Do Auditors Correctly Identify and Assess Internal Control Deficiencies? Evidence from the PCAOB Data

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Abstract

Auditors routinely fail to disclose material weaknesses prior to a material error (i.e. restatements). One potential reason is that auditors misclassify the severity of identified internal control deficiencies due to complexity in judging the materiality and likelihood of potential related errors. Another reason is that auditors face disincentives to report a material weakness without a clear indication of an existing error. We evaluate these possibilities using a proprietary database on auditor-identified control deficiencies that are not deemed material weaknesses, hence not publicly disclosed. We compare the severity of the control deficiency with the severity of ex-post reporting errors. Even though we find some evidence consistent with auditor and management incentives to misclassify material weaknesses as less serious deficiencies, we generally find that 1) the severity of identified control deficiencies is properly assessed and 2) the auditor is able to provide reasonable assurance about whether financial statements are materially misstated in the presence of identified deficiencies. Our evidence indicates that the inability of auditors to properly identify relevant internal controls is a contributing reason why material weaknesses are not discovered and disclosed prior to material error restatements.

1. Introduction

This study exploits a proprietary database to examine potential reasons for why auditors fail to report material weaknesses in internal controls prior to material errors (i.e., restatements). One possible reason auditors fail to provide a leading indicator for material errors is because they err in assessing the severity of the internal control deficiencies, where only the most severe is publicly disclosed to investors (i.e., material weakness). To examine this issue, we exploit a dataset on identified internal control deficiencies undisclosed to the public to examine whether auditors correctly evaluate the effectiveness of internal controls over financial reporting (ICFR). Specifically, we compare the severity of internal control deficiencies with the severity of ex post financial reporting errors.[1] We also investigate whether the auditor's difficulty in identifying the relevant/key internal controls contributes to the inability to warn investors of ICFR problems in advance of error discovery. Our analysis sheds light on why material weaknesses often do not precede a material error (i.e. restatements).

Section 404 of the Sarbanes Oxley Act of 2002 (SOX) resulted in monumental and controversial changes in auditing practices that increased the focus on internal controls over financial reporting with the intent to improve financial reporting reliability (e.g., Kinney, Martin and Shepardson 2013). As described in Auditing Standard No. 5 (AS5), the underlying assumption is that material financial reporting errors stem from material weaknesses in internal controls (ICMW). Specifically, the intention was to identify problems in internal controls before they potentially led to material errors (i.e., preventing material errors) and disclose the existence of problematic internal controls in advance of material errors when errors would/could not be

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[1] Our dataset is composed of deficiencies and significant deficiencies assessed by the auditor that result in internal controls being deemed effective overall; accordingly these are not reported to investors per AS5, in contrast with publicly disclosed material weaknesses.

prevented (i.e. providing a warning signal to investors; e.g., Goelzer 2008). All material

weaknesses are not expected to lead to a material error, in part due to remediation from an early

warning signal. Accordingly, evidence that ICFR auditing is working as intended would suggest

a greater prevalence of material weaknesses relative to material errors (i.e. an increase in

material weakness propensities and a decrease in material error propensities). Further evidence

of effectiveness of the audit of ICFR would result in material weakness disclosures that

frequently precede the discovery of material errors.

Following SOX, recent empirical studies examine and question the effectiveness of the

ICFR audit. Plumlee and Yohn (2010) document that restatements have generally outpaced

reported ICMW in recent years, suggesting that some material weaknesses go unreported. Rice

and Weber (2012) find that material weakness disclosures infrequently precede a future material

misstatement. Only 32.4% of their sample firms report the existence of a material weakness

during the misstatement period; moreover, this proportion is decreasing over time, reaching a

low of 13.6% in the most recent years. This leads one to question whether the internal control

over financial reporting audit is working effectively and what the problem might be.

Several recent studies documenting that a majority of companies fail to report ICMW in a

timely manner (e.g., Rice and Weber 2012, Rice et al. 2015) attribute this phenomenon to client

and auditor incentives to avoid ICMW reports. Given the difficulty and subjectivity in assessing

the severity level of internal control deficiencies auditors may find it difficult to assess an

internal control deficiency as a material weakness in the absence of an existing error due to

pressure from management (e.g., Kinney et al. 2013, Whitehouse 2016a). This pressure could

lead the auditor to underestimate the severity of a deficient internal control by classifying it as a

deficiency or significant deficiency, rather than a material weakness. The pressure could arise

from the fact that deficiencies and significant deficiencies are not publicly disclosed to investors, while ICMW is publicly disclosed. Consistent with this explanation, prior studies document that disclosure of ICMW is associated with lower financial reporting quality and higher cost of capital (e.g., Doyle et al. 2007a, Ashbaugh-Skaife et al. 2008, Chan et al. 2008, Hoitash et al. 2008, Hammersley et al. 2008, Ashbaugh-Skaife et al. 2009, and Donelson et al. 2015). In other words, companies with material control weaknesses have lower quality financial reports and investors charge a premium for this risk. Thus, managers prefer to avoid ICMW disclosures and may attempt to deter auditors from disclosing control weaknesses.

Other reasons for why control weaknesses are not reported prior to material errors include inability to detect control deficiencies or inability to assess the severity correctly. While it is management's responsibility to identify and disclose an ICMW, auditors play a role by auditing management's ICFR assessment, often deeming deficiencies as more severe relative to management (e.g., Bedard and Graham 2011). But, auditors may have difficulty effectively identifying the relevant internal controls to test or asses their severity correctly such that they provide incomplete or inaccurate ICFR opinions. If the auditor misses a control deficiency or underestimates the severity of an internal control deficiency, then the ICFR opinion would be unable to warn investors or prevent material errors. Consistent with these potential explanations, Brian Croteau, Deputy Chief Accountant at the Securities and Exchange Commission (SEC), mentions:

> *"I continue to question whether all material weaknesses are being properly identified. It is surprisingly rare to see management identify a material weakness in the absence of a material misstatement. This could be either because the deficiencies are not being identified in the first instance or otherwise because the severity of deficiencies is not being evaluated appropriately.* (Croteau 2013).*"*

Owing to these concerns about the evaluation of internal control deficiencies, the SEC brought several enforcement actions against offending companies and auditors (e.g., Whitehouse 2016a and b, also see O'Connor, Zatylny and Michaud 2014).

Since internal control deficiencies are only publicly disclosed when classified as a material weakness, prior studies are unable to evaluate whether auditors correctly assess the severity of internal control deficiencies. Thus, it is difficult to empirically examine whether and which of these potential explanations detract from the effectiveness of the ICFR audit. We exploit proprietary data from the Public Company Accounting Oversight Board (PCAOB) gathered during the inspection process to overcome these limitations and provide evidence regarding why the ICFR audit may not be achieving its full potential.[2] We use auditors' evaluation of internal control deficiencies (including deficiencies and significant deficiencies, which are not publicly disclosed), for the individual engagements selected for inspection, combined with audit deficiencies related to internal control procedures identified by the PCAOB to examine three questions outlined below.[3]

First, we evaluate whether managers and auditors have incentives to misclassify identified internal controls deficiencies as lower level deficiencies rather than material weaknesses. While this analysis does not represent the main contribution of our study, it extends Rice and Weber (2012) and Rice et al. (2015) who find that companies and auditors have incentives not to report ICMW preceding a restatement, but (due to data limitations) are unable to evaluate whether identification of lower-level deficiencies can lead to comparable outcomes.

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[2] The PCAOB is a non-profit organization established by the Sarbanes Oxley Act of 2002 (SOX) to oversee the audits of public companies and improve audit quality. As part of its regular inspections of audit firms involved in the audits of public companies, the PCAOB selects several individual audit engagements for inspection. See Aobdia (2015a and 2015b) for details.

[3] Because the PCAOB's inspection of audits is focused on limited areas/accounts that are deemed most critical by the PCAOB, typically three (e.g., Aobdia 2015a), data are available only for the accounts selected for inspection.

We find that companies are more likely to switch Chief Financial Officers (CFOs) the year after the disclosure of a material weakness; however, we fail to find evidence of lower level deficiencies influencing CFO switches. The disparity indicates that CFOs' career concerns could lead them to pressure auditors to underestimate the severity level of identified material weaknesses, particularly in the absence of financial reporting errors.[4]

We also find evidence that the auditor significantly increases her effort following the identification of internal control deficiencies, consistent with additional audit procedures necessitated to provide reasonable assurance about whether the financial statements are materially misstated. We find that auditors proportionally increase their effort and fees without any negative impact on their profitability (measured via average fees per hour) when they identify lower-level internal control deficiencies that are reported only internally. In contrast to internally reported control deficiencies, we find that auditors do not fully recoup their extra effort in the form of additional fees when ICMW are publicly reported. Thus, our analysis is consistent with auditors having incentives to underestimate the severity of identified material weaknesses to preserve the short-term profitability of their audits.

Second, in light of these incentives to underestimate the severity of a material weakness, we examine whether the auditor correctly classifies the severity of internal control deficiencies. Specifically, we examine the association between the severity of internal control deficiencies and the severity of ex-post financial reporting errors. Following prior literature (Choudhary, Merkley and Schipper 2016), we consider three types of financial reporting errors, in increasing order of

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[4] We specifically focus on CFO turnover because prior research suggests that the CFO assumes the lead role in managing internal controls (Hoitash, Hoitash and Johnstone 2012). We also assess in untabulated analyses whether CEO turnover or CFO salary are influenced by the identification of internal control deficiencies and do not find any association between internal control deficiencies and these outcomes. Generally, our results are consistent with the CFO being ultimately responsible for internal controls in companies.

severity: adjustments, revisions and restatements. Of the three, only restatements are material. If the auditor applies AS5 correctly, we expect that only ICMW are associated with restatements (possibly due to insufficient audit scoping/testing), whereas deficiencies and significant deficiencies are associated with immaterial errors at best (i.e. revisions or adjustments). Alternatively, if the auditor underestimates the severity of internal control deficiencies, we expect that deficiencies and significant deficiencies are associated with material errors.

Despite evidence consistent with misreporting incentives in our sample, we find that, in general, auditors correctly assess the severity of internal control deficiencies once such deficiencies are identified. In other words, we find that ICMW are associated with material errors, but deficiencies and significant deficiencies are not. We find that significant deficiencies are still related to financial reporting reliability by providing predictive power over immaterial errors, implying that auditors on average are able to provide sufficient assurance to limit the errors associated with lower level ICFR deficiencies. Our findings suggest that the increased auditing effort following the identification of internal control deficiencies provide reasonable assurance on the reliability of financial reports. We use PCAOB inspection findings to provide confirmatory evidence that misclassification in severity of internal control deficiencies are not systemic among our sample of inspected engagements. This evidence casts doubt on misclassification of the severity level of identified internal control deficiencies as an explanation for why material errors are often not preceded by ICMW.

Third, we find evidence that auditorsare unable to identify the relevant internal controls to test (18% of our sample), which contributes to the ineffectiveness of the ICFR audit to prevent

and warn investors of restatements.[5] We find predictive power over audit deficiencies related to identification of relevant controls to test and material financial reporting errors. In other words, when the auditor fails to identify the relevant internal controls she will not test these controls and accordingly will not increase the scope of audit procedures when needed (including substantive testing). Thus, the risk of misreporting ICFR opinions increases and detracts from the ability to report potential material weaknesses in a timely fashion (prior to a material error). Consistent with Aobdia (2015a), the results of these tests also suggest that PCAOB inspection findings measure true deficiencies in audit quality, and contribute to the debate of whether PCAOB inspections are informative of audit quality.

Because our analysis uses a proprietary sample from risk-based PCAOB inspections that focus on limited areas in the audit, it is potentially subject to measurement error and selection bias. Supplemental tests (described in Section 5) suggest that these concerns are unlikely to affect our conclusions.

Collectively, our evidence provides new insights into the role of internal control audits as well as evidence of why ICMW are often reported in conjunction with (rather than preceding) material financial reporting errors. Our evidence implies that auditors are unable to identify the relevant controls to focus on during the audit, which is one reason for why ICMW rarely precede or do not prevent material financial reporting errors. However, the results indicate that when control deficiencies are identified, the auditor correctly assesses their severity and expands the audit accordingly. Specifically, we find that lower level internal control deficiencies are informative about financial reporting reliability, but do not provide additional predictive power

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[5] According to AS5, para 39, the relevant controls to test correspond to: *"The auditor should test those controls that are important to the auditor's conclusion about whether the company's controls sufficiently address the assessed risk of misstatement to each relevant assertion."*

for material financial reporting errors. More broadly, the body of analysis suggests that auditors are able to assess internal control over financial reporting (ICFR) correctly. Our results indicate that an auditor's ability to identify the relevant controls is a significant driver of the lack of timeliness in the disclosure of internal control weaknesses.[6]

The remainder of this paper is structured as follows. Section 2 provides some background and our main hypotheses; Section 3, the data; Section 4, the empirical analysis; and Section 5, several robustness tests. Section 6 concludes.

2. Background and Hypotheses

2.1. Background on internal control deficiencies

The Sarbanes-Oxley Act, Section 404, requires company management (typically the chief financial officer) to assess and report on the company's internal control over financial reporting (ICFR). It also requires a company's independent auditors to issue an "attestation" that provides an independent reason to rely on management's assertion of the effectiveness of the company's ICFR. This opinion requires significant effort and expense through the expansion of audit procedures and results in higher audit fees (e.g., Raghunandan and Rama 2006, Illiev 2010, Kinney and Shepardson 2010).[7] One purpose of the ICFR audit is to *"prevent or detect errors"* (AS5, para 42) or to foster the preparation of reliable financial statements [SEC statement on Management's report on Internal Control over Financial Reporting (ICFR), 2005].

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[6] We note that our analysis cannot completely rule out whether incentive issues drive the inability to identify the relevant controls. In particular our dataset is based on the audit workpapers. A possibility is that an auditor that does not want to report a material weakness, despite being aware of deficient controls, deliberately omits the identification of these controls in the audit workpapers.

[7] As described in more details in Coates and Srinivasan (2014), SOX mandated disclosures generated significant direct costs, which led the SEC, PCAOB and Congress to exempt implementation of section 404 for companies with market capitalization of less than $75 million. Furthermore, the PCAOB replaced Audit Standard 2 (AS2) with AS5 which reduced the scope of the ICFR attestation requirements by permitting a top-down risk-based approach which allows audit firms to focus on key control risks (e.g., Asare et al. 2013, Coates and Srinivasan 2014).

Prior studies (e.g., Doyle et al. 2007a, Ashbaugh-Skaife et al. 2008, Chan et al. 2008, Hoitash et al. 2008, and Donelson et al. 2015) document an association between ICMW and lower reporting quality (including accrual quality, errors and frauds). However, these studies focus primarily on material weaknesses because they are publicly disclosed whereas lower-level control deficiencies are not. One exception is Ashbaugh-Skaife et al. (2008) who study lower level internal control deficiencies voluntarily disclosed under SOX 302. However, because these disclosures are voluntary, they are subject to self-selection reporting incentives which are not present in our analyses. Another exception, Bedard and Graham (2010), focuses on detection and severity classification of internal control deficiencies using a proprietary dataset of 76 audits in 2004-2005 of smaller accelerated filer companies. In contrast with ours, the focus of their study is on auditor versus client detection of internal control deficiencies. They find that managers often underestimate the severity of internal control deficiencies in comparison with the auditor.[8]

As part of its inspection of public company audits, the PCAOB collects information about inspected engagements (e.g., Riley et al. 2008), which includes the auditor's assessment of its client's system of internal control over financial reporting. These inspections are focused on a limited number of areas or accounts (e.g., Hanson 2012, Center for Audit Quality 2012), so internal control deficiency data are available only for the areas of inspection focus. Authoritative guidance indicates that the severity should be based on the likelihood the company's controls will fail to prevent or detect a misstatement and the magnitude of a potential restatement (AS5, para 63). Internal control deficiencies are categorized into three groups (ordered by increasing level of severity):

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[8] Our study is also related to DeFond and Lennox (2015), who focus on whether PCAOB inspections improve the quality of internal control audits.

1. **Internal Control Deficiency (ICD):** A control deficiency exists when the design or operation of a control does not allow the company's management or employees, in the normal course of performing their assigned functions, to prevent or detect misstatements on a timely basis. Deficiencies are required to be reported to management in writing but do not require public disclosure or disclosure to the audit committee. (AS5, para A3)

2. **Internal Control Significant Deficiency (ICSD):** A significant deficiency is a deficiency or combination of deficiencies in internal control over financial reporting that is less severe than a material weakness, yet important enough to merit attention by those responsible for oversight of the companies' financial reporting. ICSDs are required to be reported to management and the audit committee in writing but do not require public disclosure. (AS5, para A11)

3. **Internal Control Material Weakness (ICMW):** A deficiency or combination of deficiencies in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of a company's annual or interim financial statements will not be prevented or detected on a timely basis (AS5 para A7).[9] Material weaknesses are reported to the audit committee and are publicly disclosed with the company receiving an adverse ICFR opinion.

The severity of a deficiency does not depend on whether a misstatement occurs, but rather on whether there is a reasonable possibility that the company's controls will fail to prevent or detect a misstatement. In assessing deficiencies, auditors should consider factors such as the susceptibility of the related asset or liability to loss or fraud, and the subjectivity, complexity or extent of judgment required to determine the amount involved (AS5, para 65). Thus, at least conceptually, auditors should not determine the severity of the deficiencies based on reporting outcomes, in contrast with recent empirical evidence on the topic (Kinney et al. 2013, Rice and Weber 2012, Rice et al. 2015).

In practice, determination of the severity level of internal control deficiencies is difficult, subjective, and involves considerable expertise and judgment (e.g., Hoitash et al. 2008, Bedard and Graham 2011, Kinney et al 2013), suggesting that auditors will seek objective evidence such

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[9] Reasonable possibility of an event refers to the likelihood of an event being either "reasonably possible" or "probable" as used in SFAS 5, Accounting for Contingencies (FASB, 1975).

as misstatements to support their judgments. For example, Kinney et al. (2013) report a 2006 interview of a technical audit partner, who mentions that *"In the absence of a misstatement, whether material or not, our auditors have difficulty identifying design weaknesses […] Even when [they] do identify a design weakness, our clients often disagree that it is material unless some actual misstatement has resulted from the design weakness."* This observation is echoed by Martin Baumann, Chief Auditor at the PCAOB, who mentions, in a 2010 speech, that

> *"It has been observed that disclosures of material weaknesses, which should be a leading indicator of potential financial reporting problems, have instead become a lagging indicator. That is, material weaknesses seem to be reported, generally, only in connection with a restatement – where the material weakness is often obvious. In many cases a material weakness likely existed before the restatement as well, but unfortunately the ICFR audits are often not identifying them."* (Baumann 2010).

2.2. Hypotheses

We consider first whether company management and auditors have incentives to misclassify the severity of identified internal control deficiencies. Prior research (Rice and Weber 2012, and Rice, Weber and Wu 2015) suggests that such incentives to misclassify exist.[10] Specifically, Rice et al. (2015) document that class action lawsuits, management turnover and auditor turnover are all more likely following a restatement when ICMW were previously reported. However, they are unable to evaluate whether deficiencies and significant deficiencies also lead to similar outcomes. Furthermore, auditors could also have incentives to detect and disclose ICMW if they are properly compensated for their extra-effort. In other words, it could be the case that an auditor that detects internal control deficiencies is able to charge the same fees per hour for the extra-hours worked on the account, thereby increasing the overall size and

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[10] Anecdotal evidence also suggests that such incentives exist. For example, Whitehouse (2016a) reports, about whether to classify an internal control issue as a significant deficiency or a material weakness, that *"It's a touchy discussion, said Robert Crook, vice president of internal audit for Loews Corp., because the stakes are high. A material weakness has to be disclosed to investors, but a significant deficiency does not. "That could have an adverse effect on any kind of debt or equity offering," he said."*

profitability of the particular audit engagement. Consequently it remains an empirical question whether management and auditors have aligned incentives to misclassify the severity of identified internal control deficiencies. We test the following hypothesis, stated in its alternative form:

H1: Auditors and management have aligned incentives to underestimate the severity level of identified ICMW to significant deficiencies or deficiencies.

The relation between lower-level control deficiencies and financial reporting quality is not clear ex ante. On the one hand, if auditors misclassify identified material weaknesses as lower-level deficiencies, then lower-level internal control deficiencies would be predictive of material financial reporting errors because such control deficiencies should have been classified as ICMW, which, by definition, indicate an increased likelihood of future restatement. Thus, a finding that deficiencies are related to material financial reporting errors suggests the auditor misclassified the severity of internal control deficiencies. On the other hand, if the auditor properly classifies the severity of identified deficiencies, then this indicates that auditors believe the internal controls are sufficient and/or they can provide reasonable assurance of financial statement reliability, perhaps through additional substantive testing or analytical procedures. We test the following hypothesis:

H2: Lower-level internal control deficiencies are not associated with material financial statement errors.

PCAOB inspections of integrated audits consider whether internal control deficiencies were appropriately evaluated by the auditor for certain financial statement areas. For engagements with errors in the classification of the severity of internal control deficiencies, lower level internal control deficiencies should predict material financial statement errors. If PCAOB findings accurately measure such errors in severity assessments, these deficiencies

should have been classified as ICMW and hence they should predict material errors. Consequently we test the following hypothesis:

H3: For audits that were identified as deficient by the PCAOB in the classification of the severity of internal control deficiencies, lower level deficiencies are predictive of material financial statement errors.

Finally, we consider two potential reasons why ICMW often do not precede material financial misreporting. 1) The auditor does not properly identify relevant controls or 2) the auditor fails to properly test these controls. We assess whether these audit deficiencies identified by the PCAOB are informative about material financial misreporting.[11]

3. Data

We obtain proprietary data on internal control deficiencies collected by the PCAOB as part of its inspection process of registered public accounting firms.[12] The PCAOB has authority to oversee public accounting firms that audit issuers [Sarbanes Oxley (SOX) Act of 2002]. This oversight is executed in part by using a risk based approach to select and review audit engagements (e.g., Hanson 2012). The purpose of the review is to assess the adequacy of the audit opinion and audit work performed by the engagement team for both the ICFR and financial statement audit.[13] An inspection typically focuses on three areas of the audit, where an area is generally defined by a type of transaction. Frequent focus areas include revenue, business combinations, investment valuations, and allowances for doubtful accounts or loans (Hanson 2012). We hand collect and compile data obtained by the PCAOB about the auditor's internal

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[11] Aobdia (2015a) documents a positive association between Part I Findings and restatements and therefore we expect that some types of ICFR Part I Findings should be predictive of concurrent and future restatements.

[12] To access these proprietary data we submitted a research proposal to the PCAOB stating the nature of our study, the data necessary to conduct the study, existing work in the area, and proposed research questions. Upon approval, we collected the ICFR data from individual PCAOB inspection documents compiled into a single dataset. Our research was reviewed by PCAOB for the release of nonpublic information.

[13] For details on the inspection process, see Aobdia (2015a), Section 2 and Aobdia (2015b).

control assessment for the engagements inspected between 2010 and 2014 for the six largest audit firms (Deloitte, PWC, KPMG, Ernst & Young, BDO, and GT), which typically corresponds to issuer fiscal year ends between 2009 and 2013.[14] The internal control assessment in our dataset follows AS5 and includes the number of control deficiencies, significant deficiencies and material weaknesses the issuer has in its internal control process for each inspected area. We eliminate all observations (approximately 5%) that are not subject to ICFR auditor opinions to mitigate concerns that auditor procedures, findings, and ICFR deficiencies are handled differently for these particular issuers.

We combine data on internal control deficiencies with: 1) PCAOB proprietary data on total audit hours per engagement, obtained from audit firms through annual data request forms, 2) PCAOB proprietary data on audit deficiencies (Part I Findings) in internal control assessments identified by the PCAOB in its inspections of individual audit engagements, 3) publicly available data on audit fees, restatements/revisions, and adjustments from Audit Analytics, and 4) publicly available data from COMPUSTAT and Execucomp on issuer financial characteristics and CFO information. Our final sample contains approximately 1,000 engagements, with variation in the number of observations depending on the overlap between the internal PCAOB data and the public data sources.

Table 1 reports summary statistics of the variables employed in our analysis (see the appendix for detailed variable definitions). Among all engagements, as the most severe deficiency identified, 5% have material weaknesses (*MW* variable), 16% have significant deficiencies (*Significant_Deficiency*), 34% have more than two deficiencies (*Deficiencies > 2*),

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[14] We do not collect data prior to 2010 inspections. Changes in the collection process and data availability significantly complicate the comparability of the results in prior years.

and 20% have one or two deficiencies (*Deficiencies*).[15] Thus, internal control issues are identified in 75% of the engagements. Further, lower-level internal control deficiencies are fairly common and are present in 70% of the audit engagements. Relative to deficiencies, significant deficiencies are less present, and material weaknesses are reasonably rare.

[Insert Table 1 About Here]

Table 1 also shows that deficiencies in the ICFR audit, as identified by the PCAOB in the form of Part I Findings for the focus areas subject to inspection, are not uncommon.[16] In particular, the PCAOB claims that the auditor fails to properly identify relevant controls in 18% of the engagements, and to test them properly in 24% of the inspected engagements. In contrast the PCAOB claims that, conditional on identifying the relevant controls, the auditor misclassifies the severity of the deficiencies identified in the internal controls in only 5% of the sample. Also consistent with prior literature, we find that audit fees and hours are highly skewed and we use the natural logarithm of fees and hours to adjust for the skewness. The median audit engagement in our sample costs approximately $1.5 million, which reflects 8,300 audit hours.

Table 1 also shows that more than 20% of our sample has an error of some type in financial statements [including restatements (5%), revisions (15%), and out of period adjustments (8%) defined following Choudhary et al. 2016]. Since there are more issuers with control deficiencies than there are issuers with errors in financial statement, these statistics suggests either that some deficiencies do not result in error, or that errors exist and are not detected.

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[15] Note that these deficiencies are only for the focus areas for the PCAOB inspections. They do not reflect other potential deficiencies in other areas of financial reporting. However, the highest audit risk areas are selected for inspection (Hanson, 2012), potentially mitigating some of the partial observability of the data. See Section 5 for additional tests that address this partial observability of the data.

[16] These deficiencies are mostly related to the application of specific sections of AS5, which details the internal control assessment.

4. Empirical Analysis

4.1 Incentives not to Report a Material Weakness

4.1.1 CFO Turnover

First, we assess in initial analyses whether there is a difference in cost from a company or an auditor standpoint to report a material weakness versus a significant deficiency. We conduct two tests to assess this premise. In the first test, we focus on executive turnover and test whether internal control assessments are associated with CFO turnover. We specifically focus on CFO turnover because prior research suggests that the CFO assumes the lead role in managing and assessing internal controls (e.g., Hoitash et al. 2012), but also consider in untabulated tests other variables, such as compensation and CEO turnover. We conduct the following logistic regression:

$$CFOSwitch_{i,t+1} = \alpha + \beta_1 Deficiencies_{i,t} + \beta_2 Deficiencies > 2_{i,t} + \beta_3 Significant\_Deficiency_{i,t} \qquad (1)$$
$$+ \beta_4 MW_{i,t} + \beta_5 Controls_{i,t} + Year\ Fixed\ Effects + \varepsilon_{i,t}$$

The subscripts *i* and *t* correspond to issuer and year, respectively. The dependent variable, *CFOSwitch* is equal to one if the issuer experiences a CFO turnover during the following fiscal year. CFO data are obtained from Execucomp. We measure CFO turnover the year following the assessment of the internal controls by the auditor (i.e. by comparing the CFO at t+1 with the CFO at t) to account for whether the disclosure of specific internal control deficiencies drives the turnover effect.

In Model (1) and most specifications in the paper, the internal control variables (*Deficiencies*, *Deficiencies > 2*, *Significant_Deficiency* and *MW*) equal one if the most severe identified internal control deficiency documented constitutes one or two deficiencies, more than two deficiencies, a significant deficiency, or a material weakness, respectively. These are

mutually exclusive groups. Because the vast majority of the sample includes at least one internal control deficiency, we split deficiencies into two groups: two or fewer and more than two, to identify more variation in our sample. To be comprehensive, we also show results using non-mutually exclusive indicator variables, which take the value one when a corresponding deficiency is identified, even if a worse deficiency is also present. We also show the results using a continuous variable, the logarithm of the number of deficiencies. Because our results are qualitatively unchanged regardless of the classification used, we tabulate only results using mutually exclusive categories in subsequent analyses.

Model (1) includes CFO-specific control variables that could affect CFO turnover; specifically, *CFOAge*, the age of the CFO, and *CFOAge65*, equal to one when the CFO is more than 65 year old. In all our analyses, we also include control variables that potentially explain cross-sectional variation in CFO turnover, audit hours, audit fees and financial statement errors (e.g., Doyle et al 2007a; Ashbaugh-Skaife et al. 2007; Lobo and Zhao 2013). We control for auditor characteristics using an indicator for a big four accounting firm (*Big4*) and an indicator (*Specialist*) if in a particular year the accounting firm has the largest market share of audit fee revenue that is at least 10 percentage points greater than the second industry leader in the client's industry (by two-digit SIC code). We control for performance using *ROA* (net income/total assets) and an indicator variable (*Loss*) if the issuer reports a loss. We control for issuer complexity using: the log of total assets (*Logat*), the sum of business and geographic segments (*Segments*), an indicator if the company pays non-zero foreign taxes (*MNC*), restructuring charges scaled by beginning of period assets (*Restructure*), and an indicator for whether the company had an acquisition that contributed to sales (*Merger*).

Following Lobo and Zhao (2013) we control for the percentage change in sales from the prior to current year (*Salegrowth*), an indicator if the sum of new long-term debt plus new equity exceeds two percent of lagged total assets (*External_Financing*), the book to market ratio (*BTM*), and an indicator equal to one if free cash flows from operations scaled by lagged current assets is less than -0.5 (*Ext_Fin_Demand*). Following Rice et al. (2015) we use an indicator for whether the issuer is in the biotech, computer, electronics, or retail industries (*Lit_Industry*). We also include an indicator set to one if a restatement or revision was announced in that fiscal year (*Restatement_Announce*, *Revision_Announce*). We include year fixed effects to address year-specific changes in our dependent variables.

In all analyses, continuous variables are winsorized at the 1st and 99th percentiles and we cluster the standard errors at the issuer level. Two-tailed significance levels are reported for all tests. We note that, due to the absence of time-series in the inspection data, our empirical results are mostly cross-sectional, a limitation of the inspection data noted in Aobdia (2015a). Detailed descriptions of all variables are in the appendix.

[Insert Table 2 About Here]

Table 2 reports the results of Model (1). Column (1) presents the analyses using mutually exclusive categorizations of internal control deficiencies, Column (2) when having these categorization non-mutually exclusive, and Column (3) when reporting the logarithm of the number of each type of deficiencies. Our findings in Table 2 suggest that only material weaknesses in a company's internal controls are associated with CFO turnover.[17] In particular, *MW* loads positively in the regressions (p<0.01), while the other types of deficiencies, including

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[17] Given that the ICFR evaluation often begins with an assessment by the CFO, one possible explanation for this association is that the CFO misclassifies the severity of the ICFR problem relative to the auditor, leading to turnover. We are unable to test for this possibility because we do not have access to management's assessment of ICFR prior to the audit.

significant deficiencies, are not significant (p>0.10). An untabulated F-test supports that the

coefficient on *MW* is significantly different from *Significant_Deficiency* (p<0.01). This result

suggests that the identification and disclosure of an ICMW is associated with negative career

effects on the issuer management, whereas the identification of internal control deficiencies or

significant deficiencies does not.[18] At the average of the control variables, we find that the

probability of a CFO switch increases by 43%, much greater than the average switching

probability of 14% (untabulated). In unreported analysis, we also examine whether internal

control deficiencies are associated with either auditor switches and/or CEO switches. Our

findings imply, consistent with Hoitash et al. (2012), that ICMW affect mostly CFOs; we fail to

find evidence that CEO or auditor turnover are related to any internal control deficiencies.

Overall, these results suggest negative consequences of disclosure of ICMW and are

consistent with management incentives to pressure the auditor to underestimate the severity of an

internal control deficiency because of the negative career effect. Next, we evaluate whether the

auditor has aligned incentives to report a material weakness as a deficiency.

4.1.2 Audit Effort and Pricing

We focus on whether internal control deficiencies influence audit effort, pricing and

profitability with the following OLS regression:

$Logaudithours_{i,t}$ or $Logauditfees_{i,t}$ or $Fees\_Per\_Hour_{i,t}$ = α + $\beta_1 Deficiencies_{i,t}$ (2)
    + $\beta_2 Deficiencies > 2_{i,t}$ + $\beta_3 Significant\_Deficiency_{i,t}$ + $\beta_4 MW_{i,t}$ + $\beta_5 Controls_{i,t}$ + *Year*
    Fixed Effects + $\varepsilon_{i,t}$

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[18] To further strengthen the analysis in Table 2 we perform untabulated tests where we vary the dependent variable to CFO turnover at time t and t+2, We fail to find an association between *MW* and CFO turnover before or after the year of the *MW* disclosure, casting doubt on the possibility that time invariant correlated omitted variables could be driving our tabulated results. We also consider CFO salary and bonus as additional dependent variables because the effect of lower level deficiencies could result in outcomes less severe than turnover. We fail to find evidence of an association between CFO salary or bonus and *Significant_Deficiency* (or *MW*) at the 10% level or better, casting doubt on the possibility of a less severe outcome driving the lack of an association between CFO turnover and *Sigfinicant_Deficiency*.

The dependent variables are *Logaudithours*, the logarithm of the number of audit engagement hours, *Logauditfees*, the logarithm of audit fees, and *Fees_Per_Hour*, total audit fees divided by total audit hours. We use similar explanatory variables and control variables as in Model (1).

Table 3 reports results on the association between internal control deficiencies and audit effort/hours in Column (1), audit fees in Column (2) and fees per hour in Column (3), respectively. Since the control deficiencies are known by the reporting date (and usually earlier), we expect control deficiencies to affect contemporaneous audit effort to maintain audit risk at the pre-audit planning level.

[Insert Table 3 About Here]

The results in Column (1) suggest that audits require more effort when internal control deficiencies are detected, with increasing effort for more severe deficiencies. In particular, the coefficient on *Deficiencies* is positive at 0.08 but insignificant ($p>0.10$), whereas the coefficient on *Deficiencies > 2* is 0.18 and is significant at 1%. The coefficient is 0.27 when the issuer has significant deficiencies and 0.47 when the issuer has material weaknesses ($p<0.01$). F-tests indicate these differences are significant (at 10% or better). The identification of more than two internal control deficiencies (a significant deficiency) [a material weakness] is associated with an increase of audit hours of 20% (31%) [60%].[19] These results imply that auditors respond to internal control deficiencies by increasing audit hours, more so when the deficiencies are more severe.

Since the auditor expands audit hours when faced with internal control deficiencies, we expect audit fees to rise as well. Column (2) examines this proposition; we find evidence that

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[19] Because the dependent variable is the natural logarithm of audit hours, the economic significance of an indicator variable is $e^{(\text{coefficient of interest})}-1$.

audit fees increase in response to control deficiencies. In particular, the coefficient on *Deficiencies* is positive at 0.07 and insignificant (p>0.10), whereas the coefficient on *Deficiencies > 2* is positive at 0.17 and significant at 1%. The coefficient is 0.24 for significant deficiencies and 0.28 for material weaknesses (p<0.01). An F-test indicates that the coefficient on *Significant_Deficiency* is not significantly different from the coefficient on *Deficiencies > 2* or from *MW* (p>0.10). Overall, these results suggest that the auditor is unable to fully recoup its increased effort in the form of higher audit fees when the identified deficiencies are more severe, a proposition we examine further in Column (3).

Column (3) examines the profitability of the audit, using *Fees_Per_Hour*. The findings in Column (3) indicate that lower-level deficiencies are not associated with auditor hourly rates (p>0.10). However, identified ICMW appear to have a negative impact on audit profits, as evidenced by a negative coefficient on *MW*, significant at 1%. One possible explanation for lower profitability of audits with material weaknesses is that they require more effort from lower level audit staff who bill at lower rates. However, in untabulated analyses, when we control for the ratio of partner hours, we still find a negative association between *MW* and auditor profitability (p<0.05) and fail to find a significant negative association between *Significant_Deficiency* and fees per hour (p>0.10). The economic impact on profitability is a fee-per hour decline of $39 for reported *MW*. Relative to the average fee per hour of $229, this represents a 17% decrease in billing rate. Overall these results suggest that auditors increase engagement hours when they encounter material weaknesses, even if they are not compensated at the same rate for doing so. This observation is consistent with auditors having an incentive to underestimate the severity of material weaknesses to a significant deficiency in order to preserve

the audit profitability.[20] Collectively, the results in Section 4.1 are consistent with both management and auditor incentives to report ICMW as deficiencies.

4.2 Internal Control Deficiencies and Accounting Errors

Next we investigate whether there is an association between lower-level internal control deficiencies and material financial reporting errors. In particular, if the auditor properly classifies internal control deficiencies, we expect that lower-level deficiencies are not associated with material financial reporting errors, but could be associated with financial reporting reliability through immaterial errors.

Errors are inaccuracies in recognition, measurement, presentation or disclosure in financial statements resulting from mathematical mistakes, mistakes in the application of GAAP, or misuse of facts that existed at the time financial statements were prepared (ASC 250-10). We combine data from the Audit Analytics Restatement and Out of period adjustments databases to form a sample of financial statements with errors. The former includes restatements that result in Item 4.02 statement of non-reliance in an 8-K filing (SEC Rule 33-8400) as well as errors classified as revisions which are often recorded as prospective corrections to current and future financial reports with adjustments to opening balances of retained earnings.[21] Because restatements require a statement of non-reliance on prior financial statements, they represent material errors (Choudhary et al. 2016). We also distinguish between: 1) contemporaneous errors

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[20] Given that audit fees increase slightly, it is useful to consider whether the auditor can still break even on the extra-hours required to audit an engagement with a material weakness in comparison with an engagement with a significant deficiency. We conduct such an analysis for an audit at the average of *Logaudithours* and *Logauditfees* in the sample. We find, based on the results of Table 3 Columns (1) and (2), that hours increase by approximately 2,500 hours ($=e^{(9.07+0.471)}-e^{(9.07+0.27)}$) when a material weakness is identified, in comparison with a significant deficiency, whereas audit fees increase by approximately $85,000 ($=e^{(14.37+0.275)}-e^{(14.37+0.237)}$). Thus, the extra hours are billed at $34 an hour, which can only be profitable for the audit firm if idle labor capacity is available [entry-level yearly Big 4 salaries are around $60,000 (McKenna, 2008), corresponding to an hourly rate of $30 based on 2,000 hours per year].

[21] See the December 2008 speech made by SEC Chief Accountant, Mark Maher; available at http://www.sec.gov/news/speech/2008/spch120808mm.htm.

(errors that affect period t and were discovered at any time including those known at the audit opinion date), 2) future discovery of contemporaneous errors (which includes errors that occur in t, but are discovered after the audit opinion date), and 3) future errors which includes future discovery of contemporaneous errors and errors that affect period t+1.[22] The out of period adjustments database includes errors disclosed in the financial statements that are attributed to a prior period that do not materially affect past or present financials (ASC 250; for examples See Appendix A in Choudhary et al. 2016). We estimate a similar model to Model (2), replacing the dependent variable with *Error*, an indicator equal to one if the financial statement has either a *Restatement*, *Revision*, or *Adjustment* error. Our model is consistent with prior literature that assesses the relationship between ICMW and concurrent and future financial misreporting (e.g., Doyle et al. 2007a, Donelson et al. 2015), but incorporates both material and immaterial errors as dependent variables, and deficiencies and significant deficiencies as explanatory variables.

Table 4, Panel A, estimates the model for financial reporting errors across different time periods. Column (1) reports contemporaneous errors, Column (2) reports future discovery of contemporaneous errors, and Column (3) reports future discovery of errors.

[Insert Table 4 About Here]

The results imply that significant deficiencies and ICMW contain information about financial reporting quality. In particular, in Column (1), the probability of a cotemporaneous error increases with the severity of the deficiencies in controls from 0.05 for *Deficiencies* and 0.26 for *Deficiencies > 2* to 0.62 for *Significant_Deficiencies*, and to 1.64 for *MW*, with the coefficients on *Significant_Deficiencies* and *MW* significant at 1%. Untabulated marginal effects

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[22] For example contemporaneous errors would include errors to interim financial statements that were discovered prior to the audit opinion date, whereas future discovery of contemporaneous errors and future discovery of errors would exclude these.

indicate that the average significant deficiency is associated with a 12% increase in error rate, while a material weakness is associated with a 37% increase in error rate. Results are generally economically similar for *Significant_Deficiency*, but lower for *MW*, in Columns 2 (3) when limiting the analysis to future discovery of contemporaneous errors (future discovery of errors), which excludes errors known when the financial statements are filed. For example, in Column 3, the average significant deficiency is associated with a 13% increase, and a material weakness with a 24% increase in error rate. Some errors in financial statements, such as those affecting the cash flow statement, do not affect stockholders equity or net income (untabulated). When we drop the observations with errors that do not affect net income to restrict the analysis to errors that affect net income (Panel B of Table 4), we find similar results.

Next, we separately analyze the error types based on the materiality of the error to evaluate whether auditors are able to assess the severity of internal control problems accordingly (AS 5). We infer the materiality from the type of disclosure regarding the error following Choudhary et al. (2016). In this analysis, our main assumption is that auditors and managers faithfully apply authoritative guidance such that the way errors are reported accurately reflects the materiality assessment of the error. The results in Table 5 suggest that the severity of the deficiencies is informative about the materiality of the error. In Panel A, we focus on contemporaneous errors. We find that material weaknesses increase the probability of a restatement by 18% and a revision by 13% (untabulated). Significant deficiencies are not associated with the probability of a restatement or a revision, but positively predict concurrent adjustments (9.4%; untabulated)). Finally, having more than two control deficiencies increase the probability of out of period adjustments by 7% (untabulated), but are not related to revisions and/or restatements (p>0.10).

[Insert Table 5 About Here]

In Panel B, we focus on future discovery of errors, and find that the ability of control deficiencies to predict errors declines. We find that *MW* does not predict restatements, but does predict revisions (p<0.05; untabulated marginal effect of 14%). Both significant deficiencies and *MW* are predictive of out of period adjustments (p<0.05; untabulated marginal effects of 6.6% and 12.7%, respectively). Thus, our findings suggest that more severe deficiencies are associated with more significant financial reporting errors, consistent with AS5. These findings further indicate that auditors are usually able to perform sufficient substantive tests in the presence of internal control deficiencies and significant deficiencies such that the financial statements do not need to be subsequently revised or restated. Thus, the increase in audit effort documented in Table 3 appears to be generally sufficient to avoid material errors in financial reports altogether. Collectively the results in this subsection cast doubt on the possibility that misclassification of internal control deficiencies explains why MWs do not often precede material financial reporting errors.

4.3 Audit Deficiencies, Internal Control Deficiencies and Accounting Errors

We investigate whether ICFR audit deficiencies identified by the PCAOB influence the association between auditors' assessment of internal controls and material errors. Because all the engagements in our sample are inspected, we are able to determine for each observation whether the PCAOB identifies audit deficiencies in internal control. We incorporate these audit deficiencies in our empirical models.

The PCAOB, when inspecting individual audit engagements, identifies audit deficiencies (Part I Findings), meaning that it concludes that the auditor did not conduct sufficient work to support its ICFR and/or financial statement audit opinion (e.g, Aobdia 2015a). We obtain the list

and nature of the Part I Findings for each inspected engagement, including the specific areas of the audit standards that the PCAOB concluded were not met. We classify ICFR Part I Findings into four categories based on the nature of these audit standards. The vast majority of the deficiencies reference misapplication of specific paragraphs in AS5.

We perform analyses similar to those in Subsection 4.2, using *Restatement* as the dependent variable. We augment our initial model with four additional explanatory variables of internal control PCAOB Part I Findings: *Part1Identify* is equal to one when the PCAOB concludes that the auditor did not properly identify the issuer's relevant internal controls. *Part1Testing* is equal to one when the PCAOB concludes that the auditor did not properly test the issuer's internal controls. *Part1Severity* is equal to one when the PCAOB concludes that the auditor did not properly assess the severity of the issuer's internal control deficiencies. Finally, *Part1Other* is equal to one if the PCAOB identifies any other type of internal control audit deficiency (3% of the sample, included for comprehensiveness).[23] If the auditor does not properly identify or test the issuer's relevant internal controls that are designed to prevent or detect material errors, we expect positive associations between *Part1Identify*, *Part1Testing* and *Restatement*. Furthermore, if the auditor misclassified the severity of the internal control deficiencies, we expect that deficiencies and/or significant deficiencies will predict material errors (H3). Consequently, we also interact *Part1Severity* with each type of internal control deficiencies.

Table 6, Panel A presents the results of our analyses when we focus on the main effects, where we vary the error discovery and affected period across each column. We find a positive

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[23] The *Part1Other* category is mostly composed of issues related to benchmarking automated controls (Appendix B of AS5).

association between *Part1Identify* and *Restatements* across each column. Untabulated analyses indicate that *Part1Identify* is associated with a 4% higher propensity for future discovery of an error (p<0.01). This result suggests that the failure to identify the relevant issuer's controls increases, by 4%, the probability of material financial reporting errors (the average restatement probability in our sample is 5%). This result, combined with those in prior tables, suggests that auditors fail to identify relevant controls and therefore do not test them.. Ultimately when the auditor fails to identify deficiencies she does not increase her audit effort (substantive testing) to compensate for undetected internal control deficiencies, thereby increasing the risk of a restatement. Given that 1) 18% of the inspected engagements receive Part I Findings in identifying controls and 2) many control deficiencies exist in our sample when controls are identified and tested, our analysis above also indicates that one reason that material errors are not preceded by a material weakness could be because the auditor does not identify the relevant internal controls in the first place.

We also find a positive coefficient on *MW* in Column (2) when we focus on future discovery of contemporaneous errors and no association in Column (3) when we focus on future discovery of errors. This result suggests that in presence of an identified material weakness, the auditor sometimes does not sufficiently increase substantive testing in order to reduce the risk of material financial error. However, the auditor does so in the next period, or the issuer takes remedial action on the material weakness such that there is no relation between material weaknesses and future errors.

[Insert Table 6 About Here]

Table 6, Panel B presents the results of our analyses when we focus on the interaction between *Part1Identify* and indicator variables that proxy for the severity in internal control

deficiencies. We estimate this regression using OLS so that we can properly interpret the interaction terms (e.g., Ai and Norton 2003). We generally find positive coefficients on the interactions between *Part1Severity* and *Deficiencies*, *Deficiencies > 2* and *Significant_Deficiency*, and the interaction with *Significant_Deficiency* is statistically significant at 5% or better in all columns. Overall, this result indicates that when the auditor misclassifies severity of internal control deficiencies, these deficiencies become informative for material errors, consistent with the arguments advanced by regulators and anecdotal evidence observed.

4.4 Audit Deficiencies, Internal Control Deficiencies and Material Weaknesses

We confirm our results in the prior section by applying similar models as above but with the propensity of an issuer to have an amended or future material weakness as the dependent variable. An amended material weakness or future material weakness is a strong indicator of higher risk of future material error for an issuer.[24]

Results are presented in Table 7. We find in Column (1) a positive association between *Significant_Deficiency* and an amended or future material weakness,[25] suggesting that significant deficiencies are sometimes upgraded later on. We also find positive associations between *MW* and future material weaknesses, indicating that existing material weaknesses are not always remediated immediately after their identification, or new internal control problems surface.

[Insert Table 7 About Here]

In Column (2), we find that *Part1Severity* loads positively, indicating that misclassification in the level of severity is likely to result in the disclosure of an amended or future material

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[24] According to SEC Release No. 33-8810, section B4, there is "no requirement for management to reassess or revise its conclusion related to the effectiveness of ICFR…. in light of a restatement." Thus, the lack of a revised ICMW opinion does not indicate a lacking link between internal controls and material errors.

[25] An amended material weakness refers to an ICFR opinion for period t, revised in a future period.

weakness. This result is consistent with our results in Table 6. However, the interaction *Significant_Deficiency* × *Part1Severity* while positive, is insignificant in Column (3). This could be due to the limited number of observations with audit deficiencies in the severity assessment or with material weaknesses, which comprise only 5% of the sample for each.

5. Additional Tests

Using PCAOB proprietary data to study the effects of undisclosed internal control deficiencies introduces at least two potential concerns that could affect our ability to generalize the results from our sample. First, the data available to us on internal control deficiencies collected during inspections captures only the deficiencies identified in the areas selected for review. In other words, the internal control deficiency data we use are subject to measurement error. For example, *Deficiencies > 2* and *Significant_Deficiency* recorded as zero in the data (because none of the areas inspected had internal control problems) could actually be one if a deficiency exists in an area not selected for PCAOB inspection. Second, the PCAOB uses a risk based approach to select its inspected audit engagements, so the sample is by construction non-random.

We attempt to shed some light on whether measurement error and selection bias affect the generalizability of our inferences by exploiting a unique feature of our setting. Specifically, all the outcomes we study (e.g., audit hours, audit fees, and financial statement errors), and material weakness data are available for both inspected and non-inspected issuers. Because the internal control assessments for lower-level deficiencies arise from the same audit procedures, conducted by the same people, we believe it is reasonable to expect that evidence of measurement error and selection bias affecting material weaknesses is informative about the impact on lower level deficiencies.

5.1.Measurement error

We provide evidence of how measurement error could affect our inferences by exploiting the fact that we have material weakness data that is collected from two sources: 1) PCAOB inspection of selected areas (*MW_PCAOB*) and 2) public disclosures in financial statements collected by Audit Analytics (*MW*). Our tabulated analysis (Tables 1-7), are based on data from Audit Analytics to test for the effects of ICMW. That is, our tabulated results on material weaknesses do not suffer from measurement error, but do potentially suffer from measurement error in deficiencies and significant deficiencies. We compare the results using *MW_PCAOB* with *MW* to assess whether the measurement error arising from partial observability affects the relation between material weaknesses and our outcomes of interest. If the measurement error is correlated with any outcomes of interest, the bias could be significant such that we would reject the null hypothesis that *MW_PCAOB = MW*. We use a test of seemingly unrelated estimates to test for statistical differences between the two coefficients.

The results in Table 8, Panel A-D indicate that the differences between the coefficients on *MW_PCAOB* and *MW* are usually statistically insignificant. In most cases, they are economically insignificant as well. The exception is with respect to frequency of errors where the bias appears to overstate the magnitude of the relation with differences significant at the 5% level. Once we differentiate by the materiality of errors, the issue appears to be isolated to revisions. However, the direction of the relation between ICFR and errors is consistent across both the inspected sample and full sample. In general, we also note that the correlation between *MW* and *MW_PCAOB* is 0.83 (p<0.01), consistent with prior PCAOB claims made that the areas it inspects are the most critical parts of the audit (e,g., Hanson 2012). Collectively these findings imply that measurement error is not a major concern.

5.2 Selection Bias

We provide evidence of whether and how selection bias could affect our inferences by exploiting the fact that we can observe our outcomes of interest and material weaknesses for inspected and non-inspected issuers. All of our tabulated analysis so far reflects results using inspected issuers only. Thus our inferences are potentially subject to selection bias if the risk-based approach to select engagements is correlated with our outcomes of interest. We evaluate the potential effects of selection bias by comparing the coefficients on *MW* for the inspected and full populations. If selection bias is present and affects our analysis then the coefficient on *MW* will be significantly different across the two samples. Similar to the tests in Table 8, we use a test of seemingly unrelated estimates to test for statistical difference in the *MW* coefficient across the two samples.

Our findings are reported in Table 9, Panels A-D. Our results indicate that while selection bias may affect some of our inferences, in general selection bias is not a main concern in our analysis. Specifically, the difference between the coefficients on *MW* for the inspected and full samples are largely statistically insignificant (p>0.10). There are two notable exceptions. First, the results in Table 9 indicate that CFO turnover may be affected by selection bias. Specifically selection bias appears to overstate the magnitude of the relation between CFO turnover and *MW* with differences significant at the 5% level. Second, the relation between *MW* and audit fees appears to be understated in the inspected sample with differences significant at the 5% level. Despite these differences, the direction of these relations remains similar. Yet, with the exception of the two analyses mentioned above, our study does not seem to be highly affected by any selection bias in our data.

6. Conclusion

This study finds that, despite the existence of incentives that could lead an auditor or management to misclassify the severity of identified internal control deficiencies, in general auditors correctly classify the severity of identified ICFR deficiencies. Specifically, we find that only material weaknesses are predictive of material errors in financial reporting. Only 5% of our sample is found to misclassify the severity-level of internal control deficiencies by PCAOB inspectors; when this occurs we find evidence that significant deficiencies are associated with future discovery of contemporaneous and future material restatements.

Collectively, our results indicate that misclassification of the severity of internal control deficiencies is unlikely to be the main reason for why material weaknesses do not often precede a material error restatement. Rather, our results indicate that the inability of the auditor to properly identify relevant internal controls is a contributing factor to the lack of timeliness in disclosures of internal control material weaknesses. We note a limitation of our study is that our analysis is based on large accounting firms, and therefore may not extend to the entire population of auditors. Our results help inform the debate among auditors, issuers and policy makers interested in reducing the probability of material restatement by identifying a significant reason for lack of timeliness in the identification of internal controls – the poor identification of existence of internal control deficiencies.

We note that it remains an open question whether AS5, if properly applied, is sufficient for an auditor to identify, detect and report all control deficiencies relevant for material financial reporting errors. As discussed in Coates and Srinivasan (2014), AS5 significantly relaxed the attestation requirements from those initially adopted in AS2. Our results indicate that failure to identify relevant internal controls under the top down approach in AS5 is associated with material financial reporting errors. However, due to our sample timeframe, our analysis cannot

determine whether application of a more or less rigorous auditing standard could be more or

equally helpful for the internal control assessment to be a leading indicator of financial reporting

errors. We leave this assessment to future research.

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Appendix: Variable Definition

Variable	Definition
Dependent Variables	
CFO_Switch	An indicator variable equal to one if the CFO is replaced during the fiscal year. The CFO data are from Execucomp
Logaudithours	The logarithm of engagement total audit hours
Logauditfees	The logarithm of engagement total audit fees. Audit fee data are from Audit Analytics
Fees_Per_Hour	Total audit fees divided by total audit hours
Restatement	An indicator variable equal to one if the fiscal year financial report is subsequently restated with an item 4.02 (non reliance on previously issued financial statements) filed. The data are from Audit Analytics
Revision	An indicator variable equal to one if the fiscal year financial report is subsequently restated without an item 4.02. The data are from Audit Analytics
Adjustments	An indicator variable equal to one if the fiscal year financial report is subsequently adjusted. The data are from Audit Analytics (Accounting and Oversight Module)
Error	An indicator variable equal to one if Revision equals one, Restatement equals one, or Adjustments equals one
Test Variables	
Deficiencies	An indicator variable equal to one if the most severe issue is one or two internal control deficiencies
Deficiencies > 2	An indicator variable equal to one if the most severe issue is three or more internal control deficiencies
Significant_Deficiency	An indicator variable equal to one if the most severe issue is one or more internal control significant deficiencies
MW	An indicator variable equal to one if the most severe issue is one or more material weakness
MW_PCAOB	An indicator variable equal to one if a material weakness exists in one of the areas of the audit inspected by the PCAOB
Part1Identify	An indicator variable equal to one if the PCAOB identifies a Part I Finding (audit deficiency) in the area of the auditor identifying proper internal controls at the company
Part1Testing	An indicator variable equal to one if the PCAOB identifies a Part I Finding (audit deficiency) in the area of properly testing the internal control of the company
Part1Severity	An indicator variable equal to one if the PCAOB identifies a Part I Finding (audit deficiency) in the area of properly classifying the severity of the control deficiency
Part1Other	An indicator variable equal to one if the PCAOB identifies any other Part I Finding (audit deficiency) related to ICFR
Control Variables	
Restatement_Announce	An indicator variable equal to one if the company announces a restatement with an item 4.02 (non reliance on previously issued financial statements) during the fiscal year
Revision_Announce	An indicator variable equal to one if the company announces a revision (restatement without item 4.02) during the fiscal year
Lit_Industry	An indicator variable equal to one if the firm is in the biotech, computer, electronics, or retail industries. (SIC codes: 2833-2836, 8731-8734, 3570-3577, 7370-7374, 3600-3674 and 5200-5961)
Logat	The logarithm of the company's assets
Big4	An indicator variable equal to one if the auditor is one of the Big 4
Salegrowth	The year on year sales growth (salet/salet-1-1)
ROA	Return on assets for the year prior to the restatement, computed as net income divided by total assets
Specialist	An indicator variable equal to one if the accounting firm has the largest market share of audit fee revenue in the client's industry and its market share is at least 10 percentage

Variable	Definition
	points greater than the second industry leader in the market. Industries are defined at the two digit SIC code level
External_Financing	An indicator variable equal to one if the sum of newly issued long-term debt plus newly issued equity exceeds two percent of lagged total assets
Loss	An indicator variable equal to one if net income is negative
BTM	Book to market ratio at the end of the fiscal year (CEQ/(PRCC_F*CSHO)
Ext_Fin_Demand	An indicator variable equal to one if freecash<-0.5. Freecash is cash flows from operations minus average capital expenditure scaled by lagged current assets (OANCF-average CAPX)/ACT. Capital expenditures are averaged over the preceding two years (t-2 to t-1) if CAPX is unavailable in year t-3. Capital expenditures are lagged by one year (t-1) if CAPX is unavailable in year t-2
Segments	Sum of the number of business and geographic segments per Compustat segments
MNC	An indicator variable equal to one if the firm pays non zero foreign taxes (multinational corporation)
Restructure	Restructuring charges scaled by beginning of period assets
Merger	An indicator variable equal to one if the company had an acquisition that contributed to sales (Compustat AQS>0)
CFOAge	The Age of the CFO, per Execucomp
CFOAge65	An indicator variable equal to one if the CFO is 65 years old or more

Table 1: Descriptive Statistics

This table presents the sample descriptive statistics. Variables are defined in the Appendix.

Variable	Observations	Mean	Std	25th perc.	50th perc.	75th perc.
CFO_Switch	712	0.14	0.35	0.00	0.00	0.00
Logaudithours	1,003	9.07	0.95	8.46	9.02	9.64
Logauditfees	1,139	14.37	1.03	13.67	14.22	15.00
Fees_Per_Hour	999	229.02	139.70	159.25	201.37	255.93
Error (at t)	1,144	0.25	0.43	0.00	0.00	0.00
Restatement (at t)	1,144	0.05	0.22	0.00	0.00	0.00
Revision (at t)	1,144	0.15	0.36	0.00	0.00	0.00
Adjustments (at t)	1,144	0.08	0.28	0.00	0.00	0.00
Deficiencies	1,144	0.20	0.40	0.00	0.00	0.00
Deficiencies > 2	1,144	0.34	0.47	0.00	0.00	1.00
Significant_Deficiency	1,144	0.16	0.37	0.00	0.00	0.00
MW	1,144	0.05	0.22	0.00	0.00	0.00
Part1Identify	1,144	0.18	0.39	0.00	0.00	0.00
Part1Testing	1,144	0.24	0.43	0.00	0.00	0.00
Part1Severity	1,144	0.05	0.22	0.00	0.00	0.00
Part1Other	1,144	0.03	0.17	0.00	0.00	0.00
Restatement_Announce	1,144	0.02	0.14	0.00	0.00	0.00
Revision_Announce	1,144	0.07	0.26	0.00	0.00	0.00
Lit_Industry	1,144	0.27	0.44	0.00	0.00	1.00
Logat	1,144	7.55	1.79	6.21	7.42	8.66
Big4	1,144	0.79	0.41	1.00	1.00	1.00
Salegrowth	1,144	0.15	0.44	-0.04	0.06	0.20
ROA	1,144	0.06	0.11	0.02	0.06	0.11
Specialist	1,144	0.12	0.32	0.00	0.00	0.00
External_Financing	1,144	0.61	0.49	0.00	1.00	1.00
Loss	1,144	0.27	0.44	0.00	0.00	1.00
BTM	1,144	0.58	0.54	0.28	0.49	0.83
Ext_Fin_Demand	1,144	0.04	0.20	0.00	0.00	0.00
Segments	1,144	4.94	3.36	2.00	4.00	7.00
MNC	1,144	0.64	0.48	0.00	1.00	1.00
Restructure	1,144	0.00	0.01	0.00	0.00	0.00
Merger	1,144	0.14	0.35	0.00	0.00	0.00

Table 2: Internal Control Deficiencies and CFO Turnover

This table presents the results of Model (1) that determines whether CFO turnover is influenced by the discovery of internal control deficiencies. In Column (1) *Deficiencies*, *Deficiencies>2*, *Significant_Deficiency* and *MW* are coded as mutually exclusive categories, corresponding to their exact definition in the Appendix. In Column (2) these variables are not coded as mutually exclusive and are equal to one whenever a deficiency corresponding to the specific category is identified. In Column (3) the logarithm of the number of deficiencies in each category is used as the explanatory variable of interest. Other dependent and control variables are defined in the Appendix. The coefficient is above the standard error (in parenthesis), clustered at the issuer level. Significance levels are * (10%), ** (5%) and *** (1%) using two-tailed tests.

Dependent Variable: CFOSwitch	(1) Mutually Exclusive Indicator Variables	(2) Non-Mutually Exclusive Indicator Variables	(3) Logarithm of the Number of deficiencies
Deficiencies	0.429	0.411	-0.0512
	(0.369)	(0.349)	(0.104)
Deficiencies > 2	0.0670	-0.337	
	(0.336)	(0.289)	
Significant_Deficiency	0.222	0.120	0.0181
	(0.392)	(0.298)	(0.230)
MW	2.291***	2.104***	1.459***
	(0.610)	(0.564)	(0.415)
Ext_Fin_Demand	0.229	0.279	0.318
	(0.693)	(0.686)	(0.652)
CFOAge	-0.0818***	-0.0823***	-0.0790***
	(0.0203)	(0.0204)	(0.0200)
CFOAge65	1.297	1.320	1.184
	(1.156)	(1.156)	(1.146)
Restatement_Announce	-0.481	-0.466	-0.766
	(0.659)	(0.662)	(0.769)
Revision_Announce	-0.812	-0.817	-0.678
	(0.534)	(0.539)	(0.536)
Lit_Industry	0.231	0.230	0.190
	(0.261)	(0.260)	(0.261)
Logat	0.0578	0.0594	0.0665
	(0.0755)	(0.0764)	(0.0757)
Big4	0.949**	0.962**	0.954**
	(0.461)	(0.462)	(0.462)
Salegrowth	-0.339	-0.323	-0.292
	(0.671)	(0.673)	(0.655)
ROA	4.385***	4.423***	4.179***
	(1.508)	(1.516)	(1.494)
Specialist	-0.185	-0.184	-0.141
	(0.347)	(0.347)	(0.341)
External_Financing	0.305	0.307	0.310
	(0.250)	(0.250)	(0.251)
Loss	1.114***	1.100***	1.157***
	(0.323)	(0.326)	(0.325)
BTM	0.217	0.216	0.202
	(0.271)	(0.270)	(0.265)
Segments	0.0399	0.0401	0.0375

Dependent Variable: CFOSwitch	(1) Mutually Exclusive Indicator Variables	(2) Non-Mutually Exclusive Indicator Variables	(3) Logarithm of the Number of deficiencies
	(0.0327)	(0.0328)	(0.0323)
MNC	-0.164	-0.159	-0.182
	(0.289)	(0.289)	(0.283)
Restructure	-19.57	-19.38	-17.63
	(13.34)	(13.25)	(12.97)
Merger	0.570	0.564	0.590
	(0.382)	(0.387)	(0.381)
Year Fixed Effects	Yes	Yes	Yes
AUC	0.7218	0.7228	0.7153
Pseudo R-Square	11.10%	11.14%	10.53%
Observations	707	707	707

Table 3: Internal Control Deficiencies, Audit Hours and Audit Fees

This table presents the results of Model (2) that determines whether audit hours, fees and fees per hour are influenced by the discovery of internal control deficiencies. All dependent and control variables are defined in the Appendix. The coefficient is above the standard error (in parenthesis), clustered at the issuer level. Significance levels are * (10%), ** (5%) and *** (1%) using two-tailed tests.

Dependent Variables:	(1) Logaudithours	(2) Logauditfees	(3) Fees_Per_Hour
Deficiencies	0.0773	0.0703	3.531
	(0.0523)	(0.0436)	(13.11)
Deficiencies > 2	0.180***	0.170***	0.835
	(0.0490)	(0.0411)	(12.10)
Significant_Deficiency	0.270***	0.237***	-4.227
	(0.0596)	(0.0468)	(15.73)
MW	0.471***	0.275***	-39.34***
	(0.0799)	(0.0798)	(14.38)
Restatement_Announce	0.0219	0.0424	-18.18
	(0.115)	(0.112)	(16.94)
Revision_Announce	0.0422	-0.0226	-16.70
	(0.0820)	(0.0612)	(17.74)
Lit_Industry	0.0323	0.0839**	19.39*
	(0.0401)	(0.0346)	(11.21)
Logat	0.363***	0.445***	17.76***
	(0.0136)	(0.0111)	(2.885)
Big4	0.321***	0.162***	-43.16***
	(0.0600)	(0.0432)	(16.32)
Salegrowth	-0.133***	-0.0712	12.22
	(0.0436)	(0.0468)	(17.12)
ROA	-0.232	-0.0743	-23.56
	(0.229)	(0.183)	(46.94)
Specialist	0.0816*	0.101**	-4.003
	(0.0494)	(0.0485)	(8.405)
External_Financing	0.0172	0.0366	-2.835
	(0.0368)	(0.0313)	(8.946)
Loss	0.0789	0.0777*	-5.203
	(0.0497)	(0.0419)	(11.32)
BTM	-0.153***	-0.105***	6.956
	(0.0421)	(0.0308)	(10.21)
Ext_Fin_Demand	-0.265***	-0.143*	31.18
	(0.0773)	(0.0733)	(23.10)
Segments	0.0286***	0.0372***	3.317**
	(0.00584)	(0.00482)	(1.320)
MNC	0.262***	0.370***	28.05***
	(0.0405)	(0.0360)	(10.29)
Restructure	-8.956***	-12.10***	-342.2
	(2.203)	(1.786)	(417.3)
Merger	0.149***	0.0762*	-19.38
	(0.0446)	(0.0400)	(12.18)
Year Fixed Effects	Yes	Yes	Yes
Observations	1,003	1,139	999
R-squared	0.676	0.775	0.097

Table 4: Internal Control Deficiencies and Financial Statement Errors

This table presents the results of Model (2) that determines whether financial statement errors are associated with the discovery of internal control deficiencies. Panel A presents the results for all types of errors, and Panel B for errors that affect net income. All dependent and control variables are defined in the Appendix. The coefficient is above the standard error (in parenthesis), clustered at the issuer level. Significance levels are * (10%), ** (5%) and *** (1%) using two-tailed tests.

Panel A: All types of error

Dependent Variables:	(1) Error (in t)	(2) Errot (in t, post FYE)	(3) Error (in t post FYE or t+1)
Deficiencies	0.0539	-0.0232	0.144
	(0.231)	(0.234)	(0.216)
Deficiencies > 2	0.255	0.0578	0.198
	(0.206)	(0.216)	(0.200)
Significant_Deficiency	0.621***	0.463*	0.625***
	(0.230)	(0.241)	(0.222)
MW	1.635***	1.246***	1.065***
	(0.319)	(0.319)	(0.316)
Lit_Industry	-0.397**	-0.198	-0.134
	(0.176)	(0.179)	(0.167)
Logat	-0.0992**	-0.0374	-0.0470
	(0.0476)	(0.0553)	(0.0495)
Big4	0.950***	0.758***	0.657***
	(0.224)	(0.233)	(0.206)
Salegrowth	0.0437	-0.00921	-0.0503
	(0.183)	(0.187)	(0.176)
ROA	-0.611	-1.456*	-1.336
	(0.871)	(0.885)	(0.817)
Specialist	0.136	0.257	0.347*
	(0.218)	(0.223)	(0.209)
External_Financing	0.0985	0.0917	0.172
	(0.150)	(0.162)	(0.150)
Loss	-0.0700	-0.205	-0.156
	(0.213)	(0.228)	(0.205)
BTM	0.255*	0.131	0.150
	(0.154)	(0.167)	(0.151)
Ext_Fin_Demand	0.186	0.0807	0.0542
	(0.390)	(0.416)	(0.380)
Segments	-0.00298	-0.0252	-0.0493**
	(0.0229)	(0.0249)	(0.0237)
MNC	0.0948	0.0658	0.00365
	(0.167)	(0.181)	(0.166)
Restructure	-2.298	-12.58	-16.96*
	(10.55)	(10.08)	(9.400)
Merger	0.366*	0.400*	0.268
	(0.202)	(0.206)	(0.199)
Year Fixed Effects	Yes	Yes	Yes
AUC	0.6625	0.6435	0.6475
Pseudo R-Square	6.15%	4.58%	4.62%
Observations	1,144	1,144	1,144

Panel B: Errors that affect net income

Dependent Variables:	(1) Error (in t)	(2) Errot (in t, post FYE)	(3) Error (in t post FYE or t+1)
Deficiencies	0.00626	0.0352	0.291
	(0.384)	(0.363)	(0.286)
Deficiencies > 2	0.493	0.285	0.391
	(0.325)	(0.311)	(0.255)
Significant_Deficiency	1.162***	1.022***	1.074***
	(0.346)	(0.326)	(0.276)
MW	2.398***	2.097***	1.661***
	(0.430)	(0.409)	(0.389)
Lit_Industry	-0.451*	-0.0821	0.00239
	(0.264)	(0.250)	(0.209)
Logat	-0.113	0.00383	-0.0169
	(0.0750)	(0.0867)	(0.0663)
Big4	0.944***	0.439	0.347
	(0.364)	(0.343)	(0.270)
Salegrowth	-0.662**	-0.235	-0.250
	(0.288)	(0.290)	(0.248)
ROA	-1.302	-2.045*	-1.704*
	(1.172)	(1.172)	(1.035)
Specialist	0.0807	0.303	0.435*
	(0.322)	(0.310)	(0.261)
External_Financing	0.170	0.230	0.328
	(0.227)	(0.243)	(0.203)
Loss	-0.334	-0.310	-0.218
	(0.329)	(0.337)	(0.268)
BTM	0.342	0.217	0.218
	(0.240)	(0.246)	(0.196)
Ext_Fin_Demand	0.526	0.201	0.154
	(0.547)	(0.584)	(0.491)
Segments	0.00569	-0.0361	-0.0738**
	(0.0333)	(0.0351)	(0.0328)
MNC	0.0308	0.0828	0.0310
	(0.239)	(0.251)	(0.208)
Restructure	0.493	-13.73	-20.43*
	(16.07)	(12.78)	(11.21)
Merger	0.225	0.166	-0.0798
	(0.305)	(0.291)	(0.265)
Year Fixed Effects	Yes	Yes	Yes
AUC	0.7375	0.6992	0.6971
Pseudo R-Square	11.33%	8.41%	7.78%
Observations	974	974	974

Table 5: Internal Control Deficiencies and Different Types of Financial Statement Errors

This table presents a similar analysis to Table 4 but splits the financial statement errors among their components, which include *Restatement*, *Revision* and *Adjustment*. Panel A presents the results for concurrent errors, and Panel B for future discovery of contemporaneous and future errors (errors discovered after the end of the fiscal year or in the next period). All dependent and control variables are defined in the Appendix. The coefficient is above the standard error (in parenthesis), clustered at the issuer level. Significance levels are * (10%), ** (5%) and *** (1%) using two-tailed tests.

Panel A: Concurrent errors

Dependent Variables:	(1) Restatement (in t)	(2) Revision (in t)	(3) Adjustments (in t)
Deficiencies	-0.00925	-0.0451	0.382
	(0.434)	(0.279)	(0.435)
Deficiencies > 2	-0.672	0.0309	0.999***
	(0.503)	(0.246)	(0.364)
Significant_Deficiency	-0.0727	0.435	1.123***
	(0.540)	(0.274)	(0.397)
MW	2.363***	0.877**	1.321**
	(0.458)	(0.367)	(0.574)
Lit_Industry	-0.863**	-0.0998	-0.548**
	(0.429)	(0.207)	(0.267)
Logat	-0.140	-0.100*	-0.00120
	(0.0941)	(0.0558)	(0.0774)
Big4	0.688	1.137***	0.988**
	(0.443)	(0.287)	(0.411)
Salegrowth	0.433	-0.294	-0.108
	(0.281)	(0.268)	(0.344)
ROA	2.095	-0.943	-1.273
	(1.439)	(1.063)	(1.213)
Specialist	0.228	0.0965	0.0132
	(0.466)	(0.254)	(0.327)
External_Financing	-0.432	0.398**	-0.124
	(0.339)	(0.185)	(0.227)
Loss	0.705*	-0.307	-0.177
	(0.416)	(0.256)	(0.356)
BTM	-0.0103	0.442**	0.200
	(0.273)	(0.173)	(0.272)
Ext_Fin_Demand	1.424***	-0.196	-0.907
	(0.537)	(0.467)	(0.816)
Segments	-0.00347	-0.0258	0.0262
	(0.0547)	(0.0306)	(0.0311)
MNC	-0.452	0.0486	0.514*
	(0.320)	(0.204)	(0.280)
Restructure	2.845	7.471	-2.496
	(26.15)	(13.56)	(14.89)
Merger	0.378	0.402*	0.179
	(0.426)	(0.237)	(0.299)
Year Fixed Effects	Yes	Yes	Yes
AUC	0.8278	0.6625	0.72
Pseudo R-Square	20.67	0.053	0.0819

	Observations	1,144	1,144	1,144

Panel B: Future discovery of contemporaneous and future errors

Dependent Variables:	(1) Restatement (in t post FYE or in t+1)	(2) Revision (in t post FYE or in t+1)	(3) Adjustments (in t post FYE or in t+1)
Deficiencies	0.242	0.105	0.0743
	(0.407)	(0.251)	(0.381)
Deficiencies > 2	-0.0868	0.134	0.424
	(0.433)	(0.234)	(0.344)
Significant_Deficiency	0.316	0.327	0.770**
	(0.462)	(0.267)	(0.370)
MW	0.849	0.840**	1.184**
	(0.565)	(0.367)	(0.470)
Lit_Industry	-0.237	-0.0562	-0.209
	(0.348)	(0.197)	(0.251)
Logat	-0.167*	-0.0826	0.0828
	(0.0973)	(0.0518)	(0.0790)
Big4	0.392	0.826***	0.825**
	(0.375)	(0.252)	(0.396)
Salegrowth	0.506*	-0.294	-0.246
	(0.268)	(0.235)	(0.308)
ROA	1.744	-1.033	-2.721**
	(1.458)	(0.987)	(1.086)
Specialist	0.180	0.344	0.408
	(0.453)	(0.234)	(0.290)
External_Financing	-0.0768	0.188	-0.0632
	(0.312)	(0.177)	(0.233)
Loss	0.405	-0.425*	-0.225
	(0.415)	(0.242)	(0.332)
BTM	0.101	0.433**	-0.0294
	(0.270)	(0.170)	(0.241)
Ext_Fin_Demand	1.164**	-0.0785	-0.796
	(0.549)	(0.438)	(0.695)
Segments	-0.0246	-0.0517*	-0.0255
	(0.0585)	(0.0295)	(0.0344)
MNC	-0.550*	0.0762	0.211
	(0.328)	(0.193)	(0.272)
Restructure	-18.39	3.360	-23.17*
	(17.12)	(11.92)	(12.16)
Merger	0.359	0.223	0.253
	(0.398)	(0.237)	(0.282)
Year Fixed Effects	Yes	Yes	Yes
AUC	0.7595	0.6363	0.68
Pseudo R-Square	0.106	0.0397	0.0629
Observations	1,144	1,144	1,144

Table 6: Audit Deficiencies, Internal Control Deficiencies and Restatements

This table presents a similar analysis to Table 5 but focuses on *Restatement* and the identification of audit deficiencies (Part I Findings) by the PCAOB. Panel A presents initial uninteracted results, and Panel B presents the results of interactions between the types of deficiencies and Part I Findings on assessment of the severity of the internal control deficiencies. All dependent and control variables are defined in the Appendix. The coefficient is above the standard error (in parenthesis), clustered at the issuer level. Significance levels are * (10%), ** (5%) and *** (1%) using two-tailed tests.

Panel A: Uninteracted Results

Dependent Variables:	(1) Restatement (in t)	(2) Restatement (in t post FYE)	(3) Restatement (in t+1)
Deficiencies	0.00791	-0.179	0.201
	(0.441)	(0.473)	(0.419)
Deficiencies > 2	-0.762	-0.719	-0.196
	(0.505)	(0.517)	(0.438)
Significant_Deficiency	-0.114	-0.111	0.294
	(0.532)	(0.536)	(0.451)
MW	2.451***	1.011*	0.867
	(0.461)	(0.569)	(0.570)
Part1Identify	0.934**	0.949**	1.064***
	(0.413)	(0.443)	(0.392)
Part1Testing	0.116	0.411	0.615
	(0.393)	(0.418)	(0.403)
Part1Severity	-0.397	-0.455	-0.143
	(0.698)	(0.745)	(0.531)
Part1Other	1.022	0.862	0.282
	(0.805)	(0.826)	(0.797)
Lit_Industry	-0.831*	-0.362	-0.137
	(0.426)	(0.417)	(0.340)
Logat	-0.131	-0.171	-0.151
	(0.0943)	(0.115)	(0.0995)
Big4	0.697	0.590	0.499
	(0.449)	(0.477)	(0.384)
Salegrowth	0.458	0.696**	0.538*
	(0.301)	(0.311)	(0.284)
ROA	2.290	3.679**	1.976
	(1.449)	(1.762)	(1.489)
Specialist	0.274	0.195	0.181
	(0.450)	(0.496)	(0.432)
External_Financing	-0.471	-0.421	-0.0658
	(0.346)	(0.381)	(0.320)
Loss	0.753*	0.530	0.447
	(0.433)	(0.535)	(0.428)
BTM	-0.0549	0.283	0.0370
	(0.281)	(0.358)	(0.278)
Ext_Fin_Demand	1.716***	1.633**	1.595***
	(0.561)	(0.684)	(0.582)
Segments	-0.00231	0.0294	-0.0206
	(0.0564)	(0.0615)	(0.0596)
MNC	-0.430	-0.400	-0.533*

Dependent Variables:	(1) Restatement (in t)	(2) Restatement (in t post FYE)	(3) Restatement (in t+1)
	(0.306)	(0.369)	(0.317)
Restructure	0.646	-12.39	-20.86
	(25.99)	(21.24)	(18.10)
Merger	0.303	0.600	0.248
	(0.457)	(0.460)	(0.426)
Year Fixed Effects	Yes	Yes	Yes
AUC	0.85	0.82	0.80
Pseudo R-square	0.23	0.15	0.15
Observations	1,144	1,144	1,144

Panel B: Interacted Results

Dependent Variables:	(1) Restatement (in t)	(2) Restatement (in t post FYE)	(3) Restatement (in t+1)
Deficiencies	0.00341	-0.00289	0.00922
	(0.0184)	(0.0176)	(0.0195)
Deficiencies > 2	-0.0215	-0.0181	-0.00445
	(0.0151)	(0.0149)	(0.0161)
Significant_Deficiency	-0.0156	-0.0148	-0.00987
	(0.0173)	(0.0172)	(0.0175)
MW	0.277***	0.0657	0.0578
	(0.0625)	(0.0428)	(0.0429)
Part1Identify	0.0473**	0.0420*	0.0600**
	(0.0227)	(0.0230)	(0.0269)
Part1Testing	0.00157	0.0137	0.0283
	(0.0176)	(0.0170)	(0.0223)
Part1Severity	-0.104***	-0.113***	-0.135***
	(0.0349)	(0.0354)	(0.0366)
Part1Other	0.0506	0.0456	0.0215
	(0.0555)	(0.0555)	(0.0571)
Deficiencies × PartISeverity	-0.0133	0.00197	0.0932
	(0.0393)	(0.0369)	(0.111)
Deficiencies > 2 × PartISeverity	0.0858	0.0909*	0.0820
	(0.0546)	(0.0543)	(0.0558)
Significant_Deficiency×PartISeverity	0.200**	0.215**	0.324***
	(0.0932)	(0.0915)	(0.105)
MW × PartISeverity	-0.0147	-0.0448	-0.0508
	(0.231)	(0.0536)	(0.0550)
Lit_Industry	-0.0263**	-0.00970	-0.00217
	(0.0127)	(0.0123)	(0.0144)
Logat	-0.00314	-0.00411	-0.00533
	(0.00359)	(0.00318)	(0.00352)
Big4	0.0273	0.0170	0.0200
	(0.0175)	(0.0164)	(0.0174)
Salegrowth	0.0284	0.0379*	0.0422*
	(0.0231)	(0.0218)	(0.0253)
ROA	0.121	0.145**	0.105
	(0.0810)	(0.0711)	(0.0876)
Specialist	0.00715	0.00405	0.00412
	(0.0194)	(0.0167)	(0.0190)
External_Financing	-0.0181	-0.0158	-0.00759
	(0.0129)	(0.0119)	(0.0127)
Loss	0.0372*	0.0257	0.0253
	(0.0202)	(0.0184)	(0.0194)
BTM	-0.00636	0.00809	9.47e-05
	(0.0156)	(0.0126)	(0.0129)
Ext_Fin_Demand	0.130**	0.0720	0.110*
	(0.0555)	(0.0481)	(0.0566)
Segments	-0.000295	0.000745	-0.000550
	(0.00185)	(0.00167)	(0.00191)

Dependent Variables:	(1) Restatement (in t)	(2) Restatement (in t post FYE)	(3) Restatement (in t+1)
MNC	-0.0156	-0.0146	-0.0227
	(0.0147)	(0.0140)	(0.0154)
Restructure	0.0454	-0.646	-1.274
	(1.044)	(0.994)	(1.167)
Merger	0.0138	0.0219	0.00991
	(0.0197)	(0.0203)	(0.0220)
Year Fixed Effects	Yes	Yes	Yes
R-Squared	0.143	0.064	0.084
Observations	1,144	1,144	1,144

Table 7: Audit Deficiencies, Internal Control Deficiencies and Material Weaknesses

This table presents a similar analysis to Table 6 but focuses on *MW* as the dependent variable and the identification of audit deficiencies (Part I Findings) by the PCAOB. All dependent and control variables are defined in the Appendix. The coefficient is above the standard error (in parenthesis), clustered at the issuer level. Significance levels are * (10%), ** (5%) and *** (1%) using two-tailed tests.

Dependent Variables:	(1) MW (in t post FYE or in t+1)	(2) MW (in t post FYE or in t+1)	(3) MW (in t post FYE or in t+1)
Deficiencies	-0.720	-0.833	-0.0351**
	(0.501)	(0.509)	(0.0171)
Deficiencies > 2	-0.395	-0.530	-0.0187
	(0.436)	(0.448)	(0.0172)
Significant_Deficiency	0.755*	0.599	0.0129
	(0.406)	(0.400)	(0.0236)
MW	2.226***	2.239***	0.267***
	(0.447)	(0.473)	(0.0670)
Part1Identify		0.363	0.0281
		(0.421)	(0.0282)
Part1Testing		0.592	0.0360
		(0.391)	(0.0263)
Part1Severity		1.389***	0.0929
		(0.459)	(0.175)
Part1Other		0.280	-0.00208
		(0.727)	(0.0578)
Deficiencies*PartISeverity			0.0588
			(0.224)
Deficiencies > 2*PartISeverity			-0.0670
			(0.187)
Significant_Deficiency*PartISeverity			0.277
			(0.207)
MW*PartISeverity			-0.145
			(0.322)
Lit_Industry	-0.128	0.0671	0.00610
	(0.302)	(0.304)	(0.0171)
Logat	-0.316***	-0.280**	-0.0117**
	(0.121)	(0.124)	(0.00494)
Big4	0.569	0.651*	0.0347*
	(0.346)	(0.379)	(0.0194)
Salegrowth	0.202	0.166	0.0124
	(0.310)	(0.343)	(0.0260)
ROA	-1.256	-1.120	-0.120
	(1.470)	(1.550)	(0.105)
Specialist	0.964***	0.935***	0.0397*
	(0.369)	(0.360)	(0.0236)
External_Financing	0.184	0.190	0.00752
	(0.315)	(0.320)	(0.0143)
Loss	0.467	0.519	0.0263
	(0.368)	(0.394)	(0.0239)
BTM	-0.335	-0.409	-0.0264

Dependent Variables:	(1) MW (in t post FYE or in t+1)	(2) MW (in t post FYE or in t+1)	(3) MW (in t post FYE or in t+1)
	(0.290)	(0.289)	(0.0166)
Ext_Fin_Demand	-0.545	-0.306	-0.0128
	(0.724)	(0.771)	(0.0484)
Segments	0.00972	0.0155	0.000666
	(0.0441)	(0.0431)	(0.00211)
MNC	-0.167	-0.129	-0.00634
	(0.336)	(0.349)	(0.0184)
Restructure	-4.593	-10.10	-0.669
	(16.87)	(16.69)	(1.146)
Merger	0.704**	0.526	0.0355
	(0.338)	(0.361)	(0.0265)
Year Fixed Effects	Yes	Yes	Yes
AUC	0.81	0.84	
Pseudo / Adjusted R-Squared	0.19	0.24	0.17
Observations	1,099	1,099	1,099

Table 8: Evaluating the Effects of Measurement Error on our Analyses

This Table presents analyses similar to Tables 2 to 5, but evaluates the effect of measurement error stemming from partial observability of ICFR deficiencies, which are limited only to the areas subject to PCAOB inspection. We use a seemingly unrelated estimation approach and a Hausman test to analyze the effects of measurement error by comparing the ICMW collected from PCAOB inspections to ICMW publicly disclosed and collected by Audit Analytics. Control variables are included but not reported for brevity. All dependent and control variables are defined in the Appendix. The coefficient is above the standard error (in parenthesis), clustered at the issuer level. Significance levels are * (10%), ** (5%) and *** (1%) using two-tailed tests.

Panel A: CFO Switch, Hours, and Fees

Dependent Variables:	(1) CFOSwitch	(2) CFOSwitch	(3) Logaudithours	(4) Logaudithours	(5) Logauditfees	(6) Logauditfees	(7) Fees_Per_Hour	(8) Fees_Per_Hour
Deficiencies	0.226	0.429	0.0640	0.0773	0.0625	0.0703	5.977	3.531
	(0.351)	(0.369)	(0.0516)	(0.0523)	(0.0435)	(0.0436)	(12.97)	(13.11)
Deficiencies > 2	-0.136	0.0670	0.166***	0.180***	0.162***	0.170***	3.309	0.835
	(0.318)	(0.336)	(0.0477)	(0.0490)	(0.0408)	(0.0411)	(11.69)	(12.10)
Significant_Deficiency	0.00979	0.222	0.257***	0.270***	0.229***	0.237***	-1.710	-4.227
	(0.377)	(0.392)	(0.0585)	(0.0596)	(0.0466)	(0.0468)	(15.40)	(15.73)
MW_PCAOB	1.708**		0.557***		0.328***		-36.05**	
	(0.686)		(0.0849)		(0.0823)		(14.67)	
MW		2.291***		0.471***		0.275***		-39.34***
		(0.610)		(0.0799)		(0.0798)		(14.38)
Observations	707	707	1,003	1,003	1,139	1,139	999	999
Hausman test: MW_PCAOB = MW	1.66		2.41		0.72		0.16	
p value	0.2		0.12		0.4		0.7	

Panel B: Frequency of Errors and Material Weaknesses

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							MW (in t post FYE or at t+1)	
Dependent Variables:	Error (in t)		Error (in t, post FYE)		Error (in t post FYE or t+1)			
Deficiencies	-0.0761	0.0539	-0.0193	-0.0232	0.162	0.144	-0.819*	-0.720
	(0.224)	(0.231)	(0.232)	(0.234)	(0.214)	(0.216)	(0.486)	(0.501)
Deficiencies > 2	0.127	0.255	0.0632	0.0578	0.217	0.198	-0.498	-0.395
	(0.198)	(0.206)	(0.213)	(0.216)	(0.198)	(0.200)	(0.420)	(0.436)
Significant_Deficiency	0.492**	0.621***	0.470**	0.463*	0.646***	0.625***	0.654*	0.755*
	(0.223)	(0.230)	(0.238)	(0.241)	(0.220)	(0.222)	(0.387)	(0.406)
MW_PCAOB	1.521***		1.687***		1.550***		2.319***	
	(0.343)		(0.347)		(0.345)		(0.434)	
MW		1.635***		1.246***		1.065***		2.226***
		(0.319)		(0.319)		(0.316)		(0.447)
Observations	1,144	1,144	1,144	1,144	1,144	1,144	1,099	1,099
Hausman test: MW_PCAOB = MW	0.24		**4.26**		**4.99**		0.12	
p value	0.62		**0.04**		**0.03**		0.73	

Panel C: Material Weaknesses across Different Types of Concurrent Financial Statement Errors

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variables:	Restatement (in t)		Revision (in t)		Adjustments (in t)	
Deficiencies	-0.382	-0.00925	-0.0160	-0.0451	0.169	0.382
	(0.392)	(0.434)	(0.276)	(0.279)	(0.409)	(0.435)
Deficiencies > 2	-1.060**	-0.672	0.0615	0.0309	0.790**	0.999***
	(0.470)	(0.503)	(0.242)	(0.246)	(0.332)	(0.364)
Significant_Deficiency	-0.467	-0.0727	0.466*	0.435	0.908**	1.123***
	(0.502)	(0.540)	(0.270)	(0.274)	(0.366)	(0.397)
MW_PCAOB	2.005***		1.247***		0.874	
	(0.466)		(0.398)		(0.650)	
MW		2.363***		0.877**		1.321**
		(0.458)		(0.367)		(0.574)
Observations	1,144	1,144	1,144	1,144	1,144	1,144
Hausman test: MW_PCAOB = MW	0.93		**5.53**		0.9	
p value	0.33		**0.02**		0.34	

Panel D: Material Weaknesses across Different Types of Financial Statement Errors Discovered in the Future

Dependent Variables:	(1)	(2)	(3)	(4)	(5)	(6)
	Restatement (in t post fye or in t+1)		Revision (in t post fye or in t+1)		Adjustments (in t post fye or in t+1)	
Deficiencies	0.242	0.242	0.137	0.105	0.0819	0.0743
	(0.397)	(0.407)	(0.250)	(0.251)	(0.376)	(0.381)
Deficiencies > 2	-0.0851	-0.0868	0.167	0.134	0.433	0.424
	(0.423)	(0.433)	(0.232)	(0.234)	(0.339)	(0.344)
Significant_Deficiency	0.313	0.316	0.361	0.327	0.781**	0.770**
	(0.451)	(0.462)	(0.264)	(0.267)	(0.364)	(0.370)
MW_PCAOB	1.129**		1.250***		1.543***	
	(0.570)		(0.399)		(0.483)	
MW		0.849		0.840**		1.184**
		(0.565)		(0.367)		(0.470)
Observations	1,144	1,144	1,144	1,144	1,144	1,144
Hausman test: MW_PCAOB = MW		0.68	**5.57**			2.67
p-value		0.41	**0.02**			0.10

Table 9: Evaluating the Effects of Selection Bias on our Analyses

This Table presents analyses similar to Tables 2 to 5, but evaluates the effect of selection bias stemming from a risk based approach to select inspected audit engagements used in our study. We use a seemingly unrelated estimation approach and a Hausman test to analyze the effects of selection bias on ICMW by comparing identified ICMW across the sample of inspected engagements with the full sample of engagements with available data. Control variables are included but not reported for brevity. All dependent and control variables are defined in the Appendix. The coefficient is above the standard error (in parenthesis), clustered at the issuer level. Significance levels are * (10%), ** (5%) and *** (1%) using two-tailed tests.

Panel A: CFO Switch, Hours, and Fees

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variables:	CFOSwitch		Logaudithours		Logauditfees		Fees_Per_Hour	
MW	2.120***	1.028***	0.295***	0.328***	0.104	0.270***	-31.53***	-15.19**
	(0.560)	(0.190)	(0.0712)	(0.0368)	(0.0715)	(0.0368)	(10.95)	(7.617)
Observations	713	8,208	1,041	13,830	1,200	23,277	1,037	13,789
Hausman test MW =MW	**4.46**		0.23		**5.84**		1.91	
p-value	**0.04**		0.63		**0.02**		0.17	

Panel B: Frequency of Errors and Material Weaknesses

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							MW (in t post FYE or at t+1)	
Dependent Variables:	Error (in t)		Errot (in t, post FYE)		Error (in t post FYE or t+1)			
MW	1.368***	1.648***	1.058***	0.871***	0.765***	0.717***	2.214***	2.519***
	(0.274)	(0.0996)	(0.278)	(0.115)	(0.281)	(0.109)	(0.347)	(0.126)
Observations	1,205	23,580	1,205	23,580	1,205	23,580	1,145	22,256
Hausman test MW = MW	1.2		0.45		0.03		0.94	
p value	0.27		0.5		0.86		0.33	

Panel C: Material Weaknesses across Different Types of Concurrent Financial Statement Errors

Dependent Variables:	(1)	(2)	(3)	(4)	(5)	(6)
	Restatement (in t)		Revision (in t)		Adjustments (in t)	
MW	2.486***	2.377***	0.832***	0.941***	0.545	1.121***
	(0.338)	(0.110)	(0.317)	(0.121)	(0.452)	(0.153)
Observations	1,205	23,580	1,205	23,580	1,205	23,580
Hausman test MW = MW	0.11		0.13		1.91	
p-value	0.74		0.72		0.17	

Panel D: Material Weaknesses across Different Types of Financial Statement Errors Discovered in the Future

Dependent Variables:	(1)	(2)	(3)	(4)	(5)	(6)
	Restatement (in t post fye or in t+1)		Revision (in t post fye or in t+1)		Adjustments (in t post fye or in t+1)	
MW	0.641	0.941***	0.743**	0.492***	0.629	0.835***
	(0.488)	(0.165)	(0.324)	(0.128)	(0.438)	(0.171)
Observations	1,205	23,580	1,205	23,580	1,205	23,580
Hausman test MW = MW	0.41		0.67		0.25	
p-value	0.52		0.41		0.62	