

## **Do PCAOB Inspections Improve the Quality of Internal Control Audits?**

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### **Abstract:**

We test whether PCAOB inspections help remediate auditors' deficiencies in detecting and reporting material internal control weaknesses. We find that when PCAOB inspectors report higher rates of internal control audit deficiencies, auditors respond by increasing their issuance of adverse internal control audit opinions. We also find that the increased adverse internal control opinions are issued to clients that genuinely warrant such opinions, and do not simply result from auditors adopting more conservative reporting practices. Finally, we find that higher inspection deficiency rates also lead to higher audit fees. Taken together, our results are consistent with critical PCAOB inspection reports prompting auditors to increase the rigor of their evaluation of clients' internal controls. Overall, our findings suggest that PCAOB inspections improve the quality of internal control audits through their ability to remediate deficiencies in auditors' internal control audit procedures.

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# **Do PCAOB Inspections Improve the Quality of Internal Control Audits?**

## **1. Introduction**

Internal controls over financial reporting help assure that companies' financial statements are prepared in accordance with Generally Accepted Accounting Principles. Outside auditors often rely on clients' internal controls in conducting their financial statement audits, and Section 404 of the Sarbanes-Oxley Act (SOX) requires auditors to report on the effectiveness of their clients' controls. In 2009, the PCAOB expressed concerns that audit firms were improperly implementing newly adopted Auditing Standard No. 5 (AS5), which provides guidance in conducting internal control audits (PCAOB, 2009). These concerns coincided with a downward trend in auditors issuing adverse internal control opinions, prompting the SEC to speculate that auditors were systematically failing to detect and report material weaknesses in their clients' internal controls (Besch, 2009). The PCAOB responded by directing its inspectors to focus on assessing whether audit firms were obtaining sufficient evidence to support their internal control opinions, and to communicate any identified deficiencies in their inspection reports. The purpose of this study is to test whether the PCAOB's inspection efforts were successful in remediating auditor behavior to improve the quality of internal control audits.

Audit firm inspections are the PCAOB's core function and the primary tool given by Congress to enable the PCAOB to maintain investor confidence in audited financial statements (PCAOB, 2005). Auditors place great emphasis on receiving clean inspection reports because adverse inspection outcomes negatively affect their compensation and promotion prospects (Johnson et al., 2015). The PCAOB also has broad powers to sanction individual auditors and firms that provide substandard audits. Therefore, auditors have incentives to remediate systematic deficiencies in their auditing procedures identified by PCAOB inspectors. Remediation should improve an auditor's ability to identify and report

material control weaknesses, the existence of which requires the auditor to issue an adverse internal control opinion. Thus, we hypothesize that after PCAOB inspectors report higher rates of internal control audit deficiencies, auditors respond by increasing their issuance of adverse internal control audit opinions.

There are several reasons, however, why we may not observe our predicted result. One reason is that the deficiencies identified in the inspection reports may not be indicative of serious shortcomings in the audit firms' procedures. This is consistent with evidence from interviews that suggests auditors believe that adverse inspection findings reflect differences in professional judgment rather than audit failures that require remediation (Johnson et al., 2015).<sup>1,2</sup> It is also consistent with evidence that US auditors do not suffer significant declines in market share following the receipt of unfavorable inspection reports (Lennox and Pittman, 2010). Further, the engagements inspected by the PCAOB are not randomly chosen, which means that identified deficiencies may not be representative of the quality of an auditor's internal control audits. If the identified deficiencies do not reflect systematic problems with an auditor's internal control audits, the audit firm is less likely to see a need to improve its procedures for detecting and reporting material weaknesses. Moreover, an audit firm's remediation of idiosyncratic client-specific deficiencies is not expected to improve audit quality across the audit firm as a whole. In addition, none of the deficiencies in our sample indicate that the auditor failed to identify or report an existing material weakness. Instead, the deficiencies indicate that the auditor failed to properly perform tests that may have detected weaknesses, or that the auditor improperly evaluated the materiality of detected weaknesses.

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<sup>1</sup> In interviews, auditors claim that their clients have little interest in the details of inspection reports, and when clients do read the reports, they see little value in the findings (Johnson et al., 2015).

<sup>2</sup> The PCAOB contends that it considers suggestions by the auditors that "... a reasonable judgment could be made that, despite the deficiency cited in the inspection report, the omitted procedures were unnecessary and that the firm had a reasonable basis for its audit opinion. For each audit deficiency included in the report, the inspection staff has rejected any such suggestion and found that the firm had failed to obtain sufficient audit evidence to support its audit opinion" (PCAOB, 2012a).

Therefore, an auditor cannot remediate internal control audits to the satisfaction of the inspectors by merely issuing more adverse internal control opinions. It is also notable that auditors claim that identified deficiencies may result simply from a failure to *document* their auditing procedures, and not from a failure to gather sufficient evidence to support their opinion (PCAOB, 2012a page 5). If the audit procedures had indeed been performed, improvements in their documentation alone should not affect the auditor's propensity to issue an adverse internal control opinion.<sup>3</sup> Remediation is also expected to be costly, providing auditors with incentives to forego remediation if clients are unwilling to pay higher fees (Johnson et al., 2015). Finally, auditors might be reluctant to issue more adverse internal control opinions because doing so may increase their chances of being dismissed (Ettredge et al., 2011; Newton et al., 2016).

We perform our analysis using internal control reports for fiscal years 2010-2013. This period immediately follows concerns expressed by both the PCAOB and the SEC that auditors were systematically failing to detect and report material internal control weaknesses (PCAOB, 2009; Besch, 2009). The 2010 inspections also mark the beginning of a period in which the PCAOB explicitly directed its inspectors to focus on assessing whether audit firms were obtaining sufficient evidence to support their internal control opinions, and to communicate any identified deficiencies in their inspection reports (Franzel, 2014). Further, 2010 is the first year in which the PCAOB inspection reports disclose the number of audit engagements examined by inspectors in their inspections of audit firms with 100 or more

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<sup>3</sup> PCAOB (2012a) expresses skepticism regarding claims that the absence of audit documentation alone is sufficient grounds for an inspection deficiency. In particular, in the absence of audit documentation the inspectors consider whether there is other persuasive evidence to support a firm's contention that it performed a particular audit procedure that was undocumented. Thus, there must be *both* the absence of documentation and as the absence of other persuasive evidence suggesting that the procedure was performed. This is consistent with AS No. 3, Audit Documentation, which indicates that a firm that has not adequately documented that it performed a procedure must demonstrate with persuasive other evidence that it did so, and that oral assertions and explanations alone do not constitute persuasive other evidence.

clients. This is important because it allows us to compute the reported rate of internal control deficiencies, a central feature of our research design.

We begin by empirically validating the SEC's observation that the relative frequency of adverse internal control audit opinions declined during the period 2005-2009. The SEC observed that this downward trend might reflect actual improvements in companies' internal controls, or an increase in auditor complacency, with auditors increasingly failing to properly test internal controls and report material weaknesses.<sup>4</sup> We also document a sharp increase in PCAOB inspectors identifying deficiencies in internal control audits over the period 2010-2013, consistent with the PCAOB's assertion that its inspectors intensified their focus on assessing whether audit firms were obtaining sufficient evidence to support their internal control opinions.

We test our hypothesis by examining whether the internal control "audit deficiency rate" in audit firms' PCAOB inspection reports predict the firms' subsequent issuance of adverse internal control audit opinions. We compute the internal control deficiency rate as the number of inspected engagements with identified internal control audit deficiencies, scaled by the number of inspected engagements. Our identification strategy controls for both audit firm and year fixed effects, making it similar to a difference-in-difference design, since we examine whether auditors' internal control reports change subsequent to PCAOB inspectors issuing reports that criticize auditors' internal control audits. As predicted, we find that audit firms receiving PCAOB inspection reports with higher internal control deficiency rates subsequently issue more adverse internal control audit opinions. We further find that the increased issuance of adverse opinions is economically significant. When moving from the 10th to the 90th deficiency rate percentile, the predicted probability of issuing an adverse

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<sup>4</sup> Consistent with an under-reporting of internal control weaknesses, Rice and Weber (2012) document that only 32 percent of restating companies disclose the existence of a related material weakness during the misstated time period.

internal control opinion more than doubles -- from 2.0% to 5.2%. These results are resilient to a variety of robustness tests and are significant for both the annually inspected and triennially inspected audit firms.<sup>5</sup> Taken together, our results are consistent with the PCAOB inspection reports identifying systematic shortcomings in the audit firms' procedures, and with the issuance of those reports successfully prompting auditors to remediate those shortcomings by increasing the thoroughness and rigor of their tests.

A potential alternative explanation for our findings is that auditors simply become more conservative in reporting adverse internal control opinions following critical inspection reports. We address this potential explanation in several ways. First, we observe that the PCAOB inspectors focus on evaluating the audit process (i.e., the testing of internal controls), and not just the outcome of that process (i.e., the type of internal control opinion issued). This is because the inspectors are trying to assess whether the auditor has gathered sufficient evidence to support their internal control opinion. Such an assessment necessarily involves examination of the audit process and cannot be inferred from simply examining the audit opinion. This means that audit firms cannot avoid deficiencies in their inspection reports simply by issuing more adverse internal control opinions, unless those opinions are also supported by evidence gathered as a result of their audit procedures. The inspectors' focus on evaluating the audit process, and not simply the outcome of that process, is consistent with none of the inspection reports in our sample criticizing audit firms for failing to issue adverse internal control audit opinions (i.e., the inspectors did not second-guess whether the audit firm should have issued an adverse opinion). It is also consistent with our finding that inspectors report failures to adequately test internal controls (17% of inspected engagements) as well as failures to assess the materiality of identified weaknesses (2% of inspected

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<sup>5</sup> The PCAOB annually inspects audit firms that issue audit reports to more than 100 issuers, and triennially inspects audit firms that issue audit reports to at least one but no more than 100 issuers, or that played a substantial role in the preparation or furnishing of an audit report with respect to at least one issuer.

engagements). Moreover, we find that both types of deficiencies – inadequate testing of internal controls and inadequate evaluation of detected control weaknesses – lead to increases in the issuance of adverse internal control opinions. This suggests that our results are driven by improvements to internal control testing and improvements in the auditor’s evaluation of detected internal control weaknesses.

Second, we test whether critical PCAOB inspection reports prompt auditors to issue more adverse opinions to clients that warrant such opinions. These tests are based on the observation that material misstatements can only occur in companies with material weaknesses in their internal controls over financial reporting. This suggests that if auditors are effective in identifying material internal control weaknesses, they are more likely to issue adverse internal control opinions to companies that materially misstate their financial reports (Rice and Weber, 2012). Thus, if the adverse opinions issued in response to the inspection deficiencies are warranted, they should be associated with clients that contemporaneously misstate their financial statements. We test this by examining whether clients with material misstatements are more likely to receive adverse opinions after inspectors disclose higher deficiency rates in internal control audits. As predicted, our results indicate that audit firms receiving critical inspection reports are subsequently more likely to issue adverse opinions to clients that concurrently misstate their financial statements. This is consistent with PCAOB inspections prompting auditors to increase their issuance of adverse internal control opinions to clients that have material weaknesses, and therefore genuinely warrant such opinions.

Another potential explanation for our findings is that audit firms attempt to “game” the outcomes of future PCAOB inspections by mechanically issuing more adverse opinions in advance of the inspections. We consider this unlikely because the PCAOB inspectors do not criticize auditors for failing to issue adverse opinions. Instead, the inspectors focus on deficiencies related to inadequate testing and inadequate evaluation of identified control

weaknesses (as discussed previously). Moreover, the type of internal control opinion issued does not influence the PCAOB's choice of engagements to inspect (PCAOB, 2009). Consistent with this, we find that PCAOB inspectors do not issue more favorable inspection reports to audit firms that issued more adverse internal control opinions in the period *before* the start of the inspection. Thus, while PCAOB inspection outcomes affect subsequent internal control audit opinions, internal control audit opinions do not affect the outcomes of subsequent PCAOB inspections. This suggests that audit firms are unable to “game” the outcome of PCAOB inspections merely by issuing more adverse internal control opinions.

Finally, we expect audit fees to increase if audit firms undertake costly improvements of their internal control audits and if clients are willing to pay the extra costs. On the other hand, we do not expect audit fees to increase if audit firms simply issue more adverse opinions without concurrent costly improvements in audit quality. As expected, we find that audit fees increase significantly following the inspectors' disclosure of higher internal control deficiency rates. This is consistent with auditors undertaking costly remediation efforts to improve their internal control audits, corroborating the results of our main hypothesis test. We note, however, that the increase in audit fees is only statistically significant for the annually inspected auditors. The absence of a significant fee increase among the triennially inspected auditors may be due to the clients of these auditors having a lower demand for audit assurance and hence being unwilling to pay for the extra costs of remediating the audit firms' internal control deficiencies.<sup>6</sup>

Our findings make contributions to two streams of literature. One is to the research investigating the audits of internal controls. While there is a large literature that examines how auditors formulate their opinions over *financial statements*, relatively few studies

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<sup>6</sup> Companies with a low demand for audit assurance tend to employ small audit firms and they pay significantly lower audit fees (Lennox and Pittman, 2011).



examine how auditors formulate their opinions over *internal controls* (Ashbaugh et al., 2007; Doyle et al., 2007; Rice and Weber, 2012).<sup>7</sup> Our study adds to the literature by examining a potential determinant of auditors' internal control opinions not previously examined -- the PCAOB's inspection program. We find that in an effort to reverse a perceived decline in the quality of internal control audits, the PCAOB successfully used its inspection program to improve auditors' ability to identify and report material weaknesses. This is consistent with PCAOB inspections playing an important role in formulating auditors' opinions over the effectiveness of their clients' internal controls.

We also contribute to the stream of literature that examines whether PCAOB inspections result in improved audit quality. Perhaps surprisingly, most prior research focuses on the remedial effects of PCAOB inspections for audit firms outside of the US (Lamoreaux, 2013; Fung et al., 2014; Krishnan et al., 2014).<sup>8</sup> This is likely due to inherent research design challenges in establishing an association between PCAOB inspections and subsequent remediation by US audit firms. Identifying an appropriate control group in this setting is difficult because all US public company audit firms are subject to inspections. In contrast, foreign auditors are only subject to PCAOB inspections when they are registered with the PCAOB and have audit clients listed in the US. This makes it easier to test whether the occurrence of a PCAOB inspection has remediation benefits among non-US audit firms (Lamoreaux, 2013; Fung et al., 2014; Krishnan et al., 2014). By comparison, it is difficult to test for remedial benefits among US audit firms because all US audit firms with SEC issuers

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<sup>7</sup> See Carson et al. (2013) for a review of the literature that studies auditors' reporting decisions on financial statements. See DeFond and Zhang (2014) for a review of the literature on Section 404 internal control opinions.

<sup>8</sup> One exception is Carcello et al. (2011), who find that discretionary accruals decrease following inspections of the Big Four US audit firms. A study by Gramling et al. (2011) finds an insignificant association between going-concern deficiencies reported by inspectors and subsequent going-concern opinions of triennially inspected audit firms. However, going-concern audit deficiencies are rarely mentioned in PCAOB inspection reports, which may explain why their results are insignificant. In Section 5, we provide further evidence on the association between auditors' going-concern deficiencies and their subsequent going-concern reporting decisions.

are subject to periodic inspections by the PCAOB.<sup>9</sup> We address this challenge by examining the *content* of PCAOB inspection reports rather than simply the occurrence of an inspection. Specifically, we measure the deficiency rates in internal control audits reported by inspectors and then test whether these deficiency rates are associated with auditors' subsequent internal control reports. This approach allows us to find evidence consistent with PCAOB inspections leading to remediation benefits. Our results suggest that auditors conduct more rigorous tests and evaluations of clients' internal control weaknesses after PCAOB inspectors report higher deficiency rates in auditors' internal control audits. Our study illustrates the benefits of examining the content of PCAOB inspection reports in testing whether the inspection program yields remedial benefits.

Section 2 develops the hypothesis and Section 3 explains the research design. The main results are presented in Section 4 while Section 5 reports the results of sensitivity tests. Section 6 concludes with a discussion of the study's limitations.

## **2. Hypothesis Development**

### ***2.1 PCAOB inspection reports and the implementation of AS5***

Arguably the most controversial of the SOX reforms, Section 404 requires external auditors to issue a formal opinion on the effectiveness of clients' internal controls over financial reporting. Auditors must issue adverse internal control opinions to clients who are discovered to have material weaknesses in their internal controls. The first internal control audits were performed under Accounting Standard No. 2 (AS2) but this standard was widely criticized for requiring duplication of effort and for resulting in excessively high audit fees (Franzel, 2014). The PCAOB investigated this criticism by focusing its 2006 inspections on

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<sup>9</sup> Gipper et al. (2015) address this challenge by using a research design that exploits the staggered introduction of PCAOB inspections over time. In particular, most non-US audit firms with SEC issuer clients were inspected after most US audit firms had already been inspected. The evidence in Gipper et al. (2015) reports that clients' earnings response coefficients increase after audit firms are inspected, suggesting that PCAOB inspections improve the credibility of financial reporting.

assessing the efficiency of audits conducted under AS2 (PCAOB, 2006). Confirming the widespread criticism of AS2, the PCAOB inspectors concluded that AS2 audits were inefficient and overly costly. As a result, the PCAOB replaced AS2 with AS5 in November 2007 (PCAOB, 2007). AS5 attempts to improve upon AS2 primarily by using a risk-based approach that eliminates unnecessary auditing procedures, and by scaling the audit based on the size and complexity of the client, thereby reducing the audit fee.<sup>10</sup>

During 2007-2009, the PCAOB used its inspection program to monitor the transition to AS5. The PCAOB indicated that its inspectors found a number of deficiencies in engagement teams' implementation of several aspects of AS5, and issued a 2009 report summarizing these deficiencies (PCAOB, 2009). Shortly thereafter, the SEC reported a decline in auditors' issuance of adverse internal control opinions, and suggested the decline was due to auditors' failures to identify or report material weaknesses during their internal control audits:

*“the number of registrants reporting material weaknesses continues to decline. This decline could be due to registrants, on average, having addressed previously reported material weaknesses, while also having controlled all of the unique financial reporting risks introduced by recent economic conditions. Although this is possible given the focus and significant attention by registrants on managing financial reporting risks, another skeptical view is this trend could also be due to material weaknesses not being identified or reported.”* (Besch, 2009)

In an attempt to reverse the perceived deterioration in the quality of internal control audits, the PCAOB instituted changes to its inspection approach (Franzel, 2014). Beginning with the 2010 inspections, the PCAOB directed its inspectors to focus their efforts on assessing whether auditors were obtaining sufficient evidence to support their internal control opinions. Finally, citing the large numbers of deficiencies reported in their inspections during

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<sup>10</sup> Consistent with this expectation, Doogar et al. (2010) find that the switch from AS2 to AS5 resulted in significant cost savings.

2010-2013, the PCAOB issued Staff Practice Alert No. 11, which provides detailed guidance to auditors on how to properly implement AS5 (PCAOB, 2013).<sup>11</sup>

## ***2.2 Trends in internal control audit deficiencies and adverse audit opinions***

In this section we investigate empirically the assertions made by the PCAOB and SEC discussed in the preceding section. We document whether the incidence of adverse internal control opinions declined from 2005-2009 (as suggested by the SEC), and whether the incidence of reported deficiencies in internal control audits increased beginning with the 2010 inspections (as suggested by the PCAOB).

Col. 1 of Table 1 shows the frequency of adverse internal control reports over the period 2005-2013 for the sample as a whole. Col. 2 reports the same information for the sub-sample of companies whose financial statements are materially misstated and were restated *subsequent* to the date of the internal control report. Thus, Col. 2 is a sub-sample of companies for which adverse opinions are warranted, as evidenced by the subsequent restatement. Cols. 3 to 5 provide descriptive statistics on the PCAOB inspections of the sample audit firms. Statistics are shown separately for the Big Four firms (Panel A), the annually inspected non-Big Four firms (Panel B), and the triennially inspected non-Big Four firms (Panel C).

Consistent with the SEC's assertions, Col. (1) reports a downward trend in adverse internal control reports through 2010, particularly after 2007, which marks the transition from AS2 to AS5. For Big Four auditors, the frequency of adverse opinions declines from 10.0% in 2005 to 6.3% in 2007, then to 1.9% in 2010. Similarly, for non-Big Four annually

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<sup>11</sup> As noted in Staff Alert No. 11, the PCAOB inspectors found that audit firms were frequently failing to: (1) identify and sufficiently test controls that are intended to reduce the risk of material misstatement, (2) sufficiently test the design and operating effectiveness of management review controls, (3) obtain sufficient evidence to update the results of testing of controls from an interim date to the company's year-end, (4) sufficiently test controls over the system-generated data and reports that support important controls, (5) sufficiently perform procedures regarding the use of the work of others, and (6) sufficiently evaluate identified control deficiencies.

inspected firms, the frequency of adverse reports declines from 10.8% in 2005 to 6.5% in 2007, then to 2.3% in 2010. For the triennially inspected firms, the frequency of adverse reports declines from 14.8% in 2005 to 14.3% in 2007, then to 8.2% in 2010.<sup>12</sup> Col. (2) reports a similar downward trend in adverse internal control reports in the sub-sample of companies with materially misstated financial statements at the year-end date. For example, Panel A shows that the adverse opinion frequency declines from 19.9% in 2005 to 3.8% in 2010 for Big Four clients. This suggests that the decline in adverse internal control opinions resulted in an increase in auditors' failing to issue adverse internal control opinions to companies that clearly warranted such opinions, as evidenced by their subsequent restatements. Similar downward trends are observed for the annually inspected non-Big Four auditors (Panel B) and the triennially inspected auditors (Panel C). These findings support the SEC's concerns that over the period 2005 to 2010 auditors were increasingly failing to issue adverse internal control opinions to companies with material weaknesses (Besch, 2009).<sup>13</sup>

Cols. (1) and (2) also document that the downward trend in adverse internal control reports generally ends and then reverses after the PCAOB inspectors began to more carefully scrutinize the effectiveness of internal control audits beginning with the 2010 inspection cycle. For example, for the Big Four firms, the frequency of adverse internal control reports rises from 1.9% in 2010 to 3.6% in 2013. A similar pattern emerges in the sub-sample of misstatements. For example, in Panel A the adverse opinion frequency in the misstatement

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<sup>12</sup> The proportion of internal control audits with adverse opinions is generally higher for triennially inspected auditors across all years, consistent with the smaller and less sophisticated clients of triennially inspected auditors having poorer internal controls.

<sup>13</sup> Rice and Weber (2012) examine the period 2005-2009 and report a higher proportion of adverse internal control reports among companies with material misstatements as compared with the proportions we report in Table 1. We speculate that this difference results from two sampling restrictions imposed in Rice and Weber (2012), both of which reduce the proportion of misstatements in their sample that do not contain an adverse opinion during the misstatement year. That is, both restrictions reduce the "type II" error rate reported in Rice and Weber (2012). One restriction limits their analysis to first-time restatements, which mechanically reduces the number of misstatements they include in the later years of their sample which is when auditors were issuing fewer adverse opinions. The other restriction excludes restatements that do not explicitly acknowledge that the misstatement results from a material weakness. We do not impose these restrictions because both types of misstatements suggest that a material weakness existed at the time of the misstatement.

sample increases from 3.8% in 2010 to 9.0% in 2013. Similarly, the misstatement subsamples show upward trends in adverse internal opinions between 2010 and 2013 for the annually inspected non-Big Four auditors (Panel B) and the triennially inspected auditors (Panel C). This indicates that auditors were increasingly issuing adverse internal control opinions to companies with material internal control weaknesses during 2010 to 2013.

Consistent with the PCAOB's assertion that it began to intensify its examination of internal control audits starting in 2010, Col. (3) finds an increasing trend in reported deficiencies in internal control audits from 2010 onwards. For example, the mean number of Big Four audits with internal control deficiencies increases from 2.50 in 2010 to 16.50 in 2013. Over the same period, for the annually inspected non-Big Four firms, the mean number of audits with internal control deficiencies increases from 1.25 to 7.50. There is also a small increase in internal control deficiencies for the triennially inspected auditors, from 0.02 to 0.27 from 2010 through 2013.

Col. (4) of Table 1 shows the mean number of audits examined by the PCAOB inspectors, with the PCAOB providing this information for annually inspected auditors during 2010-2013 only. Not surprisingly, the inspectors examine more audits for the larger audit firms. From 2010 to 2013, the mean number of audits examined in a Big Four inspection ranges from 50.50 to 66.75. Over the same period, the mean number of audits examined ranges from 20.50 to 26.00 for the annually inspected non-Big Four auditors, and from 3.29 to 3.69 for the triennially inspected auditors.<sup>14</sup>

Col. (5) computes the mean internal control deficiency rate per inspection, where the deficiency rate is computed by dividing the number of audits with internal control

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<sup>14</sup> Table 1 shows a decline in the number of engagements inspected from 2010 to 2013. This is consistent with inspectors switching their focus to accelerated filers, whose audits are larger and more complex, and therefore more time-consuming to inspect.

deficiencies (Col. 3) by the number of audits inspected (Col. 4).<sup>15</sup> Consistent with the PCAOB examining internal control audits more intensively from 2010 onwards, Col. (5) reports a sharp increase in the mean internal control deficiency rate from 2010 to 2013. The mean deficiency rate for Big Four firms increases from 3.78% in 2010 to 32.65% in 2013. Over the same period, the mean deficiency rate for annually inspected non-Big Four firms increases from 5.40% to 31.36%, and for triennially inspected audit firms increases from 1.42% to 8.24%.<sup>16</sup> The internal control audit deficiency rates trend upwards over time despite potential remediation of the deficiencies by audit firms because from 2010 onwards the PCAOB inspectors were increasingly focused on assessing whether audit firms were obtaining sufficient evidence to support their internal control opinions (PCAOB, 2013; Franzel, 2014).<sup>17</sup>

Overall, the analysis in Table 1 is consistent with the SEC's assertions that the rate of adverse internal control opinions declined over the period 2005-2009 in both the full sample and the sub-sample of companies with misstatements (Besch, 2009), and that the PCAOB responded by directing its inspectors to focus on assessing whether audit firms were obtaining sufficient evidence to support their internal control opinions beginning with the 2010 inspections cycle (PCAOB, 2013; Franzel, 2014).

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<sup>15</sup> The PCAOB inspectors do not examine every audit and their tests are not designed to identify every possible deficiency (Franzel, 2014). The PCAOB selects audits for inspection based on risk factors that include (1) the nature of the issuer or its industry, (2) audit issues likely to be encountered, (3) the issuer's market capitalization, (4) whether the issuer has significant operations in certain emerging markets, (5) considerations related to the particular audit firm including prior inspection results, and (6) any other relevant information that comes to the PCAOB's attention (PCAOB, 2012b). In addition, only the higher-risk portions of an audit are typically examined during the inspection.

<sup>16</sup> The inspection reports do not disclose whether the audit being inspected is a SOX 404 audit or a non-SOX 404 audit. Therefore, the denominator for the deficiency rate cannot be restricted to audits in which auditors issue internal control opinions. The deficiency rates for the triennially inspected auditors in Col. (4) are lower than those for the annually inspected auditors because a higher proportion of their clients are not subject to SOX 404. In our model of internal control reporting, the estimation sample is restricted to companies that receive internal control opinions from their auditors.

<sup>17</sup> We control for this upward trend in our empirical tests by including year fixed effects.

### ***2.3 Audit inspections and adverse audit opinions***

As noted above, beginning with the inspections of 2010, the PCAOB directed its inspectors to focus on assessing whether audit firms were obtaining sufficient evidence to support their internal control opinions. If audit firms were lax in their audit of internal controls, this increased scrutiny is likely to result in more reported audit deficiencies. Audit deficiencies identified by PCAOB inspectors are likely to impose costs on auditors, so auditors have incentives to respond to the inspection reports by remediating the identified deficiencies. If the PCAOB inspectors successfully identify systemic problems, then their remediation should have firm-wide effects on auditors' ability to identify and report material weaknesses in their clients' internal controls. Further, the greater the number of deficiencies identified, holding constant the number of engagements inspected, the more systemic the identified problems are likely to be, and the stronger the signal to the auditing firm that remediation is required. Thus, higher rates of identified deficiencies will lead to more remediation. We expect that remediation would result in auditors detecting more internal control weaknesses and evaluating the materiality of detected weaknesses more thoroughly. Since auditors are required to issue adverse audit opinions to clients that are found to have material weaknesses, this leads to the following hypothesis:

*Hypothesis: Audit firms are more likely to issue adverse internal control opinions after receiving PCAOB inspection reports that disclose higher internal control deficiency rates.*

## **3. Research design**

### ***3.1 Sample period***

Our sample comprises internal control reports with fiscal year-ends from January 1, 2010 through December 31, 2013. We begin our sample period in 2010 for several reasons. One is that this period immediately follows suggestions by both the PCAOB and the SEC that audit firms were systematically failing to identify material internal control weaknesses



(Besch, 2009; PCAOB, 2009). Further, 2010 is the first year in which the PCAOB directed its inspectors to focus their efforts on whether auditors were obtaining sufficient evidence to support their internal control opinions. Importantly, 2010 is also the first year in which the PCAOB disclosed the number of audit engagements examined in their annual inspections of auditors with 100 or more clients. Disclosing the number of inspected engagements allows us to compute the rate of internal control audit deficiencies in each inspection, which is a central feature of our research design.

### ***3.2 Measuring the post-inspection window***

We test our hypothesis by examining whether auditors increase their issuance of adverse internal control reports subsequent to receiving PCAOB inspection reports that disclose relatively high internal control deficiency rates. Our “post-inspection window” begins with the date of the most recent inspection report and ends with the date of the next inspection report. Fig. 1 illustrates how we determine the post-inspection window for annually inspected and triennially inspected audit firms. For example, the PCAOB issued inspection reports to Deloitte & Touche on May 4, 2010, Dec 7, 2011, Nov 28, 2012, May 7, 2013, and May 6, 2014. The post-inspection window for the May 4, 2010 report begins May 4, 2010 and ends on Dec 6, 2011, just before the next inspection report is issued; and the post-inspection period for the Dec 7, 2011 report begins Dec 7, 2011 and ends on Nov 27, 2012, just before the next inspection report is issued.

Because they are inspected less frequently, the post-inspection windows for the triennially inspected audit firms are longer. For example, the PCAOB issued inspection reports for Brown, Edwards and Company on Sept 30, 2008, Aug 3, 2011, and Feb 27, 2014. The post-inspection window for the Sept 30, 2008 report begins on Sept 30, 2008 and ends on Aug 2, 2011, just before the next inspection report is issued; and the post-inspection window

for the Aug 3, 2011 report begins on Aug 3, 2011 and ends on Feb 26, 2014, just before the next inspection report is issued.<sup>18</sup>

### 3.3 Model of adverse internal control reports

We test our hypothesis by estimating eq. (1), which models the auditor's decision to issue an adverse internal control opinion:

$$ICOP = \alpha_1 DEF\_IC\% + \alpha_2 DEF\_NOT\_IC\% + CONTROLS \\ + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u \quad (1)$$

The dependent variable (*ICOP*) equals one if the auditor issues an adverse internal control opinion during the post-inspection window, and zero if the auditor issues a clean opinion during the post-inspection window. Because subsequent accounting restatements can prompt revisions in previously-issued clean internal control opinions, we use the originally-issued internal control opinion rather than any revised opinions.

Our treatment variable is the internal control deficiency rate (*DEF\_IC%*), which equals the number of inspected engagements found by PCAOB inspectors to have internal control deficiencies, divided by the total number of audits examined during the inspection. We expect that audit firms issue more adverse internal control reports following PCAOB inspection reports that disclose higher internal control deficiency rates. We therefore predict a positive coefficient on *DEF\_IC%* in eq. (1); i.e.,  $\alpha_1 > 0$ . We estimate eq. (1) separately for annually and triennially inspected auditors because their post-inspection windows differ (Fig. 1).

PCAOB inspection reports also disclose deficiencies that are unrelated to the auditing of internal controls, such as deficiencies in substantive testing and analytical procedures. We expect auditors to modify their internal control procedures in response to reported internal control deficiencies, but not in response to deficiencies unrelated to internal controls. This

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<sup>18</sup> As reported in Section 5, we find consistent results using an alternative definition of the post-inspection window.

allows us to conduct a falsification test for our hypothesis by including in Eq. (1) the variable *DEF\_NOT\_IC%*, which equals the number of audits that are found to have deficiencies that are unrelated to internal controls, divided by the total number of audits examined during the inspection. Because these deficiencies are unrelated to internal control audits, we expect an insignificant coefficient on *DEF\_NOT\_IC%*.<sup>19</sup>

We include *Year fixed effects* in eq. (1) to control for time variation in adverse internal control reports. This is important because Table 1 shows an upward trend in adverse opinions between 2010 and 2013, which may reflect deterioration in companies' internal controls over time, and/or improvements in auditors' testing and evaluation of internal control weaknesses. We also control for *Audit firm fixed effects* because the existence and reporting of internal control weaknesses is likely to vary across audit firms.<sup>20</sup> By controlling for audit firm and year fixed effects, our empirical identification strategy is similar to a difference-in-difference research design. In particular, we test whether auditors increase their propensity to issue adverse internal control reports subsequent to PCAOB inspectors criticizing their internal control audits.

### **3.4 Control variables (CONTROLS)**

We include several control variables based on prior research (Ashbaugh et al., 2007; Doyle et al., 2007; Rice and Weber, 2012). Audit opinions on internal controls are likely to be persistent if companies fail to remediate their control weaknesses, or if the auditor's approach to testing and evaluating internal controls is similar from one year to the next. Thus, we control for the prior year's internal control opinion (*ICOP\_LAG*), which equals one if the

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<sup>19</sup> A PCAOB inspection report may disclose that an inspected audit has *both* internal control deficiencies *and* other types of deficiencies. These audits are captured by the *DEF\_IC%* variable. *DEF\_NOT\_IC%* captures the audits that are found to have deficiencies that are unrelated to the internal controls.

<sup>20</sup> Including audit firm fixed effects in eq. (1) also controls for Big Four membership. Our inferences are similar if we use a Big Four dummy variable rather than audit firm fixed effects.

company received an adverse internal control opinion in the previous year, and zero otherwise. We expect a positive coefficient on *ICOP\_LAG*.

We control for material misstatements (*MISSTATE*) because a misstatement indicates that a company has material internal control weaknesses over financial reporting implying that the company should receive an adverse internal control opinion (Rice and Weber, 2012). The *MISSTATE* variable equals one if the company's financial statements are subsequently restated, and zero otherwise. We expect a positive coefficient on *MISSTATE* because auditors are more likely to issue adverse internal control opinions when companies are materially misstating their financial statements. We also control for auditor resignations (*RESIGN*) because a resignation can signal the existence of internal control weaknesses. *RESIGN* equals one if an auditor resignation is announced during the past 12 months, and zero otherwise. Following Rice and Weber (2012), who find that audit fees are positively associated with reported internal control weaknesses, we include the natural log of audit fees ( $\ln(AF)$ ). The positive association between adverse opinions and audit fees may reflect additional audit effort to detect internal control problems, or it could reflect the auditor's pricing response to higher control risk.

We control for client size using the natural log of the company's market capitalization (*SIZE*). Small companies may have insufficient personnel and/or expertise to maintain high quality controls. Because poorly performing companies are more likely to have control weaknesses, we also include a loss dummy (*LOSS*), which takes the value one if net income is negative and zero otherwise. Multi-segment companies can face added internal control problems due to the complexity of their operations, and multinationals may find it difficult to have effective internal controls due to their geographic and institutional diversity. Thus, following Ashbaugh et al. (2007) and Doyle et al. (2007), we control for the number of business segments (*SEGMENTS*) and include a *FOREIGN* dummy, which equals one if the

company has a foreign currency translation and zero otherwise. Also following Ashbaugh et al. (2007) we control for the ratio of inventory to total assets (*INVENTORY*). Companies with more inventory face increased risks related to measurement and recognition issues and an increased risk of theft. We also control for sales growth (*GROWTH*) because the internal control system of a growing company may fail to keep pace with the rate of expansion of the company's operations.

We control for external financing (*XTFIN*) using the sum of newly issued equity and newly issued debt, divided by total assets. Companies intending to raise external financing are likely to prefer clean internal control opinions. On the other hand, external financing may expose the auditor to a greater risk of reputational or litigation losses if the auditor fails to disclose existing weaknesses. Therefore, the effect of external financing on internal control reporting is unclear *ex ante*. Finally, we control for mergers and acquisitions by including a dummy variable (*M&A*), which equals one if the company is involved in a merger or acquisition during the year, and zero otherwise. Acquisitions present significant challenges in internal control system integration. We also include a dummy to capture restructurings (*RESTRUCTURE*), which is coded one if the company restructures its operations during the year, and zero otherwise. Restructuring can cause control weaknesses due to the loss of critical staff and supervision problems.

## **4. Results**

### ***4.1 Descriptive statistics and univariate results***

Table 2 provides descriptive statistics for our sample, which comprises 13,933 internal control reports issued by auditors for fiscal years 2010-2013.<sup>21</sup> The vast majority of internal control reports are issued by the Big Four audit firms (N = 11,778). The annually

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<sup>21</sup> We identify material misstatements corresponding to fiscal years 2010 to 2013 (*MISSTATE*) using all restatements announced up to May 2015. The lag between the occurrence of a misstatement and a subsequent restatement announcement is typically less than one year (median lag = 180 days).

inspected non-Big Four firms issue 1,280 internal control reports, while the 94 triennially inspected non-Big Four firms issue 875. The proportion of adverse internal control opinions ranges from 1.90% to 3.04% for the Big Four auditors, and 1.92% to 5.35% among the others. This reflects that the clients of Big Four audit firms generally have higher quality internal controls and so are less likely to receive adverse opinions.

Table 2 shows that there are 32 post-inspection windows for the eight annually inspected audit firms (four for each audit firm), and 310 post-inspection windows for the 94 triennially inspected audit firms. Averaged over the four years we examine (2010-2013), the percentage of inspected audits with internal control audit deficiencies ranges from 9.95% to 27.56% among the annually inspected auditors, and is 4.83% for the triennially inspected auditors.<sup>22</sup> The much smaller rate of deficiencies among the triennially inspected auditors is due to two factors. One is that triennially inspected audit firms have relatively few clients who are required to have internal control audits under SOX Section 404, reducing the possibility of inspectors finding internal control audit deficiencies.<sup>23</sup> A second is that the clients of triennially inspected audit firms are more likely to have controls that are missing altogether. In such cases, the auditor is unable to test the control, and instead would rely on extended substantive testing.

Table 3 reports the mean values of the independent variables after partitioning the sample by the type of internal control report. There are 409 adverse opinions and 13,524 clean opinions issued during the post-inspection windows. Consistent with our hypothesis, we find a significant positive association between the internal control deficiency rate and the

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<sup>22</sup> Although untabulated, there is a relatively large variation across audit firm inspections in the percentage of inspected audits with deficiencies in internal control audits. For example, Grant Thornton's internal control audit deficiency rate increases from 2.56% in 2010 to 48.39% in 2013, whereas McGladrey's rate increases from 5.61% in 2010 to 9.29% in 2013

<sup>23</sup> An internal control audit deficiency can exist even when the company being audited is not subject to SOX 404. This is because auditing standards require an auditor to test internal controls that the auditor intends to rely upon, even when the company is not subject to SOX 404.

subsequent issuance of adverse internal control reports. The average internal control deficiency rate in an audit firm's most recent inspection (*DEF\_IC%*) is 19.48% in the sub-sample with adverse internal control reports, and 16.83% in the sub-sample with clean internal control reports, with the difference highly significant (t-stat. = 3.98).<sup>24</sup> However, because this univariate test in Table 2 does not control for other factors that potentially explain internal control reporting, we draw our conclusions from the multivariate tests in Table 4.

Importantly, we find an insignificant association between identified deficiencies unrelated to internal controls and the subsequent issuance of adverse internal control reports. The average deficiency rate for audits with deficiencies that are unrelated to internal controls (*DEF\_NOT\_IC%*) is 12.89% in the sub-sample with adverse internal control reports and 12.11% in the sub-sample with clean internal control reports. The difference is insignificant at conventional levels.

Univariate results for the control variables are generally consistent with expectations. Auditors are significantly more likely to issue an adverse internal control opinion when the client: 1) receives an adverse opinion in the prior year (*ICOP\_LAG*), 2) misstates its financial statements (*MISSTATE*), 3) recently experiences an auditor resignation (*RESIGN*), 4) is smaller (*SIZE*), 5) reports a loss (*LOSS*), 6) has foreign operations (*FOREIGN*), and 7) has more inventory (*INVENTORY*). The other control variables are not statistically significant.

#### **4.2 Multivariate results**

Table 4 reports the regression results for Eq. (1). The standard errors are corrected for clustering on each client company because there are repeated annual observations during our sample period (2010-2013).<sup>25</sup> Col. (1) reports results for all auditors, while Cols. (2) and (3)

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<sup>24</sup> While not tabulated, the median values of *DEF\_IC%* are 18.31% when *ICOP* = 1 and 13.46% when *ICOP* = 0, and the difference is significant at the 1% level two-tailed ( $\text{Chi}^2 = 10.17$ ).

<sup>25</sup> Our inferences are unchanged if the standard errors are clustered on each audit firm.

report results separately for the annually and triennially inspected auditors, respectively. Consistent with our hypothesis, Col. (1) reports a positive coefficient on *DEF\_IC%*, the internal control deficiency rate during the audit firm's most recent inspection, and the *DEF\_IC%* coefficient is highly significant (z-stat. = 5.76). This indicates that audit firms receiving PCAOB inspection reports with higher internal control deficiency rates subsequently issue more adverse internal control audit opinions. These findings are consistent with audit firms responding to critical PCAOB inspections by remediating their audit procedures related to identifying and reporting internal control weaknesses. Cols. (2) and (3) find that the coefficients on *DEF\_IC%* are significantly positive for both annually inspected auditors (z-stat. = 3.87) and triennially inspected auditors (z-stat. = 2.93).

In untabulated analysis we measure the economic significance of our results by calculating the predicted probability of an adverse internal control opinion as *DEF\_IC%* increases from the 10th percentile (0.027) to the 90th percentile (0.385). Over this range, the predicted probability of an adverse internal control opinion more than doubles from 2.00% to 5.21%. Therefore, our results are economically significant as well as statistically significant.<sup>26</sup>

Notably, we do not find significant results for inspector-reported deficiencies that are unrelated to internal controls. The coefficients on *DEF\_NOT\_IC%* are insignificant at conventional levels in all three regressions. Therefore, while auditors' internal control opinions are associated with the internal control deficiencies found by PCAOB inspectors, they are not associated with other types of deficiencies.

Results for the control variables are generally consistent with the univariate analysis in Table 3 and prior research. We find that auditors are more likely to issue adverse opinions to clients who: 1) receive an adverse opinion in the prior year (*ICOP\_LAG*), 2) misstate their

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<sup>26</sup> We use the 10th and 90th percentiles because very few observations have *DEF\_IC%* = 0 or 1.



financial statements (*MISSTATE*), 3) experience a recent auditor resignation (*RESIGN*), 4) have higher audit fees ( $\ln(AF)$ ), 5) are smaller (*SIZE*), 6) report losses (*LOSS*), and 7) have more inventories (*INV*).<sup>27</sup>

#### **4.3 Types of internal control deficiencies identified by PCAOB inspectors**

In this section we examine whether PCAOB inspectors focus on deficiencies in both internal control testing (i.e., the audit process) and internal control reporting (i.e., audit outcomes). This analysis is important, because remediation is meaningful only if auditors improve the specific deficiencies identified by the inspectors, rather than simply issue more adverse opinions. If most of the identified deficiencies involve audit testing rather than audit reporting, audit firms are unlikely to satisfy the inspectors merely by increasing their issuance of adverse internal control opinions.

We begin this analysis by classifying the identified deficiencies (*DEF\_IC%*) into two broad categories, based on the reported cause of the deficiency: (1) inadequate *tests* of internal controls, which potentially result in failures to *detect* the existence of material weaknesses; or (2) inappropriate *evaluation of the materiality* of detected weaknesses, which potentially result in failures to *report* material weaknesses. We measure inadequate *tests* of control weaknesses (*DEF\_IC\_TEST%*) as the number of audits where the PCAOB inspectors found that the auditor had failed to adequately test internal controls, divided by the total number of audits examined during the inspection. We measure the failure to *report* material weaknesses (*DEF\_IC\_REPORT%*) as the number of audits where the PCAOB inspectors indicate that the auditor failed to adequately evaluate the materiality of an identified

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<sup>27</sup> The coefficients on the dummy variables for each Big Four auditor are all negative and statistically significant, indicating that the clients of Big Four auditors are more likely to receive clean internal control reports. The coefficients on the dummy variables for the non-Big Four annually inspected auditors are all insignificant, indicating no differences between the internal control reports issued by these and the triennially inspected auditors. The coefficients on the dummy variables for each sample year confirm an increase in the issuance of adverse internal control reports from 2010 to 2013. Overall, the dummy variable results are consistent with the descriptive statistics reported in Tables 1 and 2. The coefficients on *DEF\_IC%* remain significantly positive even if we do not control for audit firm and year fixed effects.

weakness, divided by the total number of audits examined during the inspection. Panel A of Table 5 reports descriptive statistics for these variables. The mean value of *DEF\_IC\_TEST%* is 16.90% while the mean value of *DEF\_IC\_REPORT%* is 1.82%. Therefore, most deficiencies relate to inadequate testing rather than inadequate reporting of identified weaknesses.

We emphasize that the deficiencies identified by the inspectors do not necessarily indicate that the auditor failed to identify or report a material weakness. Rather, they indicate that the auditor failed to properly perform tests that may have detected a material weakness (*DEF\_IC\_TEST%*), or failed to properly evaluate the materiality of a detected weakness that may have been material and therefore should have been reported (*DEF\_IC\_REPORT%*). None of the inspection reports in our sample speculate on whether the proper performance of the test or the proper evaluation of the weakness would have resulted in the auditor identifying or reporting an actual material control weakness. Thus, there are no inspection reports in our sample where the inspector concluded that the audit firm failed to issue an adverse internal control audit opinion when such an opinion was appropriate.

Next, we disaggregate *DEF\_IC\_TEST%* into three sub-categories, which describe the type of test that the inspectors assert was inadequately performed: (1) inadequate tests of specific account balances (*DEF\_IC\_TEST\_AC%*), (2) inadequate tests of information technology (IT) controls (*DEF\_IC\_TEST\_IT%*), and (3) inadequate tests due to over-reliance on the work of others (*DEF\_IC\_TEST\_OTHERS%*). These variables are measured similar to *DEF\_IC\_TEST%*, as described in Table 5. Panel B of Table 5 reports descriptive statistics on these three sub-categories. The mean value of *DEF\_IC\_TEST\_AC%* is 15.80%, the mean value of *DEF\_IC\_TEST\_IT%* is 2.88%, and the mean value of *DEF\_IC\_TEST\_OTHERS%* is 3.83%. Therefore, the most frequent type of deficiency is the auditor's failure to adequately test internal controls relating to specific account balances.

Next, we examine whether the regression results in Table 4 are explained by the inspectors' detection of inadequate testing (*DEF\_IC\_TEST%*) or inadequate reporting (*DEF\_IC\_REPORT%*). To the extent that auditors respond to these two types of deficiency by improving both their testing and reporting, we would expect significant positive coefficients on *DEF\_IC\_TEST%* and *DEF\_IC\_REPORT%*. Panel C of Table 5 reports regression results for the model of internal control reporting. The first column reports significant positive coefficients on both *DEF\_IC\_TEST%* (z-stat. = 4.96) and *DEF\_IC\_REPORT%* (z-stat. = 3.00). Therefore, auditors increase their issuance of adverse opinions in response to reported deficiencies in their *tests* of internal controls, as well as in their *evaluation* of the materiality of detected weaknesses. The second column of Panel C reports that the results on the deficiencies in testing (*DEF\_IC\_TEST%*) are primarily explained by inadequate tests of specific accounts (*DEF\_IC\_TEST\_AC%*, z-stat. = 4.71). The results for the other two types of testing deficiencies are insignificant at conventional levels.

In summary, the analysis in Table 5 is consistent with the deficiencies identified in inspection reports triggering auditors' subsequent remediation of their internal control procedures; and with the PCAOB inspections being most effective in remediating deficiencies relating to inadequate testing at the account level and inadequate evaluation of the materiality of identified weaknesses.

#### ***4.4 Companies with material accounting misstatements***

In this section we test whether the PCAOB inspections prompt auditors to issue adverse internal control opinions to clients that are indeed more likely to have material weaknesses in their controls over financial reporting. This is an important analysis because auditors may attempt to appease the PCAOB by simply issuing more adverse opinions in response to critical inspection reports, irrespective of whether the opinions are genuinely deserved. Our tests are based on the observation that material misstatements can only occur

in companies with material weaknesses in their internal controls over financial reporting. Therefore, if auditors are issuing adverse control opinions to clients that genuinely have material control weaknesses, those companies are more likely to concurrently misstate their financial statements. Rice and Weber (2012) document that 68 percent of restating companies receive *unqualified* internal control opinions from their auditors at the time the financial statements are materially misstated. We explore whether PCAOB inspections help reduce such reporting errors, which fail to warn investors of companies that are more likely to misreport. Specifically, we test whether the critical findings from PCAOB inspections are prompting auditors to issue more adverse opinions to the companies that warrant such opinions; i.e., companies with concurrent material misstatements.

To test this, we add to eq. (1) the interaction between our treatment variable (*DEF\_IC%*) and the misstatement variable (*MISSTATE*). Except for the interaction term (*DEF\_IC% × MISSTATE*) eq. (2) is identical to eq. (1):

$$ICOP = \alpha_1 DEF\_IC\% + \alpha_2 DEF\_IC\% \times MISSTATE + \alpha_3 MISSTATE + CONTROLS + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u \quad (2)$$

The sum of the coefficients  $\alpha_1 + \alpha_2$  captures the impact of *DEF\_IC%* on *ICOP* among companies that materially misstate their financial statements. We expect  $\alpha_1 + \alpha_2 > 0$  if the deficiencies identified in PCAOB inspections prompt auditors to issue more adverse opinions to companies that warrant such opinions (i.e., companies that materially misstate their accounts). The  $\alpha_1$  coefficient captures the impact of *DEF\_IC%* on *ICOP* among the companies that do not have subsequent restatements. For these companies it is unclear whether their auditors should issue adverse or unqualified internal control opinions.<sup>28</sup> The ambiguity arises because the absence of a misstatement does not imply the absence of a prior material internal control weakness. Given this ambiguity, we focus on  $\alpha_1 + \alpha_2$  and  $\alpha_2$  rather

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<sup>28</sup> Such companies may deserve adverse opinions if there are material weaknesses that did not trigger a misstatement in that particular year, or if an undetected misstatement occurred.

than  $\alpha_1$ . The  $\alpha_2$  coefficient indicates whether the impact of  $DEF\_IC\%$  on  $ICOP$  is different for companies with misstatements compared to companies without misstatements. If critical inspection reports cause auditors to issue unwarranted adverse opinions more frequently, we would expect relatively fewer adverse opinions being issued to companies with misstatements and relatively more adverse opinions being issued to companies without misstatements (i.e.,  $\alpha_2 < 0$ ). Further, this would mean that the positive association between  $MISSTATE$  and  $ICOP$  becomes significantly weaker following the inspectors' revelation of high deficiency rates in internal control audits (i.e.,  $\alpha_3 > \alpha_2 + \alpha_3 > 0$ ).

The results for eq. (2) are reported in Table 6. We suppress the results for the control variables since they are similar to those reported in Table 4. We find that  $\alpha_1 + \alpha_2$  is significantly positive in the full sample and in the sub-sample of annually inspected auditors, while  $\alpha_1 + \alpha_2$  is positive but insignificant in the smaller sample of triennially inspected auditors. Therefore, companies with material misstatements receive more adverse internal control opinions after PCAOB inspectors report higher deficiency rates in their auditors' internal control audits. This suggests that PCAOB inspections are prompting auditors to issue more adverse internal control opinions to the companies that warrant such opinions. In addition, the coefficient on  $\alpha_2$  is insignificant in all the models. This indicates that the critical inspection reports do not prompt auditors to issue relatively more adverse opinions to companies without misstatements rather than to companies with misstatements. That is, the strong positive association between  $MISSTATE$  and  $ICOP$  does not become weaker after the inspectors report high deficiency rates in internal control audits.

#### ***4.5 Do audit firms issue adverse opinions in order to obtain more lenient outcomes in future inspections?***

Another explanation for our results is that audit firms attempt to “game” the outcome of future PCAOB inspections by mechanically issuing more adverse opinions to their clients,

hoping that the adverse opinions will lead to more lenient inspections. We consider this alternative explanation unlikely because the inspectors focus on deficiencies related to the testing of controls, in addition to deficiencies related to the materiality of identified weaknesses (Table 5). Therefore, auditors are unlikely to satisfy the inspectors by merely issuing more adverse opinions without concurrent improvements in control testing or their evaluation of materiality. Moreover, the PCAOB states that its inspectors do *not* choose to examine an engagement based on whether the client received a clean or adverse internal control report. Specifically, PCAOB Release No. 2009-006 states that its inspectors select audit engagements for examination:

*“without regard to whether the ICFR audits resulted in adverse or unqualified opinions and without regard to the number or extent of internal control deficiencies identified by the engagement team during the audit.”*

Therefore, we do not expect that audit firms are able to game the inspection process by issuing more adverse internal control opinions.<sup>29</sup>

Nevertheless, in this section we consider whether audit firms’ prior reporting decisions can influence the outcomes of future PCAOB inspections. If they do, audit firms may be able to game the inspection process by issuing more adverse internal control opinions. We investigate this by testing whether the internal control opinions issued during the period leading up to the audit firm’s inspection are associated with the internal control deficiency rates subsequently reported by the inspectors. For example, the inspection report issued to Deloitte & Touche on Dec 7, 2011 discloses that the inspection began in October 2009. Thus, we test whether the deficiency rate disclosed in the Dec 7, 2011 inspection report

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<sup>29</sup> There are two reasons why reverse causality is unlikely to affect our main results in Table 4. First, inspectors are only able to observe an audit firm’s *past* engagements, whereas the dependent variable in Table 4 captures the internal control reports issued *subsequent* to the inspection (Fig. 1). Obviously, inspectors cannot select audits based upon internal control opinions that have not yet been issued. Second, Table 4 controls for internal control opinions issued during the previous year (*ICOP\_LAG*). This helps control for selection bias that might arise from inspectors selecting engagements based upon the content of internal control reports issued before the inspection starts.

is associated with the internal control opinions previously issued by Deloitte and Touche during the period leading up to October 2009. In this example, the “pre-inspection” window for Deloitte & Touche’s inspection report issued on Dec 7, 2011 is measured from October 1, 2008 (the start date of the previous year’s inspection) to September 30, 2009 (the day before the start of the current year’s inspection). Similarly, all other pre-inspection windows are measured using the dates on which the inspections begin.

We test whether previous internal control opinions are associated with subsequent inspection outcomes by estimating eq. (3):

$$PRE\_ICOP = \beta_1 DEF\_IC\% + \beta_2 PRE\_ICOP\_LAG + CONTROLS + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u \quad (3)$$

In eq. (3), the dependent variable (*PRE\_ICOP*) equals one if the auditor issues an adverse internal control report during the *pre-inspection* window, and zero otherwise. As before, *DEF\_IC%* measures the internal control deficiency rate subsequently reported by the PCAOB inspectors. If audit firms issue more adverse internal control opinions in order to receive more favorable outcomes in the next inspection, we would expect a significant negative association between *PRE\_ICOP* and *DEF\_IC%*; i.e.,  $\beta_1 < 0$ . An insignificant coefficient on *DEF\_IC%* would mean that the deficiency rate reported by inspectors is not associated with the internal control opinions issued by auditors during the pre-inspection window.

Table 7 reports the results from estimating eq. (3). We find insignificant coefficients on *DEF\_IC%* for both the annually and triennially inspected auditors. This is consistent with auditors being unable to game the outcomes of future inspections by mechanically issuing more adverse internal control opinions. Overall, our evidence suggests that auditors need to genuinely improve their internal control audit procedures in response to critical inspections.

#### ***4.6 PCAOB inspection deficiencies and subsequent audit fees***

If audit firms remediate internal control deficiencies by conducting more rigorous tests of internal controls, we expect audit effort and the costs of the audit to increase. In contrast, if audit firms respond to the cited deficiencies by mechanically issuing more adverse internal control opinions, we do not expect audit costs to increase. Therefore, in this section we examine the link between PCAOB inspections and subsequent audit fees. To the extent that the costs of remediation can be passed on to clients, we expect audit fees to be higher after inspectors report more deficiencies in internal control audits.<sup>30</sup> Thus, if the inferences drawn from our hypothesis test are correct, and if clients are willing to pay the costs of the extra audit work, we expect to observe higher audit fees after the inspectors report higher deficiency rates in internal control audits.

We test this by estimating the following regression model for audit fees:

$$\begin{aligned} \ln(AF) = & \alpha_1 DEF\_IC\% + \alpha_2 DEF\_NOT\_IC\% + \alpha_3 \ln(AF\_LAG) + CONTROLS \\ & + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u \end{aligned} \quad (4)$$

This model regresses the log of audit fees on the rate of reported internal control audit deficiencies (*DEF\_IC%*), the rate of deficiencies unrelated to internal control audits (*DEF\_NOT\_IC%*), lagged audit fees (*Ln(AF\_LAG)*), and several control variables found in prior literature to explain audit fees.

Table 8 presents results for the audit fee model, with the sample dropping from 13,933 to 13,873 observations because we require data on lagged audit fees. We find significant positive coefficients on *DEF\_IC%* for the full sample and the sub-sample of annually inspected auditors (t-stats. = 3.06 and 2.68, respectively). This is consistent with audit costs increasing after PCAOB inspectors identify deficiencies in internal control audits. In contrast, the coefficient on *DEF\_IC%* is insignificant for the sub-sample of triennially-inspected auditors. This could be because the clients of triennially inspected auditors have a

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<sup>30</sup> Twelve of the eighteen auditors who were asked by Johnson et al. (2015) about the costs of remediating audit deficiencies claimed that it was difficult to pass on the extra costs to audit clients. This makes it less likely that we would observe a significant impact on audit fees when costly remediation occurs.



lower demand for audit assurance, and therefore are unwilling to compensate auditors for the extra costs of remediating the internal control deficiencies.<sup>31</sup> In summary, our analysis in Table 8 is consistent with auditors undertaking costly remediation efforts to improve their audits of internal controls.

## 5 Sensitivity Tests

### 5.1 Company fixed effects

We control for audit firm and year fixed effects in our primary analysis. We do not control for company fixed effects because this would necessitate dropping companies that have no time variation in the dependent variable (*ICOP*). This is because the fixed effects logit model requires that a company receive both a clean opinion *and* an adverse opinion at some point during the four-year sample period. To test whether our results are sensitive to controlling for company fixed effects, we examine the sub-sample of companies that do not receive the same internal control opinion in every sample year, reducing our sample from 13,933 to just 1,023 observations. As reported in Table 9, the fixed effects results remain significant in this analysis. When the fixed effects model is estimated for the model of internal control reporting, the *DEF\_IC%* coefficient is positive and statistically significant (z-stat. = 4.09). The *DEF\_IC%* coefficient is also positive and statistically significant in the audit fee model (t-stat. = 4.80). In addition, we estimate random effects specifications, which do not result in sample attrition because the random effects models retain companies that lack time variation in the dependent variable. In the random effects specifications, the *DEF\_IC%* coefficients are positive and significant in both the internal control reporting model (z-stat. = 4.75) and the audit fee model (t-stat. = 2.95). Hence, our results are robust to controlling for unobserved time-invariant company characteristics.

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<sup>31</sup> The R-squares in Table 8 are higher than those generally reported in the literature because we include lagged audit fees as a control variable.

## ***5.2 Going-concern deficiencies and auditors' subsequent going-concern reports***

Our study asks whether there is a link between the internal control deficiencies reported by PCAOB inspectors and auditors' subsequent internal control opinions. A related question is to ask whether there is also a link between going-concern deficiencies found by inspectors and auditors' subsequent going-concern opinions. This question is examined by Gramling et al. (2011), using inspection reports issued to triennially inspected auditors from 2005 to 2007. They find an insignificant association between going-concern deficiencies reported by inspectors and auditors' subsequent going-concern reports.<sup>32</sup> A potential explanation for this insignificant result is that going-concern deficiencies are rarely mentioned in PCAOB inspection reports. In untabulated analysis, we review the inspection reports issued to triennially inspected auditors over the period 2005-2007, and find that only *five* of the 650 inspected engagements are identified as having going concern deficiencies (156 of the 650 engagements are found to have deficiencies unrelated to going concern deficiencies). Thus, the small number of going concern deficiencies may explain why Gramling et al. (2011) find an insignificant effect on auditors' subsequent going-concern reports.

We update the analysis in Gramling et al. (2011) by examining the inspection reports issued to both annually inspected and triennially inspected auditors between 2010 and 2013. Over this period, inspectors examine 2,226 audits and report that 764 audits are deficient. However, the inspectors report that only 5 of the 2,226 audits have going-concern deficiencies. In untabulated analysis, we continue to find an insignificant association between the handful of going-concern deficiencies reported by PCAOB inspectors and auditors' subsequent going-concern opinions.

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<sup>32</sup> Specifically, the coefficient on *DEFVAR*×*POST* is insignificant in the going-concern reporting model reported in Col.2, Panel A, Table 3 of Gramling et al. (2011).

### ***5.3 Alternative measure of internal control deficiency rates***

Our measure of deficiency rates captures the *level* of deficiencies reported by the inspectors. However, auditors may also respond to *changes* in deficiency rates. Thus, in untabulated analysis we repeat our analysis in Table 4 after replacing *DEF\_IC%* with the *change* in the internal control deficiency rate ( $\Delta DEF\_IC\%$ ). We drop the first sample year (2010) because we do not observe the number of audits examined by the inspectors before 2010, causing the sample to fall to 9,989 observations. We find that the coefficient on  $\Delta DEF\_IC\%$  remains positive (3.46) and highly significant (z-statistic = 6.15). Therefore, our results continue to support our hypothesis when we measure the change in an audit firm's reported deficiency rate.

### ***5.4 Audit deficiencies that are unrelated to internal control audits***

Some of the inspected audits have both internal control deficiencies *and* other types of audit deficiencies (e.g., deficiencies in substantive testing or analytical procedures). To test whether our results are driven by the combination of internal control and other types of deficiencies, we re-estimate our Table 4 analysis after replacing *DEF\_NOT\_IC%* with *DEF%*, where *DEF%* equals the total number of audits that are found to have any type of deficiency divided by the total number of audits examined during the inspection. In untabulated analysis we find that the coefficient on *DEF\_IC%* remains positive and significant (z-statistic = 3.81) whereas the coefficient on *DEF%* is insignificant (z-statistic = 0.34). This supports our Table 4 analysis that finds auditors' internal control opinions are affected by the inspectors' prior disclosure of internal control deficiencies but not by their prior disclosure of other types of deficiencies.

### ***5.5 Using unscaled internal control audit deficiencies***

In untabulated analysis we find similar results if we do not scale the number of deficiencies by the number of inspected engagements. We also find that our inferences are

unchanged if we estimate eq. (1) using the unscaled deficiency variable for the entire period for which we have internal control audit reports (2005-2013).

### ***5.6 Alternative post-inspection window***

As shown in Fig. 1, our tabulated analysis uses the dates of the inspection reports to measure the post-inspection windows. However, it is possible that remediation could occur earlier than this because the inspectors typically discuss their findings with audit firms before releasing the inspection reports to the public. Therefore, as a robustness test, we re-estimate the models of Table 4 after re-defining the post-inspection windows using the inspection completion dates rather than the inspection report dates. In untabulated analysis, we continue to find significant positive coefficients on *DEF\_IC%* in the full sample and the sample of annually inspected auditors (z-stats. = 3.95, 3.78). In the sample of triennially inspected auditors, the *DEF\_IC%* coefficient is positive but insignificant (z-stat. = 1.15). Overall, these results are slightly weaker than those reported in Table 4, suggesting that remediation is concentrated in the period after the inspection report is issued rather than after completion of the inspection. This suggests that it takes time for audit firms to implement improvements following the end of the inspection, or that audit firms wait for the inspection reports to be issued before undertaking remediation.

## **6. Summary and conclusion**

Recently, the PCAOB and SEC expressed concerns that auditors were failing to properly report material internal control weaknesses. In an effort to improve the quality of internal control audits, the PCAOB focused its inspections on assessing whether audit firms were obtaining sufficient evidence to support their internal control opinions and disclosing any identified deficiencies in their inspection reports. The purpose of our study is to test whether the PCAOB's efforts were successful in improving the quality of internal control audits. We find that PCAOB inspection reports that disclose higher rates of internal control

audit deficiencies lead to a subsequent increase in auditors' issuance of adverse internal control opinions. In addition, the reported deficiencies prompt auditors to issue more adverse opinions to companies that warrant such opinions; i.e., companies with concurrent material misstatements. Finally, we find that inspection reports with higher deficiency rates lead to increased audit fees. Together, these findings suggest that PCAOB inspections successfully remediate deficiencies in auditors' internal control audits, leading to improved quality in the audits of internal controls, albeit at a higher cost to audit clients.

We caution, however, that there are several caveats in interpreting our findings and conclusions. One is that we are unable to conclude whether the observed remediation is socially optimal. The increase in adverse opinions is accompanied by an increase in audit fees as well as an increase in inspection costs, and it is not obvious that the benefits from remediation justify these additional costs. Another caveat is that we compare remediation by audit firms with high deficiency rates relative to those with low deficiency rates. However, audit firms with low deficiency rates may also derive remediation benefits from PCAOB inspections. Without comparisons to uninspected audit firms (which is not feasible, since every US public company audit firm is inspected), we are unable to measure the potential benefits of inspections to audit firms with low deficiency rates. Finally, it remains an open question whether the other types of deficiencies reported by PCAOB inspectors (e.g., deficiencies in substantive testing and analytical procedures) also lead to subsequent improvements in audit quality. Using publicly available data it is challenging to reliably measure improvements in substantive testing and analytical procedures. Therefore, we leave this to future research.

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**TABLE 1**  
**Audit firms' internal control reports and the deficiencies in internal control audits found by PCAOB inspectors.**

**Panel A: Big 4 audit firms**

Year	Adverse internal control reports (%)		PCAOB inspection reports		
	Full sample (1)	Misstatements sub-sample (2)	Mean no. of audits found to have internal control deficiencies (3)	Mean no. of audits examined by inspectors (4)	Mean % of audits found to have internal control deficiencies (5)
2005	10.0%	19.9%	4.00	n.a.	n.a.
2006	7.4%	16.8%	0.75	n.a.	n.a.
2007	6.3%	13.8%	1.00	n.a.	n.a.
2008	3.8%	9.0%	0.00	n.a.	n.a.
2009	2.6%	4.9%	0.75	n.a.	n.a.
2010	1.9%	3.8%	2.50	66.75	3.78%
2011	2.5%	5.4%	9.00	60.50	14.64%
2012	2.8%	6.1%	12.75	54.75	23.36%
2013	3.6%	9.0%	16.50	50.50	32.65%

**Panel B: Annually-inspected non-Big 4 audit firms**

Year	Adverse internal control reports (%)		PCAOB inspection reports		
	Full sample (1)	Misstatements sub-sample (2)	Mean no. of audits found to have internal control deficiencies (3)	Mean no. of audits examined by inspectors (4)	Mean % of audits found to have internal control deficiencies (5)
2005	10.8%	22.1%	2.50	n.a.	n.a.
2006	7.7%	18.2%	2.00	n.a.	n.a.
2007	6.5%	13.4%	0.50	n.a.	n.a.
2008	4.1%	9.0%	0.50	n.a.	n.a.
2009	2.9%	5.5%	0.25	n.a.	n.a.



**TABLE 1 (cont.)**  
**Audit firms' internal control reports and the deficiencies in internal control audits found by PCAOB inspectors.**

***Panel B: Annually-inspected non-Big 4 audit firms (cont.)***

Year	Adverse internal control reports (%)		PCAOB inspection reports		
	Full sample (1)	Misstatements sub-sample (2)	Mean no. of audits found to have internal control deficiencies (2)	Mean no. of audits examined by inspectors (3)	Mean % of audits found to have internal control deficiencies (4)
2010	2.3%	5.8%	1.25	26.00	5.40%
2011	2.8%	6.6%	3.50	26.00	18.53%
2012	2.9%	6.6%	4.50	21.75	19.67%
2013	3.7%	8.5%	7.50	20.50	31.36%

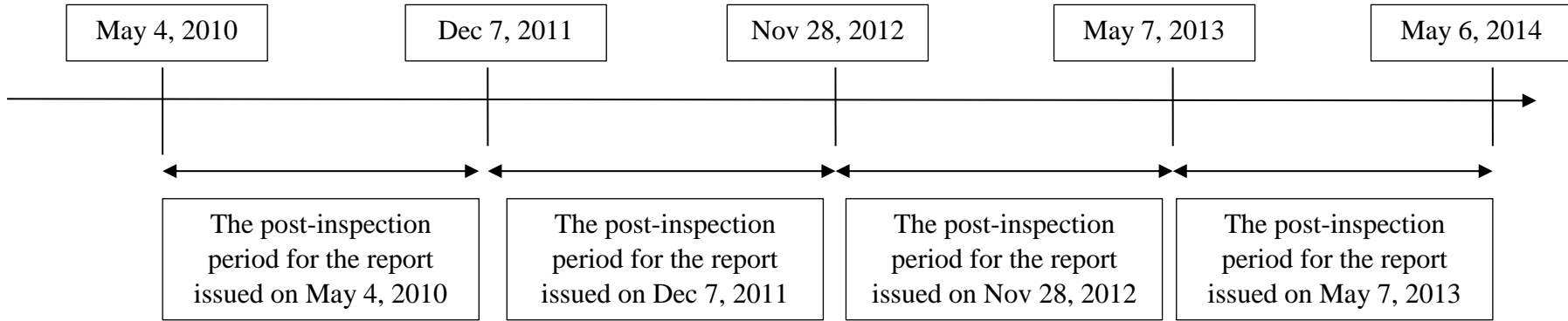
***Panel C: Triennially-inspected non-Big 4 audit firms***

Year	Adverse internal control reports (%)		PCAOB inspection reports		
	Full sample (1)	Misstatements sub-sample (2)	Mean no. of audits found to have internal control deficiencies (2)	Mean no. of audits examined by inspectors (3)	Mean % of audits found to have internal control deficiencies (4)
2005	14.8%	26.7%	0.44	5.36	12.63%
2006	16.9%	24.6%	0.10	3.25	3.26%
2007	14.3%	24.4%	0.13	5.46	2.34%
2008	13.1%	23.1%	0.00	4.24	0.00%
2009	7.1%	14.3%	0.00	2.63	0.00%
2010	8.2%	17.9%	0.02	3.69	1.42%
2011	12.1%	14.3%	0.07	3.42	1.76%
2012	8.2%	23.8%	0.22	3.59	6.39%
2013	6.1%	25.0%	0.27	3.29	8.24%

**Fig. 1**  
**The post-inspection windows.**

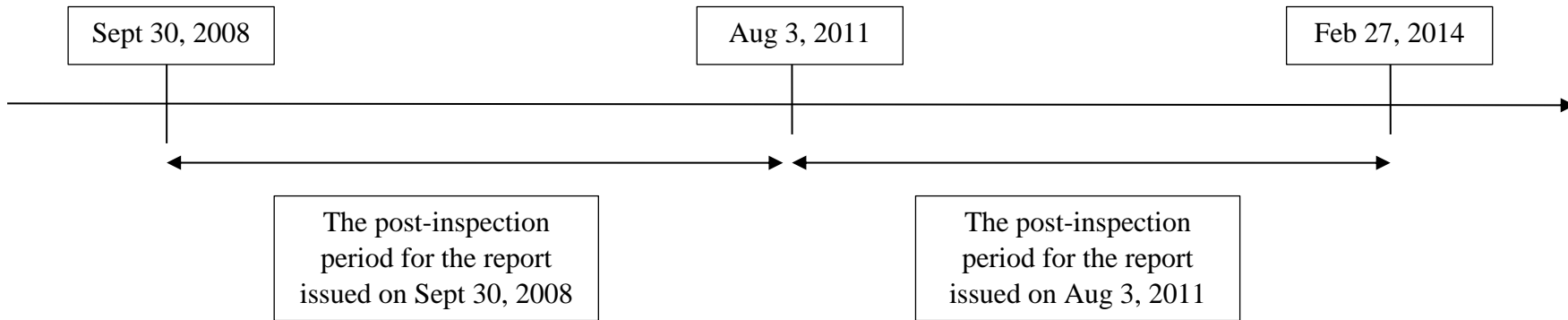
**(a) Annually inspected auditors.**

For example, inspection reports were issued to Deloitte & Touche on May 4, 2010, Dec 7, 2011, Nov 28, 2012, May 7, 2013, and May 6, 2014. Its four post-inspection windows are measured as follows:



**(b) Triennially inspected auditors.**

For example, inspection reports were issued to Brown, Edwards and Company on Sept 30, 2008, Aug 3, 2011, and Feb 27, 2014. Its two post-inspection windows are measured as follows:



**TABLE 2**  
**Auditors' internal control reports and PCAOB inspection reports.**  
**The sample of internal control reports comprises companies with year-ends in the period 2010-2013.**  
**The sample of PCAOB inspection reports comprises the post-inspection windows for this period (see Fig. 1).**

	Auditors' internal control reports		PCAOB inspection reports	
	No. of reports	Adverse (%)	No. of post-inspection windows (see Fig. 1)	% of audits with internal control deficiencies
8 Annually inspected auditors:				
Deloitte & Touche	2,635	1.90%	4	17.22%
Ernst & Young	3,560	2.75%	4	21.20%
KPMG	2,594	2.58%	4	15.83%
PricewaterhouseCoopers	2,989	3.04%	4	20.18%
BDO	388	4.38%	4	13.36%
Crowe Horwath	156	1.92%	4	27.56%
Grant Thornton	598	5.35%	4	24.09%
McGladrey	138	5.07%	4	9.95%
	13,058		32	
94 Triennially inspected auditors	875	5.03%	310	4.83%
Total	13,933		Total 342	

**TABLE 3**  
**Mean values of the independent variables.**

	Adverse internal control reports issued during the post-inspection window ( <i>ICOP</i> = 1)	Clean internal control reports issued during the post-inspection window ( <i>ICOP</i> = 0)	Adverse vs. clean (t-stat.)
<i>DEF_IC%</i>	0.1948	0.1683	3.98***
<i>DEF_NOT_IC%</i>	0.1289	0.1211	1.62
<i>ICOP_LAG</i>	0.2861	0.0191	34.27***
<i>MISSTATE</i>	0.2323	0.0909	9.64***
<i>RESIGN</i>	0.0367	0.0035	9.87***
<i>Ln(AF)</i>	14.1613	14.1128	0.80
<i>SIZE</i>	12.4372	13.6843	-8.34***
<i>LOSS</i>	0.4670	0.2192	11.86***
<i>SEGMENTS</i>	4.0513	4.2556	-0.91
<i>FOREIGN</i>	0.3887	0.3465	1.77*
<i>INVENTORY</i>	0.0826	0.0714	2.03**
<i>GROWTH</i>	0.0536	0.0733	1.30
<i>XTFIN</i>	0.1589	0.1388	1.41
<i>M&amp;A</i>	0.1883	0.1735	0.77
<i>RESTRUCTURE</i>	0.3056	0.2810	1.26
Obs.	409	13,524	

\*\*\*, \*\*, \* denote statistically significant at the 1%, 5%, 10% levels, respectively (two-tailed tests)

Variable definitions:

*ICOP* = 1 if the auditor issues an adverse internal control opinion during the post-inspection window; = 0 if the auditor issues a clean internal control opinion during the post-inspection window. The post-inspection window captures the period immediately following the issuance of the audit firm's inspection report. See Fig. 1 for further details about the measurement of the post-inspection windows.

*DEF\_IC%* = the number of audits that are found by PCAOB inspectors to have internal control deficiencies, divided by the total number of audits examined during the inspection.

*DEF\_NOT\_IC%* = the number of audits that are found by PCAOB inspectors to have deficiencies unrelated to internal controls, divided by the total number of audits examined during the inspection.

*ICOP\_LAG* = 1 if the auditor issued an adverse internal control opinion in the prior year; = 0 if the auditor issued a clean internal control opinion in the prior year.

*MISSTATE* = 1 if the company's financial statements are subsequently restated; = 0 otherwise.

*RESIGN* = 1 if the company announced an auditor resignation during the past 12 months; = 0 otherwise.

*Ln(AF)* = the natural log of audit fees.

*SIZE* = Natural log of the company's market value.

*LOSS* = 1 if the company reports a loss; = 0 otherwise.

*SEGMENTS* = the number of reported business segments (Compustat Segment File).

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**TABLE 3 (cont.)**  
**Mean values of the independent variables.**

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*FOREIGN* = 1 if the company has a non-zero foreign currency translation during the year; = 0 otherwise.

*INVENTORY* = inventory divided by total assets.

*GROWTH* = the annual percentage growth in sales.

*XTFIN* = the sum of newly issued equity and newly issued debt, divided by total assets.

*M&A* = 1 if the company is involved in a merger or acquisition during the year; = 0 otherwise.

*RESTRUCTURE* = 1 if the company restructures its operations during the year (non-missing values for RCA, RCEPS, RCP, or RCD); = 0 otherwise.

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**TABLE 4**  
**PCAOB inspection deficiencies and auditors' subsequent internal control reports.**

$$ICOP = \alpha_1 DEF\_IC\% + \alpha_2 DEF\_NOT\_IC\% + CONTROLS \\ + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u$$

The dependent variable (*ICOP*) equals one if the auditor issues an adverse internal control opinion during the post-inspection window, and zero if the auditor issues a clean internal control opinion during the post-inspection window. The post-inspection window captures the period immediately following the issuance of the audit firm's PCAOB report. See Fig. 1 for further details about the measurement of the post-inspection windows. Z-statistics are reported in parentheses below the coefficients. Standard errors are corrected for clustering on each company.

	All auditors	Annually inspected auditors	Triennially inspected auditors
<i>DEF_IC%</i>	3.17*** (5.76)	3.43*** (3.87)	2.55*** (2.93)
<i>DEF_NOT_IC%</i>	0.19 (0.34)	0.54 (0.48)	0.47 (0.59)
<i>ICOP_LAG</i>	2.67*** (15.87)	2.69*** (14.76)	2.61*** (5.44)
<i>MISSTATE</i>	1.10*** (8.14)	1.09*** (7.80)	1.09* (1.92)
<i>RESIGN</i>	1.78*** (4.82)	2.04** (4.52)	0.94* (1.74)
<i>Ln(AF)</i>	0.24*** (3.90)	0.24*** (3.67)	0.32 (1.55)
<i>SIZE</i>	-0.09*** (-8.32)	-0.08*** (-7.99)	-0.10** (-2.03)
<i>LOSS</i>	0.88*** (7.47)	0.84*** (6.90)	1.48*** (3.46)
<i>SEGMENTS</i>	0.01 (0.39)	0.01 (0.33)	0.02 (0.39)
<i>FOREIGN</i>	0.12 (1.07)	0.20* (1.65)	-1.18** (-2.42)
<i>INVENTORY</i>	0.92** (2.20)	0.94** (2.04)	1.14 (1.36)
<i>GROWTH</i>	0.12 (0.72)	0.08 (0.45)	0.52 (0.97)
<i>XTFIN</i>	-0.06 (-0.22)	0.03 (0.14)	-1.47 (-1.19)
<i>M&amp;A</i>	0.15 (1.02)	0.11 (0.74)	0.46 (0.76)
<i>RESTRUCTURE</i>	-0.15 (-1.13)	-0.14 (-1.03)	-0.96 (-0.86)
Obs.	13,933	13,058	875
Pseudo R <sup>2</sup>	17.6%	16.6%	30.7%

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**TABLE 4 (cont.)**  
**PCAOB inspection deficiencies and auditors' subsequent internal control reports.**

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\*\*\*, \*\*, \* denote statistically significant at the 1%, 5%, 10% levels, respectively (two-tailed tests).

Variable definitions:

*DEF\_IC%* = the number of audits that are found by PCAOB inspectors to have internal control deficiencies, divided by the total number of audits examined during the inspection.

*DEF\_NOT\_IC%* = the number of audits that are found by PCAOB inspectors to have deficiencies unrelated to internal controls, divided by the total number of audits examined during the inspection.

*ICOP\_LAG* = 1 if the auditor issued an adverse internal control opinion in the prior year; = 0 if the auditor issued a clean internal control opinion in the prior year.

*MISSTATE* = 1 if the company's financial statements are subsequently restated; = 0 otherwise.

*RESIGN* = 1 if the company announced an auditor resignation during the past 12 months; = 0 otherwise.

*Ln(AF)* = the natural log of audit fees.

*SIZE* = Natural log of the company's market value.

*LOSS* = 1 if the company reports a loss; = 0 otherwise.

*SEGMENTS* = the number of reported business segments (Compustat Segment File).

*FOREIGN* = 1 if the company has a non-zero foreign currency translation during the year; = 0 otherwise.

*INVENTORY* = inventory divided by total assets.

*GROWTH* = the annual percentage growth in sales.

*XTFIN* = the sum of newly issued equity and newly issued debt, divided by total assets.

*M&A* = 1 if the company is involved in a merger or acquisition during the year; = 0 otherwise.

*RESTRUCTURE* = 1 if the company restructures its operations during the year (non-missing values for RCA, RCEPS, RCP, or RCD); = 0 otherwise.

**TABLE 5**  
**Types of internal control audit deficiencies identified by PCAOB inspectors**

**Panel A: Deficiencies arising from:**

1) inadequate testing of internal controls (*DEF\_IC\_TEST%*)

2) inadequate evaluation of materiality of identified weaknesses (*DEF\_IC\_REPORT%*)

	All auditors	Annually inspected auditors	Triennially inspected auditors
<i>DEF_IC_TEST%</i>	0.1690	0.1780	0.0367
<i>DEF_IC_REPORT%</i>	0.0182	0.0194	0.0000

**Panel B: Three sub-categories of an auditor's inadequate testing of internal controls:**

1) inadequate testing of controls relating to specific accounts (*DEF\_IC\_TEST\_AC%*)

2) inadequate testing of controls relating to IT systems (*DEF\_IC\_TEST\_IT%*)

3) inadequate testing of controls due to over-reliance on the work of others (*DEF\_IC\_TEST\_OTHERS%*)

	All auditors	Annually inspected auditors	Triennially inspected auditors
<i>DEF_IC_TEST_AC%</i>	0.1580	0.1664	0.0324
<i>DEF_IC_TEST_IT%</i>	0.0288	0.0307	0.0000
<i>DEF_IC_TEST_OTHERS%</i>	0.0383	0.0403	0.0074

**Panel C: Regression results**

The dependent variable (*ICOP*) equals one if the auditor issues an adverse internal control opinion during the post-inspection window, and zero if the auditor issues a clean internal control opinion during the post-inspection window. Z-statistics are reported in parentheses below the coefficients. Standard errors are corrected for clustering on each company. We use the same control variables (*CONTROLS*) as in Table 4 but results for the control variables are untabulated. The models are estimated for the full sample because *DEF\_IC\_REPORT%* equals zero for all the triennially inspected auditors (see Panel A above).

<i>DEF_IC_TEST%</i>	2.86*** (4.96)	
<i>DEF_IC_REPORT%</i>	7.05*** (3.00)	6.56** (2.36)
<i>DEF_IC_TEST_AC%</i>		2.72*** (4.71)
<i>DEF_IC_TEST_IT%</i>		2.06 (0.52)
<i>DEF_IC_TEST_OTHERS%</i>		1.59 (0.70)
<i>CONTROLS?</i>	YES	YES
Obs.	13,933	13,933



---

**TABLE 5 (cont.)**  
**Types of internal control audit deficiencies identified by PCAOB inspectors.**

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\*\*\*, \*\* denote statistically significant at the 1%, 5% levels, respectively (two-tailed tests).

Variable definitions:

*DEF\_IC\_TEST%* = the number of audits where the PCAOB inspectors found that the auditor had failed to adequately test internal controls, divided by the total number of audits examined during the inspection.

*DEF\_IC\_REPORT%* = the number of audits where the PCAOB inspectors found that the auditor had failed to adequately evaluate the materiality of identified internal control weaknesses, divided by the total number of audits examined by the PCAOB inspectors.

*DEF\_IC\_TEST\_AC%* = the number of audits where the PCAOB inspectors found that the auditor had failed to adequately test internal controls relating to specific account balances (e.g., revenue, inventory), divided by the total number of audits examined during the inspection.

*DEF\_IC\_TEST\_IT%* = the number of audits where the PCAOB inspectors found that the auditor had failed to adequately test general or application controls for the company's IT system, divided by the total number of audits examined during the inspection.

*DEF\_IC\_TEST\_OTHERS%* = the number of audits where the PCAOB inspectors found that the auditor had failed to adequately test internal controls due to the auditor's over-reliance on the work of others (e.g., internal auditors, external service organizations), divided by the total number of audits examined during the inspection.

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**TABLE 6**  
**PCAOB inspection deficiencies and auditors' subsequent internal control reports for companies with accounting misstatements.**

$$ICOP = \alpha_1 DEF\_IC\% + \alpha_2 DEF\_IC\% \times MISSTATE + \alpha_3 MISSTATE + CONTROLS + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u$$

The dependent variable (*ICOP*) equals one if the auditor issues an adverse internal control opinion during the post-inspection window, and zero if the auditor issues a clean internal control opinion during the post-inspection window. The post-inspection window captures the period immediately following the issuance of the audit firm's PCAOB report. See Fig. 1 for further details about the measurement of the post-inspection windows. Z-statistics are reported in parentheses below the coefficients. Standard errors are corrected for clustering on each company. We use the same control variables (*CONTROLS*) as in Table 4 but results for the control variables are untabulated.

	All auditors	Annually inspected auditors	Triennially inspected auditors
<i>DEF_IC%</i>	3.21*** (5.88)	3.48*** (3.92)	2.59*** (3.03)
<i>DEF_IC%</i> × <i>MISSTATE</i>	-0.39 (-0.38)	-0.29 (-0.27)	-2.41 (-0.58)
<i>MISSTATE</i>	1.17*** (5.33)	1.44*** (4.88)	2.50** (4.71)
<i>CONTROLS?</i>	YES	YES	YES
$\alpha_1 + \alpha_2$	2.82	3.19	0.18
Test of $\alpha_1 + \alpha_2$	Chi <sup>2</sup> = 6.38**	Chi <sup>2</sup> = 6.08**	Chi <sup>2</sup> = 0.01
Obs.	13,933	13,058	875
Pseudo R <sup>2</sup>	23.7%	22.8%	36.7%

\*\*\*, \*\* denote statistically significant at the 1%, 5% levels, respectively (two-tailed tests).

Variable definitions:

*DEF\_IC%* = the number of audits that are found by PCAOB inspectors to have internal control deficiencies, divided by the total number of audits examined during the inspection.

*MISSTATE* = 1 if the company's financial statements are subsequently restated; = 0 otherwise.

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**TABLE 7**  
**PCAOB inspections and auditors' internal control reports issued in the period before the inspections begin.**

$$PRE\_ICOP = \beta_1 DEF\_IC\% + CONTROLS + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u$$

The dependent variable (*PRE\_ICOP*) equals one if the auditor issues an adverse internal control opinion during the pre-inspection window, and zero if the auditor issues a clean internal control opinion during the pre-inspection window. The pre-inspection window is measured using consecutive inspection begin dates. For example, the report issued to Deloitte & Touche on Dec 7, 2011 was for an inspection that began in October 2009. As Deloitte & Touche is an annually inspected audit firm, its inspection prior to this began in October 2008. Therefore, the “pre-inspection” window for Deloitte & Touche’s report issued on Dec 7, 2011 is measured from October 1, 2008 (the start date of the previous year’s inspection) to September 30, 2009 (the day before the start of the current year’s inspection). Z-statistics are reported in parentheses below the coefficients. Standard errors are corrected for clustering on each company. We use the same control variables (*CONTROLS*) as in Table 4 but results for the control variables are untabulated.

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	All auditors	Annually inspected auditors	Triennially inspected auditors
<i>DEF_IC%</i>	-0.11 (-0.18)	-0.50 (-0.75)	0.14 (0.13)
<i>CONTROLS?</i>	YES	YES	YES
Obs.	16,154	15,048	1,106

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Variable definition:

*DEF\_IC%* = the number of audits that are found by PCAOB inspectors to have internal control deficiencies, divided by the total number of audits examined during the inspection.

**TABLE 8**  
**PCAOB inspection results and subsequent audit fees.**

$$\ln(AF) = \alpha_1 DEF\_IC\% + \alpha_2 DEF\_NOT\_IC\% + CONTROLS \\ + Year\ fixed\ effects + Audit\ firm\ fixed\ effects + u$$

The dependent variable ( $\ln(AF)$ ) equals the natural log of audit fees for audits conducted during the post-inspection window. The post-inspection window captures the period immediately following the issuance of the audit firm's PCAOB report. See Fig. 1 for further details about the measurement of the post-inspection windows. T-statistics are reported in parentheses below the coefficients. Standard errors are corrected for clustering on each company.

	All auditors	Annually inspected auditors	Triennially inspected auditors
<i>DEF_IC%</i>	0.09*** (3.06)	0.09*** (2.68)	0.02 (0.32)
<i>DEF_NOT_IC%</i>	0.02 (0.48)	0.02 (0.53)	0.01 (0.14)
<i>Ln(AF_LAG)</i>	0.96*** (380.55)	0.97*** (390.47)	0.91*** (50.29)
<i>MISSTATE</i>	0.02*** (3.14)	0.02*** (3.06)	0.03 (0.77)
<i>RESIGN</i>	-0.01 (-0.19)	-0.01 (-0.6)	-0.02 (-0.14)
<i>SIZE</i>	0.01*** (6.71)	0.01*** (6.44)	0.01 (1.31)
<i>LOSS</i>	0.01 (0.29)	0.01 (0.35)	0.01 (0.12)
<i>SEGMENTS</i>	0.01 (0.76)	0.01 (0.99)	-0.01 (0.76)
<i>FOREIGN</i>	0.01 (0.29)	0.01 (0.22)	0.02 (0.67)
<i>INVENTORY</i>	-0.01 (-0.72)	-0.01 (-0.63)	0.07 (1.15)
<i>GROWTH</i>	0.11*** (8.70)	0.12*** (9.35)	0.05 (1.61)
<i>XTFIN</i>	0.04*** (5.37)	0.04*** (5.13)	0.02 (0.95)
<i>M&amp;A</i>	0.09*** (15.28)	0.08*** (14.58)	0.16*** (5.12)
<i>RESTRUCTURE</i>	-0.02*** (-3.72)	-0.02*** (-3.58)	-0.07* (-1.86)
Obs.	13,873	13,006	867
R <sup>2</sup>	96.2%	95.9%	90.1%

\*\*\*, \*\*, \* denote statistically significant at the 1%, 5%, 10% levels, respectively (two-tailed tests).

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**TABLE 8 (cont.)**  
**PCAOB inspection results and subsequent audit fees.**

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Variable definitions:

*DEF\_IC%* = the number of audits that are found by PCAOB inspectors to have internal control deficiencies, divided by the total number of audits examined during the inspection.

*DEF\_NOT\_IC%* = the number of audits that are found by PCAOB inspectors to have deficiencies unrelated to internal controls, divided by the total number of audits examined during the inspection.

*Ln(AF\_LAG)* = the natural log of audit fees during the prior year.

*MISSTATE* = 1 if the company's financial statements are subsequently restated; = 0 otherwise.

*RESIGN* = 1 if the company announced an auditor resignation during the past 12 months; = 0 otherwise.

*SIZE* = Natural log of the company's market value.

*LOSS* = 1 if the company reports a loss; = 0 otherwise.

*SEGMENTS* = the number of reported business segments (Compustat Segment File).

*FOREIGN* = 1 if the company has a non-zero foreign currency translation during the year; = 0 otherwise.

*INVENTORY* = inventory divided by total assets.

*GROWTH* = the annual percentage growth in sales.

*XTFIN* = the sum of newly issued equity and newly issued debt, divided by total assets.

*M&A* = 1 if the company is involved in a merger or acquisition during the year; = 0 otherwise.

*RESTRUCTURE* = 1 if the company restructures its operations during the year (non-missing values for RCA, RCEPS, RCP, or RCD); = 0 otherwise.

**TABLE 9**  
**Controlling for company-specific effects.**

The dependent variable in Cols. (1) and (2) equals one if the auditor issues an adverse internal control opinion (*ICOP*) during the post-inspection window, and zero if the auditor issues a clean internal control opinion during the post-inspection window. The dependent variable in Cols. (3) and (4) equals the natural log of audit fees for audits conducted during the post-inspection window ( $Ln(AF)$ ). Cols. (1) and (3) control for company random effects. Cols. (2) and (4) control for company fixed effects. Z-statistics and t-statistics are reported in parentheses below the coefficients. Standard errors are corrected for clustering on each company. We use the same control variables (*CONTROLS*) as in Tables 4 and 7 but results for the control variables are untabulated.

	Internal control reporting ( <i>ICOP</i> )		Audit fees ( $Ln(AF)$ )	
	Random effects	Fixed effects	Random effects	Fixed effects
<i>DEF_IC%</i>	3.19*** (4.75)	5.11*** (4.09)	0.08*** (2.95)	0.13*** (4.80)
<i>CONTROLS?</i>	YES	YES	YES	YES
Obs.	13,933	1,023	13,873	13,873

\*\*\*, \*\*, \* denote statistically significant at the 1%, 5%, 10% levels, respectively (two-tailed tests).

**Variable definition:**

*DEF\_IC%* = the number of audits that are found by PCAOB inspectors to have internal control deficiencies, divided by the total number of audits examined during the inspection.