AE_RIM (AE_DCF) = $a_0 + a_1 DACC + a_2 BM + a_3 ES + a_4 Std\_ROE + a_5 Loss$

	Valuation Model			
	AE_RIM		***AE_DCF***	
Variables	**Coefficient Est.**	**t-stat.**	**Coefficient Est.**	**t-stat.**
Intercept	0.401	57.39***	0.386	39.74***
DACC	0.159	2.21**	0.006	0.06
BM	-0.217	-21.56***	-0.042	-3.01***
ES	0.290	3.90***	0.180	1.75*
Std_ROE	0.013	1.33	0.024	1.77*
Loss	0.016	1.62	0.015	1.11
Adjusted R2	0.108		0.004	
N	4,573		4,573	

AE_RIM (A*E_DCF*) is defined as the absolute value of the difference between estimated intrinsic value calculated under RIM (or DCF) according to Equation 2 (or Equation 3) and the stock price at the forecast date, scaled by the latter.

DACC computed as the absolute value of the residuals from Dechow et al.'s (2003) forward-looking modified Jones model (FLMJ), estimated every year for each 2-digit SIC code industry; *BM* (book-to-market ratio) is defined as book value per share over stock price per share, measured at fiscal yearend; *ES* (earnings shock) is defined as the absolute value of changes in net income from Year t-1 to Year t, scaled by opening total assets; *Std_ROE* (standard deviation of return on equity) is measured over a 5-year period immediately preceding the annual report date; *Loss* is equal to one if the net income in Year t is negative.

***, **,* significant at the 1%, 5% and 10% levels, respectively (two-sided).