Do SOX 404 Control Audits and Management Assessments Improve Internal Control System Quality?

Joseph H. Schroeder
Assistant Professor
Kelley School of Business
Indiana University
jhschroe@indiana.edu

Marcy L. Shepardson
Assistant Professor
Kelley School of Business
Indiana University
shepardm@indiana.edu

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ABSTRACT: We address whether SOX 404(b) internal control audits under two auditing standard regimes and SOX 404(a) management assessments are associated with improved internal control system quality, an important and largely unstudied potential benefit. In 2013, the PCAOB voiced concerns that fifteen percent of inspected control audits were ineffective, suggesting material weakness disclosures may provide poor estimates of actual internal control quality. We therefore use an indirect measure, differences in quarterly accruals quality, as our proxy for internal control quality because lasting internal control improvements should be exhibited in future, unaudited financial reports that are unaltered by contemporaneous financial statement audits. We find internal control audits initially provided internal control quality benefits. After the 2007 auditing standards change, internal control quality deteriorated for ICFR audited versus unaudited firms. Finally, we find little evidence that management assessments affect internal control quality. Results indicate recent PCAOB concerns may have merit.

Keywords: Internal control quality; SOX Section 404; Internal Control Audits; PCAOB Auditing Standard No. 5 (AS5)

Data Availability: Data are publicly available from the sources identified in the text.

I. INTRODUCTION

In this study, we address whether audits and management assessments of internal controls over financial reporting (ICFR) required by Section 404 of the Sarbanes-Oxley Act of 2002 (SOX) improve internal control system quality. Stakeholders and researchers continue to question whether benefits of ICFR audits justify high costs (e.g. Kinney and Shepardson 2011) and regulators and researchers alike have questioned whether control audits under the current auditing standard provide accurate material weakness disclosures (e.g. Rice and Weber 2012; SEC 2009; PCAOB 2013).[1] Thus, debates about the value of ICFR audits and management assessments continue. However, we believe that one important benefit, lasting improvements to internal control quality (ICQ), has been left largely unexplored. We proxy for differences in ICQ between accelerated and non-accelerated filers subject to different SOX 404 regimes using *unaudited*, quarterly accruals quality (QAQ) in periods subsequent to ICFR audits and management assessments.[2] By using quarterly, rather than annual, financial reports to estimate differences in accruals quality, we are able to disentangle period-specific improvements induced by the annual financial statement audit and test whether control audits and management assessments improve ICQ such that identifiable improvements in subsequent, unaudited QAQ can be found.

ICFR audits provide three primary potential benefits. First, auditors provide disclosures about material weaknesses in ICFR as of year-end – ICFR audits may improve disclosures. Second, ICFR audits enhance control risk assessments used to determine the amount of

[1] In a 2013 practice alert, the PCAOB voiced concerns that fifteen percent of 2010 inspected internal control audits were found to be ineffective, suggesting decreasing material weakness disclosure rates may be inaccurate estimates of actual control system quality (PCAOB 2013).

[2] Accelerated (non-accelerated) filers are firms with more than (less than) $75 million in public float as of the end of the second fiscal quarter.

substantive testing in the annual financial statement audit – ICFR audits may improve contemporaneous financial statement audits and thus annual financial reporting. Finally, ICFR audits lead to identification and remediation of deficiencies, in turn leading to potential lasting enhancements to control systems – control audits may improve ICQ. The first and second benefits are limited to the time period being audited, whereas the third relates to lasting enhancements to control systems, and thus has the potential to be a very important benefit of ICFR audits.

To measure ICQ, we would ideally obtain information about actual internal control quality, such as a listing of all existing weaknesses and associated magnitudes of potential errors. However, this information is not publically available, and only one study of which we are aware has used private, audit-firm data with this level of detail, and only for a small number of audits (Bedard and Graham 2011). Thus, true ICQ for all public firms is inherently unobservable. A related measure that provides some amount of information about ICQ is disclosures of material weaknesses in ICFR. However, material weakness disclosures are not an ideal measure to test if SOX 404 provisions have improved ICQ because (1) they represent only the most severe of internal control deficiencies and therefore do not present a complete picture of ICQ and (2) managers and auditors may not accurately disclose all existing material weaknesses, either because they are not identified, or they are identified but not disclosed (Ashbaugh-Skaife, Collins, and Kinney 2007). Because an accurate and complete, direct measure of ICQ does not exist, we use an indirect measure that infers differences in ICQ from differences in the unaudited financial reporting output of the control system.

We address our research question in three parts, in conjunction with changing ICFR-related regulatory regimes during the last decade. Our first objective is assessing initial effects of

SOX 404(b) audits on ICQ. There has been recent research about effects of other types of control audits on financial reporting quality from a study of FDICIA control audit requirements in the banking industry during the 1990s (Altamuro and Beatty 2010). However, FDICIA control audits are not equivalent to SOX-required ICFR audits and it is unclear whether results identified at privately-held banks could generalize to our sample and time period. Our first objective is to assess whether internal control audits under the original ICFR auditing standard, Auditing Standard No. 2 (AS2), improved ICQ relative to firms not subject to ICFR audits.

Our second objective relates to changes in auditing standards since the implementation of ICFR audits. In 2007, the PCAOB replaced AS2 with Auditing Standard No. 5 (AS5) with the goal of increasing ICFR audit efficiency and effectiveness (PCAOB 2007b). Regulators and researchers subsequently noted that the number of accelerated filers disclosing ineffective internal controls has decreased leading them to question if ICFR audits under AS5 have become *less* effective (e.g. SEC 2009; Rice and Weber 2012; PCAOB 2013). Our second objective is to assess whether there are ICQ differences between the AS2 and AS5 periods, as compared to firms without ICFR audits.

Our last objective relates to effects of management assessments on ICQ. Concurrent with the change from AS2 to AS5 for accelerated filers, in 2007 non-accelerated filers began providing Section 404(a) management assessments without concurrent audits of ICFR. Due to cost/benefit concerns, non-accelerated filers were subsequently exempted from SOX 404(b) (U.S. Congress 2010), and have been providing management assessments without a concurrent audit of ICFR since 2007.[3] Studies have suggested that managements' assessments combined

[3] Prior to the effective date of Section 404(a) for non-accelerated filers in 2007, non-accelerated filers were required to comply with Section 302 certifications and disclosures regarding internal controls over the financial reporting process. Section 302 is far less in scope than the management assessment requirements under Section 404(a).

with enhanced financial statement audit reporting might be a cost beneficial alternative to full scope ICFR audits (Kinney and Shepardson 2011; Kinney, Martin, and Shepardson 2013). Our last objective is to assess whether there are ICQ differences between a management assessment regime and one without management assessments.

To examine effects of SOX 404 provisions on ICQ we use a difference-in-differences design comparing accelerated and non-accelerated filers across two regime changes: (1) accelerated filer implementation of SOX 404(b) ICFR audits under AS2[4] in 2004 and (2) two contemporaneous changes of implementation of AS5 for accelerated filers (changing ICFR auditing standards) and SOX 404(a) for non-accelerated filers (requiring management assessments) in 2007.[5] The difference-in-differences design allows us to estimate differences in QAQ, our proxy for ICQ, across regime changes and removes biases related to permanent differences between accelerated and non-accelerated filers and related to time trends.

We measure ICQ using two QAQ measures: quarterly discretionary working capital accruals and quarterly accrual estimation error. We estimate quarterly discretionary working capital accruals using a modified Jones-model (Dechow, Sloan, and Sweeney 1995) that is adjusted for performance and growth consistent with the recommendations of Collins, Pungaliya, and Vigh (2012). Second, we estimate quarterly accrual estimation error using a model based on Dechow and Dichev (2002) which maps earnings into prior, current, and future cash flows.

We find that internal control audits under AS2 were associated with a larger improvement in QAQ between the unaudited and audited regime than non-accelerated filers with

[4] Throughout this study, we refer to this regime change as AS2 to refer to the accelerated filer implementation of ICFR audits under AS2. There was no concurrent change for non-accelerated filers.
[5] Throughout this study, we refer to this regime change as AS5/404(a) to refer to the accelerated filer implementation of AS5 and the concurrent implementation of 404(a) for non-accelerated filers.

no concurrent regime change; thus, audits improved accelerated filer ICQ relative to non-accelerated filers that were not subject to ICFR audits. Subsequent to the 2007 implementation of AS5 for accelerated filers and Section 404(a) for non-accelerated filers, accelerated filer QAQ decreased relative to non-accelerated filers. Further analysis suggests that the relative decrease in accelerated filers' QAQ is due to a decrease in quality for accelerated filers or changes related to AS5 rather than an increase for non-accelerated filers related to 404(a). This evidence is consistent with concerns that lower material weakness disclosure rates under AS5 are due to non-disclosure of existing weaknesses, or decreasing ICQ. Finally, we find little and limited evidence that Section 404(a) management assessments affect ICQ.

Our study contributes to prior literature identifying factors that affect disclosure of material weaknesses in internal control (e.g. Ge and McVay 2005; Ashbaugh-Skaife et al. 2007; Bedard and Graham 2011; Kinney and Shepardson 2011) and associating material weakness disclosures with outcomes such as annual financial reporting quality (Doyle, Ge, and McVay 2007; Ashbaugh-Skaife, Collins, Kinney, and LaFond 2008) and management forecasts (Feng, Li, and McVay 2009). We add to this literature by addressing whether audits and assessments have lasting effects on control system quality.

Second, our study contributes to recent and concurrent studies regarding the accuracy of material weakness disclosures. Recent research shows that audited firms are disclosing significantly less material weaknesses than exist using future restatements in accelerated filer samples (Rice and Weber 2012; Acito, Hogan and Imdieke 2014). In a concurrent study, Ge, McVay and Koester (2014) estimate approximately 42% more non-accelerated filers should be disclosing material weaknesses under SOX 404(a), but also conclude having an ICFR audit may not curtail the misreporting. We find evidence consistent with material weakness disclosures

becoming less accurate over time and management assessments alone not being as effective as those with concurrent ICFR audits.

Finally, our study contributes to the literature on the value of audits. Because financial statement audits have been required for all publicly traded firms in the U.S. since the 1930's, it is challenging to identify the value of financial statement auditing (ie, whether financial statement audits improve the financial statements being audited) using public firm data.[6] However, because there are a subset of firms not required to have ICFR audits, we are able to speak directly to whether audits of ICFR are associated with improved ICFR, thus providing evidence of the value of external audits.

This study proceeds as follows: in Section II, we develop hypotheses, in Section III we provide descriptive and univariate statistics, as well as develop our statistical methods, in Sections IV and V we provide results and sensitivity analyses, respectively, and in Section VI we conclude.

II. BACKGROUND AND HYPOTHESIS DEVELOPMENT

Primary Benefits of ICFR Audits and Management Assessments

The COSO Internal Control – Integrated Framework lists three primary objectives of internal controls: effectiveness and efficiency of operations, financial reporting objectives including reliability, timeliness, and transparency, and compliance with applicable laws and

[6] Barton and Waymire (2004) provide evidence in financial reporting quality improvements after the mandatory audit requirements of the Securities and Exchange Act of 1934; however, many aspects of business and financial regulatory environment have changed significantly over the past 80 years. Marshall, Schroeder and Yohn (2014) provide evidence that complete audits as of the earnings announcement date are associated with lower information asymmetry and increased value relevance of the earnings announcement disclosure suggesting the equity market values audited disclosures. However, these studies do not document long-lasting accounting quality improvements derived by the external audit.

regulations (COSO 2013). SOX-based audits and management assessments required under Sections 404(b) and 404(a), respectively, relate to internal controls over financial reporting (the second COSO objective listed above), and thus are focused on those internal controls that affect the outputs of the accounting and control system, the financial statements. Audits and management assessments of ICFR provide three primary benefits to stakeholders: public disclosures about whether they identified any material weaknesses in internal controls, improved reliability of contemporaneous financial reports, and improved overall quality of the internal control system leading to lasting improvements in the reliability of financial reports.

[INSERT FIGURE 1]

Prior research has addressed determinants of material weakness disclosures and find that initial audits and management assessments led to a larger percentage of small firms disclosing material weaknesses than regimes without audits or management assessments (Kinney and Shepardson 2011) and audits lead to identification of more control deficiencies – not limited to publicly disclosed material weaknesses (Bedard and Graham 2011). Thus, audits identify more deficiencies, but these studies do not address the accuracy of material weakness disclosures. More recently, Ge et al. (2014) conclude that approximately 42% more firms should be disclosing ineffective internal controls than are disclosed in unaudited management assessment reports but also conclude that an audit of ICFR likely would not correct the problem. Thus, while it appears that audits of ICFR initially led to the identification and disclosure of more material weaknesses than a regime without audits, material weakness disclosures by non-accelerated and small accelerated filers appear to not be reporting all existing material weaknesses and thus may not provide a good estimate of the actual existence of material weaknesses in ICFR.

The next benefit of audits and management assessments is higher quality contemporaneous financial reporting. There are two ways in which audits and management assessments might improve contemporaneous financial reporting: (1) deficiencies might be identified and remediated prior to year end and (2) identification of deficiencies may lead to more accurate estimates of control risk which is a determining factor in the amount of substantive testing the financial statement auditor performs (Hogan and Wilkins 2008). Prior research has found a positive association between material weakness disclosures and the quality of contemporaneous, audited annual financial statements. Ashbaugh-Skaife et al. (2008) find that annual accruals quality improves subsequent to the remediation of a material weakness. Doyle et al. (2007) find entity-level material weaknesses are associated with lower quality accruals. Thus, audited financial statements of firms with no concurrent material weaknesses have been found to be higher quality than those of material weakness firms. However, financial statements issued contemporaneously with audited material weakness disclosures are affected by both the ICFR and the financial statement audits, and thus are not an ideal setting for assessing effects of the ICFR audit alone on ICQ.

The third potential benefit, the focus of this study, is lasting improvements to the underlying internal control system of the firm. Firms are required to identify and disclose material weaknesses in ICFR (PCAOB 2007a), but audits also identify less important control deficiencies and significant deficiencies that also likely affect financial reporting quality (Bedard and Graham 2011). When firms identify and remediate deficiencies of any level of severity, thus improving ICQ, future financial reporting outputs derived using those improved controls should be of higher quality. Because there is no accurate, observable measure of ICQ, we infer improvements in ICQ by measuring lasting effects on unaudited, quarterly financial reports, via

differences in quarterly accrual quality. It is important to use unaudited QAQ because the financial statement auditor assesses the quality of internal controls and modifies their financial statement auditing procedures accordingly, thus improving annual accrual quality. We are interested in the quality of underlying ICQ, and thus we proxy for ICQ using QAQ. Improved QAQ is only one potential secondary benefit of improved ICQ. Better internal reports, management forecasts (Feng et. al 2009), efficiency of operations, and capital market effects are additional potential secondary benefits of SOX 404 requirements if they in fact improve ICQ. Thus, we believe that this benefit of control audits and management assessments has the potential to be extremely important to stakeholders.

Hypotheses

Initial ICFR Audits under Auditing Standard No. 2

Accelerated filers are currently subject to two audit requirements. Under the Securities Act of 1934, all publicly traded corporations are required to have an audit of their financial statements, the output of the accounting control system, on an annual basis. Accelerated filer compliance with SOX 404 began in 2004, when firms began making and disclosing results of management's annual assessment of the effectiveness of ICFR (SOX 404(a)) and auditors began performing audits of ICFR (SOX 404(b)), implemented using AS2. AS2 directed auditors to perform procedures to identify material weaknesses in ICFR, and has been said to have led to excessive amounts of process-level testing (Kinney et al. 2013). Thus, effective for years ending on or after November 15, 2004, accelerated filers are required to have an audit of the internal controls over the financial reporting system (the *process*), as well as an audit of the financial statements themselves (the *output*). The ICFR and financial statement audits provide assurance

over the financial reporting process and output, respectively, and are currently performed as an integrated audit in the U.S. for accelerated filers.

Using proprietary audit firm data, Bedard and Graham (2011) provide evidence that 84.3 (72.1) percent of material weaknesses (total control deficiencies) were identified by the auditor, indicating that an internal control audit is important for material weakness identification and thus ICQ improvement. Kinney & Shepardson (2011) also note that having an audit of ICFR is associated with an increased likelihood of disclosing a material weakness in internal control. Both of these studies link auditors to the identification of control weaknesses, but neither addresses effects of ICFR auditing on the quality of the financial control system output, quarterly or otherwise.

Our first research question relates to whether mandated audits of ICFR under AS2 lead to lasting improvements to ICQ, as proxied by QAQ. Audits of ICFR should lead to the identification of deficiencies in internal control, thus leading to remediation of deficiencies and improved ICQ, in turn leading to higher quality and more reliable financial reporting. However, because the SEC does not require remediation and identification of deficiencies as of the audit report date may only lead to enhancements in reporting as of that date, whether increased identification of control deficiencies of all levels of severity leads to lasting ICQ improvement is an empirical question. Because prior research links audits to the identification of control weaknesses, whose remediation should in turn lead to improved ICQ and better QAQ, we state our first hypothesis in alternative form:

> H1: Differences in internal control quality between an unaudited and audited regime will be larger than for firms with no auditing regime change.

2007 Implementation of Auditing Standard No. 5

In 2007, the PCAOB issued Auditing Standard No. 5 (AS5). This standard superceded AS2 which was deemed by many to be extremely costly to implement (e.g. Raghunandan and Rama 2006; Kinney and Shepardson 2011). Reasons cited for the high implementation cost relate to excessive process level testing which inflated time spent on engagements (and thus audit fees). As such, AS5 focuses auditors on a top-down approach, intended to "both increase the likelihood that material weaknesses in companies' internal control will be found before they cause material misstatement of the financial statements and steer the auditor away from procedures that are not necessary to achieve the intended benefits" (PCAOB 2007b).

Material weakness disclosure rates for sample firms with audits of ICFR decreased from 13 percent in 2005 to approximately 3 percent in 2011, subsequent to the implementation of AS5 (see Panel A of Table 2). Disclosure of material weaknesses is a function of the incidence of material weakness, auditor identification, and disclosure incentives (Ashbaugh-Skaife et al. 2007). While some might argue the post-2007 decrease in material weakness rates is due to decreased incidence of material weaknesses, others suggest the decrease may be due to a lower rate of identification and/or disclosure of existing material weaknesses (e.g. SEC 2009), or a less effective ICFR audit (PCAOB 2013). Rice and Weber (2012) study the likelihood of restating firms providing material weakness disclosures during the originally reported restatement period and find that only 32.4 percent of firms that subsequently restated their financial information disclosed material weaknesses during the restatement period, suggesting that auditors are not identifying or requiring disclosure of existing weaknesses.

Identification of increasing QAQ in the post 2007 time period, as compared to firms without ICFR audits, while material weakness rates are declining would provide evidence that

the underlying rate of control deficiencies is decreasing, or ICQ is improving. Unchanged or deteriorating QAQ in the post 2007 time period would suggest that the incidence of control deficiencies is remaining the same or increasing, and that the rate of identification or disclosure is decreasing. We state our second hypothesis (in null form) as follows:

> H2: Differences in internal control quality between Auditing Standard No. 2 and Auditing Standard No. 5 will not differ from firms with no auditing regime change.

Management Assessments of ICFR

With respect to smaller firms, in 2007 non-accelerated filers began complying with Section 404(a), completing management assessments of ICFR without a concurrent ICFR audit. Prior to 2007, non-accelerated filers were only required to provide Section 302 certifications regarding the existence and effectiveness of disclosure controls. The effort required for these certifications is far less in scope than effort related to management assessments under Section 404(a). Due to concerns about placing an undue cost burden on the smallest of public firms, implementation of 404(b) for non-accelerated filers was deferred six times until 2010 when Congress, under the Dodd-Frank Wall Street Reform and Consumer Protection Act, granted a permanent exemption for non-accelerated filers (U.S. Congress 2010).

Similar to audits of ICFR, the incremental effort required of managers in performing management's assessment of ICFR should lead to the identification and remediation of more deficiencies than under a regime without management assessments. Thus, ICQ should be enhanced with the implementation of SOX 404(a) over a no management assessment regime. However, because (for non-accelerated filers) management assessments are performed without a concurrent audit of ICFR, management assessments may not be an effective mechanism for identifying weaknesses or for improving ICQ. Additionally, our assessment of SOX 404(a) is

based on non-accelerated filer implementation. Non-accelerated filers are very small firms, having typically limited capital with which to enhance control systems. Thus, in these firms, it is less likely that the identification of control deficiencies will lead to what may be costly remediation of weaknesses in ICFR. If non-accelerated filers do not remediate weaknesses in ICFR, we should not identify an association between management assessments and ICQ (Hammersley et al. 2012).

Because of our belief that the incremental effort exerted to comply with SOX 404(a) should lead to increased identification and remediation of at least some deficiencies in internal control, we state our third hypothesis in alternative form:

> H3: Management assessments of internal controls over financial reporting are associated with higher internal control quality than a regime without management assessments.

III. METHODOLOGY AND SAMPLE

To examine effects of ICFR audits and management assessments on internal control quality, we use a difference-in-differences research design comparing quarterly accruals quality, our proxy for ICQ, for accelerated and non-accelerated filers across two different regime changes: (1) accelerated filer implementation of Section 404(b) internal control audits under AS2 and (2) the contemporaneous change in regulations related to AS5 for accelerated filers (reducing internal control audit requirements) and Section 404(a) management assessments for non-accelerated filers. The difference-in-differences design allows us to estimate differences in QAQ across regimes and removes biases related to permanent differences between accelerated and non-accelerated filers and related to time trends. Permanent differences are important because accelerated filers may display different firm characteristics than non-accelerated filers

and controlling for time trends is also important because of macroeconomic events occurring concurrently with the period of our study.

Measures of Internal Control Quality

Extant research on internal controls and contemporaneous financial reporting quality has used various proxies for financial reporting quality, including accruals quality measures (Ashbaugh-Skaife et al. 2008; Doyle et a. 2007), future restatements (Rice and Weber 2012), propensity to meet or beat earnings targets, and earnings persistence (Altamuro and Beatty 2010). We use two accruals measures to proxy for control system quality: quarterly discretionary working capital accruals, a quarterly modified Jones-model following Collins et al. (2012), and quarterly accrual estimation error developed in Dechow and Dichev (2002) and modified into a quarterly setting by Dhaliwal, Naiker, and Navissi (2010).

Quarterly Discretionary Working Capital Accruals

The first accruals quality measure is quarterly discretionary working capital accruals (*QAQ_DISC*), which is approximated by the residuals from a quarterly cross-sectional modified Jones-model, shown in equation (1) below. Jones-type models are typically used to derive measures of earnings management, therefore decreases in discretionary accruals would suggest ICFR audits and assessments improve ICQ through enhanced controls over intentional error (Jones 1991). The model specification is adapted from Collins et al. (2012) and includes measures of firm performance (*ROA*) and growth (*SGROWTH*), as well as asymmetric timeliness of gains and losses (*CFO*, *DCFO* and *DCFO*CFO*) as recommended by Ball and Shivakumar (2006).[7] We also control for fiscal quarter in order to control for seasonality effects. The model

[7] Collins et al. (2012) excludes the performance and growth variables from the first stage model. Instead, they adjust the residuals from the first stage model by matching the observation with the closest observation from the same 2-digit SIC code, calendar year, quarter, *ROA* quintile with the closest sales growth number. Per Acito (2013) matching the residuals on *ROA* and *SGROWTH* results in error in abnormal accrual measurement and increases the

is estimated cross-sectionally for each 2-digit SIC code calendar quarter combination that has at least 20 observations. The accrual model specification is as follows with variable definitions below.

$$WCA_{it} = \alpha_1 Q1_{it} + \alpha_2 Q2_{it} + \alpha_3 Q3_{it} + \alpha_4 Q4_{it} + \alpha_5(1/ASSETS_{it}) + \alpha_6(\Delta REV_{it} - \Delta AR_{it}) + \alpha_7 WCA_{it-4} + \alpha_8 ROA_{it-4} + \alpha_9 SGROWTH_{it} + \alpha_{10} CFO_{it} + \alpha_{11} DCFO_{it} + \alpha_{12} DCFO*CFO_{it} + \varepsilon_{it} \quad (1)$$

Where

WCA	Working capital accruals calculated as net income before extraordinary items (icby) plus depreciation expense (dpcy) less operating cash flows (oancfy) scaled by assets (atq). Variables adjusted to reflect three month period;
QX	Indicator variable equal to one if the observation is from fiscal quarter X and zero otherwise, where X is equal to the fiscal quarter;
ASSETS	Beginning of the quarter total assets (atq);
ΔREV	Change in revenue (revtq) from quarter t-1 to quarter t scaled by assets;
ΔAR	Change in accounts receivable (rectq) from quarter t-1 to quarter t scaled by assets;
ROA	Earnings before extraordinary items (ibcy) scaled by assets. Variable adjusted to reflect three month period;
SGROWTH	Change in revenue from quarter t-4 to quarter t scaled by revenue in quarter t-4;
CFO	Cash flow from operations (oancfy) scaled by assets. Variable adjusted to reflect three month period;
DCFO	Indicator variable equal to 1 if cash flow from operations is less than zero; and 0 otherwise.

Quarterly Accrual Estimation Error

The second accruals quality measure (*QAQ_NOISE*) is calculated as the firm-specific standard deviation of the residuals from a regression of current period working capital accruals on prior, current, and future cash flows (Dechow and Dichev 2002). Estimation error is a measure of the variability of accruals which would be associated with both intentional and

standard deviation of abnormal accrual estimates by approximately 40 percent (see Collins et al. 2012). See Section IV for discussion of sensitivity results that match the residuals on performance and growth.

unintentional error, therefore differences in *QAQ_NOISE* would suggest effects from controls over unintentional and/or intentional error. We again include controls for conditional conservatism (Ball and Shivakumar 2006). We also control for fiscal quarter in order to control for seasonality effects due to the quarterly nature of our data, (Dhaliwal et al. 2010). *QAQ_NOISE* is measured as the standard deviation of the residuals over the previous eight to twelve, non-year end quarters. A higher standard deviation indicates greater "noise" or less precise estimates, and is therefore negatively associated with ICQ. The model is estimated by firm for as many prior quarterly observations as available on *Compustat Quarterly*. The model specification is as follows (variable definitions remain the same as the previous model):

$$WCA_{it} = \alpha_1 Q1_{it} + \alpha_2 Q2_{it} + \alpha_3 Q3_{it} + \alpha_4 Q4_{it} + \alpha_5 CFO_{it} + \alpha_6 CFO_{it-1} + \alpha_7 CFO_{it+1} + \alpha_8 DCFO_{it} + \alpha_9 DCFO_{it} * CFO_{it} + \alpha_{10} \Delta REV_{it} + \varepsilon_{it} \quad (2)$$

Empirical Models

We utilize a difference-in-differences regression design that compares accelerated and non-accelerated filers across the two regime changes. This design allows us to benchmark QAQ differences between accelerated and non-accelerated filers during the three regime periods (pre-AS2, AS2, and AS5/404(a)) to see how ICFR audits and management assessments under different regulations and standards impact differences in QAQ between the filer groups. Below is the model specification with variable definitions found in the Appendix:

$$\begin{aligned} QAQ\_DISC/QAQ\_NOISE_{i,t} = {} & \beta_0 + \beta_1 AF_{i,t} + \beta_2 RegChg_{i,t} + \beta_3 AF * RegChg_{i,t} + \beta_4 MW_{i,t} + \\ & \beta_5 LNBSEG_{i,t} + \beta_6 FOREIGN_{i,t} + \beta_7 GROWTH_{i,t} + \beta_8 ARINV_{i,t} + \\ & \beta_9 M\&A_{i,t} + \beta_{10} RESTRUCTURE_{i,t} + \beta_{11} STD\_CFO_{i,t} + \\ & \beta_{12} STD\_SALES_{i,t} + \beta_{13} OP\_CYCLE_{i,t} + \beta_{14} INT\_INTENSITY_{i,t} + \\ & \beta_{15} NO\_INT_{i,t} + \beta_{16} CAP\_INTENSITY_{i,t} + \beta_{17} SIZE_{i,t} + \beta_{18} \%LOSS_{i,t} + \\ & \beta_{19} ZMIJ\_SHUM_{i,t} + \beta_{20} MBR_{i,t} + \beta_{21} BIGN_{i,t} + \beta_{22} LNFEES_{i,t} + \\ & Quarter\ Fixed\ Effects + Year\ Fixed\ Effects + Industry\ Fixed\ Effects \\ & + \varepsilon_{i,t} \end{aligned} \quad (3)$$

We estimate two iterations of the above model with different sample periods capturing the two regime changes. The first iteration uses a sample from January 1, 2001 to November 14, 2007 and captures the regime change that relates to first-time accelerated filer implementation of ICFR audits under AS2, effective for fiscal years ending on or after November 15, 2004. In this iteration, *AS2* (represented as *RegChg* in equation (3) above) takes the value of 1 if the observation is in the AS2 period (November 15, 2004 to November 14, 2007) and 0 if in the pre-AS2 period (January 1, 2001 to November 14, 2004).

Recall that H1 predicts ICQ differences for accelerated filers between the unaudited and audited regime will be higher than non-accelerated filer differences experiencing no regime change. Consequently, we expect a negative coefficient on *AF*AS2* indicating that QAQ is improving at a higher rate for accelerated filers compared to non-accelerated filers. The coefficient on *AF* provides a benchmark comparison of QAQ differences between accelerated and non-accelerated filers during the period when ICFR audits were not required for all filers.

The second iteration uses a sample of observations from the period November 15, 2004 to December 31, 2011[8] and captures two contemporaneous regime changes, both effective November 15, 2007: implementation of AS5 for accelerated filers (reducing ICFR auditing requirements) and Section 404(a) for non-accelerated filers (requiring management assessments). *AS5/404(a)* (represented as *RegChg* in equation (3) above) in this iteration takes the value of 1 if the observation is in the AS5/404(a) period (November 15, 2007 to December 31, 2011) and 0 if in the AS2 period (November 15, 2004 to November 14, 2007).

[8] Also, during this period the most recent economic recession occurred, which according to the National Bureau of Economic Research, from December 2007 to June 2009 (see http://www.nber.org/cycles.html). The use of the difference-in-differences design helps rule out concerns of the confounding effect of the economic recession as there is little reason to believe the recession would impact accelerated filers differently than non-accelerated filers.

H2 addresses differences in ICQ between AS5 and AS2 for accelerated filers as compared to non-accelerated filers with no audit requirements. AS5 reduced ICFR audit requirements for accelerated filers. Consequently, there may have been a reduction in the auditor's ability to detect control deficiencies, thereby decreasing QAQ (identification hypothesis). However, if AS5 is performing as the PCAOB intended, AS5 may have a positive effect as ICQ is of higher quality (incidence hypothesis). Regarding the identification (incidence) hypothesis, we would expect the coefficient on *AF*AS5/404(a)* to be positive (negative) consistent with QAQ decreasing (increasing) at a higher rate for accelerated filers compared to non-accelerated filers.

H3 predicts that management assessments will have a positive association with ICQ, which we evaluate by separately estimating the above regression for the non-accelerated filer sample during the pre/post-404(a) period. To the extent that management assessments of internal controls have a positive effect on ICQ, we would expect the coefficient on *AS5/404(a)* to be negative and significant indicating QAQ is higher during the post-404(a) period. This additional analysis also allows us to further interpret the findings of H2 to determine if differences between periods were attributable specifically to AS5, 404(a), or a combination of the two.

Control Variables

We include measures to control for firm-specific operating characteristics that have been shown in prior studies to be determinants of discretionary accruals and accrual estimation error (Becker, DeFond, Jiambalvo, and Subramanyam 1998; Dechow and Dichev 2002; Dechow et al. 1995; Francis LaFond, Olsson, and Schipper 1999; Francis, LaFond, Olsson, and Schipper 2004; Kothari, Leone, and Wasley 2005; Ashbaugh-Skaife et al. 2008).

We control for management or auditor material weakness disclosures under SOX 404(b), 404(a), or 302. A material weakness disclosure indicates that the internal control system would be unable to prevent a material misstatement to the financial statements (PCAOB 2007a). Using *Audit Analytics*, we identify management disclosures for each quarter and management and auditor disclosures (when applicable) for each year in our sample period, and create an indicator variable (*MW*) that takes the value of 1 if the firm discloses a material weakness at year-end or during the specific quarter in question and 0 otherwise.[9]

More complex firms have been posited to have higher quality accruals due to less volatile operations; however, other studies argue that greater complexity results in larger discretionary accruals due to increased accounting complexity. We control for complexity using the log of the number of business segments reported in the 10-Q (*LNBSEG*) and an indicator variable capturing whether the firm has foreign operations (*FOREIGN*).

High growth firms are likely to have noisier and larger accruals due to the nature of their operations and up-front investments necessary for future revenue growth. We include two measures of growth to control for the effect on accruals quality: three year average of asset growth (*GROWTH*) and total accounts receivable and inventory scaled by total assets (*ARINV*). We include two indicator variables that capture mergers and acquisitions (*M&A*) and/or restructuring (*RESTRUCTURE*) activities during the past three years because firms with these transactions are likely to have larger discretionary accruals. Volatile operations may increase accrual estimation errors. Therefore, we include the standard deviation of operating cash flows (*STD_CFO*) and the standard deviation of sales (*STD_SALES*).

[9] To classify material weakness disclosures as of year-end, we first use Section 404(b) audit opinions, followed by Section 404(a) management reports, and finally Section 302 certifications. All disclosures are available in the Audit Analytics database.

We include the natural log of the firm's operating cycle (*OP_CYCLE*), to control for the speed by which accruals are realized in cash flows (Dechow and Dichev 2002; Dhaliwal et al. 2010). We include measures of a firm's intangible (*INT_INTENSITY* and *NO_INT*) and tangible (*CAP_INTENSITY*) investment to control for the firm's asset structure and the likelihood of large accrual adjustments due to differences in measurement and recognition of intangible and tangible assets (Francis et al. 2005).

We include the natural log of total assets (*SIZE*) to control for firm size because prior studies posit that larger firms have higher accruals quality due to more stable and predictable operations. Furthermore, firms with negative earnings are likely to have low accruals quality due to negative shocks in the operating environment and distressed firms are more likely to have low quality accruals; we thus control for percentage of loss periods during the current and previous four quarters (*%LOSS*), and the Zmijewski financial distress measure (*ZMIJ_SHUM*) (Shumway 2001). We also include the market-to-book ratio (*MBR*) to control for the impact of accounting conservatism.

Finally, audit firm characteristics could also impact accruals quality. Larger audit firms typically serve larger clients (Craswell, Francis, and Taylor 1995; Francis and Wilson 1988) and financial information quality differs between large clients and small clients (Becker et al. 1998; Francis et al. 1999; Reynolds and Francis 2000). We include an indicator measure (*BIGN*) that takes the value of 1 if the firm is audited by a Big 4 audit firm and 0 otherwise. Furthermore, audit firms expend greater effort and adjust their fees for higher inherent risk associated with firms reporting larger abnormal accruals (Hogan and Wilkins 2008). Accordingly, we include the natural log of total audit fees (*LNFEES*).We finally include fiscal quarter, year, and industry (2-digit SIC code) fixed effects.

Sample Selection

Table 1 presents the details of the sample selection for the study. We begin by identifying all U.S. quarterly observations from the *Compustat* Quarterly file for Q1 to Q3 fiscal periods ending after January 1, 2001 to November 14, 2004 (November 15, 2004 to December 31, 2011), for a total of 213,072 (185,546) observations. We exclude Q4 observations as this quarter is subject to financial statement audit. We lose 65,100 (51,496) observations when merging with *Audit Analytics*. We exclude 39,943 (39,870) financial firm observations (i.e. SIC code 6000 to 6999) given their unique regulatory requirements. We lose 47,561 (38,030) observations due to missing variables. This results in a final sample of 60,468 (56,150) firm-quarter observations available for the analysis using the modified Jones-model. The final sample available for quarterly accrual estimation error (*QAQ_NOISE*) follows a similar process and is 60,660 (56,683).

[INSERT TABLE 1]

IV. RESULTS

Descriptive Statistics

Table 2 presents descriptive statistics for the variables used in the multivariate analyses. Panel A provides the means for material weakness disclosures (MW) for 2003 to 2011 separated by accelerated and non-accelerated filer status. We also provide the quarterly 302 material weakness disclosures (for Q1 to Q3) and annual 404(a)/404(b) material weakness disclosures for comparison purposes. Years 2001 and 2002 are not presented because there were no material weakness disclosure requirements during those years. Consistent with recent trends, we find that accelerated filer material weakness disclosures have steadily declined from a high of 13.22 percent during 2005 to a low of 3.36 percent during 2011. The disclosure rate drops considerably

starting in 2007 and 2008 with 7.93 and 4.98 percent respectively, compared to 10.18 percent in 2006, which coincides with the AS5 effective date of November 15, 2007. Disclosure rates for quarterly 302 certification and 404 assessments are consistent for accelerated filers likely due to the nature of integrated audits during the year.

[INSERT TABLE 2]

Non-accelerated filers were subject to 302 certifications for Q4 for the years 2003 to 2006 and annual 404(a) management assessments starting in 2007. From 2003 to 2006 material weakness disclosures under Section 302 ranged from a low of 2 percent in 2003 to a high of 13.08 percent in 2006. Consistent with the more stringent requirements of 404(a) management assessments, the rate spikes considerably starting in 2007 to a high of 20.51 percent and continues to be higher ranging from 14.8 to 19.7 percent during the period 2008 to 2011. A comparison of 302 quarterly material weakness disclosure rates to annual disclosure rates (both 302 and 404(a)) indicates a considerably higher disclosure rate during year-end. This suggests that the year-end financial statement audit has spillover effects on year-end, unaudited, material weakness disclosure rates, which are not as pronounced during the quarters (Kinney and Shepardson 2011).

Panel B of Table 2 provides descriptive statistics for the dependent and control variables used in the multivariate analyses separated into the pre-AS2, AS2, and AS5/404(a) periods for accelerated and non-accelerated filers. The samples for the discretionary accruals model are reported; however, the estimation error sample is qualitatively similar. Consistent with annual accrual studies, both quarterly accruals quality measures are lower for the accelerated filers compared to the non-accelerated filers in all three regimes. QAQ for the accelerated filers is consistent across the regime periods, despite the fact that there were changing economic

conditions. The non-accelerated filer accruals measures are highest during the AS2 regime and lower during the AS5/404(a) regime. Many of the control variables differ necessitating controlling for these factors in multivariate models.

Table 3 provides the Pearson correlation matrix for the variables used in our multivariate models for the pre/post-AS5/404(a) period. We do not tabulate the pre/post-AS2 correlation matrix, but the results are qualitatively similar to the pre/post-AS5/404(a) period. Consistent with annual accruals studies, firms that disclose a material weakness (*MW*) are positive and significantly correlated with our quarterly accruals measures (0.104 for *QAQ_DISC* and 0.139 for *QAQ_NOISE*) suggesting lower quarterly accruals quality. The measure capturing the internal control audit requirement (*AF*) is negative and significantly correlated with *QAQ_DISC* (-0.260) and *QAQ_NOISE* (-0.362) suggesting that accelerated filers compared to non-accelerated filers have higher QAQ. Finally, the correlation between the *AS5/404(a)* indicator variable and the two accrual measures is negative and significant (-0.024 for *QAQ_DISC* and -0.048 for *QAQ_NOISE*) suggesting an improvement in QAQ during the AS5/404(a) period.

[INSERT TABLE 3]

Multivariate Results

Table 4 includes the results of the quarterly accruals analyses for the AS2 and AS5/404(a) regime changes. Panel A and Panel B present results using the quarterly discretionary accruals measure (*QAQ_DISC*) and the accruals estimation error measure (*QAQ_NOISE*), respectively. Columns (1) and (3) include only the accelerated filer indicator variable (*AF*) to compare differences across the entire AS2 and AS5/404(a) periods, respectively. Columns (2) and (4) present the difference-in-differences results for the AS2 and AS5/404(a)

analyses, respectively. For brevity, we discuss the results of the *QAQ_DISC* and *QAQ_NOISE* models jointly and note any differences.

[INSERT TABLE 4]

AS2 Analysis

Column (1) includes the *AF* indicator variable capturing differences in QAQ for accelerated and non-accelerated filers for the entire period from January 1, 2001 to November 14, 2007. The coefficient on *AF* in both the *QAQ_DISC* and *QAQ_NOISE* iterations is positive; however, it is not statistically significant indicating there was no difference in QAQ for the entire sample period. Column (2) provides the difference-in-differences results comparing differences between accelerated and non-accelerated filers across the AS2 regime change. The coefficient on *AF* is positive and statistically significant in the *QAQ_DISC* model ($p = 0.032$), but is not statistically significant in the *QAQ_NOISE* model ($p = 0.242$). Recall that discretionary accruals proxy for intentional earnings management, while accruals estimation error captures both intentional and unintentional error. This would suggest during the pre-AS2 benchmark period there was no difference in ICQ between accelerated and non-accelerated filers regarding unintentional errors, but accelerated filers were more likely to have control weaknesses allowing intentional errors.

The coefficient on *AF*AS2* measures the incremental impact of AS2 ICFR audits on accelerated filers as compared to non-accelerated filers without ICFR audit. Consistent with the predictions of H1, we find negative and significant coefficients on *AF*AS2* ($p < 0.01$ in *QAQ_DISC* model and $p = 0.065$ in *QAQ_NOISE* model). This suggests that control system quality for accelerated filers that were subject to ICFR audits and management assessments

improved at a higher rate from the pre-AS2 to the AS2 periods compared to non-accelerated filers that were exempt from Section 404 requirements during both periods.

AS5/404(a) Analysis

Column (3) compares accelerated and non-accelerated filers for the entire AS2 and AS5/404(a) periods from November 15, 2004 to December 31, 2011. The coefficient on *AF* in both the *QAQ_DISC* and *QAQ_NOISE* iterations is negative; however, it is not statistically significant indicating there was no difference in accruals quality between filer types for the entire sample period. To capture the impact of the concurrent events of AS5 and 404(a), Column (4) provides the difference-in-differences results comparing accelerated and non-accelerated filers across the regime change. Consistent with the AS2 iteration, the coefficient on *AF* is negative and significant ($p < 0.01$ in the *QAQ_DISC* model and $p = 0.092$ in the *QAQ_NOISE* model) indicating accelerated filers had lower QAQ compared to non-accelerated filers during the AS2 regime.

The coefficient on *AF*AS5/404(a)* captures the differential impact of the concurrent events of AS5 and Section 404(a) on QAQ for accelerated vs. non-accelerated filers. Recall that H2 does not make a directional prediction as to whether AS5 internal control audits affect QAQ differently than AS2 audits and can have either a diminishing effect (identification hypothesis) or an increasing effect (incidence hypothesis). We find a positive and significant coefficient on *AF*AS5/404(a)* ($p < 0.01$ in the *QAQ_DISC* model and $p = 0.026$ in the *QAQ_NOISE* model), consistent with the identification hypothesis, indicating that accelerated filer ICQ is diminishing at a higher rate than non-accelerated filers during the AS5/404(a) period. This is consistent with fewer existing material weaknesses being identified or disclosed in the AS5 period than the AS2 period, for accelerated filers.

Additional Analyses for H2 and H3

AS5 and Section 404(a) implementation for accelerated and non-accelerated filers, respectively, occurred simultaneously in 2007. Consequently, further analysis is necessary to determine if AS5, Section 404(a) or a combination of the two regulatory changes resulted in the change in the relationship between internal control requirements and ICQ across filer groups. Table 5 presents the results of the additional analyses. Columns (1) and (2) [Columns (3) and (4)] present the results of the accelerated filer [non-accelerated filer] subsample using the discretionary accrual (*QAQ_DISC*) and accrual estimation error (*QAQ_NOISE*) measures, respectively. The variable of interest is the *AS5/404(a)* indicator variable that captures the difference between accruals pre and post AS5 and Section 404(a) for the accelerated and non-accelerated subsamples, respectively.

[INSERT TABLE 5]

Per the results of the quarterly discretionary accrual model presented in Column (1), the *AS5/404(a)* coefficient is positive and significant ($p < 0.01$). However, per the results of the accrual estimation error model in Column (2), the coefficient on *AS5/404(a)* is not statistically significant. This indicates accelerated filer discretionary QAQ was lower during the AS5 period than the AS2 period, however, accrual estimation error was no different between the two periods. This provides partial evidence that AS5 may have unintentionally resulted in lower ICQ due to reduced requirements to comply with Section 404(b) audits and may be specifically related to worsening controls over intentional error.

The non-accelerated filer subsample also allows us to examine H3, which predicts a positive association between Section 404(a) management assessments and ICQ. Contrary to the prediction of H3, the results of the non-accelerated filer subsample in Columns (3) and (4)

suggest that Section 404(a) had no effect on QAQ. Although there has been an increase in material weakness disclosures for non-accelerated filers subsequent to the effective date of Section 404(a), it appears QAQ remained unchanged when Section 404(a) went into effect.

The results taken together indicate that the main finding in Column (4) of Table 4 is largely attributable to decreasing QAQ, or decreasing internal control quality, due to the enactment of AS5 by accelerated filers rather than increasing QAQ for non-accelerated filers due to 404(a). This suggests that during the AS5/Section 404(a) period, the lower incidence of material weakness disclosures is largely due to *lack of identification or disclosure* of existing weaknesses. Furthermore, it suggests that SOX 404(a) management assessments are not associated with higher quality control systems.

Additional Analysis – Annual Accruals Measures

We believe examining the impact of ICFR audits on unaudited, quarterly financial reporting measures provides the strongest setting to evaluate the impact of SOX 404 on the control system without confounding effects of year-end audits. However, utilizing a difference-in-differences design allows us to parse out effects of substantive audits, potentially allowing us to capture the impact of the ICFR audit on annual accruals measures. Furthermore, given prior research has not examined the impact of ICFR audits on annual accruals quality, we duplicate our analyses using annualized versions of the accruals measures.

To calculate annual discretionary accruals, we adapt equation (1) by excluding the fiscal quarter dummies and estimating the model cross-sectionally for each 2-digit SIC code calendar year combination that has at least 20 observations. To calculate annual accrual estimation error, we adapt equation (2) by excluding the fiscal quarter dummies from the model. We estimate the

model for each firm that has at least 4 years of data in order to obtain residuals necessary to compute standard deviations.

Panel A of Table 6 provides the results of the annual discretionary working capital accrual analyses. We find results qualitatively consistent with the quarterly analyses reported in Panel A of Table 4. Panel B of Table 6 presents the results using the annual accrual estimation error measure. The AS2 difference-in-differences results reported in Column (2) are consistent with both the quarterly results reported in Panel B of Table 4 and the annual discretionary accrual results reported in Panel B of Table 6. However, results also indicate no difference in annual accrual estimation error between accelerated and non-accelerated filers for the AS5/404(a) sample period. The lack of statistical significance provides additional support for our use of the quarterly setting in this paper as it is less likely to be confounded by the year-end substantive audit.

V. SENSITIVITY ANALYSES

Calendar-year Observations

The main sample contains calendar and non-calendar year-end firms. Consequently, given the strict cut-off of quarters ending on or after November 15, 2004 and 2007, respectively, it is possible that fiscal year-end firm quarters will be inappropriately classified in the post-*AS2 and AS5/404(a)* periods, respectively. We therefore eliminate all non-calendar year-end observations. We find results (untabulated) for our difference-in-differences estimators that are qualitatively consistent with the prior analyses with the following exceptions. When examining the individual subsamples for the AS5/404(a) analysis, we find in the *QAQ_DISC* model that the coefficient on *AS5/404(a)* is no longer significant in the accelerated filer subsample ($p = 0.979$ vs. $p < 0.01$ in Table 5) and becomes negative and significant in the non-accelerated filer

subsample (p = 0.095 vs. p = 0.411 in Table 5). In the *QAQ_NOISE* model the coefficient on *AS5/404(a)* in the accelerated filer subsample becomes positive and significant (p < 0.01 vs. p = 0.959 in Table 5). The combined results continue to support the main conclusions regarding the effect of AS5; however, the non-accelerated filer improvement in QFRQ suggests that Section 404(a) ICFR management assessments may have had a positive effect on ICQ. However, we caution that the results are marginally significant.

Balanced Panel

To rule out concerns that our main results are driven by firms dropping out of our sample period of 2001 to 2011, we re-estimate our main models using a balanced panel where each firm is present for at least one year in each of three regime periods. This results in a sample of 49,029 and 49,212 (46,917 and 47,304) firm-quarter-year observations for the AS2 and AS5/404(a) analyses, respectively. We continue to find results consistent with the main findings reported in Table 4 and Table 5, with the exception of the *QAQ_NOISE* results in the AS2 analysis reported in Panel B of Table 4 column (4). The coefficient on AF*AS2 continues to be negative, but the p-value is 0.15 (0.075 one-tailed) vs. 0.065 as reported in the main analysis.

Excluding Firms Disclosing Material Weaknesses

To address whether effects are due entirely to material weakness firms, we re-estimate the models by excluding those observations that have a material weakness disclosure. We continue to find results that are consistent with what is reported in Table 4, with the exception of the accrual estimation error results in the AS2 analysis reported in Panel B of Table 4 column (4). The coefficient on *AF*AS2* continues to be negative, but is no longer statistically significant (p-value of 0.548 vs. 0.065 in the main analysis).

VI. CONCLUSION

In this study we examine whether SOX 404 ICFR audits and management assessments affect internal control quality as estimated by differences in unaudited, quarterly accruals quality across SOX 404 regimes. Section 404 of SOX has received considerable scrutiny with questions raised on whether costs exceed the benefit of compliance, and the PCAOB has recently raised concerns about the adequacy of audit procedures under the current auditing standard. Furthermore, there is continued discussion as to whether non-accelerated filers should be subject to ICFR audits or if Section 404(a) management assessments alone are sufficient for the intended goals of SOX.

Our results suggest that more rigorous SOX 404(b) ICFR audits under Auditing Standard No. 2 had real benefits in terms of improved internal control quality and quarterly accruals quality. However, attempts to reduce ICFR audit costs via reduced auditing requirements of Auditing Standard No. 5 may have resulted in lower material weakness disclosure rates and lower internal control quality, providing evidence consistent with recently voiced PCAOB concerns (PCAOB 2013). Finally, our evidence suggests 404(a) management assessments alone may not yield significant improvement in internal control quality.

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Appendix
Variable Definitions

Dependent Variable

QAQ_DISC	The absolute value of the residual obtained from the quarterly cross-sectional modified Jones-model consistent with Collins et al. (2012). See narrative in Section III for specifics.
QAQ_NOISE	The standard deviation of the residuals over the previous eight to twelve quarters from the DD model as modified by Dhaliwal et al. (2010). See narrative in Section III for specifics.

Variables of Interest

AF	Coded as 1 if the firm receives a Section 404(b) internal control audit opinion and 0 otherwise (obtained from Audit Analytics).
AS2	Coded as 1 if the observation is between November 15, 2004 and November 14, 2007 and 0 if the observation is between January 1, 2001 and November 14, 2004.
AS5/404(a)	Coded as 1 if the observation is between November 15, 2007 and December 31, 2011 and 0 if the observation is between November 15, 2004 and November 14, 2007.

Control Variables

MW	Coded as 1 if the firm discloses a material weakness at some point during the fiscal year and 0 otherwise. Material weakness disclosures are based on Section 404(b) opinions, Section 404(a) management reports, and/or Section 302 disclosures (obtained from Audit Analytics).
LNBSEG	Natural log of total reported business segments as available from the Compustat Segment file.
FOREIGN	Coded as 1 if the firm has foreign operations (fcaq) and 0 otherwise.
GROWTH	Total assets (atq) as of quarter t less total assets as of quarter t-4 scaled by quarter t-4 assets.
ARINV	The sum of end of quarter accounts receivable (rectq) and inventory (invtq) scaled by total assets (atq).
M&A	Coded as 1 if the firm discloses any M&A activity during the previous three fiscal years and 0 otherwise (obtained from Compustat footnote file).
RESTRUCTURE	Coded as 1 if the firm experiences any restructuring activity during the previous three fiscal years and 0 otherwise.
STD_CFO	The standard deviation of cash flows from operations (oancfy) during the respective quarter for the previous five years with a minimum of three years. Cash flows from operations are adjusted to reflect the three month period.
STD_SALES	The standard deviation of cash flows (oancfy) from operations during the respective quarter for the previous five years with a minimum of three years.
OP_CYCLE	The natural log of the operating cycle calculated as the sum of 360/cost of goods sold turnover (cogsq/ invtq average) and 360/sales turnover (revtq/rect average).

Appendix (continued)
Variable Definitions

INT_INTENSITY	Intangible asset intensity measured as R&D plus advertising divided by sales.
NO_INT	Coded as 1 if INT_INTENSITY is equal to 0 and 0 otherwise.
CAP_INTENSITY	Capital asset intensity measured as net property, plant and equipment (ppentq) divided by total assets (atq).
SIZE	Natural log of total assets (atq).
%LOSS	The percentage of reported losses (niq) during the previous three years.
ZMIJ_SHUM	The Zmijweski measure of financial distress using the coefficients from Shumway (2001).
MBR	Market to book ratio calculated as market capitalization (cshoq*prccq) divided by book value (atq-ltq).
BIGN	Coded as 1 if firm is audited by a Big 4 audit firm and 0 otherwise (obtained from Audit Analytics).
LNFEES	Natural log of total audit fees (obtained from Audit Analytics).
Quarter fixed effects	Indicator variables for each fiscal quarter.
Year fixed effects	Indicator variable for each year.
Industry fixed effects	Indicator variable for each 2-digit SIC code.

Compustat data items are defined in parentheses. All other data sources are noted above.

FIGURE 1
Research Design

RQ: Do SOX internal control regulations and related auditing standards affect internal control quality, as measured by unaudited quarterly accrual quality?

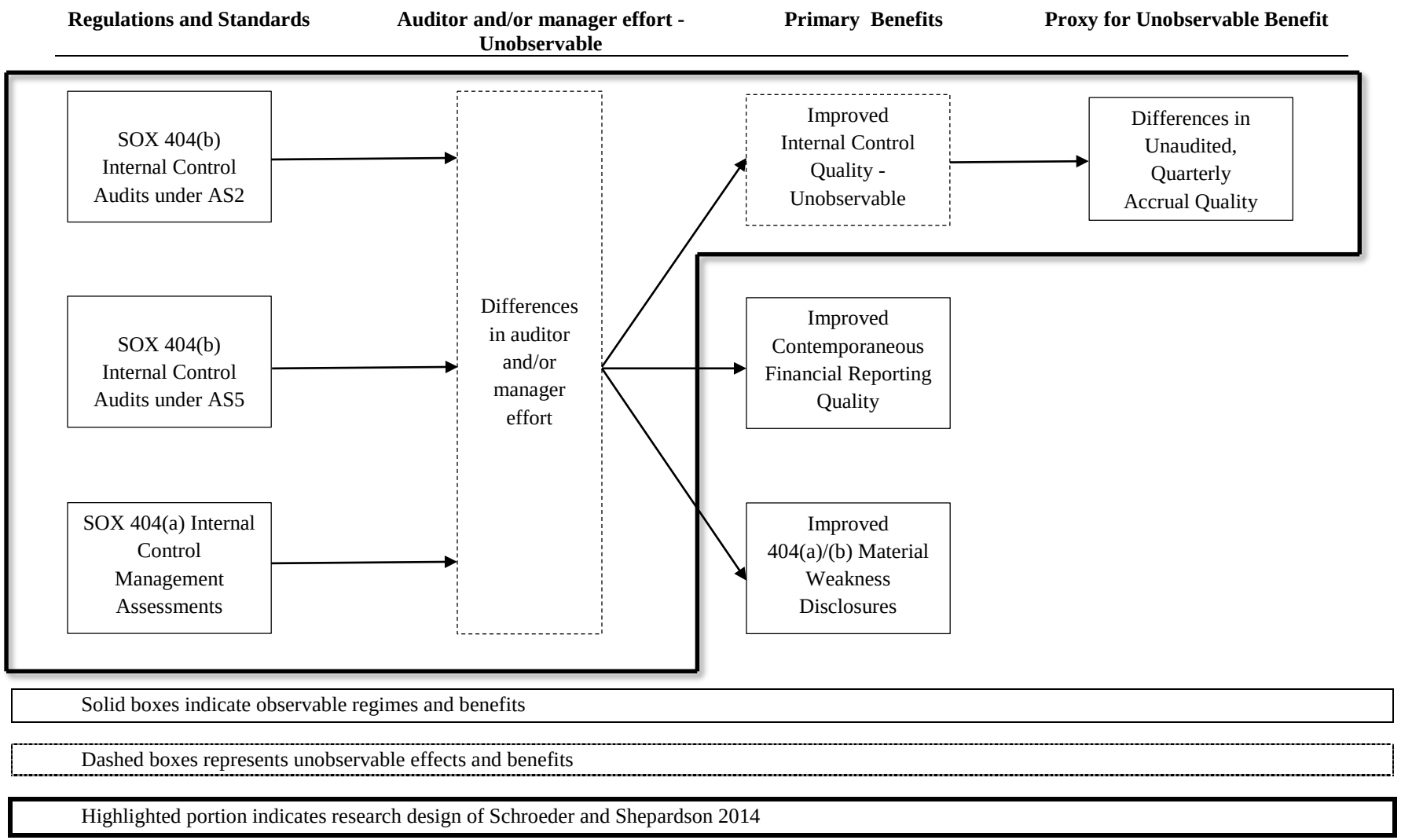

TABLE 1
Sample Selection

	AS2 Analysis Sample (January 1, 2001 to November 14, 2007)	AS5/404(a) Analysis Sample (November 15, 2004 to December 31, 2011)
All available U.S. Compustat quarterly observations for Q1 to Q3 for the respective fiscal periods	213,072	185,546
Less: Observations that do not merge with the Audit Analytics database	(65,100)	(51,496)
Less: Observations with SIC codes between 6000 to 6999	(39,943)	(39,870)
Less: Observations with missing data necessary to calculate the discretionary accrual measure used for the DV (ABSWCACC)	(26,051)	(22,064)
Less: Observations with missing values for the remaining control variables necessary to run the multivariate analyses	(21,510)	(15,966)
Total available observations for the main multivariate analyses	60,468	56,150

TABLE 2
Descriptive Statistics

Panel A: Material weakness disclosure rates for sample firms

	2003	2004	2005	2006	2007	2008	2009	2010	2011
Accelerated Filers									
Q1 to Q3 302 Certifications	0.67%	1.82%	9.14%	11.10%	8.18%	6.60%	3.73%	2.73%	1.99%
Audited 404(b) Disclosures	1.83%	12.03%	13.22%	10.18%	7.93%	4.98%	3.33%	2.92%	3.36%
Non-Accelerated Filers									
Q1 to Q3 302 Certifications	0.54%	1.69%	7.53%	9.93%	11.90%	12.85%	12.29%	10.22%	9.66%
Q4 302 Certification	2.00%	7.66%	12.42%	13.08%					
Unaudited 404(a) Disclosures					20.51%	19.71%	16.86%	16.31%	14.84%

Panel B: Dependent and control variable descriptive statistics

	Pre-AS2 Period (1/1/01 to 11/14/04)				AS2 Period (11/15/04 to 11/14/07)				AS5/404(a) Period (11/15/07 to 12/31/11)			
	AF (n = 20,919)		NAF (n = 13,426)		AF (n = 18,335)		NAF (n = 7,788)		AF (n = 21,401)		NAF (n = 8,626)	
Variables	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**
QAQ_DISC	0.023	0.012	0.046	0.024	0.023	0.013	0.059	0.029	0.023	0.012	0.051	0.026
QAQ_NOISE	0.017	0.012	0.039	0.025	0.017	0.011	0.051	0.028	0.015	0.010	0.043	0.024
LNBSEG	0.635	0.000	0.404	0.000	0.642	0.693	0.345	0.000	0.668	0.693	0.344	0.000
FOREIGN	0.089	0.000	0.044	0.000	0.129	0.000	0.072	0.000	0.180	0.000	0.099	0.000
GROWTH	0.242	0.103	0.190	0.003	0.225	0.104	0.473	0.064	0.153	0.070	0.267	0.021
ARINV	0.255	0.229	0.351	0.333	0.245	0.215	0.345	0.316	0.228	0.202	0.321	0.295
M&A	0.493	0.000	0.221	0.000	0.500	0.000	0.228	0.000	0.518	1.000	0.223	0.000
RESTRUCTURE	0.253	0.000	0.127	0.000	0.308	0.000	0.109	0.000	0.377	0.000	0.135	0.000
STD_CFO	0.048	0.033	0.095	0.057	0.046	0.029	0.147	0.065	0.043	0.026	0.122	0.059
STD_SALES	0.063	0.044	0.101	0.068	0.052	0.035	0.119	0.075	0.052	0.035	0.102	0.062
OP_CYCLE	5.973	6.027	6.128	6.169	5.900	5.942	6.043	6.085	5.894	5.962	6.100	6.167
INT_INTENSITY	0.281	0.000	0.305	0.000	0.315	0.000	0.410	0.000	0.275	0.000	0.430	0.000
NO_INT	0.592	1.000	0.585	1.000	0.576	1.000	0.551	1.000	0.587	1.000	0.534	1.000

Continued on next page

TABLE 2 (continued)
Descriptive Statistics

	Pre-AS2 Period (1/1/01 to 11/14/04)				AS2 Period (11/15/04 to 11/14/07)				AS5/404(a) Period (11/15/07 to 12/31/11)			
	AF (n = 20,919)		NAF (n = 13,426)		AF (n = 18,335)		NAF (n = 7,788)		AF (n = 21,401)		NAF (n = 8,626)	
Variables	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**
CAP_INTENSITY	0.268	0.199	0.230	0.148	0.248	0.165	0.179	0.098	0.272	0.178	0.199	0.111
SIZE	6.312	6.222	3.085	3.153	6.360	6.253	2.670	2.866	6.723	6.631	3.047	3.202
%LOSS	0.276	0.200	0.532	0.600	0.294	0.200	0.588	0.600	0.258	0.000	0.558	0.600
ZMIJ_SHUM	-3.097	-3.077	-1.919	-2.729	-3.070	-3.080	-0.678	-2.731	-2.951	-2.977	-1.184	-2.876
MBR	3.050	2.174	1.631	1.031	3.300	2.451	2.300	1.611	2.517	1.812	1.625	1.071
BIGN	0.935	1.000	0.504	1.000	0.816	1.000	0.161	0.000	0.828	1.000	0.150	0.000
LNFEES	13.221	13.124	11.623	11.626	13.964	13.922	11.790	11.810	14.033	13.955	11.986	12.008

Panel A provides the average SOX 302 material weakness disclosure rates for Q1 to Q3 and year end 404(a) and 404(b) disclosure rates for non-accelerated and accelerated filers, respectively, separated by calendar year. Please note that descriptive statistics are provided for sample firms only, and therefore differ from other studies which present material weakness disclosure rates for all public issuers. Panel B provides the mean and median values for the control variables used in the multivariate analyses separated by the three regime periods. Variable definitions can be found in the appendix. All non-logarithmic transformed continuous variables are winsorized at the 1st and 99th percentile.

TABLE 3
Pearson Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) QAQ_DISC														
(2) QAQ_NOISE	0.423													
(3) AF	-0.260	-0.362												
(4) MW	0.104	0.139	-0.106											
(5) AS5/404(a)	-0.024	-0.048	0.012	-0.077										
(6) LNBSEG	-0.140	-0.203	0.213	-0.029	0.016									
(7) FOREIGN	-0.035	-0.060	0.093	0.010	0.066	0.038								
(8) GROWTH	0.121	0.337	-0.093	0.084	-0.065	-0.065	-0.027							
(9) ARINV	0.030	0.032	-0.226	0.037	-0.051	0.026	0.044	-0.069						
(10) M&A	-0.121	-0.187	0.261	-0.012	0.014	0.238	0.092	0.022	-0.030					
(11) RESTRUCTURE	-0.071	-0.134	0.226	**-0.003**	0.065	0.135	0.146	-0.110	**-0.008**	0.195				
(12) STD_CFO	0.318	0.613	-0.265	0.099	-0.034	-0.158	-0.048	0.429	0.018	-0.129	-0.119			
(13) STD_SALES	0.215	0.435	-0.292	0.100	-0.033	-0.100	-0.063	0.331	0.239	-0.101	-0.123	0.391		
(14) OP_CYCLE	0.045	0.022	-0.093	0.055	**0.008**	0.015	0.101	-0.025	0.383	-0.024	0.063	0.003	-0.102	
(15) INT_INTENSITY	0.167	0.169	-0.034	0.002	**-0.007**	-0.128	-0.019	0.059	-0.180	-0.105	-0.032	0.154	-0.042	0.103
(16) NO_INT	-0.118	-0.122	0.037	-0.026	**0.003**	0.155	-0.142	**0.001**	0.072	0.017	-0.116	-0.093	0.048	-0.267
(17) CAP_INTENSITY	-0.146	-0.173	0.140	-0.046	0.050	0.101	-0.090	-0.028	-0.306	-0.128	-0.115	-0.130	-0.148	-0.284
(18) SIZE	-0.371	-0.525	0.707	-0.150	0.086	0.394	0.105	-0.123	-0.190	0.350	0.300	-0.389	-0.355	-0.103
(19) %LOSS	0.311	0.400	-0.358	0.146	-0.050	-0.270	-0.047	0.124	-0.113	-0.251	-0.025	0.299	0.163	0.075
(20) ZMIJ_SHUM	0.312	0.500	-0.188	0.086	-0.009	-0.065	-0.036	0.022	0.032	-0.080	-0.040	0.378	0.202	-0.035
(21) MBR	-0.016	-0.011	0.056	-0.004	-0.049	-0.021	**0.003**	0.037	-0.034	**-0.007**	-0.028	**0.008**	**0.007**	-0.011
(22) BIGN	-0.240	-0.350	0.628	-0.145	0.013	0.214	0.078	-0.151	-0.167	0.235	0.253	-0.253	-0.277	-0.101
(23) LNFEES	-0.288	-0.429	0.700	-0.048	0.047	0.393	0.175	-0.148	-0.127	0.383	0.389	-0.327	-0.305	-0.045

	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
(15) INT_INTENSITY								
(16) NO_INT	-0.221							
(17) CAP_INTENSITY	-0.108	0.404						
(18) SIZE	-0.158	0.191	0.267					
(19) %LOSS	0.271	-0.281	-0.162	-0.523				
(20) ZMIJ_SHUM	0.070	0.028	-0.008	-0.273	0.222			
(21) MBR	0.039	-0.057	-0.035	**0.005**	**0.006**	-0.092		
(22) BIGN	-0.041	0.032	0.107	0.660	-0.314	-0.140	0.026	
(23) LNFEES	-0.114	0.038	0.090	0.894	-0.397	-0.180	0.016	0.682

Unbolded numbers mean the correlation is significant at $p < 0.05$ level (2-tailed). Variable definitions can be found in the appendix. All non-logarithmic transformed continuous variables are winsorized at the 1st and 99th percentile.

TABLE 4
Cross-Sectional Analysis of Quarterly Accrual Quality

Panel A: Quarterly abnormal working capital accruals (*QAQ_DISC*)

		AS2 Analysis (1/1/2001 to 11/14/2007)				AS5/404(a) Analysis (11/15/2004 to 12/31/2011)			
	Exp.	(1)		(2)		(3)		(4)	
Variables	**Sign**	**Coef.**	**p-value**	**Coef.**	**p-value**	**Coef.**	**p-value**	**Coef.**	**p-value**
Intercept		0.0143	0.036	0.0089	0.199	0.0187	0.017	0.0161	0.045
AF	**+/-**	**0.0002**	**0.846**	**0.0019**	**0.032**	**-0.0018**	**0.107**	**-0.0042**	**0.002**
AS2	**+/-**			**0.0040**	**0.000**				
AF*AS2	**-**			**-0.0048**	**0.000**				
AS5/404(a)	+/-							**0.0000**	**0.987**
AF*AS5/404(a)	+/-							**0.0045**	**0.002**
MW	+	-0.0006	0.474	-0.0009	0.311	0.0035	0.003	0.0039	0.001
LNBSEG	+/-	-0.0004	0.389	-0.0004	0.354	-0.0002	0.608	-0.0002	0.571
FOREIGN	+/-	-0.0024	0.003	-0.0025	0.003	-0.0018	0.038	-0.0018	0.030
GROWTH	+	0.0004	0.474	0.0004	0.513	0.0008	0.278	0.0007	0.300
ARINV	+/-	-0.0043	0.081	-0.0043	0.079	-0.0022	0.431	-0.0023	0.423
M&A	+	0.0000	0.997	0.0000	0.942	-0.0007	0.196	-0.0007	0.182
RESTRUCTURE	+	0.0010	0.085	0.0011	0.076	0.0004	0.539	0.0003	0.637
STD_CFO	+	0.0367	0.000	0.0364	0.000	0.0345	0.000	0.0345	0.000
STD_SALES	+	0.0340	0.000	0.0336	0.000	0.0325	0.000	0.0321	0.000
OP_CYCLE	+	0.0006	0.331	0.0006	0.317	0.0000	0.976	0.0000	0.990
INT_INTENSITY	+	0.0014	0.000	0.0014	0.000	0.0021	0.000	0.0021	0.000
NO_INT	-	-0.0016	0.074	-0.0016	0.082	-0.0001	0.903	-0.0001	0.901
CAP_INTENSITY	-	-0.0026	0.167	-0.0025	0.184	-0.0022	0.350	-0.0023	0.342
SIZE	-	-0.0057	0.000	-0.0059	0.000	-0.0054	0.000	-0.0054	0.000
%LOSS	+	0.0095	0.000	0.0095	0.000	0.0109	0.000	0.0109	0.000
ZMIJ_SHUM	-	0.0019	0.000	0.0019	0.000	0.0020	0.000	0.0020	0.000
MBR	+/-	0.0000	0.813	0.0000	0.843	0.0000	0.752	0.0000	0.760
BIGN	-	-0.0047	0.000	-0.0044	0.000	-0.0023	0.010	-0.0024	0.008
LNFEES	+	0.0034	0.000	0.0037	0.000	0.0032	0.000	0.0033	0.000
Quarter, Year, and Industry Fixed Effects		Yes		Yes		Yes		Yes	
Observations		60,468		60,468		56,150		56,150	
Adjusted R^2		0.2567		0.2567		0.2610		0.2614	

The standard errors used to calculate p-values are clustered by firm. The sample period is all available Q1 to Q3 observations during the period ending January 1, 2001 to November 14, 2007 for the AS2 Analysis and November 15, 2004 to December 31, 2011 for the AS5/404(a) Analysis. ***AF*AS2*** (***AF*AS5/404(a)***) represents the difference-in-differences estimator for firms with audits of ICFR under AS2 (AS5). All other variable definitions can be found in the appendix. All non-logarithmic transformed continuous variables are winsorized at the 1st and 99th percentile.

TABLE 4 (continued)
Cross-Sectional Analysis of Quarterly Accrual Quality

Panel B: Quarterly accrual estimation error (*QAQ_NOISE*)

		AS2 Analysis (1/1/2001 to 11/14/2007)				AS5/ 404(a) Analysis (11/15/2004 to 12/31/2011)			
	Exp.	(1)		(2)		(3)		(4)	
Variables	**Sign**	**Coef.**	**p-value**	**Coef.**	**p-value**	**Coef.**	**p-value**	**Coef.**	**p-value**
Intercept		-0.0035	0.597	-0.0062	0.351	0.0191	0.009	0.0189	0.010
AF	**+/-**	**0.0002**	**0.791**	**0.0008**	**0.242**	**-0.0005**	**0.595**	**-0.0019**	**0.092**
AS2	**+/-**			**0.0023**	**0.067**				
AF*AS2	**-**			**-0.0018**	**0.065**				
AS5/404(a)	+/-							**-0.0012**	**0.317**
AF*AS5/404(a)	+/-							**0.0027**	**0.026**
MW	+	-0.0016	0.030	-0.0017	0.022	0.0020	0.031	0.0022	0.017
LNBSEG	+/-	-0.0009	0.026	-0.0009	0.025	-0.0004	0.382	-0.0004	0.365
FOREIGN	+/-	0.0001	0.864	0.0001	0.879	-0.0002	0.770	-0.0002	0.721
GROWTH	+	0.0051	0.000	0.0051	0.000	0.0075	0.000	0.0075	0.000
ARINV	+/-	-0.0153	0.000	-0.0153	0.000	-0.0136	0.000	-0.0136	0.000
M&A	+	-0.0021	0.000	-0.0021	0.000	-0.0020	0.000	-0.0021	0.000
RESTRUCTURE	+	0.0013	0.028	0.0012	0.027	0.0005	0.286	0.0005	0.336
STD_CFO	+	0.0702	0.000	0.7009	0.000	0.0678	0.000	0.0678	0.000
STD_SALES	+	0.0615	0.000	0.0613	0.000	0.0639	0.000	0.0637	0.000
OP_CYCLE	+	0.0018	0.001	0.0018	0.001	0.0013	0.018	0.0013	0.017
INT_INTENSITY	+	0.0002	0.371	0.0002	0.374	0.0005	0.035	0.0005	0.034
NO_INT	-	-0.0020	0.025	-0.0020	0.026	-0.0015	0.079	-0.0015	0.077
CAP_INTENSITY	-	-0.0085	0.000	-0.0085	0.000	-0.0054	0.028	-0.0054	0.028
SIZE	-	-0.0058	0.000	-0.0058	0.000	-0.0045	0.000	-0.0045	0.000
%LOSS	+	0.0068	0.000	0.0068	0.000	0.0056	0.000	0.0055	0.000
ZMIJ_SHUM	-	0.0018	0.000	0.0018	0.000	0.0022	0.000	0.0022	0.000
MBR	+/-	0.0000	0.230	0.0000	0.240	0.0000	0.367	0.0000	0.366
BIGN	-	-0.0044	0.000	-0.0043	0.000	-0.0019	0.009	-0.0019	0.008
LNFEES	+	0.0037	0.000	0.0038	0.000	0.0017	0.007	0.0018	0.005
Quarter, Year, and Industry Fixed Effects		Yes		Yes		Yes		Yes	
Observations		60,660		60,660		56,683		56,683	
Adjusted R^2		0.5496		0.5497		0.5927		0.5929	

The standard errors used to calculate p-values are clustered by firm. The sample period is all available Q1 to Q3 observations during the period ending January 1, 2001 to November 14, 2007 for the AS2 Analysis and November 15, 2004 to December 31, 2011 for the AS5/404(a) Analysis. ***AF*AS2*** (***AF*AS5/404(a)***) represents the difference-in-differences estimator for firms with audits of ICFR under AS2 (AS5). All other variable definitions can be found in the appendix. All non-logarithmic transformed continuous variables are winsorized at the 1st and 99th percentile.

TABLE 5
AS2 and 404(a) Comparison

		Accelerated Filer Pre/Post-AS5				Non-Accelerated Filer Pre/Post-404(a)			
		(1)		(2)		(3)		(4)	
	Exp.	*QAQ_DISC*		*QAQ_NOISE*		*QAQ_DISC*		*QAQ_NOISE*	
Variables	**Sign**	**Coef.**	**p-value**	**Coef.**	**p-value**	**Coef.**	**p-value**	**Coef.**	**p-value**
Intercept		0.0461	0.000	0.0147	0.073	-0.0003	0.989	0.0403	0.017
AS5/404(a)	**+/-**	**0.0028**	**0.008**	**0.0000**	**0.959**	**0.0031**	**0.411**	**0.0030**	**0.146**
MW	+	0.0015	0.142	0.0006	0.389	0.0097	0.000	0.0071	0.000
LNBSEG	+/-	-0.0004	0.255	-0.0001	0.798	-0.0013	0.286	-0.0021	0.071
FOREIGN	+/-	-0.0002	0.781	0.0000	0.956	-0.0034	0.205	0.0015	0.437
GROWTH	+	0.0009	0.404	0.0044	0.000	0.0016	0.062	0.0092	0.000
ARINV	+/-	-0.0008	0.772	-0.0091	0.000	-0.0056	0.233	-0.0102	0.013
M&A	+	-0.0002	0.662	-0.0022	0.000	-0.0010	0.545	0.0006	0.665
RESTRUCTURE	+	-0.0006	0.302	0.0000	0.926	0.0053	0.012	0.0013	0.328
STD_CFO	+	0.0667	0.000	0.0858	0.000	0.0192	0.001	0.0553	0.000
STD_SALES	+	0.0291	0.001	0.0545	0.000	0.0244	0.004	0.0559	0.000
OP_CYCLE	+	0.0005	0.388	0.0003	0.566	-0.0003	0.812	0.0016	0.106
INT_INTENSITY	+	0.0016	0.000	0.0005	0.020	0.0025	0.000	0.0008	0.041
NO_INT	-	-0.0011	0.228	-0.0017	0.015	-0.0008	0.718	-0.0020	0.289
CAP_INTENSITY	-	-0.0061	0.004	-0.0081	0.000	-0.0077	0.167	-0.0011	0.846
SIZE	-	-0.0029	0.000	-0.0026	0.000	-0.0141	0.000	-0.0113	0.000
%LOSS	+	0.0062	0.000	0.0051	0.000	0.0122	0.000	0.0088	0.000
ZMIJ_SHUM	-	0.0058	0.000	0.0018	0.000	0.0012	0.000	0.0016	0.000
MBR	+/-	0.0002	0.027	0.0001	0.001	-0.0003	0.004	-0.0001	0.039
BIGN	-	-0.0022	0.011	-0.0026	0.001	-0.0037	0.052	-0.0020	0.187
LNFEES	+	0.0003	0.647	0.0015	0.019	0.0071	0.000	0.0009	0.533
Quarter, Year, and Industry Fixed Effects		Yes		Yes		Yes		Yes	
Observations		39,736		40,249		16,414		16,434	
Adjusted R^2		0.1893		0.4118		0.2615		0.6144	

The standard errors used to calculate p-values are clustered by firm. The sample period is all available Q1 to Q3 observations during the period ending November 15, 2004 to December 31, 2011. Variable definitions can be found in the appendix. All non-logarithmic transformed continuous variables are winsorized at the 1st and 99th percentile.

TABLE 6
Cross-Sectional Analysis of Annual Accrual Quality

Panel A: Annual abnormal working capital accruals

		AS2 Analysis (1/1/2001 to 11/14/2007)				AS5/404(a) Analysis (11/15/2004 to 12/31/2011)			
	Exp.	(1)		(2)		(3)		(4)	
Variables	**Sign**	**Coef.**	**p-value**	**Coef.**	**p-value**	**Coef.**	**p-value**	**Coef.**	**p-value**
Intercept		0.0820	0.015	0.0311	0.370	0.1026	0.004	0.1007	0.004
AF	**+/-**	**-0.0086**	**0.049**	**0.0109**	**0.039**	**-0.0173**	**0.000**	**-0.0294**	**0.000**
AS2	**+/-**			**0.0194**	**0.014**				
AF*AS2	**-**			**-0.0353**	**0.000**				
AS5/404(a)	+/-							**-0.0180**	**0.050**
AF*AS5/404(a)	+/-							**0.0247**	**0.000**
MW	+	0.0034	0.318	0.0029	0.395	0.0084	0.015	0.0093	0.007
LNBSEG	+/-	-0.0014	0.503	-0.0019	0.369	0.0019	0.341	0.0017	0.398
FOREIGN	+/-	-0.0034	0.295	-0.0039	0.222	-0.0034	0.265	-0.0038	0.202
GROWTH	+	0.0250	0.000	0.0249	0.000	0.0257	0.000	0.0252	0.000
ARINV	+/-	-0.0259	0.043	-0.0267	0.037	-0.0185	0.135	-0.0194	0.117
M&A	+	-0.0033	0.276	-0.0038	0.218	-0.0075	0.007	-0.0074	0.008
RESTRUCTURE	+	-0.0072	0.009	-0.0078	0.005	-0.0083	0.002	-0.0085	0.002
STD_CFO	+	0.0358	0.001	0.0344	0.001	0.0383	0.000	0.0388	0.000
STD_SALES	+	0.0604	0.000	0.0589	0.000	0.0486	0.000	0.0483	0.000
OP_CYCLE	+	0.0008	0.817	0.0010	0.772	-0.0009	0.788	-0.0007	0.823
INT_INTENSITY	+	0.0029	0.056	0.0030	0.049	0.0036	0.015	0.0036	0.014
NO_INT	-	-0.0018	0.725	-0.0011	0.820	0.0042	0.384	0.0042	0.384
CAP_INTENSITY	-	-0.0361	0.000	-0.0347	0.000	-0.0400	0.000	-0.0401	0.000
SIZE	-	-0.0143	0.000	-0.0162	0.000	-0.0115	0.000	-0.0120	0.000
%LOSS	+	0.0374	0.000	0.0371	0.000	0.0502	0.000	0.0498	0.000
ZMIJ_SHUM	-	0.0034	0.000	0.0033	0.000	0.0026	0.000	0.0026	0.000
MBR	+/-	0.0007	0.086	0.0006	0.091	0.0001	0.856	0.0001	0.858
BIGN	-	-0.0191	0.000	-0.0172	0.000	-0.0053	0.157	-0.0061	0.107
LNFEES	+	0.0087	0.001	0.0125	0.000	0.0048	0.123	0.0058	0.061
Year and Industry Fixed Effects		Yes		Yes		Yes		Yes	
Observations		16,291		16,291		20,964		20,964	
Adjusted R^2		0.259		0.261		0.245		0.246	

The standard errors used to calculate p-values are clustered by firm. The sample period is all available Q1 to Q3 observations during the period ending January 1, 2001 to November 14, 2007 for the AS2 Analysis and November 15, 2004 to December 31, 2011 for the AS5/404(a) Analysis. ***AF*AS2*** (***AF*AS5/404(a)***) represents the difference-in-differences estimator for firms with audits of ICFR under AS2 (AS5). All other variable definitions can be found in the appendix. All non-logarithmic transformed continuous variables are winsorized at the 1st and 99th percentile.

TABLE 6 (continued)
Cross-Sectional Analysis of Annual Accrual Quality

Panel B: Annual accrual estimation error

		AS2 Analysis (1/1/2001 to 11/14/2007)				AS5/ 404(a) Analysis (11/15/2004 to 12/31/2011)			
	Exp.	(1)		(2)		(3)		(4)	
Variables	**Sign**	**Coef.**	**p-value**	**Coef.**	**p-value**	**Coef.**	**p-value**	**Coef.**	**p-value**
Intercept		0.0232	0.429	0.0055	0.858	0.0029	0.939	0.0036	0.925
AF	**+/-**	**0.0012**	**0.741**	**0.0083**	**0.028**	**-0.0060**	**0.179**	**-0.0021**	**0.658**
AS2	**+/-**			**0.0031**	**0.505**				
AF*AS2	**-**			**-0.0130**	**0.002**				
AS5/404(a)	+/-							**0.0058**	**0.369**
AF*AS5/404(a)	+/-							**-0.0082**	**0.122**
MW	+	0.0004	0.890	0.0003	0.932	0.0063	0.073	0.0061	0.081
LNBSEG	+/-	0.0006	0.775	0.0004	0.862	0.0008	0.687	0.0009	0.665
FOREIGN	+/-	-0.0053	0.080	-0.0056	0.067	-0.0095	0.003	-0.0094	0.004
GROWTH	+	0.0300	0.000	0.0299	0.000	0.0439	0.000	0.0440	0.000
ARINV	+/-	-0.0640	0.000	-0.0646	0.000	-0.0603	0.000	-0.0600	0.000
M&A	+	-0.0051	0.054	-0.0053	0.047	-0.0091	0.001	-0.0092	0.001
RESTRUCTURE	+	-0.0022	0.403	-0.0025	0.329	-0.0043	0.123	-0.0042	0.135
STD_CFO	+	0.0500	0.002	0.0494	0.002	0.0518	0.000	0.0517	0.000
STD_SALES	+	0.0230	0.062	0.0225	0.067	0.0290	0.029	0.0291	0.028
OP_CYCLE	+	-0.0002	0.941	-0.0001	0.962	0.0007	0.829	0.0007	0.836
INT_INTENSITY	+	0.0041	0.014	0.0041	0.013	0.0051	0.002	0.0051	0.002
NO_INT	-	-0.0080	0.069	-0.0076	0.083	-0.0089	0.066	-0.0089	0.067
CAP_INTENSITY	-	-0.0333	0.000	-0.0329	0.000	-0.0242	0.014	-0.0243	0.014
SIZE	-	-0.0153	0.000	-0.0161	0.000	-0.0146	0.000	-0.0146	0.000
%LOSS	+	0.0382	0.000	0.0381	0.000	0.0460	0.000	0.0461	0.000
ZMIJ_SHUM	-	0.0038	0.000	0.0038	0.000	0.0041	0.000	0.0041	0.000
MBR	+/-	0.0005	0.118	0.0005	0.122	0.0006	0.048	0.0006	0.047
BIGN	-	-0.0154	0.000	-0.0148	0.000	-0.0101	0.013	-0.0098	0.015
LNFEES	+	0.0119	0.000	0.0136	0.000	0.0129	0.000	0.0125	0.000
Year and Industry Fixed Effects		Yes		Yes		Yes		Yes	
Observations		13,701		13,701		17,410		17,410	
Adjusted R^2		0.383		0.383		0.418		0.418	

The standard errors used to calculate p-values are clustered by firm. The sample period is all available Q1 to Q3 observations during the period ending January 1, 2001 to November 14, 2007 for the AS2 Analysis and November 15, 2004 to December 31, 2011 for the AS5/404(a) Analysis. ***AF*AS2*** (***AF*AS5/404(a)***) represents the difference-in-differences estimator for firms with audits of ICFR under AS2 (AS5). All other variable definitions can be found in the appendix. All non-logarithmic transformed continuous variables are winsorized at the 1st and 99th percentile.