

**Do control effectiveness disclosures require internal control audits:
A natural experiment with small U.S. public companies**

William R. Kinney, Jr.
Professor
University of Texas at Austin

Marcy L. Shepardson
Ph.D. Student
University of Texas at Austin

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Abstract

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We use incremental implementation of multiple SOX-based material weakness disclosure and internal control audit mandates to assess the trade offs of alternatives for small U.S. public companies. The analyses are important because alternatives within SOX and extant financial auditing standards may be cost effective. Using data from several low and high effort management disclosure and audit regimes implemented from 2003-2008, we find substantial and statistically significant increases in material weakness disclosure rates for small firms undergoing initial SOX-based audits, but find quantitatively and statistically similar increases for initial *unaudited* management reports of small firms currently exempt from such audits. As to cost, small firm audit fees more than double for initial SOX-based audits in 2004 and remain high, while SOX audit-exempt firms' fees grew about one-tenth annually. Overall, we find that unaudited management reports and traditional financial audits may be a cost effective disclosure alternative for small public companies.

I. Introduction

Prior to 2002, neither management nor the auditors of publicly listed companies (other than certain regulated financial institutions in the U.S.) were required to evaluate, audit, or publicly report on the effectiveness of internal control over financial reporting (ICFR). In July 2002, four short sections of the Sarbanes-Oxley Act (SOX) greatly expanded ICFR information for U.S. public companies by mandating *multiple* and partially redundant ICFR disclosures and audits. Section 302 of SOX requires management’s “certification” of its disclosure controls (that include almost all of ICFR) but mandates no specific work effort and adds no audit requirements, while section 404(a) mandates a formal assessment process and management report on ICFR effectiveness.¹ For auditors, section 404(b) of SOX requires an audit of management’s ICFR report, and separately, section 103(a)(2)(A)(iii) requires the auditor’s own evaluation of ICFR (U.S. Congress 2002b).²

Christopher Cox, a member of Congress in 2002 and later Chairman of the Securities and Exchange Commission (SEC), has stated “The objective of Section 404 is to *provide meaningful disclosure* to investors about the effectiveness of a company’s internal controls systems, *without creating unnecessary compliance burdens or wasting shareholder resources*” (emphasis added) (SEC 2007a). This statement of objective raises the question: What are the tradeoffs of material weakness disclosures with various combinations of ICFR management and auditor work effort?

¹ As elaborated in section II, all financial statement auditors are required to read information accompanying audited financial statements (e.g., a 10-K filing) to assess possible material misstatements of fact within the “other information,” such as SOX 302 certifications and unaudited SOX 404(a) ICFR reports by management, and to take follow up action to resolve such misstatements.

² For convenience, we will refer to elements of either 103 or 404(b) as ICFR audits. As of 2007 under Auditing Standard 5 (AS 5) auditors continue to express their opinions on ICFR effectiveness but are no longer required to audit and report on management’s assessment of ICFR.

In concept, a two-factor experiment could be conducted to address the tradeoff question using combinations of SOX requirements. For example, material weakness disclosures and costs could be compared for similar companies randomly assigned to treatment groups that apply combinations of management effort (low vs. high) and ICFR related audit effort (low vs. high).³ While such an experiment is not practicable, a close substitute is possible for smaller U.S. public companies for 2003 through 2008.⁴

In this paper, we address the disclosure/effort tradeoff question using public data from implementation of management and audit ICFR mandates at different times and in different combinations according to the filing status of smaller U.S. public companies. In addition, we exploit details of existing ICFR disclosures to infer the likely effectiveness and cost of an alternative that doesn't involve management and requires only modest enhancement of traditional financial auditing.

The disclosure/effort tradeoffs are important because the relative effectiveness of various combinations of management and audit effort inherent in SOX are not known and effectiveness and costs may vary disproportionately. Also, while both the high management effort and high ICFR related audit effort regimes are known to be costly, there is little analysis of the relative disclosure rates and costs for comparable firms. Collectively, our results allow assessment of some of the tradeoffs of benefits and costs across alternative mechanism designs for material weakness disclosure that exist under both U.S. and international auditing standards.

³ In both cases, “low” refers to incremental effort that is “inconsequential” and “high” is substantial incremental effort required for management to evaluate essential controls and for the auditor to express an audit opinion on ICFR or management’s review and report.

⁴ Incremental implementation of SOX was deemed necessary, in part, to allow the PCAOB to develop and refine ICFR process audit standards for sections 103 and 404(b), and also because costs of ICFR audits and management reports under 404(a) led to extensive complaints by smaller issuers, hearings in both houses of Congress (Cox 2007), and five different deferrals of 103 and 404(b) implementation by small firms.

We use four combinations of management and audit effort to form three main predictions. The baseline for predictions is provided by

- LL: Low management effort disclosure control certifications (under section 302) and Low audit effort (i.e., without high effort ICFR audits)—first applied in late 2003 and continuing through 2008 for all public companies.⁵

The three innovations and predictions are

- HH: High effort management reports on ICFR and High effort ICFR audits (under sections 404(a) and (b), respectively) and the auditor’s own opinion on ICFR (under section 103) first applied after November 15, 2004 by “accelerated filers” (firms with public float of \$75 million or more as of six months before the fiscal year-end). Prediction: ineffective ICFR disclosure rates and audit fees under HH will increase, all else equal.
- HL: High effort management reports *without* High effort ICFR audits (under 404(a) alone) first applied after December 15, 2007 by “non-accelerated filers” (firms with public float less than \$75 million as of six months before the fiscal year-end). Prediction: ineffective ICFR disclosure rates will increase under HL but audit fees will not, all else equal.
- H2H: High effort ICFR audits (under 404(b)) for the second year of High effort management reports (under 404(a)) first applied by first-time accelerated filers after December 15, 2008 (SEC 2008b). Prediction: audit fees increase but no prediction on ICFR effectiveness, all else equal.

The H2H group is unique in that these firms reported under three regimes in three years: under 302 in 2006 (LL), 404(a) in 2007 (HL), and 404(a) and 404(b) in 2008 (H2H), thus allowing analysis of application of separate elements of ICFR reporting and audits.

We compare year-to-year differences in material weakness disclosure rates and external audit fees for “intervention” firms experiencing a SOX-related work effort regime change with disclosure and effort differences for firms not undergoing a regime

⁵ Even though management’s certifications are not subject to ICFR audits, the financial statement auditor is required to read the year-end (10-K) management certification to determine whether it is materially misstated. A material misstatement might arise, for example, if management certifies disclosure controls as effective when the auditor is aware of material weaknesses. In such a situation, the auditor would attempt to have management correct the misstatement or take follow up action (AU 550, PCAOB 2003).

change.⁶ We also analyze details regarding material weakness type to infer results for a hypothetical low management and low ICFR audit effort (LL) group based on a modest enhancement of existing financial auditing standards.

Using data from *Audit Analytics*, we identify three groups of small U.S. firms with fiscal years ending December 31 from those that filed (unaudited) disclosure control certifications (LL) for 2003 or any subsequent year. Small firms that remained non-accelerated filers from 2004-2008 were exempt from ICFR audits but were required to issue (without ICFR audits) management reports on ICFR effectiveness (HL) beginning in 2007. Larger small firms that continued as accelerated filers for 2004-2008 maintained HH status for all four years. Finally, firms whose market capitalization growth required a change to HH status for a particular year are denoted first-time accelerated filers.

We find that, relative to other firms, first-time accelerated filers applying the HH combination of audited management reports from 2004–2007 are 14.4% more likely to disclose a material weakness.⁷ The H2H combination firms having ICFR audits for the first time in 2008 yield a 6.4%, marginally significant increase in material weakness disclosures. The latter is noteworthy because, in 2007, these firms implemented high effort management reports without ICFR audits (HL) that are accompanied by a 12.5% increase in likelihood of disclosing a weakness relative to other firms.

The continuing non-accelerated filers experience substantial and statistically significant increases in material weakness disclosures in 2007 when they implement the HL regime but also in 2004 when they had no regime change. Thus, while initial audited management reports are associated with significant increases in material weakness

⁶ In addition, we make secondary predictions based on a refinement in ICFR auditing standards intended to reduce the cost of implementing ICFR audits by the replacement of AS 2 with AS 5 in 2007.

⁷ The first filing year increases are followed by substantial second filing year declines as some firms remediate previously disclosed weaknesses.

disclosures, so too are initial unaudited 2007 management reports subject only to financial auditing.⁸

As to incremental audit cost, the average initial audit fee percentage increase for smaller first-time accelerated filers from 2004–2007 (HH) is 96%, all else equal, but increases decline each year, consistent with learning and savings following an auditing standards change designed to reduce audit cost.⁹ In contrast, percentage increases for non-accelerated filers operating under LL are about 11% per year, including 2007 when HL is implemented, but increase by 43% for first-time ICFR audits (H2H) in 2008.

Overall, the similar increases in weakness disclosures between the HH and HL regimes coupled with a negligible audit fee change for the HL regime suggest that management reports accompanied by traditional financial audit oversight may be cost effective for smaller U.S. public company disclosures. In addition, our analysis of how weaknesses are discovered suggests that modestly enhanced financial audits and no management reports may identify more than half of small firms with ineffective ICFR.

The remainder of the paper is organized as follows. Section II summarizes development and requirements of ICFR reporting implementation policies, policy alternatives, and policy implementation costs and benefits. Section III outlines our research design, predictions sample selection, and descriptive statistics. Section IV presents statistical analyses and Section V concludes.

⁸ As elaborated below, auditors applying PCAOB Interim Standards (AU) section 550 (SAS No. 8, AICPA 1978), compare management disclosures under SOX 404(a) with financial audit results and may require correction of material inconsistencies. Also, while non-accelerated filers avoid SOX 404(b) audit costs in 2007, they must incur costs of management's evaluation and reporting on controls under SOX 404(a).

⁹In 2007, cost concerns, especially for small firms, led to the replacement of the initial audit guidance in Auditing Standard No. 2 (AS2) (PCAOB 2004) with Auditing Standard No. 5 (AS5) (PCAOB 2007).

II. Background, Expectations, and Policy Alternatives for ICFR Reporting

The history of internal control disclosures and audits, both mandated and voluntary (or market-driven), is concentrated in the U.S. and is not lengthy. The Foreign Corrupt Practices Act (U.S. Congress 1977 and 1988) requires that public companies maintain cost-justified internal controls, but does not require reports to investors or ICFR audits. The first mandate for management assessments and audits of ICFR effectiveness was the Federal Deposit Insurance Corporation Improvement Act (U.S. Congress 1991). However, this act applies only to certain insured financial institutions and does not require public disclosure of evaluations or audit results.

As to voluntary disclosure of internal control information, McMullen, Raghunandan, and Rama (1996) report that in 1993 about one-third of NAARS file firms provided some type of management report, but only 2.5% of them asserted that ICFR was effective. Also in 1993, the American Institute of Certified Public Accountants (AICPA) established standards for voluntary audits of ICFR effectiveness.¹⁰ A study of medium-size firms for 1998 reveals that while 36% provided management reports and 15% claimed controls were effective none had an ICFR audit (Bronson, Carcello, and Raghunandan 2006). Thus, SOX mandates disclosures and an auditing service that did not have substantial prior demand in a free market.

Outside the U.S., France (AMF 2008) and Japan (Whitesides 2007) have adopted SOX-like statutory mandates for internal control reporting and auditing. In contrast, a number of European Union member states, including the U.K., the Netherlands, Germany, and Italy, and to some degree Canada (Salterio and Schmidt 2007), have

¹⁰ AICPA Statement of Standards on Assurance Services No. 2 (1993), entitled *Reporting on an Entity's Internal Control Over Financial Reporting* provides standards for stand-alone "audits" of internal control and direct reporting of results to third parties.

adopted a voluntary “comply or explain” approach whereby a firm states that it complies with a recognized code of conduct or it explains why it does not comply with particular provisions.¹¹ Under this approach, individual firms assess the costs and benefits of compliance vs. explaining why they choose not to do so (including stock price implications) and whether to have their assertions independently audited.

Finally, although PCAOB standards require audits of ICFR for U.S. public companies, international auditing standards do not. Rather, international standards require only that the auditor report to management and those charged with governance any significant ICFR deficiencies noted during the financial audit (ISA 260 2009).¹²

II.1 Legislative expectations, benefits and costs of SOX 404

The House version of SOX (H.R. 3763), passed April 24, 2002, was silent on ICFR reports and audits. Sections 103, 302, and 404(a) and (b) were added in the Senate version following a recommendation of the Senate Banking, Housing and Urban Affairs Committee (U.S. Congress 2002a).¹³ Further, there is no mention in SOX or the Senate Committee’s recommendation of intended benefits of the multiple ICFR disclosure and audit provisions of sections 103, 302, 404(a) and 404(b) or why seemingly redundant requirements were necessary or how incremental benefits justified incremental costs. Thus, Cox’s statement (SEC 2007b) about ICFR effectiveness disclosures to investors is the most specific statement of objective and is the primary benefit metric that we use.

ICFR audit mandates of SOX 404(b) and 103 may have been based on an incorrect presumption about costs by the Senate Committee and other members of

¹¹ For example, a small U.K. firm might comply with other provisions of the U.K. private sector’s Combined Code on Corporate Governance (2003) and explain why it does not comply with the internal control criteria provide in The Turnbull Guidance portion of the code.

¹² Prior to SOX and continuing under the PCAOB, U.S. auditing standards have had an equivalent reporting requirement.

¹³ According to Oxley, the WorldCom collapse “. . . pushed the Senate toward adopting 404” (Taub 2006).

Congress.¹⁴ In recommending passage, the Committee's report states "High quality audits *typically* incorporate extensive internal control testing" (emphasis added). By implication, 404(b) would not be expected to require more effort for these audits and the auditor would merely report the results of the extant "extensive internal control testing." However, while pre-SOX auditing standards (AU 319) allowed, but did not require, auditor testing of ICFR, auditors of smaller firms typically conducted substantive tests of account balances rather than testing internal controls.

Benefits from internal control evaluation, disclosure, and auditing go beyond merely informing investors about material weaknesses. Disclosure of deficiencies to directors may lead to timely remediation and cost effective improvements. Better internal controls yield more reliable unaudited interim reports and even audited annual reports (Doyle, Ge and McVay 2007; Ashbaugh-Skaife, Collins, Kinney and LaFond 2008). Also, auditor confirmation of weakness remediation may lower the cost of capital, at least in the short term (Ashbaugh-Skaife et al. 2009) and may lead to better terms of trade with suppliers and customers. Furthermore, Feng, Li and McVay (2009) find that management guidance and forecasts are less accurate in the presence of ineffective ICFR and that both improve when weaknesses are remediated. They attribute their results to better (unaudited) interim financial statement figures.

Within a firm, better ICFR should yield better internal data and reports (such as inventory, payables, and performance displays) and thus better internal decision making,

¹⁴ The Senate committee was explicit: "... the Committee does not intend that the auditor's evaluation be the subject of a separate engagement or the basis for increased charges or fees." (U.S. Congress 2002a). Congressman Cox, a member of the House-Senate Conference Committee that wrote the final law, said "... Congress never intended for section 404 to be unduly burdensome and expensive. It came as a surprise that legislative language that had been copied virtually word for word from the FDIC Improvement Act, where it had not ruffled any feathers, was the source of multimillion-dollar expenses for companies of all sizes." (*Journal of Accountancy* 2007).

improved operations, and lower employee fraud. In addition, management and director consideration of the control environment, monitoring, and possible ICFR deficiencies may cause reassessment of whether better controls are cost justified.

Regarding costs, the SEC staff initially estimated that management reporting costs for 404(a) would average \$91,000 across public companies of all sizes (SEC 2002)¹⁵ and at least two studies assess incremental costs of applying SOX 404(a) and (b). Most cost estimates have been voluntary responses to surveys or voluntary disclosures and may reflect response bias that overstate costs across the population. For example, in a study of voluntary disclosures of initial cost estimates in their 10-Ks, Krishnan, Rama, and Zhang (2008) find median 404(a) costs (employee time plus outside consultant fees) of \$589,800 and median audit fee increases for 404(b) of \$551,003, for a sum of \$1,140,803. Similarly, a Financial Executives International (FEI) member survey (FERF 2008) reports that, for 2007, 64 smaller accelerated filers estimate average 404(a) costs of \$500,055 and average ICFR audit fees of \$550,654, for a total of \$1,050,710. Further, seventeen non-accelerated filers subject to management reports but not to ICFR audits (the HL regime) report costs to implement SOX 404(a) were \$340,847 (FERF 2008). To summarize, based upon these two studies, incremental costs for small firms to implement SOX 404 average about \$1 million with management's evaluation and ICFR-related audit fees each comprising about one half of the total.¹⁶

¹⁵ The SEC staff has conducted a study of SOX 404 implementation costs and benefits through interviews and a web-based survey and concurrently has deferred implementation of SOX 404(b) for non-accelerated filers to years ending after June 15, 2010 (SEC 2009).

¹⁶ In addition to direct costs of implementation, recent research examines decisions of firms not to comply with SOX 404 by going private (Engel et al. 2007), going dark (Leuz et al. 2008), or managing public float to maintain non-accelerated filer status (Gao et al. 2009). These studies suggest that accelerated filing status and SOX compliance are perceived as costly with Gao et al. (2009) concluding that SOX 404 costs exceed perceived benefits for some smaller firms. Zhang (2007) finds that small firms experience positive abnormal returns around SEC SOX 404 implementation deferral announcements, consistent with investors perceiving that implementation would be detrimental for these firms.

Cost concerns, especially for small firms, led to two implementation guidance changes in 2007: replacement of Auditing Standard No. 2 (AS2) (PCAOB 2004) with AS5 (PCAOB 2007), and SEC guidance for management in applying 404(a) (SEC 2007a).¹⁷ For auditors, AS2 required extensive ICFR audit procedures at the process level.¹⁸ Also, in the absence of guidance for applying 404(a), managements typically followed the process level focus of AS2. AS5 was intended to promote a top down risk-based approach for auditors and CMGR was intended to do the same for management. In sections III and IV, we test secondary predictions based on this intent.

II.2 Financial audit oversight and the enhanced financial audit alternative

The low ICFR related audit effort combinations involve the subtle role of long-standing financial audit guidance. PCAOB *Interim Standards* AU 550 (PCAOB 2003), entitled “Other information in documents containing audited financial statements,” incorporates the AICPA’s *Statement on Auditing Standards No. 8* (December 1975).¹⁹ The guidance states that when non-financial information appears in a document containing audited financial statements such as a 10-K filing, the financial statement auditor “should read the other information” and if the auditor “becomes aware of information that he believes is a material misstatement of fact,” the auditor is to take action to resolve the inconsistency such as management’s correction of the other information or the auditor’s withdrawal from the audit engagement (AU 550.04-.06).

¹⁷ According to the SEC, the intent of “Commission Guidance Regarding Management’s Report on Internal Control Over Financial Reporting Under Section 13(a) or 15(d) of the Securities Exchange Act of 1934” (CGMR) was to “relieve smaller companies from having to rely on the audit standard as their de facto rulebook” (SEC 2007b) and to “bring information concerning material weaknesses into public view” (SEC 2007c). Thus, cost effective material weakness disclosures are an output of interest to regulators.

¹⁸ As AS5 was being formulated, the SEC staff suggested a economical “design-only” ICFR audit option for small companies as an alternative within SOX where the auditor would evaluate ICFR design and conduct a “walk-through sample of one” to confirm implementation, but would use financial misstatement detection to indicate whether implementation is effective (Norris 2006).

¹⁹ Equivalent guidance appears in International Standard on Auditing 720.

To illustrate how AU 550 should be applied, suppose that management is subject to SOX 404(a) but not to 404(b) (the HL regime), and that management’s 404(a) report contained in its 10-K filing asserts that ICFR is effective.²⁰ Also suppose the financial audit detected a misstatement that required adjustment and that the auditor also concluded that the misstatement resulted from a material weakness in ICFR.²¹ Applying AU 550, the auditor would “read” management’s entire 10-K filing, note the material misstatement of fact based on the financial audit finding, and should resolve the matter before issuing an audit report. Thus, even without an ICFR audit, AU 550 requires auditor monitoring of management’s ICFR disclosures under either SOX 302 or 404(a).²²

The above scenario and “sourcing as to cause” any material misstatements discovered raises the possibility of a material weakness disclosure regime involving no management certification or reporting effort and a slightly enhanced financial audit. The enhanced financial audit (denoted EFA) would direct the auditor to:

- investigate as to cause *all* misstatements detected in the financial audit, including those noted by management, and
- describe in the auditor’s report any material weakness in ICFR determined to be the cause of the misstatement(s).

The only added audit cost would be the cost of “sourcing” the cause of detected misstatements and drafting an extended audit report.²³

To summarize, the HH regime should, other things equal, yield detection and disclosure of more material weaknesses than would an HL or LL regime or enhanced

²⁰ Equivalently, management could certify that its disclosure controls are effective under SOX 302.

²¹ The possibility of such a scenario and the auditor’s duty to take such actions under AU 550 is noted by the Center for Audit Quality in CAQ Alert #2007-66 (December 19,2007). Furthermore, *Audit Analytics* shows that 70.3% of 10-K filers for FYE 12/31/07 with ineffective controls report that at least one weakness was due to “material and/or numerous auditor / year-end adjustments.”

²² As a non-mandated reporting example, the auditor could also become associated with managements’ voluntary non-financial disclosures in a “comply or explain” regime.

²³ We are not aware of evidence that this plausible and virtually zero added cost control effectiveness disclosure alternative was considered by Congress when drafting SOX in 2002.

financial audits. However, there is reason to believe that an HL or LL regime or the EFA alternative may be cost effective.²⁴ First, during the early years of application of SOX 404(b), some practicing auditors stated that eighty percent or more of the material weaknesses are discovered through analysis of misstatements detected during the financial audit process.²⁵

Second, *Audit Analytics* classifies Form 10-K disclosures as to the nature and origin of material weaknesses identified. One category is “Material and/or numerous auditor /YE adjustments” that:

“Represents circumstances where one of the explanations for a material weakness opinion was the number and/or size of year-end adjustments including those proposed by the auditor. These adjustments also consider footnote and related errors that need to be corrected by the auditor at year-end. Too many, or auditor initiated year-end adjustments are consider[ed] prima facie evidence of a potential material weakness in financial reporting” (*Audit Analytics* website definition).

Audit Analytics data show that, for fiscal year 2007, 69% of firms with material weaknesses indicate that at least one material weakness is due to “Material and/or numerous audit/YE adjustments.” Thus, even without ICFR audits, the financial auditor applying PCAOB *Interim Standards*, including testing significant year-end adjustments made by management (AU 316.58, .61-.62) and consideration of possible causes (AU 312.08-.11), would become aware of misstatements that, when analyzed as to source, would reveal a material weakness at negligible incremental cost and no management reporting effort.²⁶

²⁴ It is important to address alternative methods of providing disclosures to “inform us about the differential costs and benefits to firms, which in turn helps us understand how uniform reporting requirements may differentially affect firms” (Leuz and Wysocki 2008).

²⁵ As an example, this rate was the consensus of a panel discussion by Big Four SOX 404 audit professionals at the May 2006 University of Kansas Auditing Symposium.

²⁶ For such firms, other material weaknesses that did not cause a detected misstatement would remain undetected, but the firm would be identified as having ineffective ICFR.

Third, Bedard and Graham (2008) use proprietary audit firm and survey data on 77 audit engagements of 44 audit clients to study the severity of ICFR deficiencies revealed in the first years of SOX 404 audits including 153 material weaknesses. The authors don't report how many clients had at least one misstatement-related weakness, but they do report that, across the 44 clients, 42 involved misstatements.

Thus, there is some evidence that, even without auditors conducting audit procedures directed toward ICFR *and* without a management certification or management report on ICFR, financial auditors would become aware of perhaps one-half to as much as 80% of *companies* with at least one material weakness and therefore have “ineffective internal control.” This awareness suggests that enhanced financial audits might provide cost effective material weakness disclosures to investors.

Figure 1 summarizes the work effort for the three SOX alternatives for which data are available to assess incremental audit fees and material weakness disclosure rates as well as the low cost “enhanced financial audit” alternative.

[INSERT FIGURE 1]

III. Research Design, Data, and Descriptive Statistics

III.1 Research Design, Predictions and Sample Selection

Our research design incorporates year-to-year material weakness disclosure and audit fee difference measures for each firm and also between “intervention” firms whose filing status requires that they change one or more features of the ICFR disclosure regime during a particular year and “control” firms whose status does not change.

Three regime changes provide the basis for our three primary predictions

Prediction 1: When non-accelerated filers change from the LL regime in 2006 to the high management effort, low audit effort (HL) regime in 2007, the likelihood of material weakness disclosures, relative to control firms, will be greater, but NAF audit fees will remain approximately unchanged.

Prediction 2: When continuing accelerated filers and first-time accelerated filers change from the LL regime in 2003 to the HH regime in 2004 (and when, in 2005 through 2007, first-time filers change from LL to HH), the likelihood of material weakness disclosures and audit fees, relative to control firms will be greater.

Prediction 3: When the 2008 first-time accelerated filers change from the HL regime in 2007 to the HH regime in 2008 (that is, firms applying high management effort for the second year but applying high effort ICFR audits for the first time), audit fees, relative to control firms, will be greater, with no prediction for the likelihood of material weakness disclosures because the positive effect of ICFR audit scrutiny may be mitigated by increased remediation of weaknesses detected by implementation of HL in 2007.

In addition to these primary predictions, we test for effects of implementing AS5 in 2007. In particular, we compare relative audit fees for (a) CAFs applying AS5 in 2007 vis-à-vis AS2 in 2006, and (b) 2007 first-time filers applying AS5 in 2007 vis-à-vis first-time filers applying AS2 in other years. Also, because the change in audit effort may lead to changes in weakness detection, other things equal, we also test detection rates.

Using data from *Audit Analytics*, we identify three groups of small U.S. firms with fiscal years ending December 31 who filed (unaudited) disclosure control certifications (LL) as part of Form 10-K for 2003 or a subsequent year. For all six years, continuing non-accelerated filers (denoted NAFs) had no ICFR audits due to exemption. Small accelerated filers applying the HH regime for the five years (2004-2008) with market capitalization between \$150 million and \$300 million at January 1, 2003 are deemed large enough to have been classified as accelerated filers as of January 1, 2003 and are denoted CAFs (for continuing accelerated filers). Finally, firms that have ICFR audit reports for 2004 with market capitalization less than \$150 million at January 1, 2003 (deemed to be too small to have been accelerated filers for 2003) and any firm first filing under HH for 2005- 2008 are denoted FAFs (for first-time accelerated filers) for a particular year. For all groups, we exclude firms with initial public offerings during the

year of or prior to first-time accelerated filing. Our procedures result in a 2003-2008 sample of 2,292 firms, comprised of 1,076 NAFs, 264 CAFs, and 952 FAFs in 2004 through 2008 (see Table 1).

[INSERT TABLE 1]

We obtain audit fee and material weakness data from *Audit Analytics*.²⁷ As a dichotomous material weakness measure, we note whether the 10-K filing indicates controls are “effective” (zero material weaknesses) or “ineffective” (one or more material weaknesses). For all firms in 2003, for NAFs in 2004-2006, and for FAFs until their first accelerated filing year, we use management’s year-end SOX 302 10-K certifications. For CAFs and FAFs for 2004-2008 we use the ICFR audit opinion (adverse vs. unqualified) and for NAFs in 2007 and 2008 we use management’s SOX 404(a) report on internal controls (not effective vs. effective).

The three groups of firms differ substantially as to size and profitability as well as the proportion of audit fees to total assets. The NAFs median total assets are \$13.7 while the CAFs and FAFs medians are \$435.5 million and \$181.3 million, respectively. Also, the median NAF firm is in a loss position for every year (median loss \$.3 million) while median net income for CAFs and NAFs are \$10.6 million and \$3.3 million. Finally, audit fees average 0.72% of total assets for NAFs while CAFs and FAFs average 0.18% and 0.29%, respectively, reflecting the disproportionate cost burden on NAFs even though they have not yet had ICFR audits.²⁸

III.2 Descriptive statistics on material weakness disclosures and audit fees

²⁷ When a firm changes auditors during the year, *Audit Analytics* reports audit fees of the new auditor rather than the total. We therefore hand collect data on predecessor auditor fees from 10-K or proxy filings.

²⁸ For comparison, a study by the Government Accountability Office shows the average fees to total asset ratio for non-filers in 2003 and 2004 as 0.64% and 0.79%, while accelerated filers with market capitalization between \$500 million and \$700 million are 0.15% and 0.30%, respectively, even though the smaller firms did not comply with SOX 404 in 2004 (GAO 2006).

The primary variables of interest are changes in material weakness disclosure rates and audit fees from year $t-1$ to year t , as the ICFR disclosure and audit regimes are implemented. Operationally, we define: $MWchg_t = MW_t - MW_{t-1}$, where $MW_t = 1$ if material weaknesses are reported for year t and 0 otherwise, and $MW_{t-1} = 1$ if material weaknesses are reported for year $t-1$ and 0 otherwise; and $AFchg\%_t = (AF_t - AF_{t-1}) / AF_{t-1}$, where AF_t is the total audit fee for year t and AF_{t-1} is the total audit fee for year $t-1$.

Table 2 panel A provides descriptive statistics on year-to-year changes in material weakness disclosure rates by group and panel B provides median audit fee changes by group. Three patterns in weakness disclosures and audit fees are apparent for the three groups after the 2004 increases over the initial rates and fees for 2003. First, for NAFs, the weakness disclosure rate increases every year from 2004 through 2007 and audit fees increase modestly each year. The only regime change for NAF firms is 2007 as they change from LL to HL as unaudited management reports are mandated. The disclosure rate increases to 21.75% in 2007 and then declines in 2008 as NAF firms remediating all weaknesses exceed the rate of new weakness firms. Thus, NAF disclosure rates continue to rise (and weaknesses are remediated) even without ICFR audits.

[INSERT TABLE 2]

Second, in contrast to NAFs, CAFs' rate of disclosure declines every year after 2004 as firms remediate existing weaknesses at a rate greater than that of firms disclosing new material weaknesses. Audit fees for CAFs almost double in 2004 but subsequent increases are modest, perhaps as audit firms improve ICFR efficiency through learning and adjustments to inspections and auditing standards.²⁹

²⁹ The fee changes in Table 2 are similar to changes noted in other studies. Raghunandan and Rama (2006) report a median fee change for manufacturing firms of 128.8% from 2003 to 2004, while for the same period, Krishnan et al. (2008) report a median change of 170.1% for (typically small) firms that voluntarily

Third, for FAFs (whose firm composition changes each year), the material weakness rate percentage increase when these firms become subject to the HH regime is greatest in 2004 and the increase subsequently declines and becomes negative in 2008.³⁰ Also, in contrast to CAFs, the FAF's initial fee percentage increase declines each year with the biggest percentage drop occurring in 2007. The decrease in first-time fee growth could reflect auditor learning over time, PCAOB success in issuing AS5, and perhaps effects of PCAOB 2006 inspections' focus on ICFR audit efficiency (PCAOB 2006).³¹

Table 3 shows details of weaknesses and fee changes for the FAF firms under the LL, HH first year, and HH second year for 2004 through 2007. Panel A shows that for all FAF groups, the weakness rate substantially increases in the first HH year and declines in the second HH year as firms with full remediation exceed those with newly discovered ineffective ICFR. It also includes results for the 61 2008 FAFs that operated under three regimes from 2006 through 2008 (LL, HL, and HH, or 302, 404(a), and 404(a) and (b)). The year-to-year changes in material weakness disclosure results are qualitatively similar to that of the NAFs indicating that the HL regime accompanied by financial audits applying AU 550 may be an economical substitute for HH that employs costly ICFR audits. Note that while the changes in weakness disclosures of the FAFs and NAFs are similar for both years and audit fee changes are similar for 2007, there is a 51.32% increase in audit fees for FAFs in 2008 reflecting their HH status while the NAFs under the HL regime increase by only 5.52%.

[Insert Table 3]

reported estimated total costs of SOX 404 compliance. Foster, Ornstein, and Shastri (2007) report 2004 and 2005, average audit fees increases for 1,258 first-time accelerated filers of 73% and 99%, respectively for 876 first-time filers, while for 1,363 non-accelerated filers the increase is 15% and 17%, respectively.

³⁰ Second filing year material weakness rates for 2004-2008 FAFs are 8.80%, 9.71%, 7.69%, and 7.75%, respectively. All are less than that of the first filing year and reflect net remediation by these firms.

³¹ PCAOB staff indicated that some large firms had anticipated a 10% reduction in audit fees with implementation of AS5 (Johnson 2007).

Overall, the increased disclosure rate in 2007 from the HL regime with the lack of increase in 2008 and the substantial increase in audit fees, invite consideration of the adequacy of the HL combination as well as the enhanced financial audit (EFA) that does not require the cost of preparing management’s report.³²

The statistics in Table 2 and Table 3 do not control for firm specific factors known from other research to be associated with internal control quality and audit fees. In section IV, we report multivariate tests that incorporate such factors to formally test the intervention effects. We also conduct analyses exploring publicly available data that suggests disclosure rates and audit fees that might accompany an “enhanced financial audit” approach without a SOX-prescribed management certification or report.

IV. Prediction tests for Interventions and Enhanced Financial Auditing inferences

IV.1 Regression Model Specifications and Predictions for Variables of Interest

To test our three intervention predictions about the probability of disclosing a material weakness and changes in audit fees and to control for other factors, we estimate the following regressions (for definitions of all variables, see Table 4):

$$(1) \quad \text{MWCY} = \alpha + \beta_1 \times \text{IntHL} + \beta_2 \times \text{IntHH} + \beta_3 \times \text{IntH2H} + \\ + \beta_4 \times \text{IntAS5_CAF} + \beta_5 \times \text{IntAS5_FAF} + \beta_6 \times \text{MWPY} \\ + \beta_7 \times \text{RESTATE} + \beta_8 \times \text{BIG8} + \beta_9 \times \text{AUDchg} + \beta_{10} \times \text{LOSS} \\ + \beta_{12} \times \text{TAgrow} + \beta_{12} \times \text{ACQPY} + \beta_{13} \times \text{NAF} + \varepsilon.$$

$$(2) \quad \text{AFchg\%} = \alpha + \beta_1 \times \text{IntHL} + \beta_2 \times \text{IntHH} + \beta_3 \times \text{IntH2H} + \\ + \beta_4 \times \text{IntAS5_CAF} + \beta_5 \times \text{IntAS5_FAF} + \beta_6 \times \text{MWCY} \\ + \beta_7 \times \text{RESTATE} + \beta_7 \times \text{BIG8} + \beta_9 \times \text{AUDchg} \\ + \beta_{10} \times \text{LOSS} + \beta_{12} \times \text{TAgrow} + \beta_{12} \times \text{ACQPY} \\ + \beta_{13} \times \text{NAFYr1} + \beta_{14} \times \text{NAFYr2} + \beta_{15} \times \text{NAFYr3} \\ + \beta_{16} \times \text{NAFYr5} + \varepsilon.$$

³² Because our analyses are based on *unaudited* material weakness disclosures, we cannot assess how many material weaknesses might remain undetected and unreported relative to what an ICFR audit would detect.

Equation (1) is a logistic regression modeling the probability of disclosing a material weakness (MWCY) where MWCY is coded 1 if the firm disclosed “ineffective ICFR” (i.e., at least one material weakness in the current year), 0 otherwise³³. Equation (2) is an OLS regression where the dependent variable, AFchg% is defined as audit fee in year t , less audit fee in year $t-1$, all x 100 and scaled by audit fee in year $t-1$ (and Winsorized at the 5 and 95 percent levels to reduce the influence of extreme observations). These regressions are used for formal tests of our Predictions outlined in Section III.

[INSERT TABLE 4]

The independent variables of interest in both regressions relate to our three regime interventions with our proxy for the HL regime (IntHL) coded one for 2007 NAF observations and zero otherwise; our proxy for the HH regime (IntHH) coded one for 2004–2007 FAF observations and zero otherwise; and our proxy for the H2H regime (IntH2H) coded one for 2008 FAF observations and zero otherwise. We predict that the coefficient on IntHL will be positive and significant in the MWCY regression, indicating that first-time implementation of unaudited management reports (HL) by NAF firms will be associated with greater probability of material weakness disclosure than NAF firms in other years, other things equal. We do not expect a significant coefficient on IntHL in the AFchg% regression, as auditor effort remains low across the two years.

We similarly predict that the coefficient on IntHH in the MWCY regression will be positive and significant, indicating that our CAF firms in 2004 and FAF firms from 2005 through 2007 will be more likely to disclose a material weakness in their year of

³³ We use this dichotomous classification of ICFR effectiveness, rather than the number of material weaknesses disclosed, because it is likely that the method of disclosure of material weaknesses differs across firms, and also because some material weaknesses are likely more severe than others, which may result in the number of material weaknesses not being an ordinal indicator of weakness severity.

first-time filing as they first experience the HH regime. We also expect a positive and significant coefficient on IntHH in the AFchg% regression, as these firms change from low ICFR audit effort in year $t-1$ but to the high effort audit regime in year t .

Finally, we make no prediction about the sign of the IntH2H coefficient in the MWCY regression. These first-time HH filers in 2008 applied HL in 2007 and will likely have had increased weakness disclosures in 2007, some of which may be remediated in 2008 and only partially offset by discovery of new material weaknesses under HH. We predict an increase in 2008 audit fees as FAF firms switch to the high effort audit regime, but the coefficient on the interaction variable IntH2H in the AFchg% regression is expected to be negative because application of AS5 by these firms is expected to yield smaller fee increases than for FAF firms in prior years under AS2.

Of secondary importance are predictions about the effects of the 2007 replacement by the PCAOB of procedure-level ICFR audit guidance of AS2 with the top-down approach of AS5. We include IntAS5_CAF to indicate the interaction of initial application of AS5 by CAFs (coded one for CAFs in 2007 and zero otherwise) and IntAS5_FAF to indicate interaction of initial AS5 application by FAFs (coded one for FAFs in 2007 and zero otherwise).

In addition to our intervention indicator variables, we control for variables shown in prior research to be associated with material weakness disclosures or audit fee changes. Two control variables, MWPY and RESTATE, may be direct indicators of material weaknesses in the current year (per AS2 and AS5). Ineffective ICFR in year $t-1$, denoted MWPY, is coded one if the firm disclosed one or more material weaknesses under either SOX 404(b) or (a) or 302 in the prior year, zero otherwise. We anticipate positive association of MWPY with MWCY as some weaknesses may be difficult to remediate

causing some firms' ICFR to remain "ineffective." We control for MWCY in the AFchg% regression as prior studies have shown that ineffective ICFR increases audit fees (Raghunandan et al. 2006; Foster et al. 2007; Kamar et al. 2007; Hoitash et al. 2008).

We expect the filing of restated financial statements of any year in year t would increase the likelihood of ineffective ICFR for the current year as continuing ICFR problems may have caused the restatement. RESTATE is coded zero, one or two and is the number years in years t and $t-1$ that the firm restated annual or quarterly financial statements. We also expect that announcement of a restatement in year t would increase audit effort and audit fees in year t (Hoitash et al. 2008).

Two control variables relate to the audit firm employed and whether the audit firm changes from $t-1$ to t . Prior research has shown firms that engage Big n auditors are more likely to disclose ineffective ICFR (Ashbaugh-Skaife et al. 2007), and we therefore control for audit firm type. BIG8 is coded one if a firm engaged one of the largest eight audit firms (subject to annual inspection by the PCAOB) in year t , and zero otherwise.³⁴ We would expect an audit firm effect on AFchg% only if Big8 fee increases are systematically larger or if the firm changes auditor from year $t-1$ to year t . We therefore include AUDchg an indicator variable equal to one if the firm changes auditor from year $t-1$ to year t , zero otherwise.

The expected signs for Big8 and AUDchg on ICFR disclosures and fee changes are difficult to determine as firms may change auditors to lower audit fees, leading to a reduction in fees and in response the auditor may (a) work less due to the lower fee and therefore be less likely to identify material weaknesses or (b) may provide a greater effort during their initial engagement. Prior to SOX, extant literature generally finds a decrease

³⁴ The largest 8 audit firms include PriceWaterhouseCoopers, Ernst & Young, Deloitte & Touche, KPMG, Grant Thornton, BDO Seidman, Crowe Chizek, and McGladrey & Pullen.

in audit fee upon auditor change due to the lower fee reason described above (e.g., Simunic 1980). However, post SOX, auditors may make the decision that the risk of retaining a client is too high given limited resources and may therefore resign from the engagement (Browning 2005), leading to an expectation that AUDchg would be positively associated with MWCY. It is unclear whether auditor turnover in this situation would lead to higher or lower audit fees.

Three control variables relate to financial health and growth of the firm. We code LOSS as zero, one, or two if the firm experienced zero, one, or two loss years in years t and $t-1$. Prior research documents an association between losses and ICFR disclosures as financially unhealthy firms are less likely to be able to invest in strong internal control systems (Ashbaugh-Skaife et al. 2007, Doyle et al. 2007). Regarding AFchg%, we expect that financially distressed firms require more audit effort, other things equal, and therefore have higher fee increases than financially sound firms.

We control for total asset growth from year $t-1$ to t , with TAGrow calculated as total assets in year t minus total assets in year $t-1$, scaled by total assets in year $t-1$.³⁵ Prior research has found asset growth to be positively related to control deficiencies (Ashbaugh-Skaife et al. 2007) as growing firms are not able to modify their internal control systems quickly enough to keep pace with their increase in size. Audit fees have also been shown to be strongly associated with proxies for size (e.g., Simunic 1980; Raghunandan et al. 2006). Related to size, we control for acquisitions, denoted ACQ coded as zero, one, or two if the firm claimed a SOX 404(a) or (b) exemption based on an acquisition in zero, one, or two of the last two years. We include ACQ in the AFchg% regression, but only control for ACQPY in the MWCY regression due to the nature of the

³⁵ We Winsorize the TAGrow variable at the 5 and 95 percent levels to reduce the influence of extreme observations.

Audit Analytics information. If the firm requests an exemption related to an acquisition in the current year, they are not required to perform internal control testing on that acquisition, and as such we would not expect current year exemptions to be related to increased MWCY disclosure. ACQPY is coded one if the firm claimed a SOX 404(a) or (b) exemption related to an acquisition in the prior year.³⁶

Finally, we include a variable related to non-accelerated filers in each regression. For the MWCY regression, NAF is to control for any effects of non-accelerated filing status on material weakness existence, discovery, and reporting differences. For the AFchg% regression we partition NAF by year to control for possible year effects related to *financial statement audit* fee changes other than ICFR audits. Specifically, we include a year x NAF indicator variable equal to one if the firm observation is an NAF in 2004, 2005, 2006, 2007, and 2008, respectively (NAFYr1, NAFYr2, NAFYr3, NAFYr4, and NAFYr5), and zero otherwise.³⁷ We use the NAF group as the control because they have no ICFR-related audit fees in years 2004 – 2008 and therefore proxy for financial audit-only fee fluctuations.

IV.2 Regression Results and Tests of Predictions

MWCY logistic regression (eq. 1) results are presented in Table 5.³⁸ As expected, the coefficients on IntHL (1.177) and IntHH (1.540) are both positive and significant at

³⁶ Additionally, we control for both year and group (NAF, CAF, FAF) effects to assure that there are no main effects for either the year in which the disclosure is made or the group to which the firm belongs, which is essentially controlling for size.

³⁷ Note that NAFYr4, which is not included, is identical to our 2007 HL intervention variable.

³⁸ We include a change in probability measure where the initial probability is calculated as the probability of material weakness disclosure of $\pi(x) = e^{\beta'X} / (1 + e^{\beta'X})$ where $\beta'X$ is calculated using the mean values of X . The change in probability is calculated as the change in probability of a material weakness given a change in the independent variable, holding the other independent variables constant at their mean values. For the dichotomous variables, the change in probability is calculated by changing the value from 0 to 1, the trichotomous variables from 0 to 2, and for Total asset growth, by changing the value from 0% to 100% growth.

the 0.01 level and the coefficient on IntH2H (0.785) is significant at the 0.10 level. We find the probability of IntHL firms disclosing a material weakness is 10.9% higher than control firms and the probability of IntHH firms disclosing a material weakness is 14.4% higher than control firms. For prediction 3, Table 5 indicates that IntHL is significantly positive but to appropriately assess the total effect of IntHL, we must combine this effect with the overall effect of being a non-accelerated filer. The net marginal effect of these two coefficients is 12.5%. The marginal effect of IntH2H is 6.4% which is consistent with our conjecture that the 2007 HL treatment for the 2008 FAF firms is strong enough to significantly dampen the HH regime effect.

[INSERT TABLE 5]

As to the effect of 2007 PCAOB guidance changes (replacing AS2 with AS5) on MWCY, the Int4 (IntAS5_CAF) coefficient for CAF firms is not statistically significant while the Int5 (IntAS5_FAF) coefficient for FAFs is significantly negative. These results are consistent with the weakness detection power of AS2 being maintained by AS5 for those continuing application of ICFR audits, but a reduction in relative detection power for those applying ICFR audits for the first time using AS5.

The signs of predictions of the control variable coefficients are largely in line with expectations. Also of note in Table 5 is the marginally significant positive coefficient on NAF. This indicates that ineffective ICFR for NAF firms not experiencing a regime change are statistically higher than for CAF firms for non-regime change years. This is consistent with financial auditors applying AU 550 more effectively and with CAF firms continuing to remediate material weaknesses.

Audit fee change regression (eq. 2) results are presented in Table 6. We note a positive and significant coefficient (0.963 on IntHH, indicating that first-time filing in

year 2004–2007 results in a 96% increase in audit fee, on average. We also note a positive and significant coefficient (0.425) on IntH2H, indicating that 2008 FAFs experienced a 43% increase in audit fees upon implementing the IntH2H regime. We find a marginally significant coefficient (0.078) on IntHL indicating an economically small audit fee increase in the absence of an audit of ICFR for 2008.

[INSERT TABLE 6]

Introduction of the PCAOB’s AS5 that replaced AS2 in 2007 yields no significant change in audit fees for CAFs (IntAS5_CAF), but a statistically significant decrease (-0.369) in fees for FAFs (IntAS5_FAF) relative to IntHH. Thus, AS5 seems more efficient for first-time filers, but may identify fewer material weaknesses than does first-time application of AS2. Finally, the positive and varying coefficients on our year x NAF variables indicate that financial audit fee changes for NAF firms are increasing relative to accelerated filers.

IV.3 Enhanced financial audit inferences

As discussed in section II, auditors applying traditional substantive tests for financial audits often become aware of some material weaknesses in ICFR because some result in misstatements that are detected by the auditor (or by management) and lead to adjustment requests (or year-end adjustments).³⁹ PCAOB standards (e.g., AS2 and AS5) now require that the auditor “source” such misstatements to determine whether a material weakness is the cause. Furthermore, data from *Audit Analytics* (discussed below) indicate that such misstatements are a frequent precursor of identification of material weaknesses.

³⁹ The auditor would become aware of management’s adjustments through testing journal entries and adjustments as specified by AU 316.58-.62.

This history suggests a practicable enhancement to financial audits that might identify well over one-half of smaller companies with ineffective ICFR (per 10-K filings), even though such audits wouldn't necessarily identify *all* material weaknesses at these companies. Under enhanced financial audits, neither management reports nor ICFR audits would be necessary. Rather, financial auditing standards would be enhanced to require that the financial auditor analyze all known misstatements (including proposed adjustments) to determine whether one or more material weaknesses might be the cause. If a material weakness is determined to exist, then the auditor would be directed to disclose that weakness in the auditor's report. The cost of extending the financial audit would likely be small in comparison to the cost of management's reports and ICFR audit.

Existing public data allows inferences about the possible effectiveness of the enhancement. As discussed in section II, *Audit Analytics* personnel read management and audit reports and code "Internal Control Weaknesses" as "Material and/or numerous Y/E adjustments" (MNAdj), when either report indicates that such adjustments are necessitated by a material weakness. Thus, MNAdj indicates a firm that could be identified by an "enhanced financial audit" regime. Table 7, Panel A shows the MNAdj rates for material weakness firms range from just over 30% to almost 80%.⁴⁰ By implication, from 30% to 80% of firms reporting ineffective ICFR under SOX could have been identified and disclosed without substantial management effort or ICFR audits.

[INSERT TABLE 7]

⁴⁰ We contacted *Audit Analytics* personnel to see if they could explain the 2007 decline. They had noticed the low rate of MNAdj for NAFs filing their initial unaudited management reports (HL) in 2007 and had also noted a concomitant increase in coding of "Unspecified/unidentified/ inapplicable FASB/GAAP issues." For example, about 80% of the NAF firms in 2007 and 2008 had been coded as "material or numerous . . . adjustments" and/or "unspecified . . . GAAP." Both elements of the coding may be due to inexperience of small firm management in applying 404(a) or to inexperience of the audit firm with ICFR audits. As an example of audit firm size, for 2008, 27.8% of our CAFs are audited by small audit firms (one to 100 public audit clients), while 75.5% of NAFs are audited by small audit firms.

Panel B of Table 7 tabulates possible results of enhanced financial audits for our 61 first-time accelerated filers of 2008 under the HH effort regime in comparison to HL for 2007, and LL for 2006 along with the related median fees. Note that material weakness rates go from 8% to 18% then to 16% while audit fees increase by 9% in 2007 and by 51% in 2008 as unaudited management reports and then audited management reports are implemented. Not shown in Panel B is the cost of the high management effort report in 2007 which FEI non-accelerated respondents reported as an average cost of \$240,847 (FEI 2008).

The lower section of Panel B shows that 55% and 70% of the firms with material weaknesses were coded as $MNAdj = 1$. We can therefore assume that an auditor applying “sourcing misstatements as to cause” or enhanced financial auditing would have identified these firms as having ineffective internal controls. The detection rates of 18% and 16% for the two SOX regimes and their incremental costs may be compared with the 10% and 11% rates that are attainable at very low cost.

IV.4 Limitations

A primary limitation of our study is that we cannot determine the actual effectiveness of ICFR for our sample firms or how effectiveness may vary over time due to natural causes or as a result of SOX-based disclosures and possible remediation. Therefore, we cannot know the extent to which auditing of ICFR assisted the identification and disclosure of material weaknesses, other things equal. Additionally, there may be an effect on material weakness existence as well as detection and disclosure for an unaudited, 404(a) regime, or an impending ICFR audit. Knowledge that internal controls will eventually be audited may cause managers to discover and disclose more material weaknesses than they would in a 404(a) only regime.

In a controlled experiment, one would be able to mitigate the impact of some of these factors through random assignment of firms to treatments or interventions. However, through section 302, we did have a pre-intervention measure of control effectiveness for each firm and our firms had only a modest degree of “self selection” into treatments through their limited discretion over accelerated filing status. Given their filing status, firms could not choose whether to evaluate and report on ICFR, whether to have an ICFR audit, or whether their financial auditor would apply AU 550. Thus, while we can’t know the proportions of ineffective control firms that management reports and AU 550 might detect or that public disclosure might cause to be remediated relative to ICFR audits, the observed rates suggest that the number of ineffective controls associated with financial statement misstatements is relatively large.

V. Summary and Conclusion

In drafting SOX 404, members of Congress seem not to have been aware of practical implementation of then extant auditing standards regarding either internal control testing (AU 319) or financial auditor oversight of “other information” accompanying audited financial statements (AU 550). Concerns about the costs of SOX/PCAOB-based management reports and ICFR audits for small public companies led to staggered implementation and changing interpretive guidance over time, thus enabling an analysis of changes in material weakness disclosure rates and audit fees under multiple ICFR disclosure and audit regimes. We conduct such analyses for 2004 – 2008.

For four of the five years (2004 – 2007), we find that small firms undergoing first-time ICFR audits experience significantly increased material weakness disclosure rates in the year of implementation. However, small firms that first implement unaudited management reports in 2007 experience a large and statistically significant increase in

material weakness disclosures that is comparable to that of first-time accelerated filers for the same year.

As to audit fees, we find that first-time ICFR audits in 2004, audit fees are about twice what they were in 2003. We also find that, controlling for other factors previously shown to affect audit fees, first-time fee increases 2008 under AS5 are only about one and one-half times fee increases for 2007. In contrast, audit fees for continuing non-accelerated filers increase by about twelve percent more per year than do fees of accelerated filers after the initial ICFR audit year. These increases are modest, but do not reflect any change in ICFR audit retime.

Overall, for material weakness disclosures, it is possible that, for smaller filers, management assessment of internal control effectiveness with financial auditor oversight of management's report may be a cost effective alternative to annual audits of internal control over financial reporting. Furthermore, *Audit Analytics* data are consistent with the possibility that more than half of small public companies with ineffective internal controls could be identified without management reporting on internal control and with only a modest increase in financial audit effort regarding the cause of known misstatements.

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Figure 1
Alternative Policies for Identifying and Reporting Material Weaknesses in Internal Control over Financial Reporting (ICFR)

Alternative ¹²	Example output	Implementation Costs ³⁴
ICFR assessment and reporting by management and ICFR audit by financial statement auditor – HH	Management report per SOX 404(a) ICFR audit report(s) per SOX 103/404(b)	<ul style="list-style-type: none"> - Internal Costs - Documentation of procedures performed by management, employees, and consultants including tests of entity level and monitoring controls as well as significant testing of process level controls (AS2) or emphasis on entity level and monitoring controls (CGMR). Drafting management’s assessment report. - ICFR Audit Costs - Documentation of procedures performed by auditor, including tests of design and operating effectiveness of entity level and monitoring controls as well as significant testing of process level controls (AS2); or emphasis on entity level and monitoring controls (AS5). Drafting auditor’s report.
ICFR assessment and reporting by management with auditor oversight (but no ICFR audit) – HL	Management report per SOX 404(a) Auditor oversight per AU 550	<ul style="list-style-type: none"> - Internal Costs - Documentation of procedures performed by management, employees, and consultants with emphasis on entity level and monitoring controls. Drafting management’s assessment report. - ICFR Audit Costs - Sourcing of misstatements and material year-end adjustments detected during the financial statement audit to determine whether material weaknesses are indicated and follow up procedures to resolve inconsistencies (AU 550). Drafting auditor’s report.
ICFR certification by management with auditor oversight (but no ICFR audit) – LL	Management certification of disclosure controls per SOX 302 Auditor oversight per AU 550	<ul style="list-style-type: none"> - Internal Costs - Certification by management, with no required documentation, explicit procedural requirements, or measurement criteria such as that provided by the Committee of Sponsoring Organizations. - ICFR Audit Costs - Sourcing of misstatements and material year-end adjustments detected during the financial statement audit to determine whether material weaknesses are indicated and follow up procedures to resolve inconsistencies (AU 550). Drafting auditor’s report.
Auditor “sourcing” of detected misstatements and material year-end adjustments to identify any material weaknesses as cause - EFA	Sourcing as to cause all detected misstatements	<ul style="list-style-type: none"> - Internal Costs - None. - ICFR Audit Costs - Sourcing of misstatements and material year-end adjustments detected during the financial statement audit to determine whether they indicate material weaknesses in ICFR. Drafting any augmentation of the auditor’s report.

¹ The list of alternatives is not intended to be exhaustive, but instead lists approaches either used or suggested by standard setters as being appropriate for disclosure of ICFR effectiveness.

² Another suggested method is ICFR assessment through design-only audits, where management and auditors are not required to assess ICFR operating effectiveness.

³ The list of costs is not intended to be exhaustive but includes the major costs of internal assessment and external audit procedures to be performed under the alternative proposed.

⁴ Other research has suggested that there are three main types of costs related to SOX 404 compliance, internal, external consulting, and increase in independent audit fees.

Table 1
Sample Selection

	Continuing Accelerated Filers	Non- Accelerated Filers	First-time Accelerated Filers					Total
			2004	2005	2006	2007	2008	
US exchange-traded firms with fiscal years ending December 31 and	2,002	1,246	543	325	297	334	93	4,840
-Smaller continuing accelerated Filers with Total Market Capitalization > \$300M at December 31, 2003	-1,727							-1,727
-Accelerated Filers with no Market Capitalization Data in Audit Analytics			-102					-102
-Firms with no 302 or 404(a) data in year prior to First-time accelerated filing		-170		-32	-36	-45	-15	-298
-Firms with Initial Public Offerings in year of or prior to First-Time Filing			-66	-96	-74	-102	-17	-355
	<u>275</u>	<u>1076</u>	<u>375</u>	<u>197</u>	<u>187</u>	<u>187</u>	<u>61</u>	<u>2,358</u>

Table 2
Descriptive statistics on primary dependent variables

Panel A: material weakness disclosures (mean MW t)¹

		Year					
	n	2003	2004	2005	2006	2007	2008
Non-accelerated filers							
Level	1076	1.02%	4.46%	8.46%	8.74%	21.75%	19.14%
Change			3.44%	4.00%	0.28%	13.01%	-2.60%
% Change			336.36%	89.58%	3.30%	148.94%	-11.97%
Fully remediated : new MW			4:41	23:66	41:44	41:181	76:48
% Fully remediated : new MW			0.4%:3.8%	2.1%:6.1%	3.8%:4.1%	3.8%:16.8%	7.1%:4.5%
Continuing accelerated filers							
Level	264	3.03%	16.67%	8.71%	7.95%	7.20%	4.17%
Change			13.64%	-7.95%	-0.76%	-0.76%	-3.03%
% Change			450.00%	-47.73%	-8.70%	-9.52%	-42.11%
Fully remediated : new MW			3:37	25:15	21:14	12:11	17:3
% Fully remediated : new MW			1.1%:13.5%	9.1%:5.5%	7.6%:5.1%	4.4%:4.0%	6.2%:1.1%
First-time accelerated filers							
	n		318	197	187	187	61
Level	1.89%		22.01%	10.15%	16.58%	11.76%	16.39%
Change			20.13%	4.06%	4.81%	2.14%	-1.64%
% Change			1066.67%	66.67%	40.91%	22.22%	-9.09%
Fully remediated : new MW			1:82	6:14	13:22	12:16	6:5
% Fully remediated : new MW			0.3%:21.9%	3.0%:7.1%	7.0%:11.8%	6.4%:8.6%	9.8%:8.2%

¹ [xx.xxx] = HL applied, xx,xxx = HH Applied, and [xx,xxx] = H2H applied.

Table 3 (continued)
Descriptive statistics on primary dependent variables

Panel B: Audit fees (median AF_t)

		Year					
	n	2003	2004	2005	2006	2007	2008
Non-accelerated filers							
Level	1076	48,848	55,163	65,000	73,913	82,058	90,010
Change			6,316	9,837	8,913	8,146	7,952
% Change			14.43%	11.67%	10.30%	8.20%	5.52%
Continuing accelerated filers							
Level	264		309,660	335,000	378,000	392,003	411,730
Change			169,660	25,340	43,000	14,003	19,728
% Change			96.04%	6.16%	6.96%	6.73%	1.68%
First-time accelerated filers							
Level	n		318	197	187	187	61
Level		157,455	389,400	561,325	438,742	474,396	304,000
Change			31,945	315,952	215,799	226,653	129,000
% Change			108.91%	86.44%	81.24%	62.96%	51.32%

xx.xxx = HL applied, xx,xxx = HH Applied, and xx,xxx = H2H applied.

Table 3
Descriptive statistics on primary dependent variables for First-time Accelerated Filers (FAFs)

Panel A: Material Weaknesses

	n	Year					
		2003	2004	2005	2006	2007	2008
2004 - Level	318	1.89%	22.01%	8.80%			
Change			20.13%	-13.21%			
%Change			1066.67%	-60.02%			
2005 - Level	197		6.09%	10.15%	9.71%		
Change			6.09%	4.06%	-0.44%		
%Change				66.67%	-4.31%		
2006 - Level	187			11.76%	16.58%	7.69%	
Change					4.81%	-8.89%	
%Change					40.91%	-53.60%	
2007 - Level	187				9.63%	11.76%	7.75%
Change						2.14%	-4.02%
%Change						22.22%	-34.15%
2008 - Level	61				8.20%	18.03%	16.39%
Change						9.84%	-1.64%
%Change						120.00%	-9.09%

Table 3 (continued)
Descriptive statistics on primary dependent variables for First-time Accelerated Filers (FAFs)

Panel B: Audit fee changes

	n	Year					
		2003	2004	2005	2006	2007	2008
2004 - Level	318	157,455	389,400	409,159			
Change			231,945	19,759			
%Change			108.91%	5.19%			
2005 - Level	197		245,373	561,325	573,054		
Change				315,952	11,729		
%Change				86.44%	7.38%		
2006 - Level	187			222,943	438,742	404,189	
Change					215,799	(34,554)	
%Change					81.24%	-1.79%	
2007 - Level	187				247,743	474,396	402,173
Change						226,653	(72,223)
%Change						62.96%	0.00%
2008 - Level	61				106,464	175,000	304,000
Change						68,537	129,000
%Change						9.41%	51.32%

Table 4
Variable Definitions

Variable	Calculation
MWCY	An indicator variable equal to 1 if the firm disclosed at least one material weakness in internal control in the current year, 0 otherwise
AFchg%	The current year audit fee less prior year audit fee, all scaled by prior year audit fee (Winsorized at the 5 and 95 percent levels)
IntHL	An indicator variable signifying the high management, low auditor effort Intervention, equal to 1 if a 2007 Non-accelerated filer, 0 otherwise
IntHH	An indicator variable signifying the high management, low auditor effort Intervention, equal to 1 if a first-time accelerated filer in 2004, 2005, 2006, or 2007, 0 otherwise
IntH2H	An indicator variable signifying the high management, high auditor effort, given high management, low auditor effort in the prior year equal to 1 if a 2008 first-time accelerated filer, 0 otherwise
IntAS5_CAF	An indicator variable equal to 1 if the firm is a continuing accelerated filer implementing AS5 for the first time in 2007, 0 otherwise
IntAS5_FAF	An indicator variable equal to 1 if the firm is a first-time accelerated filer for 2007 implementing AS5 in its year of first-time filing, 0 otherwise
MWPY	An indicator variable equal to 1 if the firm disclosed at least one material weakness in internal control in the prior year, 0 otherwise
RESTATE	An indicator variable equal to 1 if the firm restated any annual or quarterly financial statements during the current year, 0 otherwise

Table 4
Variable Definitions (continued)

Variable	Calculation
BIG8	An indicator variable coded 1 if the firm employed a Big 8 auditor in the current year, 0 otherwise
AUDchg	An indicator variable coded one if the firm changed auditors during the current year, zero otherwise
LOSS	The number of years in the last two years that the firm was in a loss position
TAgrow	Total assets at the end of the current year less total assets at the end of the prior year, scaled by total assets at the end of the prior year (Winsorized at the 5 and 95 percent levels)
ACQPY	An indicator variable equal to 1 if the firm claimed an exemption from internal control audit procedures in the prior year due to a merger or acquisition, 0 otherwise
ACQ	The number of years in the last two years that the firm claimed an exemption from internal control audit procedures due to a merger or acquisition
NAF	Indicator variable equal to 1 if the firm is a non-accelerated filer, 0 otherwise
NAFYr1, 2, 3, 4, and 5	Indicator variables equal to one if the firm observation is an NAF in 2004, 2005, 2006, 2007, or 2008, respectively; zero otherwise

Table 5
Impact of SOX-based Interventions on Material Weakness Disclosures¹

Panel a: Logistic Regression Results

$$\begin{aligned} \text{MWCY} = & \alpha + \beta_1 \times \text{IntHL} + \beta_2 \times \text{IntHH} + \beta_3 \times \text{IntH2H} + \\ & + \beta_4 \times \text{IntAS5_CAF} + \beta_5 \times \text{IntAS5_FAF} + \beta_6 \times \text{MWPY} \\ & + \beta_7 \times \text{RESTATE} + \beta_8 \times \text{BIG8} + \beta_9 \times \text{AUDchg} + \beta_{10} \times \text{LOSS} \\ & + \beta_{12} \times \text{TAgrow} + \beta_{12} \times \text{ACQPY} + \beta_{13} \times \text{NAF} + \varepsilon. \end{aligned}$$

		Estimated Coefficients (χ^2)	Change in Probability ²
Intercept		-3.719 *** (356.13)	
IntHL	+	1.177*** (109.54)	0.101
IntHH	+	1.540*** (59.94)	0.144
IntH2H	?	0.785* (3.03)	0.064
IntAS5_CAF		0.362 (1.39)	0.023
IntAS5_FAF		-0.855*** (7.38)	-0.04
MWPY	+	2.481*** (504.49)	0.342
RESTATE	+	0.536*** (20.74)	0.038
BIG8	+	-0.176* (2.64)	-0.010
AUDchg	?	0.359*** (10.87)	0.023
LOSS	+	0.457*** (76.49)	0.055
TAgrow	+	0.104** (4.46)	0.005
ACQPY	+	0.414 (1.51)	0.029

¹ All variables are defined as in Table 1.

² The change in probability column shows the change in probability of a firm disclosing a material weakness due to a change in the independent variable holding the other independent variables constant at their mean values. For the dichotomous variables, the change in probability is calculated by changing the value from 0 to 1, the trichotomous variables from 0 to 2, and for total asset growth, from changing from the mean value to one standard deviation above the mean value.

	NAF	?	0.326*	0.042
			(3.02)	
Number of Total observations			6122	
Likelihood ratio χ^2			889.30	
Wald χ^2			737.99	
Pseudo R ²			0.249	

Panel b: Aggregated effects on estimated changes in probabilities³

	Change in probability
IntHL + NAF	0.125
IntHH + IntAS5_FAF	0.050

³ To appropriately assess the marginal effects of a change in our intervention effects, we have calculated the estimated change in probabilities while changing combinations of our indicator variables from 0 to 1. The first changes both IntHH and the NAF indicator variables from 0 to 1, the second changes both IntHH and IntH2H from 0 to 1, and the third estimates the change in probability while changing IntHH and IntAS5_FAF from 0 to 1.

Table 5
Impact of SOX Interventions on Audit Fee Changes¹

$$\begin{aligned}
 \text{AFchg\%} = & \alpha + \beta_1 \times \text{IntHL} + \beta_2 \times \text{IntHH} + \beta_3 \times \text{IntH2H} + \\
 & + \beta_4 \times \text{IntAS5_CAF} + \beta_5 \times \text{IntAS5_FAF} + \beta_6 \times \text{MWCY} \\
 & + \beta_7 \times \text{RESTATE} + \beta_7 \times \text{BIG8} + \beta_9 \times \text{AUDchg} \\
 & + \beta_{10} \times \text{LOSS} + \beta_{12} \times \text{TAgrow} + \beta_{12} \times \text{ACQPY} \\
 & + \beta_{13} \times \text{NAFYr1} + \beta_{14} \times \text{NAFYr2} + \beta_{15} \times \text{NAFYr3} \\
 & + \beta_{16} \times \text{NAFYr5} + \varepsilon.
 \end{aligned}$$

		Estimated Coefficients
Intercept		0.004 (0.87)
IntHL	?	0.078** (2.530)
IntHH	+	0.963*** (32.67)
IntH2H	+	0.425*** (5.08)
IntAS5_CAF	-	-0.050 (-1.23)
IntAS5_FAF	-	-0.369*** (-6.73)
MWCY	+	0.134*** (5.64)
RESTATE	+	0.133*** (5.28)
BIG8	+	0.054*** (3.01)
AUDchg	?	-0.007 (-0.328)
LOSS	+	0.021** (2.40)
TAgrow	+	0.202*** (20.00)
ACQ	+	0.101*** (3.11)
NAFYear1	?	0.223*** (7.08)
NAFYear2	?	0.182*** (5.87)
NAFYear3	?	0.131*** (4.25)

¹ All variables are defined as in Table 1.

NAFYear5	?	0.050 (1.59)
Number of total observations		6007
Adjusted R ²		0.279

Table 6
Analysis of Enhanced Financial Audit (EFA) Alternative

Panel A: Percentage of material weakness firms with “Material and/or numerous auditor/YE adjustments” (MNAdj)¹

	Year				
	2004	2005	2006	2007	2008
Non-accelerated filers					
Number of MW firms	48	91	94	234	206
% of MW firms	4.50%	8.50%	8.70%	21.70%	19.10%
% of MW w MNAdj	n/a	n/a	n/a	36.3%	30.6%
Continuing accelerated filers					
Number of MW firms	37	27	20	19	5**
% of MW firms	13.50%	9.80%	7.30%	6.90%	1.80%
% of MW w MNAdj	78.4%	66.7%	60.0%	63.2%	40.0%
First-time accelerated filers					
Number of MW firms	88	20	31	22	10
% of MW firms	23.50%	10.20%	16.60%	11.80%	16.40%
% of MW w MNAdj	53.4%	60.0%	58.1%	63.6%	70.0%

Panel B: First-time filers 2008

n = 61

SOX Mandated regimes:	2006	2007	2008
Number of MW firms	5	11	10
% of MW firms	8.20%	18.00%	16.40%
Number with "MNAdj" indicated	n/a	6	7
% of MW with MNAdj		54.50%	70.00%
Management effort	Low	High	High
ICFR audit effort	Low	Low	High
Audit fees (median)	\$106,454	\$175,000	\$304,000
% increase		9.41%	51.32%
Enhanced Financial Audits regime:			
Est % detected via enhanced financial audits (% MW firms x % MNAdj)		9.81%	11.48%
Management effort	Low	Low	Low
ICFR audit effort	Low	Low	Low

¹ *Audit Analytics* accumulates process aspects of material weaknesses disclosed by management or their auditors in a classification entitled “Internal Control Weaknesses.” One category within this classification is entitled “Material and/or numerous auditor/YE adjustments” (abbreviated MNAdj) and is coded as one if a firm discloses the presence of at least one such weakness.

xx,xxx = HL applied, xx,xxx = HH Applied, and xx,xxx = H2H applied.