

Internal Control Material Weakness and Sell-Side Financial Analysts

Abstract

Using a sample of firms that disclose internal control material weaknesses under Sections 302 and 404 of the Sarbanes-Oxley Act, we investigate the relations between the accuracy and bias of financial analysts' earnings forecasts and disclosed internal control material weaknesses. We find that forecast accuracy is negatively related to material weaknesses in internal control when disclosed internal control material weaknesses are related to controls over firms' broader control environment (firm-level internal control). We also hypothesize and find that optimistic forecast bias is higher for firms disclosing firm-level internal control material weaknesses, suggesting that, due to the increased complexity related to inefficient internal control at firm-level, analysts intentionally bias their forecasts upward to gain favorable access to firms' internal information.

Keywords: Internal control material weakness, financial analysts, earnings forecast accuracy, earnings forecast bias, Sarbanes-Oxley Act

Internal Control Material Weakness and Analyst Forecast accuracy

1. Introduction

As part of the Sarbanes-Oxley Act of 2002 (SOX), SEC registrants' executives are now required to certify that they have evaluated the effectiveness of their internal controls over financial reporting (Section 302, effective in August 2002), and to provide an annual report to assess the effectiveness of the internal control structure and procedures (Section 404, effective in November 2004). These assessments of internal control requirements have arguably been the most controversial aspect of SOX. Many firms complain that internal control problems are just inconsequential for financial statement users and hence the high compliance costs of assessing internal control are not justified (Solomon, 2005). On the other hand, a growing chorus of investors claims that good internal control results in much more reliable corporate financial statements, which benefit financial statement users by reducing their information collection and interpretation costs.¹ This paper directly tests whether internal control problems are inconsequential for financial statement users by examining the impact of internal control material weakness (ICMW hereafter) on one of the most important financial statement users—sell side financial analysts. In particular, we examine the association between the analyst forecast accuracy and bias and the disclosed ICMWs under Sarbanes-Oxley Act 302 and 404.

Based on a sample of 727 firms which have disclosed ICMWs in their 10-k filings since August of 2002, we first investigate the association between analyst forecast

¹ For example, Donald J. Peters, a portfolio manager at T. Rowe Price Group, says: "The accounting reforms [of SOX] have been a win. It is [now] much easier for financial statement users to have a view of the true economics" of a company. (Wall Street Journal, Jan 29th, 2007).

accuracy and the disclosed ICMWs. We argue that the impact of ICMW on analysts' forecast accuracy is not homogeneous. Specifically, we posit that if ICMWs are only related to controls over specific accounts or transactions (we call this type of ICMWs as account-level ICMWs), then the ICMWs may have no impact on the accuracy of forecasts. The rationale for this argument is that since the ICMWs are only at account-level, such ICMWs are relatively easier for financial statement users to detect. Hence, as experienced financial statement users, sell-side analysts may detect the ICMW issues and adjust financial reports accordingly. Therefore, sell-side analysts, as one of the most sophisticated investors, should be able to get around this type of ICMWs by spending more efforts on research and information collection.

In contrast, if ICMWs are related to the competency of management to efficiently control the overall firms (we define this type of ICMWs as firm-level ICMWs), then ICMWs will lead to less accurate analyst earnings forecasts. Since ICMWs are associated with management's incompetence to efficiently control the overall firms, managers will not be able to provide accurate financial reports as well as to efficiently control the business. Without access to firms' private information, this type of ICMWs is difficult for external financial statement users to detect. Therefore, financial analysts will not be able to adjust financial reports accordingly to circumvent this type of ICMWs.

Consistent with the above argument, we document a significantly negative relation between forecast accuracy and ICMWs when ICMWs are at firm-level. We interpret this finding as that firm-level ICMWs significantly increase the complexity of forecasting task for analysts. In contrast, we find no such relation when ICMWs are *only* at account-level. We interpret this finding as evidence that account-level ICMWs *alone*

do not significantly increase the complexity of forecasting task for analysts. If firm-level ICMWs *do* increase the complexity of forecasting task for analysts, we expect that, for firms disclosing this type of internal control deficiencies, analysts will make optimistic forecasts in hopes of maintaining good relationship with management to gain access to management's private information. Consistent with this hypothesis, we find that analysts bias their forecasts upwards only for firms disclosing firm-level ICMWs. These findings on accuracy and bias suggest that firm-level ICMWs add a unique dimension to forecasting complexity.

This paper makes several important contributions to the accounting literature. First, sell side financial analysts are among the most important users of financial reports, and researchers have long been interested in learning about their use of accounting information (Schipper, 1991). This study adds to this research by documenting a relation between ICMW and the accuracy and bias of analyst forecasts. We identify firm-level internal control quality as an important determinant of forecast accuracy and bias. Second, our findings are also directly relevant to both regulators and policy-makers who are currently debating the costs and benefits of Sarbanes-Oxley Act's requirement on internal control assessments and disclosures. While prior studies provide evidence on the link of earnings quality and weaknesses in internal control, how weakness in internal control affects the users of earnings reports directly has been largely ignored to date. The evidence presented in this paper shows that internal control deficiency can influence one of the most important financial statement users—sell side financial analysts.

The paper is organized as follows. Section 2 provides background on ICMW disclosures and related literature. Section 3 develops hypotheses and Section 4 describes

sample selection process, and how ICMW and forecast properties are measured. Sections 5 and 6 present the empirical tests and additional analysis, respectively. Conclusions are presented in Section 7.

2. Background on internal control and related studies

Internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting in accordance with generally accepted accounting principles (PCAOB, 2004). Firms were not required to maintain an adequate system of internal control before the enactment of Sarbanes-Oxley although they were required to publicly disclose deficiencies if there was a change in auditor (SEC, 1988). As part of the Sarbanes-Oxley Act of 2002, SEC registrants' executives are now required to certify that they have evaluated the effectiveness of their internal controls over financial reporting and indicate in their public filings whether there are any significant changes in internal control (Section 302). The firm's external auditors are also required to attest to the assessment by management (Section 404).

Researchers have examined the impacts of disclosed ICMWs on earnings quality, market reaction, audit fees and cost of equity. The evidence regarding earnings quality is mixed. On one hand, ICMWs are shown to be associated with lower earnings quality. For example, Ashbaugh et al. (2005) find that firms disclosing SOX 302 material weakness exhibit larger unexpected accruals and more positive unexpected accruals in the pre-disclosure period. Doyle et al. (2007a), in their study of firms disclosing SOX 302 and SOX 404 material weaknesses between August 2002 and May 2005, find that disclosing firms have lower earnings quality as measured by accruals quality and discretionary

accruals. On the other hand, there is some evidence showing that disclosed material weaknesses are not linked to lower earnings quality. For instance, Hogan and Wilkins (2005) find that accrual quality and the frequency of meeting or beating analysts' forecasts are not significantly different between firms disclosing under SOX 302 and their performance and industry matched firms.

Results regarding the market reactions to SOX 302 disclosures are also mixed. While De Franco et al. (2005) and Beneish et al. (2006) find negative and significant cumulative abnormal returns for firms disclosing SOX 302 material weaknesses, Ashbaugh et al. (2005) find no statistically significant market reaction to these disclosures.

Existing studies also examine the impact of ICMW disclosures on audit fees and find that audit fees are significantly higher for ICMW disclosing firms, suggesting that auditors appear to increase their level of effort for firms with ICMWs (e.g., Hogan and Wilkins, 2005 and Hoitash et al., 2005).

Last, related studies provide inconclusive evidence on the impact of ICMWs on the cost of equity of firms. For example, Ogneva et al. (2006) show that ICMWs identified under Section 404 (or Section 302) are not directly associated, on average, with higher implied cost of equity. In contrast, Beneish et al. (2006) find that firms disclosing ICMWs under Section 302 experience an increase of 4.4 percent in the cost of equity.

Although there is substantial literature on the capital market consequences of ICMW disclosures, we believe that our study is the first to directly investigate the impact of ICMWs on financial analysts. In particular, we examine the association between

ICMWs and analyst forecast accuracy and bias. The following section develops our hypotheses.

3. Hypotheses development

3.1. Internal control material weakness and forecast accuracy

The effect of ICMWs on analyst forecast accuracy depends on the reasons underlying ICMWs. If a firm's management lacks abilities or resources to exercise efficient internal control on the firm, the firm tends to have ICMWs over the overall control environment (firm-level ICMWs). This type of ICMWs calls into question management's capabilities to control the business and to prepare accurate and adequate financial reports. For example, Dyntek Inc. disclosed the following deficiencies in their 2004, 10-K: "The material weaknesses that we have identified relate to the fact that our overall financial reporting structure and current staffing levels are not sufficient to support the complexity of our financial reporting requirements. We have experienced employee turnover in our accounting department including the position of Chief Financial Officer. As a result, we have experienced difficulty with respect to our ability to record, process and summarize all of the information that we need to close our books and records on a timely basis and deliver our reports to the Securities and Exchange Commission within the time frames required under the Commission's rules."

Since the managers of firms disclosing this type of ICMWs are unable to efficiently control the business, it will be difficult for the managers to prepare accurate and adequate financial reports, and to some extent even to provide any creditable and useful aggregated information to the public (because managers lack capabilities and

resources to collect and to generate aggregated information about their own firms). In this case, the noises in the firms' financial reports stem from not only managers' failure to provide accurate financial reports but also managers' inability to efficiently control the business. It will be much more challenging for analysts to make accurate forecasts by relying on such financial reports without access to firms' private information. For example, Dyntek Inc.'s internal control issues mentioned above are associated with untimely financial reports due to insufficient staffing. It will be difficult for analysts to uncover the information about the firm because due to the insufficient staffing, information disclosed by the firm is not timely and sufficient. Hence, without accessing firms' private information, analysts will make less accurate forecasts based on firms' reports. Based on the above discussions, we expect a negative association between ICMW and analyst forecast accuracy.

Alternatively, even if management has sufficient capabilities and resources to prepare accurate and adequate financial statements, a firm may still have internal control deficiencies over financial reporting. Such internal control deficiencies may be related to management's choices in interpreting specific accounting policies, or dealing with specific accounts/transactions (account-level ICMWs). That is, although management is able to provide reliable and accurate financial statement information, managers may choose to make certain accounting choices that do not comply with GAAP requirements.² For example, Westmoreland Coal Inc. disclosed the following deficiencies in their 2005, 10-K: "The company's policies and procedures regarding coal sales contracts with its customers did not provide for a sufficiently detailed, periodic management review of the

² One of the reasons for managers to make accounting choices that do not comply with GAAP requirements may be to manage earnings.

accounting for payments received. This material weakness resulted in a material overstatement of coal revenues and an overstatement of amortization of capitalized asset retirement costs”.

If the management of firms disclosing account-level ICMWs has no difficulty in efficiently controlling the business, it is possible for the management to provide some creditable and useful aggregated information to the public, which may help analysts to make accurate forecasts. In addition, account-level ICMWs are only related to controls over specific accounting choices, which are relatively easier for financial analysts to detect (compared to firm-level ICMWs). For example, for Westmoreland Coal Inc.’s internal control issues, financial analysts may suspect overstatement of coal revenues if they observe individual material revenue transactions with unusual payment terms or other significant variations from normal terms of sale in the quarterly financial statements. Taken together, account-level ICMWs may not influence the accuracy of earnings forecasts. Account-level ICMWs may even lead to more accurate forecasts if the ICMWs are associated with management’s earnings management activities. This could be the case if management uses analysts’ forecasts as the benchmarks to manage earnings.

We have the following hypotheses based on the above discussions. First, since the direction of weak internal control on analyst earnings forecast accuracy for firms disclosing ICMWs as a whole is unclear, we test the following non-directional hypothesis (in null form):

H1a: The accuracy of analysts’ earnings forecasts is unrelated to ICMWs.

We then classify firms into two groups based on the company’s stated reasons for material weaknesses: The first group of firms discloses *only* account-level ICMWs

(hereafter G1 firms), which are related to controls over specific accounting choices and are relatively easier for financial analysts to detect (compared to firm-level ICMWs). Financial analysts can overcome the influence of this type of internal control deficiencies by spending more time on information collection and research.

The second group of firms discloses firm-level (with or without account-level) internal control material weaknesses (hereafter G2 firms). Note that unlike G1 firms that disclose only one type of ICMWs (i.e., account-level ICMWs), G2 firms can disclose two types of ICMWs (i.e., firm-level as well as account-level ICMWs). The rationale for this classification is that managers who are unable to efficiently control overall firm tend to have difficulty to control specific accounts/transactions. Hence, it is important for us to group firms with firm-level ICMWs *alone* and firms with both firm-level and account-level ICMWs together. That is, as long as a firm discloses firm-level ICMWs (regardless of whether the firm discloses account-level ICMWs or not), the firm will be classified as G2 firm.³ Since managers of G2 firms are incapable of efficiently controlling the business, it will be difficult for the management to prepare accurate and adequate financial reports, and to some extent even to provide any creditable and useful information to the public *at aggregated level*. Hence, it will be much more challenging for analysts to make accurate forecasts by relying on such financial reports without accessing firms' private information. In this case, we expect that ICMW for G2 firms should lead to less accurate forecasts.

We have the following hypotheses based on the types of firms:

³ The conclusions of this paper remain the same if we classify G2 firms as firms disclosing only firm-level ICMWs.

H1b: The accuracy of analysts' earnings forecasts is negatively associated with ICMWs for G2 firms (in alternative form).

H1c: The accuracy of analysts' earnings forecasts is unrelated to ICMWs for G1 firms (in null form).

3.2. Internal control material weakness and optimistic forecast bias

Studies have shown that analysts trade off forecast bias for forecast accuracy (e.g., Lim, 2001). For financial analysts, there are many costs related to inaccurate forecasts. Specifically, analysts suffer from not only direct costs such as compensation and reputation costs associated with inaccurate forecasts, but also indirect costs such as the lost opportunity for future career promotion (Qi and Jiang 2002). Access to firms' information is crucial for financial analysts to improve their forecast accuracy. Studies have shown that analysts may intentionally bias their forecasts upward in hopes of gaining future favorable treatment from management to access firm's private information (e.g., Huang et al., 2005). Access to management's private information is more valuable especially when firms' earnings are less predictable. Consequently, when earnings are less predictable and forecasting task is more complex, analysts have greater incentives to issue optimistic forecasts for firms (e.g., Lim, 2001 and Das et al., 1998). We, therefore, hypothesize that financial analysts will bias their forecasts upward for ICMW firms if ICMWs *indeed* significantly increase the complexity of forecasting task.

As we discussed in Section 3.1, we classify firms disclosing internal control material weaknesses into two groups: G1 and G2 firms. G1 firms disclose *only* account-level ICMWs while G2 firms disclose firm-level (with or without account-level) ICMWs. Because ICMWs for G1 firms are related only to controls over specific accounting

choices (which are relatively easier for financial analysts to detect compared to firm-level ICMWs), financial analysts can overcome the impact of account-level ICMWs by spending more time on information collection and research. Consequently, financial analysts will have less incentive to bias their forecasts upward because analysts can improve their forecast accuracy through their own efforts.

Conversely, unable to efficiently control the business, managers of G2 firms are not capable of preparing accurate and adequate financial reports (and to some extent even not capable of providing any creditable and useful information *at aggregated level*) to analysts. Further, because ICMWs for G2 firms are at firm-level, analysts can not easily circumvent the impact of internal control deficiencies on financial reports through their own efforts. In this case, financial analysts have greater incentives to gain access to firms' private information, hoping to improve future forecast accuracy. The assumption here is that although managers of firm-level ICMWs are not able to provide creditable and useful information to analysts *at aggregated level*, analysts who have accesses to firms' internal information can collect useful information *at disaggregated level* and thus improve their forecast accuracy based on the additional information. For example, assume that a firm has multiple international markets, and its managers are not able to provide sufficient information about the aggregated market to financial analysts due to lack of personnel who have expertise in international accounting and transactions to aggregate these multiple markets. Analysts following the firm can improve their forecasts accuracy if they have accesses to the firm's internal information related to the disaggregated international markets (we assume that those analysts have expertise in international accounting and transactions and are able to aggregate the information by

themselves). Based on the above discussions, we expect that analysts bias their forecasts upward for G2 firms.

Based on the above discussions, we state our second set of hypotheses. First since the impact of weak internal control on analyst earnings forecast bias for ICMW disclosing firms as a whole is unclear, we test the following non-directional hypothesis (in null form):

H2a: The optimistic bias of analysts' earnings forecasts is unrelated to ICMWs.

We have the following hypotheses based on the types of firms:

H2b: The optimistic bias of analysts' earnings forecasts is positively associated with ICMWs for G2 firms (in alternative form).

H2c: The optimistic bias of analysts' earnings forecasts is unrelated to ICMWs for G1 firms (in null form).

4. Sample selection and descriptive

4.1. The sample selection and matching procedure

We first use key words “internal control” and “material weakness” to search the 10-K filings in Lexis/Nexis in the period of August 2002 to December 2006 and obtain 1,275 firms that disclose at least one material weakness (ICMW firms). We then cross-check our 1275 firms against Doyle et al. (2007a)'s 1,210 sample firms, which are obtained by Doyle et al through searching 10Kwizard.com (10-Ks, 10-Qs, and 8-Ks) from August 1, 2002 to October 31, 2005.⁴ We find that there are 181 firms in Doyle et al. (2007a)'s sample but not in ours. We subsequently add these 181 firms into our sample to

⁴ We thank Sarah McVay for making the data available on her website (<http://pages.stern.nyu.edu/~smcvay/research/Index.html>).

create an initial sample of 1456 firms. Out of the 1456 initial sample firms, 952 firms have the required firm characteristics variables (for regressions) in Compustat annual database. Among these 952 firms, 745 firms have the analyst's forecasts data in IBES database.

Next we identify a sample of matching firms which do not disclose internal control material weaknesses (non-ICMW firms), with similar IBES and Compustat requirements as the ICMW firms. We match ICMW firms with non-ICMW firms by industry, firm size and sales performance, as measured in the fiscal year in which the ICMW is disclosed. Industry is defined using the 48 industry codes identified by Fama and French (1997), firm size is measured as total assets (Compustat #6), and sales performance is measured as total sales (Compustat #12). The matching algorithm is similar to that used by Francis et al. (2006). In particular, matches are identified by an algorithm that calculates the distance between each ICMW firm k and its matching non-ICMW counterpart j . Specifically, for each non-ICMW firm j in the same Fama-French industry as ICMW firm k , we calculate the percentage difference in assets,

$$AssetsDIS = \left| \frac{Assets_j - Assets_k}{Assets_k} \right|, \text{ and the percentage differences in sales, } SalesDIS = \left| \frac{Sales_j - Sales_k}{Sales_k} \right|.$$

The sum of the two distance measures yields a matching score for each non-ICMW firm j that is in the same industry as ICMW firm k . From the set of matching scores that are less than two, we choose the non-ICMW firm with the smallest matching score for each ICMW firm; we then remove the matching pair (the ICMW and its non-ICMW counterpart) from the lists of ICMW and non-ICMW firms. In some cases, a single non-ICMW firm is the best match for several ICMW firms. In this case, we control for the order in which we match a non-ICMW firm to an ICMW firm by first calculating all

possible matching scores, and then assigning the non-ICMW firm j to the ICMW firm k whose matching score is the smallest among the candidate ICMWs. For the remaining candidate non-ICMWs, we repeat the above steps using the remaining ICMW firms. In total, application of these procedures produces a final sample of 727 pairs of ICMW and non-ICMW firm-year observations.⁵

4.2. Descriptive statistics

Panels A and B in Table 1 show the number and percentage of sample firms by industry and by stock exchange, respectively. Industry groups with the largest representations in the sample include durable manufacturers (20.4%), computers (19.1%), retail (12.9%) and financial (12.5%). Our sample distribution is similar to that of Beneish et al (2006) and Ghosh and Lubberink (2006). As a comparison, in the last two columns of Table 1 we also present the number and percentage of 2003 Compustat population by industry. The industry distributions of our sample firms and 2003 Compustat firms are similar. The industry groups with the largest representations in 2003 Compustat population are also durable manufacturers, computers and financial. The retail industry has a larger weight in our sample relative to the weight in 2003 Compustat population. In terms of stock exchange, the majority of ICMW firms are listed on NASDAQ (436 firm-years) and NYSE (245 firm-years).

[Table 1]

Table 2 presents the descriptive statistics for sample firms and matching firms. The median number of analysts following sample firms is smaller than that of analysts

⁵ The final sample firms are not distinctive. If a firm in our final sample reports internal material weaknesses in multiple years, the firm will show up in our sample multiple times. We have 599 distinctive firms that have shown up once in our final sample and 64 firms that have shown up twice in our sample. The conclusions of this paper remain the same if we exclude these 64 firms from our analyses.

following matching firms. The firm size is measured as the natural logarithm of the market value of equity. The median firm size suggests that sample firms are smaller than matching firms (significant at the 0.1 significance level). There are no significant mean and median differences in leverage between sample firms and matching firms. The mean and median profitability of sample firms, measured by return on assets (ROA), are significantly lower than those of matching firms at the 0.01 significance level in terms of mean and median.

[Table 2]

The mean and median book to market ratio (BM) of sample firms are significantly larger than those of matching firms at the 0.01 significance level. The median of percentage change in earnings of sample firms is significantly smaller than that of matching firms at the 0.01 significance level. Also, the median number of negative earnings of sample firms is significantly greater than that of matching firms at the 0.01 significance level. Taken the statistics together, sample firms are followed by fewer analysts, and have smaller market capitalization, higher book to market ratio and lower profitability than their matching firms.

4.3. The sample firms by type of ICMW

As we discussed in Section 3, we hypothesize that the impact of the disclosed ICMWs on analysts' forecast accuracy and bias is unlikely to be homogenous. In particular, we classify firms disclosing ICMWs into two groups: one group of firms discloses only account-level ICMWs (G1 firms), and the other group of firms discloses firm-level (with or without account-level) ICMWs (G2 firms).

The classification of account-level and firm-level ICMWs is similar to Moody's classification scheme (Moody's is the bond-rating company). Account-level ICMWs are defined as the internal control issues related to controls over specific account balances, or transaction-level processes or accounting policy interpretations. Firm-level ICMWs are defined as the internal control issues related to controls over the control environment or the overall financial reporting process.

The detailed classification procedures are the following: We first provide a breakdown of the firms based on firms' stated reasons for material weaknesses in their 10K filings as in Ge and McVay (2005). Firms usually disclose the internal control issues in nine areas: Account-Specific, Training and Personnel, Period-End Reporting/Accounting Policies, Revenue Recognition, Segregation of Duties, Account Reconciliation, Subsidiary-Specific, Senior Management, and Technology Issues. We then classify account-level internal control issues as: 1) Account-Specific; 2) Period-End Reporting/Accounting Policies; 3) Revenue Recognition and 4) Account Reconciliation issues. The rationale for this classification is that these internal control issues are all related to controls over specific account balances, or transaction-level processes or accounting policy interpretation. We classify firm-level internal controls issues as: 1) Training and Personnel; 2) Segregation of Duties; 3) Subsidiary-Specific; 4) Senior Management and 5) Technology Issues, because all of these control issues are related to controls over the control environment or the overall financial reporting process.

We record 1372 distinct deficiencies for our 727 firm-year observations since some firms disclose more than one ICMW. Among these 1372 deficiencies, 431 are Account-Specific deficiencies; 243 are Period-End Reporting/Accounting Policies

deficiencies; 138 are Revenue Recognition deficiencies; 90 are Account Reconciliation issues deficiencies; 165 are Training and Personnel deficiencies; 53 are Segregation of Duties deficiencies; 89 are Subsidiary-Specific deficiencies; 56 are Senior Management deficiencies; and 68 are Technology deficiencies. Examples of our material weakness classification schemes are presented in the Appendix.

Among 727 ICMW firm-year observations, 348 firm-year observations disclose ICMWs only related to account-level deficiencies (i.e., internal control deficiencies are only related to the controls over specific account balances or transaction-level processes); 318 firm-year observations disclose internal control material weaknesses related to both account-level and firm-level deficiencies (i.e., internal control deficiencies are related not only to the controls over specific account balances or transaction-level processes, but also to the controls over the overall firm-level environments); and 61 firm-year observations disclose ICMWs only related to firm-level deficiencies (i.e., internal control deficiencies are only related to the controls over the overall firm-level environments). Hence, there are 348 G1 firm-year observations and 379 G2 firm-year observations (318 firm-year observations plus 61 firm-year observations).

In Section 3, we argue that the internal control issues of G2 firms are more likely than G1 firms to be caused by the lack of capabilities and resources of management to efficiently control the overall firms. To assess the validity of this claim, we investigate the general firm characteristics associated with G1 and G2 firms. In particular, we examine firms' profitability as well as the complexity of businesses. We expect G2 firms to have lower profitability and higher complexity of businesses because such firms' managements will have limited resources to invest in proper internal control (due to

lower profitability) and greater difficulty to establish efficient internal control (due to higher complexity). We use return on assets (ROA) and the loss indicator (LOSS) to proxy for profitability. ROA is calculated as earnings before extraordinary items (Compustat #18) scaled by average total assets (Compustat # 6); and LOSS is an indicator variable that equals one if earnings are negative and zero otherwise. As in Ge and McVey (2005), we use the existence of a foreign currency adjustment to proxy for the complexity of the business (FOREIGN) (COMPUSTAT Data Item #150).

The descriptive statistics provided in Table 3 suggest that G1 firms are, on average, more profitable than G2 firms. The average return on assets (ROA) of G1 firms is significantly higher than that of G2 firms (at the 0.01 significance level); the average loss (LOSS) of G1 firms is significantly lower than that of G2 firms (at the 0.1 significance level). By comparing our business complexity measure: the existence of a foreign currency adjustment (FOREIGN), we find that the business models of G2 firms, on average, are significantly more complex than those of G1 firms (at the 0.1 significance level). In sum, we find support in the univariate analysis that G2 firms have lower profitability and higher complexity of businesses compared to G1 firms, suggesting that the managements of G2 firms have limited resources to invest in proper internal control (due to lower profitability) and have more difficulty to establish efficient internal control (due to higher complexity) than G1 firms.

[Table 3]

5. Empirical test

5.1. Variable measurement

Based on Kanagaretnam et al. (2004), we define forecasts accuracy and bias as following:

Forecast accuracy (ACCURACY) is calculated as $\frac{|EPS \text{ Forecasted} - EPS \text{ Actual}|}{\text{Beginning Stock Price}}$, both forecasted and actual earnings per share are from IBES Summary Files. Because we are interested in assessing the impact of firms' internal control on its financial statements, we try to focus on a particular announcement date—annual earnings announcement. Forecast accuracy is computed as the absolute difference between the last median forecasted earnings before annual earnings announcement and the actual announced earnings. We deflate forecast accuracy by beginning stock price to facilitate comparisons across firms.

Forecast bias (BIAS) is calculated as $\frac{EPS \text{ Forecasted} - EPS \text{ Actual}}{\text{Beginning Stock Price}}$. Forecast bias is computed as the difference between the last median forecasted earnings before annual earnings announcement and the actual announced earnings. We also deflate forecast bias by beginning stock price to facilitate comparisons across firms.

As a sensitivity test, we also calculate ACCURACY and BIAS using the simple average of the measures across the six, nine and twelve monthly reporting periods on the IBES before the company's fiscal year end. The results are similar to what we report in this paper (not-tabulated).

5.2. Univariate analysis

In Table 4 we report the mean and median values of forecast accuracy and bias for sample firms and matching firms. In addition, we also present means and medians of forecast accuracy and bias separately for G1 firms along with their matching firms and

G2 firms and their matching firms. We attempt to see if there are significant differences between ICMW firms and their matching firms in analysts' forecast accuracy and forecast bias.

[Table 4]

We find that median forecast accuracy for ICMW sample is significantly smaller than that for matching firms at the 0.01 level, suggesting that internal control material weakness is related to less accurate forecasts. In addition, we find that median forecast bias for ICMW sample is significantly larger than that for matching firms at the 0.01 level, consistent with the notion that internal control material weakness is related to more optimistic analyst forecasts.

The similar pattern exists when we compare the forecast accuracy and forecast bias separately for G1 firms and their matching firms and G2 firms and their matching firms. In terms of forecast accuracy, the median forecast accuracy of G1 firms is smaller than that of the matching firms at the 0.01 significance level. For G2 firms, the median forecast accuracy is also smaller than that of matching firms at the 0.01 significance level. In terms of optimistic bias, we find that median forecast biases for G1 and G2 samples are larger than those for their matching firms at the 0.01 significance level.

These findings suggest that internal control material weaknesses are associated with more optimistic and less accurate forecasts for both G1 and G2 firms without controlling for other firms' characteristics. In the next subsection, in an attempt to control for various firms' characteristics, we use multivariate regressions to examine the association between internal control material weakness and analysts' forecast accuracy and bias.

5.3. Ordinary least squares (OLS) analysis

We model the association between analysts forecast accuracy and ICMW as a function of firm characteristics using the following OLS regression:

$$\begin{aligned} \text{ACCURACY} = & \alpha_0 + \alpha_1 \text{ICMW} + \alpha_2 \text{NUM} + \alpha_3 \text{MV} + \alpha_4 \text{LEV} + \alpha_5 \text{ROA} + \alpha_6 \text{BM} \\ & + \alpha_7 \text{VOLEARN} + \alpha_8 \text{ABSEARN_CHG} + \alpha_9 \text{LOSS} + \alpha_9 \text{SPECIAL} + \varepsilon \end{aligned} \quad (1)$$

Where

ACCURACY is forecast accuracy, calculated as the negative of the absolute difference between actual EPS and last median forecasted EPS scaled by stock price.

ICMW =1 if a firm discloses material weakness in internal control, and 0 otherwise.

NUM is the number of analysts who make the forecasts in calculating the last median earnings.

MV is the natural logarithm of the market value of the firms (Compustat # 25*# Compustat #199).

LEV is the ratio of debt (Compustat # 34+Compustat # 9) to asset (Compustat # 6).

ROA is the ratio of return to asset, calculated as earnings before extraordinary items (Compustat #18) scaled by average total assets (Compustat # 6).

BM is the natural logarithm of book value (Compustat # 60) to the market (Compustat # 25* Compustat #199) of the firms.

VOLEARN is the standard deviation of earnings before extraordinary items (Compustat #18) estimated using data from the prior five years.

ABSEARN_CHG is the absolute change in earnings (Compustat #18), calculated as the absolute value of the change in earnings over the previous year scaled by the previous year's earnings.

LOSS=1 if earnings are negative, zero otherwise.

SPECIAL=1 if special items (Compustat # 17) are not equal to zero, zero otherwise.

In our regression model we control for earnings characteristics. Prior research identifies earnings volatility (VOLEARN), whether firms have losses (LOSS), whether firms have special items (SPECIAL) and absolute earnings changes (ABSEARN_CHG) as earnings characteristics that negatively affect forecast accuracy. The forecasting task is more difficult for firms with historically more volatile earnings compared to firms with historically more stable earnings (e.g., Kross et al., 1990 and Lim, 2001), and for firms with losses, special items (Brown and Higgins, 2001) and larger earnings surprises (e.g., Lang and Lundholm, 1996 and Duru and Reeb, 2002).

We also control for other firm characteristics. We include size and growth as firm-specific control variables that are likely to be related to forecast accuracy and bias. We measure SIZE as the natural logarithm of market value at the end of the year (MV) and GROWTH as the natural logarithm of the ratio of the book value of equity at the end of the year to the market value of equity at the end of the year (BM). Firm size has been used in the literature as a proxy for a number of factors. To the extent that size reflects information availability about a firm (other than through annual reports), a positive relation with forecast accuracy is expected. But, firm size could also proxy for a host of other factors, such as managers' incentives, for which predictions for the relation with

forecast accuracy are unclear. Dechow and Sloan (1997) and Richardson et al. (2001) find that forecast accuracy and bias are related to measures of growth. Consistent with prior research, we expect firms with low book to market ratios (i.e., high growth or mature firms) to have more accurate forecasts than firms with high book to market ratios (i.e., turnaround and declining firms). We also include leverage (LEV) to proxy for firm risks. We expect firms with higher leverage to have less accurate forecasts (than firms with lower leverage). In addition, to control for firm's profitability, we include return on assets (ROA). We do not have predictions for the sign of this variable.

We use the number of analysts who make the forecasts in calculating the last median earnings (NUM) to account for the effects of differences in forecast characteristics on forecast accuracy. Lys and Soo (1995) argue that the number of analysts proxies for the intensity of competition in the market. We expect a positive relation between forecast accuracy and analyst following.

Hypothesis 1a predicts that there is no difference in the accuracy of analyst forecasts between ICMW firms and non-ICMW firms. Therefore, we expect, α_1 , the coefficient on ICMW, to be insignificant for the whole sample. Hypothesis 1b and 1c predict that forecast accuracy is smaller for G2 firms relative to matching firms and is not different between G1 firms and their matching firms, respectively. Therefore, we expect, α_1 , the coefficient on ICMW, to be significantly negative for G2 sample only.

We estimate the following regression model to test our second hypothesis on forecast bias:

$$\begin{aligned} \text{BIAS} = & \beta_0 + \beta_1 \text{ICMW} + \beta_2 \text{NUM} + \beta_3 \text{MV} + \beta_4 \text{LEV} + \beta_5 \text{VOLEPS} + \beta_6 \text{BM} \\ & + \beta_7 \text{SKEW} + \beta_8 \text{EARN_CHG} + \beta_9 \text{LOSS} + \beta_9 \text{SPECIAL} + \\ & \beta_{10} \text{NEARN_CHG} + \varepsilon \end{aligned} \quad (2)$$

Where

BIAS is forecast bias, calculated as the difference between last median forecasted EPS and actual EPS scaled by stock price.

SKEW is the skewness of the earnings, calculated as the difference between the last mean and the median forecast scaled by lagged stock price.

EARN_CHG is the change in earnings (Compustat #18), calculated as the change in earnings over the previous year scaled by the previous year's earnings.

NEARN_CHG is equal to one if EARN_CHG is negative and zero otherwise.

As in forecast accuracy test, we use earnings volatility (VOLEARN), whether firms have losses (LOSS) and whether firms have special items (SPECIAL) to control for earnings characteristics. Unlike accuracy test, we use earnings changes (EARN_CHG) instead of absolute earnings changes (ABSEARN_CHG). We expect that optimistic forecast bias is positively associated with earnings characteristics because these characteristics are positively related to the complexity of forecasting tasks. In addition, we include EARN_CHG and NEARN_CHG to control for the anchoring behavior of analysts who tend to anchor their forecasts closely to previous period's actual results.⁶ We use the difference between the mean earnings per share (EPS) and median earnings per share (EPS) scaled by price to proxy for earnings skewness (SKEW). We expect that optimistic forecast bias is negatively associated with earnings skewness primarily due to mean-median differences in skewed earnings distributions (Gu and Wu, 2003).

As in forecast accuracy test, we also use size (MV) and growth (BM) to control for differences in firm characteristics. We do not predict the direction of the impact of firm size and growth on the complexity of forecasting tasks. We include the number of

⁶ See Shiller (1997) on anchoring behavior of financial analysts.

analysts following the firm (NUM) to account for differences in forecasts characteristics that affect forecast bias. We have no prediction on the sign of this variable either.

Hypothesis 2a predicts that there is no difference in the bias of analyst forecasts between ICMW firms and non-ICMW firms. Therefore, we expect, β_1 , the coefficient on ICMW, to be insignificant for the whole sample. Hypothesis 2b predicts that the bias of analyst forecasts is more positive for firms with firm-level ICMWs relative to non-ICMW firms and hypothesis 2c predicts that there is no difference in the bias of analyst forecasts between firms with account-level ICMWs and non-ICMW firms. Therefore, we expect, β_1 , the coefficient on ICMW, to be significantly positive only for the G2 sample.

The results of the accuracy test are reported in Table 5. Column 2 shows the OLS regression results for the overall sample along with the matching sample; Column 3 shows the OLS regression results for the G1 sample firms and their matching firms; and Column 4 shows the OLS regression results for the G2 sample firms and their matching firms.

The results presented in Table 5 show that the coefficients on ICMW for the overall sample and G1 sample firms are not different from zero. These findings suggest that financial analysts' forecast accuracy is not significantly different for firms with any ICMW disclosures and for firms with only account-level ICMW disclosures relative to their matching firms. In contrast, for G2 sample firms, the coefficient on ICMW in Column 4 is significantly negative at the 0.05 level for the two-tailed test. The negative coefficient suggests that forecast accuracy is significantly lower for firms with firm-level ICMW disclosures compared with their matching firms.

In Table 6 we report the results for the bias test and the layout of Table 6 is similar to that of Table 5. The coefficient on ICMW is significantly positive for the overall sample at the 0.01 significance level in Column 2, suggesting that financial analysts tend to be more optimistic toward firms with ICMW disclosures. Consequently the forecast bias is significantly higher for firms with ICMW disclosures relative to matching firms. For G1 firms, the coefficient on ICMW in Column 3 is not significant, suggesting that financial analysts' forecast optimism is not related to G1 type of ICMWs (account-level ICMW disclosures *alone*). In contrast, for G2 firms, the coefficient on ICMW in Column 4 is significantly positive at the 0.01 significance level. The positive coefficient suggests that financial analysts' forecast bias is significantly positive for firms with G2 type of ICMWs relative to matching firms.

Inferences about the control variables in these regressions are generally similar to previous studies. Specifically, firms with larger size and lower leverage, lower frequency of negative earnings, larger number of analysts following and higher profitability have more accurate forecasts (as evidenced by significant P-value [<0.05] in Table 5). Firms with smaller size, higher leverage, less skewed earnings, higher frequency of negative earnings and lower profitability have more optimistically biased forecasts (as evidenced by significant P-value [<0.05] at Table 6).

6. *Additional tests*

6.1. Simultaneous tests of internal control material weakness and forecast accuracy and bias

Whereas accounting standards specify minimum standards for internal control, actual internal control is likely to vary with a number of factors. Consistent with this, previous research has investigated the determinants of disclosed ICMW. Doyle et al (2007b) find that ICMWs are negatively associated with the proxies for good corporate governance. Financial analysts are known to have impact on firm's corporate governance. For example, Degeorge et al. (2005) find that analyst following can act as a monitoring device reducing earnings management in certain countries. It is thus important to test whether the potential endogeneity of ICMW affects the relation between analysts' forecast accuracy, bias and disclosed ICMWs. In particular, we test both the determinants of ICMW and the effects of these determinants on forecast accuracy and bias in a system of equations.

The factors we consider for explaining ICMW are size (MV), profitability (ROA), leverage (LEV), analyst following (NUM), auditor type (AUD), firm age (AGE) and foreign currency transactions (FOREIGN).⁷ AUD is an indicator variable that is equal to one if the firm is audited by one of the following: BDO Seidman, Deloitte & Touche, Ernst & Young, Grant Thornton, KPMG, or PricewaterhouseCoopers; and zero otherwise. AGE is the estimated number of years a firm has been publicly traded using data from CRSP database. Within these factors, firm age, foreign currency transactions, and auditor type are thought to influence ICMW, but not to be influenced by forecast accuracy or bias. We use a two-stage probit least squares regression model (2SPLS) to control for the

⁷ The literature on determinants of ICMW is not reviewed here (see, Ge and McVay, 2005).

endogeneity issues. 2SPLS is an extension of 2SLS (two stage least squares). 2SPLS is used when the dependent variable is continuous and the endogenous explanatory variable is dichotomous. Because the exogenous variables are uncorrelated with the error terms, the predictions based on them will be uncorrelated with the errors. The prediction from the first regression is used in the second stage in place of the actual endogenous variable. The results of this analysis produce consistent estimates of the model parameters.⁸

Tables 7 and 8 report the results from the *second* stage regressions for the accuracy and bias tests respectively.⁹ In terms of accuracy tests, similar to OLS regressions results, we find that the coefficients on ICMW for the overall sample and G1 sample firms are not different from zero at the 0.1 significance level. In contrast, for G2 sample firms, the coefficient on ICMW in Column 4 is significantly negative at the 0.1 level for the two-tailed test. In terms of bias tests, similar to OLS regressions results, we find that the coefficient on ICMW is significantly positive for the overall sample at the 0.05 significance level. For G1 sample firms, the coefficient on ICMW in Column 3 is not significant, suggesting that financial analysts' forecast optimism is not related to account-level ICMW. In contrast, for G2 sample firms, the coefficient on ICMW in Column 4 is significantly positive at the 0.01 level for the two-tailed test. The positive coefficient suggests that financial analysts' forecast bias is significantly higher for firms with firm-level ICMW disclosures compared with matching firms. The inferences about the control variables in the 2SPLS regressions are generally similar to those presented in OLS regressions.

⁸ See Maddala (1983, pg. 244) for more details.

⁹ The first stage regressions' results are not tabulated.

6.2. Pseudo-ICMW and forecast accuracy and bias

Our next test probes our findings of association between ICMW and forecast accuracy (and bias) for G2 firms. In particular, we investigate whether the association between ICMW and forecast accuracy (and bias) still exists when firms resolve the internal control deficiencies. If there is indeed an association between ICMW and forecast accuracy (and bias), we should find no difference in forecast accuracy (and bias) between ICMW firms and their matching firms after ICMW firms work out their internal control issues. To test this hypothesis, we examine whether the forecast accuracy (and bias) for G2 sample firms are significantly different from their matching firms after the sample firms stop disclosing internal control material weaknesses. The assumption here is that firms will stop disclosing internal control material weaknesses when they resolve their internal control issues.

We start by assigning a pseudo-ICMW year to each G2 firm-year observation, defined as the first year after the year in which ICMWs are disclosed in our sample period.¹⁰ In this design, the pseudo-ICMW year is the first year that our sample firms solve their internal control issues after disclosing material weaknesses. We then re-estimate equations (1) to (2) for the pseudo-ICMW firm-year observations. We have 196 pseudo-ICMW firm-year observations for G2 sample. We lost 183 firm-year observations due to lack of required data.¹¹ The un-tabulated results show that the ICMW coefficients in both accuracy and bias tests are no longer significant, suggesting that in the first year in which our sample firms solve their disclosed internal control issues, there are no significant differences in accuracy and bias between G2 firms and their matching firms.

¹⁰ For firms that disclose ICMWs for multiple years, the last year in which ICMWs are disclosed for the firms in our sample period is used.

¹¹ We cannot assign a pseudo-ICMW year to sample firms that disclose ICMWs in calendar year 2006.

6.3. Other robust tests

We conduct several additional tests to probe the robustness our main results reported in Tables 5 and 6. We begin by investigating whether the level of earnings will affect our results. The recent study by Eames and Glover (2003) documents that, after controlling for the level of earnings, there is no significant relation between forecast error and earnings predictability. Given this finding, we include level of earnings, which is measured as annual earnings scaled by year-end market value of equity as a control variable. However, Gu and Wu (2003) argue that inclusion of earnings level as a control variable will induce spurious relations between the variable capturing the forecast efficiency and other control variables. Our main results remain qualitatively the same after controlling for the level of earnings (not tabulated).

Next, to assess the sensitivity of the results to the underlying functional form assumption made by OLS, we also re-estimate the models using rank regression techniques. The results using rank regressions support the reported results (not tabulated).

6.4. Discussion on Regulation Fair Disclosure (RegFD)

Our sample period is after the introduction of Regulation Fair Disclosure (RegFD) that went into effect in October 2000. The goal of RegFD is to prohibit management from selectively disclosing private information to analysts. Hence, if RegFD effectively curbs analysts' incentives to bias their forecasts upward in hopes of getting favorable treatments from management, we should find no association between ICMW and optimistic bias in analyst earnings forecasts.

We argue that our findings are consistent with recent research (see for example, Ke and Yu, 2004; Kanagaretnam et al, 2004) suggesting that there is no evidence of management relations incentive weakening after RegFD. In addition, anecdotal evidences

also show that RegFD does not prevent a company from more subtle forms of retaliations against analysts who issue negative research report (see Solomon and Frank, 2003).

7. Conclusion

In this paper we investigate the effects of firms' weaknesses in internal control over financial reporting on the accuracy and optimistic bias of financial analysts' earnings forecasts. Comparing firms reporting material weaknesses under Sections 302 and 404 of SOX to a industry- and size-matched control sample of firms that file clean reports, we find that financial analysts' earnings forecasts are less accurate for firms with firm-level ICMWs than for their matching firms. We interpret this result as managers of such firms lacking capabilities or resources to effectively control firms' financial reporting process, and hence leading to noisy financial statement, which makes financial analysts' earnings forecasts less accurate (if financial analysts rely on firms' disclosures to make forecasts). In contrast, we find no such association if the disclosed ICMWs are *only* at the account-level. This finding is consistent with the hypothesis that account-level ICMWs *alone* do not significantly increase the complexity of the forecasting job for analysts.

We also examine the association between ICMW and forecast bias. We find that forecast bias is significantly positive for ICMW firms relative to their matching firms and the positive association is only significant for firms with firm-level ICMWs. In sum, this paper provides evidence on how firms' material weaknesses in internal control over financial reporting affect the accuracy and bias of financial analysts' earnings forecasts. Our results suggest that the weakness in internal control increases the complexity of the forecasting tasks for financial analysts especially if the weaknesses are at the firm level.

References

- Ashbaugh H., D. Collins and W. Kinney. (2005). The discovery and consequences of internal control deficiencies prior to SOX-mandated audits. Working paper, University of Wisconsin-Madison.
- Beneish, D., M. Billings, and L. Hodder. (2006). International control weaknesses and information uncertainty. Working paper, Indiana University.
- Brown, L.D. and H. N. Higgins. (2001). Managing earnings surprises in the U.S. versus 12 other countries. *Journal of Accounting and Public Policy* 20 (4-5). 371-398.
- Das, S., C.B. Levine, and K. Sivaramakrishnan. (1998). Earnings predictability and bias in analysts' earnings forecasts. *The Accounting Review* 73: 277-294.
- Dechow, P. M. and R. G. Sloan. (1997). Returns to contrarian investment: Tests of the naive expectations hypotheses. *Journal of Financial Economics* 43 (January): 3-28.
- De Franco, G., Y. Guan, and H. Lu. (2005). The wealth change and redistribution effects of Sarbanes-Oxley internal control disclosures. Working paper, University of Toronto.
- Degeorge, F., Y. Ding, T. Jeanjean, and H. Stolowy, (2005). Does analyst following curb earnings management? International evidence. Working Paper, ECWI Finance.
- Doyle, J., W. Ge and S. McVay. (2007a). Accruals quality and internal control over financial reporting. *The Accounting Review* forthcoming.
- Doyle, J., W. Ge and S. McVay. (2007b). Determinants of weaknesses in internal control over financial reporting and the implications for earnings quality. *Journal of Accounting and Economics* forthcoming
- Duru, A. and D. Reeb. (2002). International diversification and analysts' forecast accuracy and bias. *The Accounting Review* 77, 415-433
- Eames, M. and S. Glover. (2003). Earnings predictability and the direction of analysts' earnings forecast errors. *The Accounting Review* 78, 707-724.
- Fama, E., and K. French. (1997). Industry costs of equity. *Journal of Financial Economics* 43, 153-194.
- Francis, J., D. Nanda, and X. Wang. (2006). Re-examining the effects of regulation fair disclosure using foreign listed firms to control for concurrent shocks. *Journal of Accounting & Economics* 41, 271-292.
- Ge, W. and S. McVay (2005). On the disclosure of material weaknesses in internal control after the Sarbanes-Oxley act. *Accounting Horizon* 19, 137-158.

- Ghosh, A. and M. Lubberink. (2006). Timeliness and mandated disclosures on internal controls under section 404. Working Paper, City University of New York.
- Gu, Z. and J. Wu. (2003). Earnings skewness and analyst forecast bias. *Journal of Accounting and Economics* 35, 5-29.
- Hogan, C. and M. Wilkins. (2005). Do internal control weaknesses result in lower earnings quality? Implications and evidence from the audit risk model. Working Paper, Southern Methodist University.
- Hoitash, R., U. Hoitash, and J. Bedard. (2005). Audit pricing and internal control disclosures under the Sarbanes-Oxley Act. Working Paper, Suffolk University.
- Huang, H., R. Willis, and A. Zang. (2005). Bold security analysts' earnings forecasts and managers' Information Flow. Working Paper, Duke University.
- Kanagaretnam, K., G. Lobo and A. Mathieu (2004). CEO compensation mix and analysts forecast accuracy and bias. Working Paper, McMaster University.
- Ke, B., and Y. Yu. 2004. The effect of issuing biased earnings forecasts on analysts' access to management and survival. Working paper, Pennsylvania State University.
- Kross, W., B. T. Ro, and D. Schroeder. (1990). Earnings expectations: The analysts' information advantage. *The Accounting Review* 65, 461-476.
- Lang, M.H. and R.J. Lundholm. (1996). Corporate disclosure policy and analyst behavior. *The Accounting Review* 71 (4): 467-492.
- Lim, T. (2001). Rationality and analysts' forecast bias. *Journal of Finance*, 56, 369-385.
- Lys, T. and L. Soo. (1995) Analysts' forecast precision as a response to competition. *Journal of Accounting, Auditing and Finance* 10, 751-765.
- Maddala, G. S. (1983). *Limited dependent and qualitative variables in econometrics*. Cambridge: Cambridge University Press.
- Qi, C and W. Jiang. (2002). Concerns and the optimal pay-for-performance sensitivity. Working Paper, Duke University.
- Ogneva, M., K. Raghunandan, and D. Subramanyam. (2006). Internal control weakness and cost of equity: evidence from SOX Section 404 disclosures. Working Paper, University of Southern California.

- Public Company Accounting Oversight Board (PCAOB). (2004). An audit of internal control over financial reporting performed in conjunction with an audit of financial statements. Auditing Standard No. 2. Washington, D.C.: PCAOB.
- Richardson, S., S. Teoh, and P. Wysocki. (2001). The walkdown to beatable analyst forecasts: The role of equity issuance and insider trading incentives. Working Paper, University of Michigan.
- Sarbanes-Oxley Act. (2002). Public Law 107-204, 107th Cong., 2nd Session. Washington, DC: GPO.
- Shiller, R.J. (1997): Human Behavior and the Efficiency of the Financial System. Working Paper. Yale University.
- Schipper, K. (1991). Commentary on analysts' forecasts. *Accounting Horizons* 5, 105-121.
- SEC. (1988). Disclosure amendments to regulation S-K, form 8-K and Schedule 14A regarding changes in accountants and potential opinion shopping situations, financial reporting release No. 31 (April), SEC Docket 1140-1147. Washington, D.C.: SEC.
- Solomon, D. and R. Frank (2003). Stock analysis: 'You don't like our stock? You are off the list' -- - SEC sets new front on conflicts by taking aim at companies that retaliate against analysts. *Wall Street Journal*, Jun 19, page C.1.
- Solomon, D. (2005). Accounting rule exposes problems but draws complaints about cost. *Wall Street Journal*, May 2, page A.1.

Appendix 1 Material weakness classification examples

Type A: Account-level material weaknesses

1. Account-Specific

e.g., “U.S. Cellular did not maintain effective controls over the completeness, accuracy, presentation and disclosure of its accounting for income taxes, including the determination of income tax expense, income taxes payable, liabilities accrued for tax contingencies and deferred income tax assets and liabilities.”(U.S. Cellular Inc., 2004 10-K report)

2. Period-End Reporting/Accounting Policies

e.g., “--a lack of an ongoing formal self-assessment process related to internal control over financial reporting.” (Ivanhoe energy Inc., 2004 10-K report)

3. Revenue Recognition

e.g., “The Company's policies and procedures regarding coal sales contracts with its customers did not provide for a sufficiently detailed, periodic management review of the accounting for payments received. This material weakness resulted in a material overstatement of coal revenues and an overstatement of amortization of capitalized asset retirement costs.” (Westmoreland Coal Co., 2005 10-K report)

4. Account Reconciliation

e.g., “The Company did not maintain effective controls over reconciliations of certain financial statement accounts.” (SIRVA Inc., 2004 10-K report)

Type B: firm-level material weakness

1. Segregation of Duties

e.g., “Inadequate segregation of duties was noted with respect to the revenue, expenditure and payroll processes as numerous incompatible tasks are performed by the same accounting personnel. The Company needs to review current policies and procedures to ensure that incompatible duties are not performed by one individual or that there are specific compensating controls if incompatible duties cannot be avoided.” (Versant Co., 2004 10-K report).

2. Subsidiary-Specific

e.g., “We have reported to the SEC that one of our foreign subsidiaries operating in Nigeria made improper payments of approximately \$2.4 million to an entity owned by a Nigerian national who held himself out as a tax consultant when in fact he was an employee of a local tax authority. The payments were made to obtain favorable tax treatment and clearly violated our Code of Business Conduct and our internal control procedures. The payments were discovered during an audit of the foreign subsidiary.” (Halliburton Co., 2002 10-K report)

3. Senior Management

e.g., “management did not set a culture that extended the necessary rigor and commitment to internal control over financial reporting.” (SIRVA Inc, 2004 10-K report)

4. Technology Issues

e.g., “There are weaknesses in the Company's information technology ("IT") controls which makes the Company's financial data vulnerable to error or fraud; a lack of documentation regarding the roles and responsibilities of the IT function; lack of security management and monitoring and inadequate segregation of duties involving IT functions.” (Earthshell Co., 2005 10-K report)

5. Training and Personnel:

e.g., “The Company lacks personnel with adequate expertise in accounting for income taxes in accordance with U.S. GAAP.” (Westmoreland Coal Co., 2005 10-K report)

Table 1

Industry and exchange distributions of firms reporting internal control material weakness (ICMW) in the period of 2003 to 2006 with data available from Compustat and IBES databases.

<i>Panel A: By industry</i>					
<i>Industry Name</i>	<i>SIC Codes</i>	<i>N</i>	<i>%</i>	<i>2003 Compustat</i> Firms(N)	<i>2003 Compustat</i> Firms(%)
Mining and Construction	1000-1999 excluding 1300-1399	13	1.79	158	2.56
Food	2000-2111	3	0.41	112	1.82
Textiles and printing/publishing	2200-2799	22	3.03	210	3.41
Chemicals	2800-2824, 2840-2899	9	1.24	135	2.19
Pharmaceuticals	2830-2836	31	4.26	559	9.07
Extractive	1300-1399, 2900-2999	25	3.44	196	3.18
Durable manufactures	3000-3999, excluding 3570-3579, 3670-3679	148	20.36	945	15.34
Computers	3570-3579, 3670-3679	139	19.12	853	13.84
Transportation	4000-4899	42	5.78	333	5.40
Utilities	4900-4999	27	3.71	287	4.66
Retail	5000-5999	94	12.93	460	7.47
Financial	6000-6999	91	12.52	1377	22.35
Services	7000-8999 excluding 7370-7379	<u>83</u>	<u>11.42</u>	<u>537</u>	<u>8.71</u>
Total		727	100	6162	98.80

Panel B: By stock exchange

<i>Stock Exchange</i>	<i>N</i>	<i>%</i>
NYSE	245	33.70
NASDAQ	436	59.97
AMEX	29	3.99
OTC	16	2.20
Other	<u>1</u>	<u>0.14</u>
Total	727	100.00

A total of 727 firm-year observations have reported ICMW and have data available from Compustat and IBES. SIC codes and stock exchanges are from the Compustat.

Table 2

Descriptive statistics for the ICMW sample and the matching sample firms.

	ICMW sample (N=727)		Matching sample (N=727)	
	<i>Mean</i>	<i>Median</i>	<i>Mean</i>	<i>Median</i>
NUM	6.183	4.000**	6.614	5.000
MV	6.285	6.165*	6.456	6.343
LEV	0.196	0.157	0.185	0.138
ROA	-0.019***	0.014***	0.019	0.038
BM	0.534***	0.473***	0.488	0.424
EARN_CHG	-0.195	-0.109***	-0.811	0.091
LOSS	0.354	0.000***	0.228	0.000

NUM is the number of analysts who make the forecasts in calculating the last median earnings. MV is the natural logarithm of the market value of the firms (Compustat # 25*#199). LEV is the ratio of debt (Compustat # 34+Compustat # 9) to asset (Compustat # 6). BM is the natural logarithm of the book value (Compustat # 60) to the market value (Compustat # 25*Compustat #199) of the firms. EARN_CHG is calculated as the change in earnings over the previous year scaled by the previous year's earnings. LOSS=1 if earnings before extraordinary items (Compustat #18) are negative, zero otherwise. ROA is the ratio of return to asset, calculated as earnings before extraordinary items (Compustat #18) scaled by average total assets (Compustat # 6).

Matching firms consist of firms in the same industry based on the 48 industry codes identified by Fama and French (1997) with the closest market value and sales at the end of fiscal year.

*, **, *** denote two-tailed significance levels of 10%, 5% and 1%, respectively for the differences between the ICMW sample and the matching sample. T-test is used to test the difference between the mean of the ICMW sample and the matching sample and Median test is used to test the difference between the median of the ICMW sample and the matching sample.

Matching firms are firms which do not disclose ICMW, with similar IBES and Compustat requirements as the ICMW firms. We match ICMW firms with non-ICMW firms by industry, firm size and sales performance, as measured in the fiscal year in which the ICMW is disclosed. Industry is defined using the 48 industry codes identified by Fama and French [1997], firm size is measured as total assets (Compustat #6), and sales performance as measured as total sales (Compustat #12). The matching algorithm is similar to that used by Jennifer et al. (2006).

Table 3

Descriptive statistics for the ICMW account level ICMW (G1) and firm level ICMW (G2) firms.

	G1 Firms (N=348)		G2 firms (N=379)	
	<i>Mean</i>	<i>Median</i>	<i>Mean</i>	<i>Median</i>
ROA	-0.001 ***	0.017	-0.035	0.012
LOSS	0.322*	0.000	0.383	0.000
FOREIGN	0.391*	0.000*	0.459	0.000

ROA is the ratio of return to asset, calculated as earnings before extraordinary items (Compustat #18) scaled by average total assets (Compustat # 6). LOSS=1 if earnings before extraordinary items (Compustat #18) are negative, zero otherwise. FOREIGN =1 if foreign currency translation (COMPUSTAT Data Item #150) is not zero, zero otherwise.

N is the number of firm-year observations.

*, **, *** denote two-tailed significance levels of 10%, 5% and 1%, respectively for the differences between G1 firms and G2 firms. T-test is used to test the difference between the mean of G1 sample and G2 sample and Median test is used to test the difference between the median of G1 sample and G2 sample.

G1 firms are firms that disclose *only* account-level ICMW and G2 firms are firms that disclose *at least* firm-level ICMW. The account-level and firm-level internal control material weaknesses are similar to Moody's classification scheme. The account-level internal control material weakness is defined as the internal control issues related to controls over specific account balances, or transaction-level processes or special accounting policy interpretation; the firm-level internal control material weakness is defined as the internal control issues related to controls over the control environment or the overall financial reporting process.

Table 4

Accuracy and Bias statistics for all ICMW firms, account level ICMW (G1) firms and firm level ICMW firms (G2) and their matching firms.

	ICMW firms (N=727)		Matching Firms (N=727)	
	<i>Mean</i>	<i>Median</i>	<i>Mean</i>	<i>Median</i>
ACCURACY	-0.019	-0.003 ^{***}	0.015	-0.002
BIAS	0.007 [*]	0.001 ^{***}	-0.001	0.000
	G1 firms (N=348)		Matching firms (N=348)	
	<i>Mean</i>	<i>Median</i>	<i>Mean</i>	<i>Median</i>
ACCURACY	-0.017	-0.003 ^{***}	-0.022	-0.002
BIAS	0.004	0.001 ^{***}	0.000	0.000
	G2 firms (N=379)		Matching firms (N=379)	
	<i>Mean</i>	<i>Median</i>	<i>Mean</i>	<i>Median</i>
ACCURACY	-0.020 ^{***}	-0.004 ^{***}	-0.009	-0.002
BIAS	0.010 ^{***}	0.001 ^{***}	0.000	0.000

ACCURACY is forecast accuracy, calculated as the negative of the absolute difference between actual EPS and last median forecasted EPS scaled by stock price. BIAS is forecast bias, calculated as the difference between last median forecasted EPS and actual EPS scaled by stock price. ^{*}, ^{**}, ^{***} denote two-tailed significance levels of 10%, 5% and 1%, respectively for the differences between ICMW firms and matching firms, G1 firms and matching firms and G2 firms and matching firms. T-test is used to test the difference between the mean of the ICMW sample and the matching sample and Median test is used to test the difference between the median of the ICMW sample and the matching sample.

Matching firms consist of firms in the same industry based on the 48 industry codes identified by Fama and French (1997) with the closest market value and sales at the end of fiscal year.

G1 firms are firms that disclose *only* account-level ICMW and G2 firms are firms that disclose *at least* firm-level ICMW. The account-level and firm-level internal control material weaknesses are similar to Moody's classification scheme. The account-level internal control material weakness is defined as the internal control issues related to controls over specific account balances, or transaction-level processes or special accounting policy interpretation; the firm-level internal control material weakness is defined as the internal control issues related to controls over the control environment or the overall financial reporting process.

Table 5
 OLS Regression estimations relating ACCURACY to ICMW firm variables.

Independent Variables	Dependent Variable = ACCURACY		
	N=1454 Coefficient Estimate (t-statistic)	N=696 Coefficient Estimate (t-statistic)	N=758 Coefficient Estimate (t-statistic)
Intercept	-0.064 (-4.90 ^{***})	-0.067 (-5.31 ^{***})	-0.024 (-4.36 ^{***})
NUM	0.001 (1.24)	0.001 (-0.58)	0.001 (3.27 ^{***})
MV	0.005 (3.14 ^{***})	0.005 (4.33 ^{***})	0.002 (2.40 ^{**})
LEV	-0.018 (-2.42 ^{***})	-0.013 (-2.36 ^{**})	0.001 (0.13)
BM	-0.001 (-0.65)	-0.002 (-1.00)	-0.001 (-0.17)
SPECIAL	0.001 (0.09)	0.001 (0.20)	0.001 (0.28)
EPSVOL	0.000 (-0.28)	0.000 (-0.32)	0.000 (0.07)
ICMW	0.003 (0.98)	0.002 (0.77)	-0.003 (-2.37 ^{**})
ABSEARN_CHG	0.000 (0.28)	0.000 (-0.24)	0.000 (0.14)
LOSS	-0.016 (-4.33 ^{***})	-0.001 (-3.06 ^{***})	-0.010 (-5.70 ^{***})
ROA	-0.001 (-0.13)	0.030 (2.52 ^{**})	0.004 (1.08)
Adjusted R ²	0.2904	0.7331	0.2268

Regressions estimate the relation between a set of independent variables, NUM, MV, LEV, BM, SPECIAL, EPSVOL, ICMW, ABSEARN_CHG, LOSS and ROA, and the dependent variable, ACCURACY using an ordinary least square (OLS) approach. Observations include ICMW firms and matching firms that don't disclose ICMW. Matching firms consist of firms in the same industry based on the 48 industry codes identified by Fama and French (1997) with the closest market value and sales at the end of fiscal year. Regressions in the second, third and fourth columns include all ICMW firms and matching firms, G1 firms and matching firms, and G2 firms and matching firms separately. Regressions control for exchange fixed effects. Outliers are excluded using Cook's (1977) distance statistic.

G1 firms are firms that disclose *only* account-level ICMW and G2 firms are firms that disclose *at least* firm-level ICMW. The account-level and firm-level internal control material weaknesses are similar to Moody's classification scheme. The account-level internal control material weakness is defined as the internal control issues related controls over specific account balances, or transaction-level processes or special accounting policy interpretation; the firm-level internal control material weakness is defined as the internal control issues related to controls over the control environment or the overall financial reporting process.

ACCURACY is forecast accuracy, calculated as the negative of the absolute difference between actual EPS and last median forecasted EPS scaled by stock price. NUM is the number of analysts who make the forecasts in calculating the last median earnings. MV is the natural logarithm of the market value of the firms (Compustat # 25*#199). LEV is the ratio of debt (Compustat #

34+Compustat # 9) to asset (Compustat # 6). BM is the natural logarithm of the book value (Compustat # 60) to the market value (Compustat # 25*Compustat #199) of the firms. SPECIAL=1 if special items (Compustat # 17) are not equal to zero, zero otherwise. EPSVOL is the standard deviation of earnings before extraordinary items (Compustat #18) estimated using data from the prior five years. ICMW =1 if a firm disclose material weakness in internal control, and zero otherwise. ABSEARN_CHG is the absolute change in earnings (Compustat #18), calculated as the absolute value of the change in earnings over the previous year scaled by the previous year's earnings. LOSS=1 if earnings are negative, zero otherwise. ROA is the ratio of return to asset, calculated as earnings before extraordinary items (Compustat #18) scaled by average total assets (Compustat # 6).

N is the number of firm-year observations.

*, **, *** denote two-tailed significance levels of 10%, 5% and 1%, respectively.

Table 6
 OLS Regression estimations relating bias to ICMW firm variables.

Independent Variables	<i>Dependent Variable = BIAS</i>		
	N=1454 Coefficient Estimate (t-statistic)	N=696 Coefficient Estimate (t-statistic)	N=758 Coefficient Estimate (t-statistic)
Intercept	0.015 (1.90 ^{**})	0.046 (2.82 ^{***})	0.001 (1.38)
NUM	0.000 (0.43)	0.000 (0.79)	0.000 (0.24)
MV	-0.003 (-3.10 ^{***})	-0.002 (-1.44)	-0.002 (-2.48 ^{**})
LEV	0.007 (1.72 [*])	0.007 (0.87)	0.005 (1.26)
BM	0.000 (-0.56)	-0.001 (-0.27)	-0.001 (-0.17)
SPECIAL	0.000 (0.28)	0.001 (0.39)	-0.001 (-0.55)
NEARN_CHG	-0.001 (-0.80)	0.003 (0.95)	-0.002 (-1.49)
SKEW	-5.204 (-15.10 ^{***})	-6.874 (-14.60 ^{***})	-0.244 (-0.36)
EPSVOL	0.000 (0.79)	0.000 (-0.70)	0.000 (-0.21)
ICMW	0.004 (2.72 ^{***})	0.003 (1.19)	0.005 (3.13 ^{***})
EARN_CHG	0.000 (-0.82)	0.000 (0.11)	0.000 (-1.28)
LOSS	0.005 (2.58 ^{***})	0.009 (2.36 ^{**})	0.006 (2.61 ^{***})
ROA	-0.007 (-1.27)	-0.075 (-5.07 ^{***})	-0.006 (-1.37)
Adjusted R ²	0.5685	0.6629	0.0760

Regressions estimate the relation between a set of independent variables, NUM, MV, LEV, BM, SPECIAL, NEARN_CHG, SKEW, EPSVOL, ICMW, EARN_CHG, LOSS and ROA, and the dependent variable, BIAS using an ordinary least square (OLS) approach. Observations include ICMW firms and matching firms that don't disclose ICMW. Matching firms consist of firms in the same industry based on the 48 industry codes identified by Fama and French (1997) with the closest market value and sales at the end of fiscal year. Regressions in the second, third and fourth columns include all ICMW firms and matching firms, G1 firms and matching firms, and G2 firms and matching firms separately. Regressions control for exchange fixed effects. Outliers are excluded using Cook's (1977) distance statistic.

G1 firms are firms that disclose only account-level ICMW and G2 firms are firms that disclose at least firm-level ICMW. The account-level and firm-level internal control material weaknesses are similar to Moody's classification scheme. The account-level internal control material weakness is defined as the internal control issues related to controls over specific account balances, or transaction-level processes or special accounting policy interpretation; the firm-level internal control material weakness is defined as the internal control issues related to controls over the control environment or the overall financial reporting process.

BIAS is forecast bias, calculated as the difference between last median forecasted EPS and actual EPS scaled by stock price. NUM is the number of analysts who make the forecasts in calculating the last median earnings. MV is the natural logarithm of the market value of the firms (Compustat # 25*#199). LEV is the ratio of debt (Compustat # 34+Compustat # 9) to asset (Compustat # 6). BM is the natural logarithm of the book value (Compustat # 60) to the market value (Compustat # 25*Compustat #199) of the firms. SPECIAL=1 if special items (Compustat # 17) are not equal to zero, zero otherwise. NEARN_CHG is equal to one if EARN_CHG is negative and zero otherwise. SKEW is the skewness of the earnings, calculated as the difference between the last mean and the median forecast scaled by lagged stock price. EPSVOL is the standard deviation of earnings before extraordinary items (Compustat #18) estimated using data from the prior five years. ICMW =1 if a firm disclose material weakness in internal control, and zero otherwise. EARN_CHG is the change in earnings (Compustat #18), calculated as the change in earnings over the previous year scaled by the previous year's earnings. LOSS=1 if earnings are negative, zero otherwise. ROA is the ratio of return to asset, calculated as earnings before extraordinary items (Compustat #18) scaled by average total assets (Compustat # 6). N is the number of firm-year observations.

*, **, *** denote two-tailed significance levels of 10%, 5% and 1%, respectively.

Table 7

2SPLS regression estimations relating errors terms from the accuracy regression to ICMW variables.

Parameter	<i>Dependent Variable = Accuracy</i>		
	N=1454 Estimate (t-stat)	N=696 Estimate (t-stat)	N=758 Estimate (t-stat)
Constant	-0.049 (-4.95 ^{***})	-0.067 (-3.57 ^{***})	-0.032 (-3.08 ^{***})
NUM	0.000 (-0.19)	0.000 (-1.31)	0.000 (0.49)
MV	0.007 (4.75 ^{***})	0.011 (3.74 ^{***})	0.004 (2.49 ^{**})
LEV	-0.044 (-2.21 ^{**})	-0.079 (-1.99 ^{**})	-0.014 (-1.47)
BM	-0.004 (-1.07)	-0.002 (-0.22)	-0.005 (-1.56)
SPECIAL	-0.004 (-1.11)	-0.005 (-0.72)	-0.002 (-0.46)
EPSVOL	0.000 (-1.06)	0.000 (-0.49)	0.000 (-0.64)
ICMW	0.001 (0.40)	0.006 (1.18)	-0.005 (-1.82 [*])
ABSEARN_CHG	0.000 (1.67 [*])	0.000 (0.82)	0.000 (1.19)
LOSS	-0.022 (-4.02 ^{***})	-0.031 (-2.49 ^{**})	-0.014 (-3.03 ^{***})
ROA	0.004 (0.27)	-0.010 (-0.18)	0.012 (0.83)
Adjusted R ²	0.0649	0.0674	0.0993

Regressions estimate the relation between a set of independent variables, NUM, MV, LEV, BM, SPECIAL, EPSVOL, ICMW, ABSEARN_CHG, LOSS and ROA, and the dependent variable, ACCURACY using a simultaneous-equation approach, whereas ACCURACY and ICMW are the endogenous variables. Observations include ICMW firms and matching firms that don't disclose ICMW. Matching firms consist of firms in the same industry based on the 48 industry codes identified by Fama and French (1997) with the closest market value and sales at the end of fiscal year. The p-values are adjusted for estimation errors in the first stage using the procedures described in Maddala (1983). Regressions in the second, third and fourth columns include all ICMW firms and matching firms, G1 firms and matching firms, and G2 firms and matching firms separately.

G1 firms are firms that disclose *only* account-level ICMW and G2 firms are firms that disclose *at least* firm-level ICMW. The account-level and firm-level internal control material weaknesses are similar to Moody's classification scheme. The account-level internal control material weakness is defined as the internal control issues related to controls over specific account balances, or transaction-level processes or special accounting policy interpretation; the firm-level internal control material weakness is defined as the internal control issues related to controls over the control environment or the overall financial reporting process.

NUM is the number of analysts who make the forecasts in calculating the last median earnings.

MV is the natural logarithm of the market value of the firms (Compustat # 25*#199). LEV is the ratio of debt (Compustat # 34+Compustat # 9) to asset (Compustat # 6). BM is the natural

logarithm of the book value (Compustat # 60) to the market value (Compustat # 25*Compustat #199) of the firms. SPECIAL=1 if special items (Compustat # 17) are not equal to zero, zero otherwise. EPSVOL is the standard deviation of earnings before extraordinary items (Compustat #18) estimated using data from the prior five years. ICMW =1 if a firm disclose material weakness in internal control, and zero otherwise. ABSEARN_CHG is the absolute change in earnings (Compustat #18), calculated as the absolute value of the change in earnings over the previous year scaled by the previous year's earnings. LOSS=1 if earnings are negative, zero otherwise. ROA is the ratio of return to asset, calculated as earnings before extraordinary items (Compustat #18) scaled by average total assets (Compustat # 6).

N is the number of firm-year observations.

*, **, *** denote two-tailed significance levels of 10%, 5% and 1%, respectively.

Table 8
2SPLS regression estimations relating errors terms from the bias regression to ICMW variables.

Parameter	N=1454 Estimate (t-stat)	N=696 Estimate (t-stat)	N=758 Estimate (t-stat)
Constant	0.015 (1.24)	0.024 (1.06)	0.011 (0.94)
NUM	0.000 (1.53)	0.000 (1.18)	0.000 (1.14)
MV	-0.002 (-1.43)	-0.001 (-0.43)	-0.002 (-1.28)
LEV	0.003 (0.14)	-0.028 (-0.64)	0.016 (1.65*)
BM	0.002 (0.45)	0.003 (0.35)	0.003 (0.79)
SPECIAL	0.001 (0.21)	0.005 (1.10)	-0.002 (-0.53)
NEARN_CHG	-0.008 (-1.78*)	-0.005 (-0.60)	-0.009 (-2.33**)
SKEW	-6.781 (-3.81***)	-7.040 (-3.98***)	-6.410 (-1.37)
EPSVOL	0.000 (1.75*)	0.000 (0.31)	0.000 (0.96)
ICMW	0.007 (2.17**)	-0.002 (-0.46)	0.011 (3.43***)
EARN_CHG	0.000 (-2.29**)	0.000 (-0.70)	0.000 (-2.41**)
LOSS	0.005 (0.82)	0.017 (1.41)	0.012 (2.14**)
ROA	-0.021 (-1.16)	-0.123 (-2.31**)	0.010 (0.69)
Adjusted R ²	0.0337	0.0363	0.0579

Regressions estimate the relation between a set of independent variables, NUM, MV, LEV, BM, SPECIAL, NEARN_CHG, SKEW, EPSVOL, ICMW, EARN_CHG, LOSS and ROA, and the dependent variable, BIAS using a simultaneous-equation approach, whereas ACCURACY and ICMW are the endogenous variables. Observations include ICMW firms and matching firms that don't disclose ICMW. Matching firms consist of firms in the same industry based on the 48 industry codes identified by Fama and French (1997) with the closest market value and sales at the end of fiscal year. The p-values are adjusted for estimation errors in the first stage using the procedures described in Maddala (1983). Regressions in the second, third and fourth columns include all ICMW firms and matching firms, G1 firms and matching firms, and G2 firms and matching firms separately.

G1 firms are firms that disclose *only* account-level ICMW and G2 firms are firms that disclose *at least* firm-level ICMW. The account-level and firm-level internal control material weaknesses are similar to Moody's classification scheme. The account-level internal control material weakness is defined as the internal control issues related to controls over specific account balances, or transaction-level processes or special accounting policy interpretation; the firm-level internal control material weakness is defined as the internal control issues related to controls over the control environment or the overall financial reporting process.

NUM is the number of analysts who make the forecasts in calculating the last median earnings. MV is the natural logarithm of the market value of the firms (Compustat # 25*#199). LEV is the ratio of debt (Compustat # 34+Compustat # 9) to asset (Compustat # 6). BM is the natural logarithm of the book value (Compustat # 60) to the market value (Compustat # 25*Compustat #199) of the firms. SPECIAL=1 if special items (Compustat # 17) are not equal to zero, zero otherwise. NEARN_CHG is equal to one if EARN_CHG is negative and zero otherwise. SKEW is the skewness of the earnings, calculated as the difference between the last mean and the median forecast scaled by lagged stock price. EPSVOL is the standard deviation of earnings before extraordinary items (Compustat #18) estimated using data from the prior five years. ICMW =1 if a firm disclose material weakness in internal control, and 0 otherwise. EARN_CHG is the change in earnings (Compustat #18), calculated as the change in earnings over the previous year scaled by the previous year's earnings. LOSS=1 if earnings are negative, zero otherwise. ROA is the ratio of return to asset, calculated as earnings before extraordinary items (Compustat #18) scaled by average total assets (Compustat # 6). Outliers are excluded using Cook's (1977) distance statistic.

N is the number of firm-year observations.

*, **, *** denote two-tailed significance levels of 10%, 5% and 1%, respectively.