

Timeliness and Mandated Disclosures on Internal Controls under Section 404^{*}

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Abstract

The new mandated disclosures on internal controls under Section 404 of the Sarbanes-Oxley Act (2002) are expected to enhance investors' confidence in financial reporting through timely identification of internal control problems of firms. We provide new insights on the timeliness argument by analyzing the *pre*-disclosure period (specifically the years 2001 and 2002). We find that firms with higher probabilities of reporting internal control weaknesses over the pre-disclosure period had: (1) lower earnings response coefficients, (2) less favorable common stock rankings and debt ratings, (3) higher cost of debt, and (4) larger errors in analysts' earnings forecasts. Finally, over the pre-disclosure period and at the time of the mandated disclosures we find that firms with internal control problems paid significantly higher audit fees. Collectively, these results are generally inconsistent with the hypothesis that the disclosures under the Sarbanes-Oxley Act fostered timely identification of internal control problems.

JEL Classification: G14, G18, M42

Key words: Section 404; Sarbanes-Oxley; Internal Controls; Timeliness; Disclosures.

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1. Introduction

The new mandated disclosures on internal controls under Section 404 require firms to identify internal controls problems in a timely fashion. Auditing Standard No. 2 (PCAOB 2004) expects prompt reporting about the effectiveness of internal control over financial reporting to appropriate levels of management. Others also believe that the new requirements will enhance firms' internal control over financial reporting through timely identification of material weaknesses, which should result in more reliable financial reporting and greater investor confidence (Deloitte & Touche et al. 2004).

One assumption embedded in this notion of timely identification of material weaknesses ("timeliness argument") is that, in the absence of mandated disclosures, capital markets cannot infer that firms have internal control problems. Consequently, disclosures under Section 404 are assumed to generate new information that is useful in assessing the reliability of financial statements.

The key objective of our study is to provide insights into the timeliness argument, using a new approach. While prior studies concentrate on the event or the post-event period, our emphasis is on the *pre*-disclosure period. We examine whether some of the important capital market participants such as investors, creditors, ratings agencies, and financial analysts could anticipate some of the internal control problems disclosed under Section 404 and how such problems might affect the reliability of financial statements. Since 2003 and 2004 were the years in which firms were required to report on the effectiveness of internal controls under Sections 302 or 404 of the Sarbanes-Oxley Act, we focus on 2001 and 2002 in examining the timeliness of the new disclosures.

One justification for concentrating on the *pre*-disclosure period is that evidence on the timeliness argument from recent studies, which tend to focus on the event period, is inconclusive. For example, Beneish et al. (2005) find a negative and statistically significant stock price reaction of firms with internal control problems, but Hammersly et al. (2005) conclude that the negative reaction is significant only for firms with severe weaknesses. The magnitude of the reaction also appears to be small; three-day abnormal returns surrounding the announcement date is around one percent. Similarly, while Beneish et al. (2005) document that control weakness disclosures significantly increase firms' ex-ante cost of capital of firms, Ogneva et al. (2005) conclude that control weaknesses are not associated with higher implied cost of equity.

Further, for various reasons, mandated disclosures may not always provide timely information to the market about the firms' internal control problems. First, some firms voluntarily disclose information about internal controls (Raghunandan and Rama 1994). Second, the number of times a firm changes its external auditor might be indicative of a firm's internal control problems. Firms that rotate auditors more frequently are more likely to have internal control issues (Krishnan 2005). Third, firms with certain attributes are more likely to have internal control problems. For instance, Doyle et al. (2005) find that material weaknesses in internal controls are associated with firms that are smaller, less profitable, more complex, and growing rapidly. Finally, since internal control problems are often associated with restructuring activities (Doyle et al. 2005), the market is likely to infer that firms taking large and frequent restructuring charges are more vulnerable to internal control problems.

If capital markets were unable to infer about the nature and extent of internal control problems prior to the mandated disclosures, the perceived quality of financial reporting would not be different between firms with and those without internal control problems for the pre-disclosure period (i.e., 2001 and 2002). In contrast, if capital markets could assess the nature and extent of internal control problems from firm-specific attributes, firms reporting internal control problems in 2004 would be perceived as having low quality financial reports during the pre-disclosure period.

To examine the timeliness argument during the pre-disclosure period we employ a three-step procedure. First, drawing on prior studies, we model the probability of firms having internal control problems based on firm specific attributes such as performance, size, growth and complexity using data from the mandated disclosure period (2004/2005). Second, we estimate the ‘implied’ probability of internal control problems for the pre-disclosure years (2001 and 2002) using the estimated coefficients and the firm specific values for those years. Finally, we use the estimated probabilities to evaluate whether capital markets perceive financial reporting as being less reliable for firms with higher estimated probabilities.

Our results are based on a sample of 2,853 firms that complied with the reporting requirements under Section 404 between November 2004 and May 2005.¹ We find 405 firms (14%) that report having ineffective internal controls, while the remaining 2,448 firms report that they do not have internal control problems. Consistent with the

¹Registrants classified as “accelerated filers” with fiscal year-ends after November 15, 2004 are required to include a report that provides an assessment of the effectiveness of the internal control over financial reporting in their 10K filings with the SEC. However, within the accelerated filers, registrants with market capitalization of less than \$700 million were granted an additional 45 days to file the Section 404 reports with the SEC if the fiscal year-end was on or before February 28, 2004.

hypothesis that markets can anticipate internal control problems, we find that—compared to firms without control weaknesses—those reporting weaknesses under Section 404 also had higher probabilities of having internal control problems in 2001 and in 2002. Our results suggest that in the absence of mandated disclosures capital markets can distinguish, at least partially, between firms with and without internal control problems based on a limited set of observable firm specific attributes.²

More importantly, our results challenge the timeliness argument. We find that firms with higher probabilities of reporting internal control weaknesses during the pre-disclosure years had: (1) lower earnings response coefficients (earnings coefficients from returns-earnings regressions), (2) less favorable S&P common stock rankings and debt ratings, (3) higher cost of debt (interest expense to total debt), and (4) larger one-year-ahead analysts' earnings forecasts errors. Finally, we also find that firms reporting internal control problems under Section 404 with internal control problems paid significantly higher audit fees in 2004 and during the pre-disclosure years.

Collectively, our results suggest that, in the absence of mandated disclosures, capital markets can discriminate between firms with high and low probabilities of internal control problems. Further, firms with higher probabilities of control problems are perceived as having lower financial reporting quality, which suggests that capital markets price protect themselves against the quality of firms' internal control systems.

Our study provides one potential explanation why recent studies fail to provide conclusive evidence on the timeliness argument. Because prior studies emphasize the

²Our estimates are biased downwards because the computation of internal control weakness probabilities are based on firms characteristics which are likely to be less than one even when firms voluntarily disclosed internal control weaknesses or auditors reported such deficiencies in the 8Ks.

event period around the mandated disclosures, while disregarding the pre-disclosure period, they ignore the possibility that rational capital markets can discriminate between firms with high and low probabilities of internal control problems.

Although our study does not focus on the costs of implementing Section 404, we contribute to this debate by providing empirical evidence about the possible benefits of the new disclosures. Our results suggest that potential benefits may be limited because much of the information on internal controls under Section 404 was anticipated by capital markets.³

The rest of the paper is organized as follows. Section 2 provides the background on the issue of internal control over financial reporting and presents our hypothesis about the timeliness of the new mandated disclosures on internal controls. Section 3 describes our research design. Section 4 explains the data selection procedure, and Section 5 reports the empirical results. Lastly, Section 6 provides a summary.

2. Internal Control Over Financial Reporting

2.1. Background

Internal control over financial reporting is broadly defined as a process carried out by a company's board of directors, management, and other personnel that is designed to provide reasonable assurance regarding (1) the effectiveness and efficiency of a firm's operations, (2) the reliability of financial reporting, and (3) compliance with applicable laws and regulations. Internal control deficiencies arise from design flaws or operating

³Many registrants complain that the prohibitively high costs of compliance with Section 404 outweigh potential benefits. The Financial Executives International (FEI 2004) survey of 321 companies indicates that firms on average are spending around \$1.9 million on compliance in the first year of Section 404 implementation. A similar survey by the American Electronics Association (AEA 2005) indicates that large and small firms are expected to spend around \$5 million and \$ 1 million in total costs, respectively, on compliance.

problems. A “significant deficiency” is an internal control deficiency that could adversely affect a firm’s ability to initiate, record, process, and report financial data. A “material weakness” exists when a significant deficiency in one or more of the internal control components precludes the firm from detecting and preventing a material misstatement in its financial statements on a timely basis.

The debate surrounding internal control over financial reporting is not new (Kinney et al. 1990). In 1978, the Cohen Commission recommended that management provide a report of their assessment of the firm’s internal controls. The Treadway Commission (1987) and the Committee of Sponsoring Organizations of the Treadway Commission (COSO, 1992) also made similar recommendations. All three reports (Cohen, Treadway, and COSO) recognized the value of management reports on internal controls (Hermanson 2000).

In 1991, the U.S. House of Representatives passed a bill requiring management to provide a report on internal controls, accompanied by the auditor’s assessment of the management report, but the bill did not pass the Senate. Prior to the Sarbanes-Oxley Act (2002), the FDIC Improvement Act of 1991 required that management of large banks report on internal control and that auditors attest to management’s assessment.

Based on a survey of nine different financial user groups (bankers, brokers, directors, executives, analysts, institutional investors, individual investors, CPAs, and internal auditors), Hermanson (2000) concludes that respondents agree about the value of voluntary management reports on internal controls, but are neutral about the role of mandatory management reports on internal controls in enhancing decision-making.

More recently, the SEC approved rules implementing Section 404 of the Sarbanes-Oxley Act requiring management and independent auditors of public companies to evaluate and report on the effectiveness of a firm's internal control over financial reporting.⁴ In 2004, the Public Company Accounting Oversight Board (PCAOB 2004) issued Auditing Standard No. 2 that described the related auditor attestation requirements. In addition, Section 302 of the Sarbanes Oxley Act (2002) requires that management evaluate the effectiveness of disclosure control and procedures, and indicate significant changes in internal control since the last Form 10-K or Form 10-Q (Ashbaugh-Skaife et al. 2005). Thus, firms reporting internal control problems in 2004 (under Section 404) might also have reported similar problems in 2003 under Section 302.

2.2. *Timeliness of Disclosures on Internal Control*

The prime purpose of internal control over financial reporting is to foster the preparation of reliable financial statements. Effective internal control involves people at all levels of the organization, including those who maintain accounting records, prepare and disseminate policies, monitor systems, and function in a variety of operating roles (Ernst and Young 2005). Effective internal controls improve the reliability of financial statements, and reduce the risk of material misstatements and fraud (Kinney and McDaniel 1989).⁵ One of the primary motivations for the Section 404 disclosures about the effectiveness of internal control over financial reporting is that the new disclosure

⁴In the original proposal, firms were required to comply with Section 404 for fiscal years ending on or after September 15, 2003 (SEC 2003). However, the compliance date was extended for accelerated (non-accelerated) filers to the fiscal year ending on or after June 15, 2004 (July 15, 2007).

⁵A central purpose of the assessment of internal control over financial reporting is to identify material weaknesses that have more than a remote likelihood of causing a material misstatement in financial statements (SEC 2005a).

requirements will enable more *timely identification* of internal control weaknesses (Deloitte et al. 2004, PCAOB 2004).

In this study, we examine the validity of the conjecture that the new mandated disclosures provide timely information about the nature and extent of internal control problems to important users of financial statements. In contrast to the arguments suggesting that disclosures on internal controls provide timely information about the likelihood of material misstatements in financial statements, there are reasons to suppose that market participants anticipate internal control problems when disclosures are not mandated. For instance, SEC Commissioner Paul Atkins asks, “should these (internal control) disclosures trigger a significant market impact? Are these problems already priced into the stock?” (SEC 2005b). De Franco et al. (2005) also argue that it is possible that investors anticipated firms’ internal control problems.

First, management often voluntarily decides to disclose information about internal control problems. Second, firms that change auditors are required to state whether any internal control issues were raised by the predecessor auditor (SEC 1988).⁶ Therefore, the market can obtain information about the extent of a firm’s internal control problems from its 8-K filings. Third, prior research finds that firms with certain attributes are more likely to have internal control problems (Ashbaugh-Skaife et al. 2005, Ogneva et al. 2005, Doyle et al. 2005). Doyle et al. (2005) find that firms with material weaknesses tend to be small but growing firms with poor performance and more complex operations. Therefore,

⁶In addition to reporting the existence of an internal control problem, the 8-K disclosures also disclose the severity of the problems. Internal control problems have to be reported if there are “significant deficiencies in the design or operation of internal control, which could adversely affect the organizations’ ability to initiate, record, process, and report financial data” (SAS No. 55, AICPA 1988). When the reportable conditions are very severe, they are designated “material weaknesses.” Thus, a material weakness is a reportable condition, but a reportable condition may not be a material weakness (Krishnan 2005).

capital market participants can draw inferences about the likelihood of internal control problems from firm characteristics such as size, profitability, growth, and business complexity. Fourth, Ashbaugh-Skaife et al. (2005) and Ogneva et al. (2005) find that firms with losses and those with higher inventory levels are more likely to have internal control problems. Thus, markets can assess the extent of potential internal control problems based on firms' losses and inventory levels. Finally, capital markets can also infer the severity of internal control problems from the audit committee structure. Krishnan (2005) finds that audit committee quality as measured by size, independence, and expertise is associated with internal control problems.

Our fundamental objective is to test whether investors, information intermediaries such as rating agencies and financial analysts, and creditors anticipated some of the internal control problems even before firms reported such problems under Section 404 of the Sarbanes Oxley Act (2002). Since material weaknesses result in less reliable financial reporting, we analyze whether prior to firms reporting internal control problems under Section 404 (relative to firms reporting no internal control problems), earnings were valued lower and stock rankings and debt ratings were less favorable, while cost of debt and analysts' earnings forecast errors were higher.

If, on the other hand, capital markets are unable to draw inferences about internal control problems in the absence of mandated disclosures, the valuation of earnings, debt ratings, stock rankings, cost of debt, and analysts' earnings forecasts errors are not expected to be different between firms reporting control problems under Section 404 and those without such problems for the pre-disclosure period. The timeliness argument suggests that the differences in the valuation of earnings, debt ratings, stock rankings,

cost of debt, and earnings forecasts errors are confined to the new disclosure period when capital markets become aware of the problems for the first time.

Considering that firms might report internal control problems under Section 302 in 2003 or under Section 404 in 2004, we focus on 2001 and 2002 to examine the timeliness of the new disclosures.

3. Research Design

3.1 Likelihood of Internal Control Problems

As in Ashbaugh-Skaife et al. (2005), we model the likelihood of firms reporting internal control weaknesses under Section 404 of Sarbanes-Oxley using the following logistic regression:

$$\text{Control weakness} = \beta_0 + \beta_1 ROA + \beta_2 Loss + \beta_3 \text{Market-to-book} + \beta_4 \text{Size} + \beta_5 \text{Segments} + \beta_6 \text{Charges} + \beta_7 \text{Age} + \beta_8 \text{Audit-change} + v \quad (1)$$

where *Control weakness* is an indicator variable that equals one when firms report internal control problems, otherwise it equals zero, *ROA* is income before interest and taxes divided by total assets, *Loss* is an indicator variable that equals one when income before extraordinary items is negative for the year, *Market-to-book* is the ratio of market value of equity to the book value of equity, *Size* is the logarithmic transformation of the book value of total assets, *Segments* are the number of geographical segments reported by the firm, *Charges* is an indicator variable that equals one if the firm reports pre-tax restructuring costs and zero otherwise, *Age* is the number of years that the firm has been publicly traded, rounded to the nearest integer, and *Audit-change* is an indicator variable set to one if a firm's auditor changes during the fiscal year.

Drawing on the recent studies on internal control over financial reporting (e.g., Ashbaugh-Skaife et al. 2005, Ogneva et al. 2005, Doyle et al. 2005), we partition the

determinants of internal control weaknesses into four categories: (1) firm performance (*ROA, Loss*), (2) Growth (*Market-to-book*) (3) *Size*, and (4) complexity (*Segments, Charges, Age, Audit-change*).

The likelihood of firms reporting internal control problems is higher for firms with poor firm performance because such firms may not have adequate resources for proper controls. Good internal controls require both time and resources which may not be the priority for firms trying to improve profitability (Ge and McVay 2005). Firms with more growth opportunities have a higher likelihood of reporting material weaknesses because of possible problems with internal controls process. Firm size is inversely related to the internal control problems because larger firms are more likely to have resources to devote towards internal controls (Kinney and McDaniel 1989). The likelihood of firms reporting internal control problems is higher for firms with complex operations because complex business transactions impose greater accounting application risks.

We estimate equation (1) using internal control effectiveness data as reported by management from 2004 in accordance with Section 404 requirements. Using the coefficient estimates from the logistic regression, we then compute the probability of firms having internal problems for the pre-mandated disclosure years 2001 and 2002 using:

$$\Pr(\text{ICW})_{i,t} = e^{\mathbf{X}\boldsymbol{\beta}} / (1 + e^{\mathbf{X}\boldsymbol{\beta}}) \quad (2)$$

where $\boldsymbol{\beta}$ is the vector of coefficients estimated using 2004 data. \mathbf{X} is the matrix of independent variables identified in equation (1).

For example, the probability estimate of an i^{th} firm being associated with potential internal control weaknesses in 2001 ($\Pr(\text{ICW})_{i,2001}$) is estimated by applying the

coefficient estimates (β) to the corresponding 2001 values of the independent variables ($\mathbf{X}_{i,2001}$).

Prior studies find that observable firm characteristics are associated with the likelihood of firms having internal control weaknesses. To the extent that the estimated coefficients from equation (1) and firm attributes are stationary over time, it is reasonable to expect that capital markets can anticipate some of the internal control problems even in the absence of mandated disclosures. Therefore, the probability measure ($Pr(ICW)$) for the pre-disclosure period is higher for firms reporting internal control problems under mandated disclosures than those without such problems.

3.2. Earnings Response Coefficients and Stock Rankings

Since investors are the primary users of financial statements, we analyze whether investors anticipated internal control problems prior to the mandated disclosures. We expect investors' pricing of earnings to vary between firms perceived as having internal control problems and those without such problems, if investors (1) can identify firms with internal control problems in the absence of mandated disclosures, and (2) perceive internal control weaknesses as affecting financial reporting quality.

Following much of the prior literature, we use earnings coefficients from returns-earnings regressions as a proxy for earnings quality (e.g., Schipper and Vincent 2003, Ghosh and Moon 2005). Specifically, we estimate the following specification

$$CAR = \beta_0 + \beta_1 \cdot Pr(ICW) + \beta_2 E + \beta_3 \Delta E + \beta_4 E \cdot Pr(ICW) + \beta_5 \Delta E \cdot Pr(ICW) + \beta_6 E \cdot Leverage + \beta_7 \Delta E \cdot Leverage + \beta_8 E \cdot Size + \beta_9 \Delta E \cdot Size + \beta_{10} E \cdot Volatility + \beta_{11} \Delta E \cdot Volatility + \beta_{12} E \cdot Persistence + \beta_{13} \Delta E \cdot Persistence + \beta_{14} E \cdot Beta + \beta_{15} \Delta E \cdot Beta + \beta_{16} E \cdot Growth + \beta_{17} \Delta E \cdot Growth + \beta_{18} E \cdot Big4 + \beta_{19} \Delta E \cdot Big4 + v \quad (3)$$

where $Pr(ICW)$ is the likelihood of firms reporting internal control weakness estimated from equation (2), E is income before extraordinary items and ΔE is the difference in

earnings between the current period and the prior period; E and ΔE are deflated by prior-period market equity values. CAR , cumulated abnormal returns, is defined as returns cumulated over fifteen months ending three months after the fiscal year-end minus CRSP value-weighted market returns over the same period.

We define earnings response coefficient (ERC) as the sum of the coefficients β_1 and β_2 . We interact the earnings variables (E and ΔE) with $Pr(ICW)$ to examine whether the incremental pricing of earnings (or the incremental ERC, $\beta_4 + \beta_5$) is different for firms with internal control weaknesses. If investors associate lower earnings quality for firms with perceived internal control problems, $\beta_4 + \beta_5$ is expected to be negative.

We control for other firm characteristics associated with ERC (Ghosh and Moon 2005; Dhaliwal and Reynolds 1994; Collins and Kothari 1989), that might also be correlated with internal control weaknesses: *Leverage* defined as total liabilities deflated by total assets; *Size* is the logarithmic transformation of total assets; *Volatility* (*Persistence*) is the standard deviation (first-order autocorrelation) of income before extraordinary items per share for the past sixteen quarters; *Beta* is the systematic risk computed from the market model using the past sixty monthly stock returns; *Growth* is the sales growth between the current year and the prior year; and *Big4* is an indicator variable that equals one if the auditor is one of the Big 4 or the Big 5 audit firms.

We also focus on stock rankings issued by financial analysts. Similar to Ghosh and Moon (2005), we examine whether firms reporting internal control problems had lower stock rankings prior to the mandated disclosures using the following regression.

$$\begin{aligned}
 \text{Stock rankings} = & \beta_0 + \beta_1 Pr(ICW) + \beta_2 Leverage + \beta_3 Profitability + \beta_4 Size + \beta_5 Age + \\
 & \beta_6 Volatility + \beta_7 Persistence + \beta_8 Beta + \beta_9 Growth + \beta_{10} Big4 + \\
 & \beta_{10} Regulated + v
 \end{aligned}
 \tag{4}$$

where *Stock rankings* are numerical values of the letter-based common stock rankings issued by S&P. We assign a numerical value of 1 to the highest stock ranking of A+ and as stock rankings decline from A+ to A, A-, and so on, the numerical value increases by 1.⁷ *Profitability* is operating cash flow deflated by total assets. *Age* is the number of years that the firm has been publicly traded (computed using beginning dates as reported in CRSP). *Regulated* is an indicator variable that equals one if the firm is in a regulated industry (transportation, utilities or financials). *Pr(ICW)* and the other control variables are as defined previously.

We include *Leverage*, *Profitability*, *Size*, *Age*, *Volatility*, *Persistence*, *Beta*, *Growth*, *Big4*, and *Regulated* to control for differences in firm quality and riskiness (Ghosh and Moon 2005, Bhojraj and Sengupta 2003, Ziebart and Reiter 1992), which impact stock rankings. Firms with higher *Leverage* have greater financial risk; more profitable firms have high earnings quality; large firms with less volatile earnings tend to be less risky; firms with persistent earnings have higher earnings quality; older firms and more mature firms and therefore are less risky, and growing firms also tend to be risky; financial statements audited by large audit firms are likely to be of higher quality; *Beta* controls for systematic risk; and regulated firms are assumed to be less risky.

If stock rankings are less favorable for firms with internal control problems, the coefficient on *Pr(ICW)* (β_1) is expected to be positive.

3.3. *Debt Ratings and Cost of Debt*

If ratings agencies penalize firms with internal control problems relative to those without such problems, debt ratings are expected to be less favorable for firms with

⁷For instance, values 1 through 7 correspond to S&P common stock rankings of A+, A, A-, B+, B, B-, and C, respectively. As in Ghosh and Moon (2005), we do not include S&P common stock rankings of D (in reorganization) and LIQ (liquidation) for going concern reasons.

internal control problems. Therefore, we analyze whether Standard and Poor's (S&P) debt ratings vary between firms with internal control problems and those without such problems using the following specification.

$$Debt\ ratings = \beta_0 + \beta_1 Pr(ICW) + \beta_2 Leverage + \beta_3 Profitability + \beta_4 Size + \beta_5 Collateral + \beta_6 Age + \beta_7 Big4 + \beta_8 Negative\ equity + \beta_9 Regulated + v \quad (5)$$

The dependent variable *Debt ratings* are S&P ratings converted into numerical ratings by assigning 1 to AAA debt ratings and then increasing the numerical value by 1 as S&P debt ratings decline. Following Pittman and Fortin (2004), we also use interest expense (Compustat #15) deflated by total debt (sum of Compustat items #9 and #34) as a proxy for *Cost of debt*. We analyze whether firms with internal control problems have high cost of debt by replacing the dependent variable in equation (3) with *Cost of debt*.

The independent variables are defined as follows: *Collateral* is gross property, plant and equipment deflated by total assets, and *Negative equity* is an indicator variable that equals one if the book value of stockholders equity is negative. The other independent variables are as defined previously.

We include *Leverage* because cost of debt increases with financial leverage (Petersen and Rajan 1994). Firms with higher *Profitability* can service debt better and, therefore, have lower cost of debt (Petersen and Rajan 1994). Cost of debt is also lower for larger firms because of economies of scale and lower riskiness (Blackwell et al. 1998). Firms with fixed assets have lower cost of debt because borrowers can provide greater security for their loans (John et al. 2003). The theory of reputation formation in lending markets predicts that interest rates decline over time (*Age*) as firms build credit histories (Diamond 1989). Firms audited by the large auditors might have lower cost of debt because of high quality audits (Pittman and Fortin 2004). Firms with negative book

value of equity and those experiencing financial distress might also have higher costs of debt. Finally, firms in regulated industries might have lower cost of borrowing. The control variables have similar effect on debt ratings.

The coefficient on $Pr(ICW)$ (β_1) is expected to be positive; debt ratings are less favorable, and the cost of debt is higher, for firms more likely to be associated with internal control problems.

3.4. *Earnings Forecast Error*

If analysts have more difficulty in predicting earnings for firms with internal control problems because earnings quality is low, analysts' earnings forecast errors are expected to be larger. Based on a number of prior studies (e.g., Eames and Glover 2003, Das et al. 1998, Duru and Reeb 2002), we use the following specification to analyze whether firms with and without internal control problems have differential analyst earnings forecast errors.

$$Forecast\ error = \beta_0 + \beta_1 Pr(ICW) + \beta_2 |\Delta E| + \beta_3 E + \beta_4 Following + \beta_5 Loss + \beta_6 Volatility + \beta_7 Persistence + \beta_8 Regulated + v \quad (6)$$

where *Forecast error* is the absolute value of the difference between reported earnings and the consensus (or the mean) earnings forecast divided by the stock price at the time of the forecast. We consider one-year-ahead forecasts for year t issued immediately after the earnings announcement for year $t-1$. We also include control variables, of which E , *Volatility*, *Persistence*, and *Regulated* are as defined previously. $|\Delta E|$ is the absolute value of the difference in earnings between the current period and the prior period number, deflated by the lagged market value of equity. *Following* is the number of analysts

following the firm. *Loss* is an indicator variable that equals one if the current year EPS is negative.

We control for change and level of earnings because larger changes in earnings are associated with less accurate forecasts (Eames and Glover 2003, Chaney et al. 1999, Das et al. 1998, Lang and Lundholm 1996). We include *Volatility* and *Persistence* because earnings that are volatile and less persistent are more difficult to predict (Das et al. 1998). Lys and Soo (1995) find that forecast accuracy increases with analyst following. We control for *Loss* because analysts issue more optimistic forecasts in loss periods (Chaney et al. 1999, Brown 2001). As before, we include an indicator variable for regulated industries.

4. Data

4.1. Sample Selection

We obtain our sample of firms with new disclosures on internal control over financial reporting from *Audit Analytics* (AA), a subsidiary of the IVES Inc group. In addition to the Section 404 data, *Audit Analytics* provides detailed audit firm related data for over 12,000 public registrants, including data on audit fees and audit opinions. AA's Section 404 Internal Control data disclosure section contains detailed information on the effectiveness of a firm's internal controls. If internal control is found to be ineffective, the underlying causes of the ineffectiveness are also reported in AA. AA records several categories of causes of internal control ineffectiveness. We find that internal control

weaknesses and GAAP/FASB application failures dominate the sample of firms with ineffective internal controls (100% and 95%, respectively).⁸

Our initial dataset contains 2,853 firms with data on internal control effectiveness, as disclosed by the management and corresponding auditors, which are also listed in the Compustat, CRSP, and I/B/E/S databases. Therefore, the final sample includes 2,853 firms with fiscal year ending in 2004 and 2005.⁹ Table 1 shows that 405 firms (about 14%) have ineffective internal control systems. The remaining 2,448 firms without any internal control problems serve as our control sample.

4.2. *Descriptive Statistics*

Since firms with internal control problems are associated with poor performance, high growth, smaller firm size, and complex business operations, capital markets can draw inferences about firms' internal control problems from these firm characteristics. In this sub-section, we directly document that, consistent with the findings of prior studies, firm characteristics such as performance, growth, size, and complexity in operations are systematically different between firms with and without internal control problems.

Panel A of Table 2 reports the differences in firm attributes between firms reporting internal control problems, under the new disclosures, and those without such problems. We use two measures to capture firm performance: (1) Return on assets (ROA) measured as income before interest and taxes divided by total assets, and (2) *Loss* (an

⁸AA's Section 404 data also tracks if firms' management and auditors agree on the effectiveness of the internal control system. However, at the time of our data collection, we found no cases where the auditor and management disagreed on the effectiveness of internal controls.

⁹We Winsorize the top and bottom 1 percent of all the independent variables (*E*, ΔE , *Leverage*, *Volatility*, *Persistence*, *Beta*, *Growth*, *Profitability*, and *Collateral*). Since CAR includes large outlier observations (the highest value of CAR is 2,029%), we also Winsorize the top and bottom 1% of CAR values. Our results are not sensitive to alternative ways of outlier treatment.

indicator variable for firms with negative income before extraordinary items). The results from Panel A of Table 2 show that firms with internal control weaknesses perform worse than those without such weaknesses. The difference in the performance measures between the two groups is statistically significant at the 1% level.

We also analyze growth and firm size. *Market-to-book* is our measure of growth defined as the ratio of the market value of equity to the book value of equity. We measure firm size as the fiscal year-end total assets. The results from Panel A of Table 2 suggest that firms with internal control weaknesses have lower growth rate and smaller firm size relative to firms without such weaknesses. The differences are statistically significant at the 1% level other than *Market-to-book*.

Finally, we examine complexity in operations using *Segments* (the number of geographic segments), *Charges* (Pretax Restructuring Charges deflated by total assets), *Age* (number of years that the firm has been publicly traded, rounded to the nearest integer), and *Audit-change* (an indicator variable set to one if a firm's auditor changes during the fiscal year). We find that firms with weaknesses in internal controls have more geographic segments, are involved in more restructuring activities, tend to be younger, are less likely to use large auditors, and are associated with frequent auditor changes relative to firms without control weaknesses. All the differences are statistically significant at the 1% level.

For capital markets to draw inferences about internal control problems, one underlying assumption is that differences in firm characteristics between firms with and without internal control problems persist over time. Therefore, in Panel B, we report the differences in firm characteristics between the two groups of firms for the pre-disclosure

period (2001 and 2002). Our results indicate that the disclosure period differences in firm characteristics between the two groups of firms are also significant for the pre-disclosure period. All the results are identical to those reported in Panel A. Thus, Panel B results suggest that it is possible for capital markets to draw inferences about internal control problems from firm characteristics.

5. Empirical Results

5.1 Likelihood of Internal Control Problems

In addition to the univariate analysis, we also model the likelihood of firms reporting internal control problems based on firms characteristics such as performance, growth, size and business complexity. We estimate the regression using internal control effectiveness data as reported by management from 2004 in accordance with Section 404 requirements. The results are reported in Panel A of Table 3.

We find that the likelihood of firms reporting internal control weaknesses declines with (1) superior performance, (2) larger firm size, and (3) lower business complexity. Although difference in *Market-to-book* and *Charges* are significant in Table 2, they are not significant in Table 3 when we control for the other variables. All the other six independent variables are significant at least at the 10% level.

In Panel B, we use the estimated coefficients from the logistic regression and the firm specific attributes for the pre-disclosure years to compute an “implied probability” of firms reporting internal control problems in 2001 and 2002 ($PR(ICW)$). We find that for both 2001 and 2002, the implied probability of firms reporting internal control problems is 29%. In contrast, the implied probability for 2001 and 2002 for firms without internal control problems in 2004 is 19% and 22%, respectively. Thus, for the pre-

disclosure years, we find that firms reporting internal control problems in 2004 also had a higher probability of reporting such problems in 2001 and 2002. The difference in the implied probabilities between the two sets of firms is statistically and economically significant.

Hence, the implied probability results from Table 3 are consistent with the assumption that market participants could infer that some firms had a higher likelihood of having internal control problems based on firm characteristics. In the subsequent sections, we investigate whether investors, debtholders, ratings agencies, and analysts perceived firms with higher implied probabilities to have lower quality financial reporting.

5.2. *Earnings Response Coefficient*

Table 4 reports the results of the regressions of returns (CAR) on earnings (E and ΔE) as well as interactions between earnings and implied probabilities of potential internal control weaknesses in 2001 and 2002. Our focus is on the incremental ERC ($\beta_4 + \beta_5$) or the interactions terms $E \cdot Pr(ICW)$ and $\Delta E \cdot Pr(ICW)$.

Consistent with prior studies, we find that the coefficients on earnings (E and ΔE) are both positive and significant in Table 3 in the pooled regression (2001 and 2002); the ERC, $\beta_2 + \beta_3$, is 1.61. More important, we find that the sum of the coefficient on the interactions of earnings with $Pr(ICW)$ is negative ($\beta_4 + \beta_5 = -0.91$, $F\text{-stat} = 24.4$). The adjusted R^2 is 14%. Thus, our results suggest that the earnings of firms reporting internal control weaknesses under the new disclosures were discounted in 2001 and 2002 by about 67% ($0.91/1.61$) relative to other firms without internal control weaknesses.

The magnitude of the penalty associated with firms perceived as having internal control problems appears to be large both economically and statistically. Our results from

the pre-disclosure period fail to support the timeliness argument. Rather, our evidence suggests that investors were able to identify firms with internal control problems even before the mandated disclosures, and that they imposed an economically large penalty on such firms.

Most of the results on the control variables are consistent with the results from prior studies. Instead of reporting the individual coefficients on the interactions between earnings and each of the control variables, we report the sum of the interaction terms. In the pooled regression (2001 and 2002), the interactions between earnings and *Size*, *Persistence*, and *Big 4* are positive and significant, which suggests that the ERC is higher for larger firms, those with higher earnings predictability, and firms using large auditors (Ghosh and Moon 2005, Collins and Kothari 1989). The interaction between earnings and *Leverage*, and *Beta* is negative and significant, which suggests that the ERC is lower higher for firms with higher risk (Dhaliwal and Reynolds 1994, Collins and Kothari 1989). The interaction between earnings and *Volatility* and *Growth* are not significant.

In summary, the results from the ERC tests suggest that (1) investors anticipated firms' internal control problems, (2) earnings are priced at a lower value when firms are perceived as having a higher probability of internal control problems, and (3) the results are robust to the inclusion of various control variables associated with ERCs. Thus, our ERC results are inconsistent with the timeliness argument.

5.3. *Stock Rankings*

The results from Panel A of Table 5 indicate that S&P common stock rankings for firms reporting internal control problems in 2004 (ICW firms) are higher by about one

point (see “Difference” column) for the pre-disclosure years (2001 and 2002), relative to those without such problems. The differences are statistically significant at the 1% level. The univariate results suggest that stock ranking agencies could anticipate some of the internal control problems.

Controlling for the other determinants of stock rankings, the multivariate regression results from Panel B indicate that ranking agencies imposed a significant penalty in 2001 and 2002 for firms with higher implied probabilities of control problems. The coefficient on $Pr(ICW)$, as estimated in Table 3, is 2.62 (t-stat=5.07) in 2001 and 0.91 (t-stat=2.58) in 2002. The coefficient on $Pr(ICW)$ in the regression using data pooled from 2001 and 2002 is very similar ($\beta=1.65$, t-stat=5.73). Thus, our results fail to support the timeliness argument. Ranking agencies assign a lower ranking to firms perceived as having control problems even before the mandated disclosures.

The results on the control variables are mostly consistent with prior studies. For instance, in the pooled regression for the pre-disclosure period, the coefficients on *Leverage*, *Volatility*, *Beta*, and *Growth* are positive; firms with higher debt, higher earnings variability, higher systematic risk, and larger growth opportunities have less favorable stock ratings. On the other hand, the coefficients on *Profitability*, *Size*, *Age*, and *Persistence* are negative, which suggests that stock rankings are more favorable for firms with higher profits, for those that are larger, more mature, with higher earnings quality. In general, *Big4* and *Regulated* are insignificant.

5.4. Debt Ratings

We also analyze whether debt ratings vary in 2001 and 2002 between firms with and without internal control problems in 2004 (i.e., ICW and non-ICW firms). Debt

ratings, which influence cost of debt, capture the perceptions of rating agencies. The analysis on debt ratings is insightful because rating agencies are more likely to change the debt ratings of firms as new information is revealed to the market about the quality of internal controls.

Panel A (Table 6) results indicate that debt ratings are lower by 2 points (or by two S&P “ranks”) for all the tow years (2001-2002) for firms with internal control problems, relative to those without such problems (all the differences are statistically significant at the 1% level).

The multivariate regression results from Panel B, which control for a number of determinants of debt ratings, indicate that debt ratings are significantly lower for firms with higher implied probabilities of reporting internal control weaknesses (in the pooled regression). The coefficients for the years 2001 and 2002 are 8.84 (t-stat=7.71) and 4.41 (t-stat=5.55), respectively. The coefficient for the pooled data is 6.41 (t-stat=9.93).

Thus, the results from ratings agencies are again inconsistent with the timeliness argument. Firms reporting internal control problems in 2004 had less favorable debt ratings for the pre-disclosure years. Moreover, firms with higher implied probabilities of reporting internal control problems during the pre-disclosure years also had lower debt ratings over the pre-disclosure years.

5.5. *Cost of Debt*

The results from Panel A of Table 7 (spread column) indicate that the cost of debt (measured as interest expense to total debt) for firms with internal control problems is higher by 2% in 2001 in 2002, relative to those without such problems (all the differences are statistically significant at the 1% level). Thus, the univariate results suggest that

creditors could anticipate some of the internal control problems and imposed a higher cost of borrowing for firms perceived as having such problems.

Controlling for the other determinants of the cost of debt, the multivariate regression results from Panel B indicate that debtholders imposed a significant premium for firms with higher implied probabilities of reporting internal control problems for the pre-disclosure years. The coefficient on *Pr(ICW)* is 0.05 (t-stat=3.55) using pooled data from 2001 and 2002. The coefficient on *Control weakness* is also significant for the yearly regressions; $\beta=0.07$ (t-stat=3.21) and $\beta=0.04$, (t-stat=2.50) for the years 2001 and 2002 respectively. Thus, as with the ERC and stock ranking results, the results from the cost of debt do not support the timeliness argument. Creditors imposed a higher cost of borrowing even before firms reported internal control problems under Sections 302 or 404.

The results on the control variables are as expected. For instance, the coefficient on *Leverage* is negative and significant in the third regression using pooled data from 2001 and 2002; firms higher financial risk have higher cost of debt. The coefficients on *Size* and *Collateral* are negative and significant; firms that are bigger in size and those that have more collateral assets tend to have lower cost of debt. The other coefficients on *Profitability*, *Big4*, *Negative equity*, and *Regulated* are insignificant.

5.5. *Earnings Forecast Error*

Finally, we analyze the perceptions of financial analysts by examining how forecast accuracy is affected by internal control problems. Panel A (Table 8) results indicate that earnings forecast errors are higher by 3% in 2001 and by 7% in 2002 for firms reporting internal control problems in 2004 under Section 404, relative to those

without such problems (the differences are statistically significant at the 1% level). To the extent analysts have more difficulty in predicting earnings for firms with lower quality earnings, our results suggest that firms reporting internal control problems have lower earnings quality.

The multivariate regression results from Panel B, which control for a number of determinants of earnings forecast errors, indicate that forecast errors are significantly higher for firms with higher implied probabilities of reporting internal control problems. The coefficient on $Pr(ICW)$ is 0.17 (t-stat=6.45) in the pooled regression for 2001 and 2002. The yearly coefficients are also significant; $\beta=0.14$ (t-stat=4.28) for 2001 and $\beta=0.10$ (t-stat=2.68) for 2002. Thus, the results from financial analysts' earnings forecasts are inconsistent with the timeliness argument. Firms with perceived internal control problems are associated with higher forecast errors, which suggest lower earnings quality.

In summary, the results from all our tests (using ERCs, stock rankings, debt ratings, cost of debt, analyst forecast errors) challenge the timeliness argument. We find that firms reporting internal control problems in 2004 had lower ERCs, less favorable stock rankings, less favorable debt ratings, higher cost of debt, and higher earnings forecast errors in 2001 and 2002.

5.6. *Added Analyses*

5.6.1. *Results for 2000*

As a robustness check, we also extend the analysis to include 2000. Consistent with the results for 2001 and 2002, we find that, in 2000, earnings response coefficients are lower, common stock rankings and debt ratings are less favorable, and the cost of debt is higher for firms with a higher likelihood of being associated with internal control

weaknesses. Analyst forecasts are the only exception; for 2000, earnings forecasts are not less accurate for firms with internal control weaknesses. Thus, our results from 2000 suggest that most of the important capital market participants—e.g., investors, lenders and ranking and rating agencies—could anticipate some of the firm’s internal control problems.

5.6.2. *Alternative Regression Specifications*

In the returns-earnings regression, we do not control for differences in ERCs between firms reporting profits and those with losses. Therefore, we replicate Table 3 results after additionally including the interactions between *Loss* and (1) *E* and (2) ΔE . We find that the results from the expanded regressions do not affect our inferences; $\beta_3 + \beta_4$ continues to be negative and significant.

We also replicate our ERC results after excluding all financial firms and find that our conclusions remain unchanged; the sum of the coefficients on $PR(ICW) \cdot E$ and $PR(ICW) \cdot \Delta E$ remains negative and significant ($\beta_4 + \beta_5 = -0.79$; F-stat = 26.8) when we include only non-financial firms for the pooled regression for the pre-disclosure period (2001 and 2002).

5.6.3. *Audit Fees*

Finally, we provide added evidence on the timeliness argument by examining audit fees both around and before Section 404 disclosures. Panel A of Table 9 shows that in 2004, average audit fees for firms with internal control weaknesses (ICW) were \$5 per \$1,000 of firm value (where firm value is the sum of a firm’s market value of equity and its book value of debt). In contrast, the average fees for firms without internal control weaknesses (non-ICW) were \$2.62 per \$1,000 of firm value and the difference between

the two sets of firms is statistically significant. This result is not surprising because identification of internal control weaknesses on part of the auditor or client firm for the first time is likely to be associated with greater effort level for the audit firm.

More interestingly, however, we find that these differences in audit fees are also significant for the pre-disclosure years. Although the differences in audit fees are smaller for the pre-disclosure years than for those in 2004; the audit fee difference is \$2.38 for 2004 versus 1.32 for 2001 and 2002.

We find similar results when we compare predicted audit fee differences between ICW and non-ICW firms where predicted audit fees are based on the specification used in Ghosh and Lustgarten (2006). Panel B of Table 9 shows that predicted audit fees are larger for ICW firms in 2004 compared to non-ICW firms. Similar differences exist for the pre-disclosure years, including 2000 (which we do not tabulate). Thus, the audit fee analysis shows another possible source upon which capital market participants may have relied to assess firms' internal control problems.

6. Conclusions

This paper investigates whether the mandated disclosures on internal controls under Section 404 provide capital markets with timely information on the reliability of financial reporting. Evidence on the timeliness argument from recent studies is generally inconclusive (e.g., Beneish et al. 2005, Hammersly et al. 2005, Ogneva et al. 2005). While prior studies concentrate on the event or the post-event period, our emphasis is on the *pre*-disclosure period. Specifically, we examine whether important capital market participants such as investors, creditors, ratings agencies, and financial analysts could anticipate firms' internal control problems and how such problems affected the reliability

of financial statements. Since 2003 and 2004 were the years in which firms were required to report on the effectiveness of internal controls under Sections 302 or 404 of the Sarbanes-Oxley Act, we focus on 2001 and 2002 in examining the timeliness of the new disclosures.

Based on a sample of 2,853 firms that complied with the reporting requirements under Section 404 between November 2004 and May 2005, we find evidence inconsistent with the timeliness argument. Controlling for the other determinants, we find that for firms with higher implied probabilities of reporting internal control problems in 2001 and 2002: (1) earnings response coefficients are lower, (2) S&P common stock rankings and debt ratings are less favorable, (3) cost of debt is higher, and (4) one-year-ahead analysts' earnings forecasts errors are larger. Finally, we also find that firms reporting internal control problems under Section 404 faced higher audit fees in 2004 and during the pre-disclosure years.

Thus, our results suggest that sophisticated capital market participants can discriminate between firms with high and those with low probabilities of internal control problems. If timeliness is one prime reason for the disclosures on internal controls, our results suggest that the effectiveness of the initiatives under Section 404 to restore investor confidence in financial reporting may be limited.

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Table 1

Sample Distribution. The sample includes Audit Analytics firms with data on internal control effectiveness as of August 2005. *All Firms* denotes, for each industry, the number (n) and percentage (%) of firms in the sample reporting internal control data under Section 404. The number and percentage (%) of *Firms with internal control weaknesses* (n) are reported in the last two columns.

Industry Name (SIC Codes)	Firms reporting under Section 404			
	All Firms		Firms with internal control weaknesses	
	n	%	n	%
Agriculture (0100–0999)	3	0.1	-	-
Mining and Construction (1000–1999)	55	1.9	10	2.5
Food (2000–2111)	42	1.5	2	0.5
Textiles and printing / publishing (2200–2799)	106	3.7	13	3.2
Chemicals (2800–2824, 2840–2899)	53	1.9	8	2.0
Pharmaceuticals (2830–2836)	191	6.7	16	4.0
Extractive (1300–1399, 2900–2999)	104	3.6	13	3.2
Durable manufactures (3000–3999, excluding 3570–3579 and 3670–3679)	456	16.0	69	17.0
Transportation (4000–4899)	183	6.4	26	6.4
Utilities (4900–4999)	112	3.9	13	3.2
Retail (5000–5999)	259	9.1	57	14.1
Financial (6000–6999)	678	23.8	62	15.3
Services (7000–8999, excluding 7370–7379)	233	8.2	32	7.9
Computers (3570–3579, 3670–3679, 7370–7379)	372	13.0	83	20.5
Others or missing	6	0.2	1	0.2
Total	2,853	100	405	14.2

Table 2:

Descriptive Statistics of the sample that comprises firms from Audit Analytics (AA) with data on internal control weaknesses. Pre Disclosure Period refers to 2001 and 2002 when firms were not mandated to disclose information on internal controls. New Disclosure Period refers to 2003 and 2004 when firms started disclosing information on internal controls.^a

	Firms with internal Control weaknesses	Firms without internal Control weaknesses	Difference	<i>p</i> -value
<i>Panel A: New Disclosure Period (Years 2003 and 2004)</i>				
Performance				
<i>ROA</i>	-0.01	0.04	-0.05	0.00
<i>Loss</i>	0.36	0.21	0.16	0.00
Growth and Size				
<i>Market-to-Book</i>	2.80	2.93	-0.13	0.08
<i>Total Assets</i>	6,389	8,332	-1,944	0.00
Complexity				
<i>Segments</i>	2.50	2.10	0.40	0.00
<i>Charges</i>	-0.020	-0.010	-0.01	0.01
<i>Age</i>	14	17	-3	0.00
<i>Audit-change</i>	0.13	0.03	0.09	0.00
	Firms with internal Control weaknesses	Firms without internal Control weaknesses	Difference	<i>p</i> -value
<i>Panel B: Pre Disclosure Period (Years 2001 and 2002)</i>				
Performance				
<i>ROA</i>	-0.08	0.00	-0.08	0.00
<i>Loss</i>	0.46	0.29	0.17	0.00
Growth and Size				
<i>Market-to-Book</i>	2.21	2.33	-0.12	0.08
<i>Total Assets</i>	5,037	6,796	-1,759	0.00
Complexity				
<i>Segments</i>	2.40	2.10	0.30	0.00
<i>Charges</i>	0.002	0.001	0.001	0.05
<i>Age</i>	12	15	-3	0.00
<i>Audit Change</i>	0.15	0.11	0.03	0.09

^a Variable definitions: *ROA* is income before interest and taxes divided by *Total Assets*. *Loss* is an indicator variable with a value of one for firms with a negative income before extraordinary items. *Market-to-Book* is the ratio of market capitalization over the book value of equity. *Segments* is the number of reported geographical segments. *Charges* is pre-tax restructuring costs divided by total assets. *Age* is the number of years that the firm has been publicly traded, rounded to the nearest integer. *Audit-change* is an indicator variable set to one if a firm's auditor changed during the fiscal year. Reported numbers are means.

Table 3

Panel A reports results from a logistic model that estimates the probability of firms having internal control problems based on firm specific attributes such as performance, size, growth and complexity for the sample of Audit Analytics firms with data on internal control effectiveness. The dependent variable is one if the firm has ineffective internal controls and zero otherwise. Panel B shows, for each year the values predicted by the model for both the firm with ineffective internal controls (ICW-firms) and the firms with effective internal controls (No-ICW). $n_{2004} = 1794$. Note that the unconditional expectation of the ICW status is 0.142, see Table 1.^a

Panel A: Prediction model

Prediction model	Estimate	<i>p</i> -value
<i>Intercept</i>	-0.77	0.04
<i>ROA</i>	-2.04	0.02
<i>Loss</i>	0.45	0.07
<i>Market-to-book</i>	-0.02	0.14
<i>Size (Log of Total Assets)</i>	-0.17	0.00
<i>Segments</i>	0.11	0.00
<i>Charges</i>	0.18	0.17
<i>Age</i>	-0.17	0.08
<i>Audit-change</i>	1.20	0.00
<i>Log-likelihood ratio</i>		119***

Panel B: Predicted values

Year	ICW firms	No-ICW	Difference	<i>p</i> -value
2001	0.29	0.19	0.11	0.00
2002	0.29	0.22	0.07	0.00

^a Variable definitions: *ROA* is income before interest and taxes divided by total assets. *Loss* is an indicator variable with a value of one for firms with a negative income before extraordinary items. *Market-to-book* is the ratio of market capitalization over the book value of equity. *Segments* are the number of reported geographical segments. *Charges* is pre-tax restructuring costs divided by total assets. *Age* is the number of years that the firm has been publicly traded. *Audit-change* is an indicator variable set to one if a firm's Audit Changes during the fiscal year.

Table 4

Association between earnings response coefficients and an implied probability of internal control problems ($Pr(ICW)$) for the pre-disclosure years (2001 and 2002) for the sample of audit analytics firms with data on internal control effectiveness over the years 2001 and 2002.^a

		Pooled	2001	2002
<i>Intercept</i>	β_0	0.05 (4.36)***	0.01 (0.75)	0.11 (8.42)***
<i>Pr(ICW)</i>	β_1	-0.26 (-4.43)***	-0.59 (-5.70)***	-0.17 (-2.59)***
<i>E</i>	β_2	0.93 (4.05)***	1.30 (3.39)***	0.77 (2.52)**
<i>ΔE</i>	β_3	0.69 (6.68)***	0.46 (1.87)*	0.90 (4.96)***
	$\beta_2 + \beta_3$	1.61 [41.0]***	1.76 [24.8]***	1.67 [18.0]***
<i>E * Pr(ICW)</i>	β_4	-0.87 (-4.79)***	-0.95 (-2.88)***	-0.93 (-4.14)***
<i>ΔE * Pr(ICW)</i>	β_5	-0.03 (-0.63)	0.14 (0.91)	-0.29 (-3.52)***
	$\beta_4 + \beta_5$	-0.91 [24.4]***	-0.81 [6.06]***	-1.22 [29.4]***
<u>Control Variables</u>				
<i>E * Leverage (β_6) / ΔE * Leverage (β_7)</i>		-0.88 [53.3]***	-0.52 [10.7]***	-1.23 [40.7]***
<i>E * Size (β_8) / ΔE * Size (β_9)</i>		0.08 [10.6]***	0.05 [1.74]	0.07 [4.18]**
<i>E * Volatility (β_{10}) / ΔE * Volatility (β_{11})</i>		-0.001 [0.03]	-0.011 [1.70]	-0.008 [0.26]
<i>E * Persistence (β_{12}) / ΔE * Persistence (β_{13})</i>		0.32 [10.0]***	0.04 [0.07]	0.54 [1.75]
<i>E * Beta (β_{14}) / ΔE * Beta (β_{15})</i>		-0.09 [10.2]***	-0.13 [10.4]***	-0.16 [13.1]***
<i>E * Growth (β_{16}) / ΔE * Growth (β_{17})</i>		0.04 [1.61]	0.13 [8.40]***	0.02 [0.27]
<i>E * Big4 (β_{18}) / ΔE * Big4 (β_{19})</i>		0.42 [9.25]***	0.53 [7.31]***	0.30 [2.12]
<i>Adjusted R²</i>		0.14	0.17	0.17
<i>Observations</i>		3,138	1,542	1,596

^a Variable definitions: The dependent variable in the OLS regression is a firm's 15-months abnormal share return. ICW (non-ICW) is firms reporting (no) internal control problems under Section 404. $Pr(ICW)$ is an implied probability of internal control problems for the pre-disclosure years (2001 and 2002) computed as follows: (a) we model the probability of firms having internal control problems based on firm specific attributes such as performance, size, growth and complexity from a logistic regression model using data from the mandated disclosure period, and (b) the implied probability of internal control problems for the pre-disclosure years (2001 and 2002) is based on the estimated coefficients and the firm specific values for the pre-disclosure years. E is the earnings reported for the current year. ΔE is the difference in earnings between current and the prior period. E and ΔE are deflated by prior period's market value of equity. *Leverage* is total liabilities divided by total assets. *Size* is the logarithmic transformation of total assets. *Volatility (Persistence)* is the standard deviation (first-order

autocorrelation) of income before extraordinary items per share for the past sixteen quarters. *Beta* is the systematic risk computed from the market model using the past sixty monthly stock returns. *Growth* is the growth in sales between the current year and the prior year. *Big4* is an indicator variable that equals one if the auditor is one of the Big 4 or the Big 5 audit firms. The significance of estimated coefficients is based on a *t*-test, and the significance of the summed coefficients is based on an *F*-test [reported in square brackets]. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level.

Table 5

Association between stock rankings and an implied probability of internal control problems ($Pr(ICW)$) for the pre-disclosure years (2001 and 2002) for the sample of audit analytics firms with data on internal control effectiveness. Panel A reports the difference in mean stock rankings between firms reporting internal control problems under Section 404 for the pre-disclosure years and those without such problems. Panel B reports OLS regression results with Stock Rankings as the dependent variable.^a

Panel A: Univariate Analysis

Year	ICW firms	No-ICW	Difference	p-value
2001	5.22	4.54	0.68	0.00
Observations	111	854		
2002	5.45	4.78	0.68	0.00
Observations	121	942		

Panel B: Multivariate analysis

Year	2001	2002	Pooled
<i>Intercept</i>	5.61 (16.3)***	6.61 (19.0)***	6.02 (25.1)***
<i>Pr(ICW)</i>	2.62 (5.07)***	0.91 (2.58)***	1.65 (5.73)***
<i>Control Variables</i>			
<i>Leverage</i>	1.37 (5.73)***	1.59 (7.50)***	1.51 (9.48)***
<i>Profitability</i>	-0.32 (-1.00)	-1.14 (-3.86)***	-0.67 (-3.15)***
<i>Size</i>	-0.33 (-11.3)***	-0.34 (-12.4)***	-0.33 (-16.4)***
<i>Age</i>	-0.19 (-2.78)***	-0.23 (-3.50)***	-0.21 (-4.41)***
<i>Volatility</i>	0.09 (3.83)***	0.17 (5.05)***	0.11 (5.76)***
<i>Persistence</i>	-0.34 (-2.68)***	-0.29 (-2.33)**	-0.33 (-3.69)***
<i>Beta</i>	0.48 (6.42)***	0.47 (7.50)***	0.49 (10.2)***
<i>Growth</i>	0.46 (4.11)***	0.03 (0.20)	0.27 (3.34)***
<i>Big 4</i>	0.10 (0.53)	-0.03 (-0.15)	0.04 (0.31)
<i>Regulated</i>	-0.10 (-0.89)	-0.12 (-1.11)	-0.10 (-1.27)
<i>Adjusted R²</i>	0.32	0.35	0.33
<i>Observations</i>	965	1,063	2,028

^a Variable definitions: *Stock Rankings* are coded as 1 for A+ rating and the number increases by 1 as S&P rankings decline. ICW (No-ICW) is firms reporting (no) internal control problems under Section 404. $Pr(ICW)$ is an implied probability of internal control problems for the pre-disclosure years (2001 and 2002) computed as follows: (a) we model the probability of firms having internal control problems based on firm specific attributes such as performance, size, growth and complexity from a logistic regression model using data from the mandated disclosure period, and (b) the implied probability of internal control problems for the pre-disclosure years (2001 and 2002) is based on the estimated coefficients and the firm specific values for the pre-disclosure years. *Leverage* is total liabilities divided by total assets. *Profitability* is operating cash flow divided by total assets. *Size* is the logarithmic transformation of total assets, *Age* is the number of years since the firm is publicly traded; *Persistence (Volatility)* is the first-order autocorrelation (standard deviation) of income before extraordinary items per share for

the past sixteen quarters. *Beta* is the systematic risk computed from the market model using the past sixty monthly stock returns. *Growth* is the growth in sales between the current year and the prior year. *Big4* is an indicator variable that equals one if the auditor is one of the Big 4 or the Big 5 audit firms, *Negative equity* is an indicator variable that equals one if the book value of stockholders equity is negative, and *Regulated* is an indicator variable that equals one if the firm is in a regulated industry (transportation, utilities or financials). *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively for a two-tailed *t*-test.

Table 6

Association between debt ratings and an implied probability of internal control problems ($Pr(ICW)$) for the pre-disclosure years (2001 and 2002) for the sample of audit analytics firms with data on internal control effectiveness. Panel A reports the difference in mean debt ratings between firms reporting internal control problems under Section 404 for the pre-disclosure years and those without such problems. Panel B reports OLS regression results with Debt Ratings as the dependent variable.^a

Panel A: Univariate Analysis

Year	ICW firms	No-ICW	Difference	p-value
2001	11.9	9.65	2.25	0.00
Observations	82	689		
2002	12.3	9.94	2.30	0.00
Observations	85	712		

Panel B: Multivariate analysis

Year	2001	2002	Pooled
<i>Intercept</i>	17.4 (18.8)***	19.2 (23.6)***	18.3 (29.8)***
<i>Pr(ICW)</i>	8.84 (7.71)***	4.41 (5.55)***	6.41 (9.93)***
<i>Control Variables</i>			
<i>Leverage</i>	4.34 (7.47)***	3.66 (6.72)***	3.95 (9.88)***
<i>Profitability</i>	-3.15 (-5.45)***	-7.61 (-9.1)***	-4.58 (-9.9)***
<i>Size</i>	-1.12 (-15.6)***	-1.11 (-16.4)***	-1.11 (-22.4)***
<i>Collateral</i>	0.03 (0.13)	0.30 (1.41)	0.13 (0.84)
<i>Age</i>	-0.64 (-6.18)***	-0.80 (-8.16)***	-0.71 (-10.0)***
<i>Big4</i>	-0.33 (-0.50)	-0.60 (-1.01)	-0.54 (-1.23)
<i>Negative equity</i>	0.02 (0.03)	0.91 (2.18)**	0.66 (2.06)**
<i>Regulated</i>	-0.08 (-0.38)	0.06 (0.28)	0.03 (0.17)
<i>Adjusted R²</i>	0.51	0.54	0.52
<i>Observations</i>	771	797	1,568

^a Variable definitions: *Debt ratings* are coded as 1 for AAA ratings and the number increases by 1 as S&P ratings decline. ICW (No-ICW) is firms reporting (no) internal control problems under Section 404. *Pr(ICW)* is an implied probability of internal control problems for the pre-disclosure years (2001 and 2002) computed as follows: (a) we model the probability of firms having internal control problems based on firm specific attributes such as performance, size, growth and complexity from a logistic regression model using data from the mandated disclosure period, and (b) the implied probability of internal control problems for the pre-disclosure years (2001 and 2002) is based on the estimated coefficients and the firm specific values for the pre-disclosure years. *Leverage* is total liabilities divided by total assets. *Profitability* is operating cash flow divided by total assets. *Size* is the logarithmic transformation of total assets, *Collateral* is gross property, plant and equipment deflated by total assets, *Age* is the number of years since the firm is publicly traded, *Big4* is an indicator variable that equals one if the auditor is one of the Big 4 or the Big 5 audit firms, *Negative equity* is an indicator variable that equals one if the book value of stockholders equity is negative, and *Regulated* is an indicator variable that equals one if the firm is in a regulated industry (transportation, utilities or financials). *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively for a two-tailed *t*-test.

Table 7

Association between the cost of debt and an implied probability of internal control problems ($Pr(ICW)$) for the pre-disclosure years (2001 and 2002) for the sample of audit analytics firms with data on internal control effectiveness. Panel A reports the difference in the mean of cost of debt between firms reporting internal control problems under Section 404 for the pre-disclosure years and those without such problems. Panel B reports OLS regression results with *Cost of Debt* as the dependent variable.^a

Panel A: Univariate Analysis

Year	ICW firms	No-ICW	Spread	p-value
2001	0.12	0.09	0.02	0.00
Observations	200	1,283		
2002	0.11	0.09	0.02	0.00
Observations	207	1,325		

Panel B: Multivariate analysis

Year	2001	2002	Pooled
<i>Intercept</i>	0.19 (13.7)***	0.18 (13.6)***	0.18 (19.6)***
<i>Pr(ICW)</i>	0.07 (3.21)***	0.04 (2.50)**	0.05 (3.55)***
<i>Control Variables</i>			
<i>Leverage</i>	0.03 (2.25)**	0.01 (1.21)	0.01 (1.69)*
<i>Profitability</i>	-0.00 (-0.06)	-0.01 (-1.11)	-0.00 (-0.23)
<i>Size</i>	-0.01 (-8.76)***	-0.01 (-7.26)***	-0.01 (-11.3)***
<i>Collateral</i>	-0.01 (-2.33)**	-0.01 (-1.75)*	-0.01 (-2.91)***
<i>Age</i>	0.00 (0.03)	-0.01 (-2.21)**	-0.00 (-1.69)*
<i>Big4</i>	-0.02 (-0.72)	-0.01 (-0.61)	-0.01 (-0.66)
<i>Negative equity</i>	0.01 (0.47)	0.02 (1.57)	0.01 (0.76)
<i>Regulated</i>	-0.00 (-0.71)	-0.00 (-0.23)	-0.00 (-0.68)
<i>Adjusted R²</i>	0.11	0.09	0.10
Observations	1,483	1,532	3,015

^a Variable definitions: *Cost of debt* is interest expense divided by the sum of long-term debt and debt in current liabilities. ICW (No-ICW) is firms reporting (no) internal control problems under Section 404. $Pr(ICW)$ is an implied probability of internal control problems for the pre-disclosure years (2001 and 2002) computed as follows: (a) we model the probability of firms having internal control problems based on firm specific attributes such as performance, size, growth and complexity from a logistic regression model using data from the mandated disclosure period, and (b) the implied probability of internal control problems for the pre-disclosure years (2001 and 2002) is based on the estimated coefficients and the firm specific values for the pre-disclosure years. *Leverage* is total liabilities divided by total assets. *Profitability* is operating cash flow divided by total assets. *Size* is the logarithmic transformation of total assets, *Collateral* is gross property, plant and equipment deflated by total assets, *Age* is the number of years since the firm is publicly traded, *Big4* is an indicator variable that equals one if the auditor is one of the Big 4 or the Big 5 audit firms. *Regulated* is an indicator variable that equals one if the firm is in a regulated industry (transportation, utilities or financials). *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively for a two-tailed *t*-test.

Table 8

Association between the I/B/E/S absolute forecast errors and an implied probability of internal control problems ($Pr(ICW)$) for the pre-disclosure years (2001 and 2002) for the sample of audit analytics firms with data on internal control effectiveness. Panel A reports the difference in the I/B/E/S mean absolute forecast errors between firms reporting internal control problems under Section 404 for the pre-disclosure years and those without such problems. Panel B reports OLS regression results with *I/B/E/S Absolute Forecast Errors* as the dependent variable.^a

Panel A: Univariate Analysis

Year	ICW firms	No-ICW	Difference	p-value
2001	0.08	0.04	0.03	0.00
<i>Observations</i>	251	1,541		
2002	0.12	0.05	0.07	0.00
<i>Observations</i>	259	1,637		

Panel B: Multivariate analysis

Year	2001	2002	Pooled
<i>Intercept</i>	0.01 (2.34)**	0.02 (3.12)***	0.01 (2.85)***
<i>Pr(ICW)</i>	0.14 (4.28)***	0.10 (2.68)***	0.17 (6.45)***
<u><i>Control Variables</i></u>			
<i> ΔEarnings </i>	0.03 (4.13)***	0.05 (5.42)***	0.03 (4.44)***
<i>Earnings</i>	-0.08 (-15.7)***	-0.20 (-30.2)***	-0.16 (-35.6)***
<i>Following</i>	-0.00 (-2.87)***	-0.00 (-3.53)***	-0.00 (-4.33)***
<i>Loss</i>	0.03 (5.29)***	0.03 (3.12)***	0.02 (4.14)***
<i>Volatility</i>	0.01 (2.92)***	0.00 (0.61)	0.00 (0.66)
<i>Persistence</i>	-0.01 (-2.01)**	0.00 (0.52)	-0.01 (-1.27)
<i>Regulated</i>	0.01 (1.27)	0.03 (3.73)***	0.02 (4.33)***
<i>Adjusted R²</i>	0.36	0.49	0.42
<i>Observations</i>	1,792	1,896	3,688

^a Variable definitions: *Analyst Forecast Error* is the absolute difference between reported earnings and the mean one-year-ahead earnings forecasts divided by the stock price at the time of the forecast. ICW (No-ICW) is firms reporting (no) internal control problems under Section 404. $Pr(ICW)$ is an implied probability of internal control problems for the pre-disclosure years (2001 and 2002) computed as follows: (a) we model the probability of firms having internal control problems based on firm specific attributes such as performance, size, growth and complexity from a logistic regression model using data from the mandated disclosure period, and (b) the implied probability of internal control problems for the pre-disclosure years (2001 and 2002) is based on the estimated coefficients and the firm specific values for the pre-disclosure years. $|ΔEarnings|$ is the absolute value of the difference in earnings between current and the prior period deflated by lagged market value of equity; *Earnings* is the earnings reported for the current year deflated by lagged market value of equity. *Following* is the number of analysts following the firm. *Loss* is an indicator variable that equals one if the current year EPS is negative. *Persistence (Volatility)* is the first-order autocorrelation (standard deviation) of income before extraordinary items per share for the past sixteen quarters, and *Regulated* is an indicator variable that equals one if the firm is in a regulated industry (transportation, utilities or financials). *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively for a two-tailed *t*-test.

Table 9

Analysis of audit fees, expressed per 1,000 dollars of total firm value for the pre disclosure years 2001 and 2002, and for 2004. Below the numbers are the numbers of observations.

Panel A: Audit fees expressed in dollars per \$1,000 of total firm value, and #'s of observations.^a

Year	ICW firms	No-ICW	Difference	p-value
<u>Disclosure year</u>				
2004	5.00	2.62	2.38	0.00
	187	1,213		
<u>Pre-disclosure years</u>				
<i>Pooled 2001-2002</i>	3.78	2.46	1.32	0.00
	441	2,609		
2002	4.43	2.72	1.71	0.00
	226	1,331		
2001	3.24	2.24	1.00	0.00
	215	1,278		

Panel B: Predicted audit fees expressed in dollars per \$1,000's of total firm value, and #'s of observations.^b

Year	ICW firms	No-ICW	Difference	p-value
<u>Disclosure year</u>				
2004	4.09	2.69	1.40	0.00
	187	1,213		
<u>Pre-disclosure years</u>				
<i>Pooled 2001-2002</i>	3.49	2.49	1.00	0.00
	441	2,609		
2002	4.01	2.76	1.25	0.00
	226	1,331		
2001	3.04	2.26	0.78	0.00
	215	1,278		

^a Panel A reports the Audit fees per \$1,000 of total firm value (market value of equity and book value of debt) for ICW and for non-ICW firms.

^b Panel B reports the predicted value of the Audit fees per \$1,000 of total firm value (market value of equity and book value of debt) based on a prediction model where *Audit fee* (the natural logarithm of the audit fees per \$1,000 of total firm value) is a function of *Total assets*; the ratio of current assets to total assets; the *Current ratio*; the ratio of inventory to total assets; *Leverage* (the ratio of total debt to total assets); *ROA* (income before interest and taxes divided by total assets); *Loss* (an indicator variable with a value of one for firms with a negative income before extraordinary items); *Big4* (an indicator variable that equals one if the auditor is one of the Big 4 or the Big 5 audit firms); *Auditor opinion* (an indicator variable that equals one when *unqualified*, 2 when *unqualified with additional language*, 3 when *qualified*); the number of different business and geographical segments for which client reports operations; *Audit-change* (an indicator variable set to one if a firm's auditor changes during the fiscal year); and lastly *Industry* (an indicator for *computing* and services *industries*). Values shown are means.