

**Auditing the Auditors:
Evidence on the PCAOB's Inspections of Audit Firms***

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Abstract

This paper analyzes the merits of audit firm inspections conducted by the Public Company Accounting and Oversight Board (PCAOB). First, we provide evidence that audit clients do not value the PCAOB's reports for signaling audit firm quality. Second, we find that the PCAOB plays a remedial role in terms of improving the quality of audit firms, particularly when its inspectors identify deficiencies. Third, after replicating prior empirical research that peer review reports are highly informative according to client perceptions, we isolate that their signaling value mainly stems from information that PCAOB inspectors do not publicly disclose in their reports. Collectively, our research implies that PCAOB inspections help to improve audit quality, although clients do not consider the inspectors' reports to be informative.

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1. Introduction

The recent watershed reforms to the monitoring of audit firms in the U.S. motivate our research on the economic implications of these new regulations. For almost 30 years, audit firms were only subject to professional self-regulation under peer review. However, the recent surge in prominent financial reporting failures has renewed concerns about the effectiveness of self-regulation and, in particular, whether an independent form of monitoring is essential for ensuring high-quality auditing. Consequently, the Sarbanes-Oxley Act of 2002 (SOX) now requires audit firms to be independently inspected by the Public Company Accounting and Oversight Board (PCAOB).¹

DeFond and Francis (2005) call for evidence on whether these major changes to the institutions responsible for monitoring audit firms are constructive for improving their quality. Against this backdrop, we empirically evaluate the merits of the PCAOB inspection program. On the one hand, PCAOB inspections might be superior to self-regulated peer reviews because the PCAOB is independent of the accounting profession. In peer review, audit firms select and pay their own reviewers, which are typically other audit firms. In contrast, the audit firms have no influence over the PCAOB's selection of inspectors, the inspectors do not have current ties to audit firms, and the PCAOB is an independently funded organization.²

On the other hand, it remains unknown at this stage whether the reports issued by PCAOB inspectors are perceived to be valuable signals of differential audit firm quality. The public portion of a PCAOB report divulges only the audit firm's engagement weaknesses, *not* its

¹ DeFond and Francis (2005) highlight that Deloitte & Touche issuing a "clean" peer review report on Arthur Andersen in December 2001—only a few weeks before Andersen admitted shredding documents related to the Enron engagement—partly precipitated the shift to audit firm oversight by the PCAOB.

² The PCAOB is a quasi-public institution that supervises the audit firms of public companies. It is private in the sense that its charter declares that it is not a public agency and its employees do not work for the government. The PCAOB is public in the sense that the SEC appoints the PCAOB's board and must approve its budget, litigation, and rules. The separate and secure funding of the PCAOB stands in stark contrast with some recent experience with self-regulation; e.g., the AICPA withdrew funding to the Public Oversight Board (POB) after a dispute over the extent of the POB's authority over the audit industry (Coates, 2007).

quality control problems whereas a peer review report publicly discloses *both* details. The absence of full public disclosure may undermine the informational value of PCAOB reports to users. In addition, we argue that it may be difficult for users to extract meaningful information about differential audit quality from the public portion of the PCAOB report. In particular, a PCAOB report does not provide an evaluative summary of the audit firm's overall level of quality, whereas peer reviewers render either an unmodified, modified, or adverse opinion.

We begin our analysis by investigating whether clients view PCAOB reports as being informative about differences in audit firm quality. If the reports are informative, we would expect that clients become more likely to appoint (dismiss) audit firms that receive favorable (unfavorable) reports. For example, an audit firm can give a favorable report to existing and potential clients in an attempt to bolster its market share (Frauenthal, 1991). Although a firm may not want to publicize an unfavorable report, it may be difficult to suppress since audit committees sometimes insist on reviewing the report before making appointment decisions (Woodlock and Claypool, 2001). Moreover, reputable news media, including *The Wall Street Journal* (e.g., Weil, 2005a, 2005b) have extensively covered the PCAOB reports of the large audit firms. Finally, clients are able to download reports from the PCAOB's website, implying that both favorable and unfavorable reports are publicly available.³

In univariate tests, the engagement performance weaknesses disclosed in PCAOB reports do not predict subsequent changes in audit firms' market shares, suggesting that the reports do not affect clients' audit firm choices. In the multivariate analysis, we estimate a model that predicts the expected number of reported weaknesses. We find that PCAOB reports disclose more weaknesses if audit firms: (1) have more clients, and (2) previously received unfavorable peer review opinions. Next, we construct an unexpected opinion variable, which equals the number of weaknesses disclosed in the PCAOB report minus the number of weaknesses

³ One firm, Beckstead and Watts, filed a lawsuit against the PCAOB alleging that its "professional reputation has been damaged by the [unfavorable] inspection report posted on the board's website" (The International Accounting Bulletin, 14 February 2006).

predicted by the model. Reinforcing our univariate evidence, we continue to find that audit firms do not gain (lose) market share after receiving favorable (unfavorable) reports.

The purpose of PCAOB inspections is not limited to issuing public reports about audit firm quality. The PCAOB also disciplines firms that supply low quality audits by, for example, barring them from auditing public companies.⁴ Indeed, the threat of a sanction could persuade audit firms to improve their auditing procedures prior to a visit by the PCAOB inspectors. During an inspection, the PCAOB inspectors engage in private communication, which may include advising on ways for the firm to improve its audit quality. Therefore, the inspectors' detection of defects may result in an audit firm taking remedial actions that lead to better audits.⁵

We argue that there is a potential trade-off between the PCAOB's remedial role and the ability of its reports to convey differences in audit firm quality. For example, suppose that an audit firm has below average quality prior to the inspection and the PCAOB inspectors issue an unfavorable report. To the extent that the inspection performs a remedial role, the audit firm's quality should improve afterward. While the unfavorable PCAOB report would reflect the audit firm's past low quality, it might not be an accurate signal about its *future* quality. Consequently, one explanation for our finding that PCAOB reports do not affect audit firms' market shares is that the inspection program performs a remedial role in terms of inducing audit firms to improve their quality.

It is therefore important to test whether the PCAOB inspection program is helping audit firms to increase their quality. If it does serve this purpose, we would expect a greater improvement in quality when firms experience PCAOB inspections. We gauge the change in

⁴ The PCAOB to August 31, 2007 has taken disciplinary actions against nine audit firms (see www.pcaobus.org/Enforcement/Disciplinary_Proceedings/index.aspx).

⁵ For example, PricewaterhouseCoopers responded to its inspection by stating (November 17, 2005), "We have taken substantive steps to address the Board's concerns, and we believe the steps we have taken, and are continuing to take, will contribute to improved audit quality and are responsive to these findings. We have updated our policies, conducted training, improved technology, increased internal inspections, hired more resources, communicated our leadership expectations related to audit quality, and modified our partner evaluation and compensation process."

quality of a given audit firm by examining the consecutive peer review opinions issued to that firm (firms are required to undergo peer review every three years).⁶ In our research design, a treatment firm receives consecutive peer reviews and is subject to a PCAOB inspection during the intervening three years, while a control firm receives consecutive reviews and is not subject to a PCAOB inspection. Consistent with the presence of remediation, we find that the firms experiencing inspections improve more according to their peer review opinions than do those in the control group.⁷ Moreover, the improvement in peer review opinions is stronger for the firms whose PCAOB reports disclose the existence of audit deficiencies.

Accordingly, the PCAOB inspections do appear to be performing a remedial role. Nevertheless, the evidence also indicates that the remedial benefits of PCAOB inspections are not so strong that they *fully* account for the lack of information content in PCAOB reports. Specifically, the evidence from peer review reports suggests that an audit firm is more likely to be below (above) average quality after the PCAOB inspection if it was below (above) average quality prior to the inspection. Since the remedial benefits of inspections do not eliminate the persistence in audit firm quality, they cannot fully explain why the PCAOB reports about past quality are uninformative about future quality. Given that this finding begs the question whether there are additional explanations for the perceived lack of information content, we turn our attention to this issue.

⁶ Prior research shows that firms with low audit quality tend to receive less favorable peer review opinions. Deis and Giroux (1992) find a significant positive association between the hours worked by audit firms and the receipt of favorable peer review opinions. Hilary and Lennox (2005) document that the SEC is less likely to allege accounting fraud when clients' financial statements are audited by firms that receive clean peer review opinions. Casterella et al. (2006) find that unfavorable peer review opinions are associated with malpractice claims alleging auditor negligence, overworking of audit staff, and the acceptance of risky clients.

⁷ Our methodology does not require an assumption that peer reviews are unbiased proxies for the level of audit quality. Since we examine the *changes* in peer review opinions, any bias in the measurement of audit quality levels will be differenced out. Similarly, we do not require an assumption that any bias in peer reviews remains constant over time since any change in the bias should affect both our treatment and control groups. This is important given the shifting market conditions surrounding the major legislative and regulatory changes in the years under study.

Hilary and Lennox (2005) document that clients perceive peer review reports to be highly informative about audit quality. We extend their study by exploring whether the informational value of peer review opinions is linked to disclosures that PCAOB reports fail to provide. The peer review reports disclose serious problems with audit firms' quality control systems, whereas this information is withheld from the public portion of PCAOB reports. Also, unlike PCAOB inspectors, the peer reviewers provide an overall assessment of the audit firm's quality in the form of an unmodified, modified, or adverse opinion. We isolate whether these differences in reporting explain why only peer review opinions are perceived to be informative. Using a larger and more recent sample than Hilary and Lennox (2005), we first replicate their finding that audit firms tend to gain (lose) clients after receiving favorable (unfavorable) peer review opinions. Next, we demonstrate that clients find the disclosure of quality control problems and the reviewer's evaluative summary to be highly informative, which is important because these details are not publicly disseminated in the PCAOB reports.

Overall, we find that the PCAOB inspection program helps to improve audit quality, which *partly* accounts for the evidence that clients do not condition auditor choice on the content of inspection reports. The evidence also supports a second explanation, namely that the PCAOB inspectors are not disclosing information—specifically, the quality control weaknesses and overall ratings of audit firms—that clients value. These results are consistent with comments made by J. Michael Cook, the former CEO of Deloitte, who told *CFO magazine*, “I think the [PCAOB inspection] process is well intentioned, and it is helpful and constructive, but right now it is not producing the kind of results that it should for people who are using the results and trying to understand what this means” (January 26, 2007). Similarly, Hodowanitz and Solieri (2005) criticize the lack of transparency in PCAOB reports, “With today's emphasis on full disclosure by public companies, a confidentiality escape clause does little to inspire investor confidence in the PCAOB as the auditing profession's newly appointed watchdog. Unless there

is full disclosure and transparency in the inspection process, Congress, the SEC, and the PCAOB will have a hard time explaining future audit failures to the investing public.”

A potentially important advantage of the PCAOB’s inspection program is its independence in the sense that the audit firms cannot choose their own inspectors. In contrast, audit firms have discretion to select their own reviewers in the self-regulated peer review system, which has raised suspicions that audit firms strategically influence the outcomes of peer review.⁸ To shed light on whether inspector independence is beneficial, we examine whether audit firms were ‘gaming’ the peer review system through their reviewer choice. Given that a favorable (unfavorable) peer review opinion can have a positive (negative) impact on an audit firm’s market share, we predict that the firm is more likely to switch to another reviewer if the incumbent issued an unfavorable report. Lending support to this argument, we detect that the probability of a reviewer switch is significantly higher in the event of a modified or adverse opinion. In fact, we find that reviewers are more likely to be switched after issuing reports that disclose more weaknesses at the reviewed firms. This implies that audit firms were avoiding reviewers who previously issued unfavorable opinions to them. The PCAOB prevents this strategic behavior since audit firms cannot influence the selection of their inspectors.

The rest of this paper is organized as follows. Section 2 describes the PCAOB inspection and peer review programs and discusses the related academic literature. Section 3 outlines the sample and provides descriptive statistics. Section 4 provides evidence on the value of PCAOB inspection reports for information and remediation purposes. Section 5 examines whether clients perceive the disclosure of quality control problems and the evaluative summary in peer review reports to be informative. We also analyze whether audit firms deliberately avoid peer reviewers that have issued them unfavorable reports in the past. The conclusions in Section 6 include some preliminary public policy implications of our research.

⁸ Prior to the passage of SOX, the Public Oversight Board (2002: page 15) asserted that, “monitoring of firms’ accounting and auditing practices by the peer review process has come to be viewed as ineffective, either as a diagnostic or remedial tool. More importantly the process has lost credibility because it is perceived as being ‘clubby’ and not sufficiently rigorous.”

2. Background

2.1 *Self-regulation versus independent regulation by the PCAOB*

The auditing profession became self-regulated in the 1970s in the aftermath of several accounting scandals involving fraudulent financial reporting and illegal acts such as bribery and corruption. After hearings at the US Senate and House of Representatives, the American Institute of Certified Public Accountants (AICPA) created the SEC Practice Section (SECPS). Any AICPA member firm that audited public companies was required to belong to the SECPS and became subject to peer review once every three years.

Peer reviews are primarily focused on the overall quality of the firm with reviewers collecting information from manuals, checklists, staff interviews, and audit engagement working papers. Peer reviewers render an opinion and disclose any systematic weaknesses that they find. If the reviewers identify “significant” weaknesses that are not considered “serious”, these are disclosed in an unmodified opinion. The peer review guidelines specify that a weakness is significant if there is more than a remote possibility that the firm failed to comply with auditing standards, whereas it is serious if there is evidence that the firm failed to comply, which warrants a modified opinion. In egregious cases, the reviewers issue an adverse opinion on the quality of the audit firm. In practice, peer reviewers seldom issue adverse or modified opinions, supporting the allegation that reviewers lack the independence to strictly monitor audit firms.

The self-regulated peer review program also has been criticized for not imposing punitive sanctions on low-quality audit firms and for allowing the firm to select its own reviewer, which typically is another audit firm (Fogarty, 1996).⁹ In response to these concerns as well as the financial reporting scandals more generally, Congress passed SOX, which requires for the first time that an independent regulatory authority handle audit firm inspections. Section 101 of SOX

⁹ The Public Oversight Board (2002: 22-23) stated “peer review has come under considerable criticism from members of Congress, the media and others. ‘You scratch my back, I’ll scratch yours’ is the prevailing cynical view of peer review raised by many.” In the same year, the former Chair of the SEC asserted that the peer review process is “too incestuous. A system needs to be established which is independent of the accounting profession.”

legislates the PCOAB, Section 102 obligates all auditors of public companies to register with the PCAOB, and Section 104 requires the PCAOB to perform periodic inspections. Key features of the new regulatory environment include that the PCAOB's funding comes from fees paid by public companies (in proportion to their market capitalization) and the activities of the PCAOB are overseen by the SEC.¹⁰ The PCAOB inspectors are not current employees of audit firms, although they are experienced auditors. Moreover, the inspectors are selected by the PCAOB, rather than by the audit firms themselves, to preserve their independence from the public accounting profession.

The self-regulated peer review program has remained in place after SOX and, currently, both the PCAOB and peer reviewers issue reports about the quality of audit firms, providing an opportune testing ground for our research. The PCAOB inspection and peer review programs share some characteristics. For example, both the inspectors and reviewers examine the audit firm's quality control system and its performance on certain audit engagements. The audit firm knows in advance when the reviewers and inspectors will visit. Both the inspectors and reviewers disclose their findings by issuing a report for the audit firm as a whole rather than at the office level. Finally, both PCAOB and peer review reports, which keep the identity of audit clients anonymous, are publicly available from the PCAOB and AICPA websites, respectively.

However, there are some major differences between the programs. Audit firms are required to undergo peer review every three years whereas PCAOB inspections are performed annually for firms that have at least 100 public company clients and every three years for smaller firms. Besides examination frequency, the programs diverge in the way that audit firms' defects are disclosed. A peer review report provides an evaluative summary of the audit firm's quality (unmodified, modified or adverse) and discloses weaknesses that systematically affect the quality of the firm's engagements. In contrast, a PCAOB report lists *each* serious defect found within the

¹⁰ In this regulatory structure, the SEC continues to monitor public companies, while the PCAOB monitors audit firms.

sample of engagements chosen by the inspectors. Peer review reports include full public disclosure of engagement performance deficiencies and problems with the firm's quality control system. In comparison, there is incomplete public disclosure within PCAOB reports as stipulated by Section 104(g)(2) of SOX: "no portions of the inspection report that deal with criticisms of or potential defects in the quality control systems of the firm under inspection shall be made public if those criticisms or defects are addressed by the firm, to the satisfaction of the Board, not later than 12 months after the date of the inspection report."¹¹ Hodowanitz and Solieri (2005) explain that the Big Four accounting firms persuaded Congress in pre-SOX deliberations to exclude the more sensitive findings on quality control from the public disclosures in PCAOB reports. Some argue that the lack of transparency could render the PCAOB's reports uninformative to market participants; e.g., Coates (2007: 101) asserts that "client firms will not know about and will not be able to react to those criticisms. Increased disclosure by PCAOB would be appropriate."

Additionally, there is some ambiguity within the public portion of the PCAOB report as to whether any quality control defects were found by the inspectors. On the one hand, PCAOB Release 104-2006-077 (2006: 6) stresses that, "The public portion of the report does not state whether the nonpublic portion includes any quality control criticism." On the other hand, the public portion sometimes uses the following wording, "The inspection team did not identify anything that it considered to be a quality control defect." In other reports, the public portion states "any defects in, or criticisms of, the Firm's quality control system are discussed in the nonpublic portion of this report." The PCAOB has informed us that the phrase "did not identify" is used when the report does not contain a nonpublic section, which can happen only if no quality control weaknesses were detected. In contrast, the inspectors use the phrase "any

¹¹ Indeed, some audit firms have complained that the PCAOB's reporting format does not provide reliable information about the firm's overall level of audit quality. For example, BDO Seidman responded to its PCAOB report (May 16, 2007) by arguing that "the inspection process is designed to identify deficiencies and [. . .] findings are not necessarily reflective of a firm's practice in general. As such, the format of the draft Report produced by this process does not lend itself to a portrayal of the overall high quality of our audit practice."

defects” if the report contains a nonpublic section, but the existence of such a section does not necessarily imply that quality control defects were found because the nonpublic portion can contain information on matters other than quality control defects.

A PCAOB report includes the name and basic details of the firm under inspection, the start and end dates of the inspection fieldwork, and the issuance date. Part IV of the report includes any written response by the firm to the inspection. The reports issued to firms that have fewer than 100 SEC clients disclose how many audit engagements were sampled by the PCAOB inspectors, unlike the reports of large audit firms that do not include this information.¹²

2.2 *Prior research*

Hilary and Lennox (2005) provide the first evidence on the credibility of the peer review program. They show that firms receiving clean (unfavorable) peer review opinions gained (lost) clients in the subsequent year. Their results suggest that, despite any limitations of the peer review program, clients interpret the reports as being informative signals of audit firm quality. Casterella et al. (2007) examine the association between peer review opinions and *actual* audit quality. Using proprietary data from an insurance company that provides liability insurance to audit firms, they document that unfavorable peer review opinions are associated with the overworking of audit staff and the acceptance of risky clients. They also find that the weaknesses identified in peer review reports are predictive of malpractice claims alleging auditor negligence. Evidently, peer review opinions are correlated with audit firms’ actual quality and clients value the opinions for conveying quality differences between firms.

¹² In an interview with PCAOB board member, Charles Niemeier, *CFO magazine* asked, “What is the logic in not revealing how many issuers are looked at for each Big Four firm?” Mr. Niemeier replied, “In my view, it’s not a relevant figure and in some respects could encourage misleading, superficial comparisons between firms” (www.cfo.com/article.cfm/8613247). Mr. Niemeier did not volunteer why the PCAOB’s sample size is only a relevant figure for small audit firms. In an alternative perspective, Professor Bierstaker told *CFO magazine* “It’s unclear how to interpret the reports without knowing the number of audits that they looked at” (CFO.com, January 26, 2007).

Analyzing data from PCAOB reports as a benchmark, Anantharaman (2007) assesses the objectivity of peer review reporting by investigating the determinants of whether these opinions are systematically more favorable than PCAOB reports. He finds that the firm's peer review opinion is likely to be more favorable than its PCAOB opinion if the reviewed firm is larger, it performs reviews on other firms, or it is reviewed by a non-competitor. This evidence suggests that audit firms may be able to influence the reporting outcomes of peer reviews, which is consistent with the criticism that self-regulation lacks objectivity.

Hermanson et al. (2007) provide the first descriptive evidence on the reports issued by the PCAOB inspectors. Using a sample of 316 reports issued to small audit firms in the period ending June 30, 2006, they find that 80% of engagement performance defects stem from insufficient substantive testing, 5% from the auditor's tests of control, and the remaining 15% from audit opinions. There are 22 (7.0%) PCAOB reports which disclose that the inspection resulted in a restatement of the client's audited financial statements, implying that inspectors catch at least some of the serious audit failures. Hermanson et al. also find that audit firms with reported deficiencies are larger in terms of the number of SEC clients but they are smaller in terms of professional staff, which the authors attribute to some smaller firms become over-extended by serving too many issuer clients.

Our study contributes to this literature in three ways. First, we provide initial evidence on whether public companies perceive that PCAOB reports are informative about audit firm quality. Second, we examine whether PCAOB inspections play a remedial role by improving audit quality, particularly in cases in which the inspectors identify problems. Finally, we shed light on whether audit firms have been 'gaming' the peer review system by avoiding reviewers that previously leveled unfavorable opinions against them.

3. The sample and descriptive statistics

3.1 The sample

We begin by collecting the 483 inspection reports issued by the PCAOB between January 1, 2005 and August 31, 2007. There are 462 firms that have fewer than 100 SEC clients and therefore receive just one PCAOB report during this period. Although large audit firms are inspected annually, the time period between consecutive reports can exceed 12 months. For example, Ernst & Young's first PCAOB report was issued on November 17, 2005 and its second on January 11, 2007, so there was no PCAOB report for them during the 2006 calendar year. Of the 8 audit firms that have at least 100 clients, 3 received two PCAOB reports and 5 were issued three reports.

Next, we update Hilary and Lennox's (2005) sample by compiling from the AICPA website the peer review reports issued up to August 31, 2007.¹³ At any given time, the AICPA website provides the audit firm's most recent peer review report, although its past reviews are unavailable. To ensure that our sample includes past reviews, we perform periodic downloads from the AICPA website in each year. As a result, our sample is a time-series panel of peer reviews reports that have been available on the AICPA website during the sample period.

3.2 PCAOB and peer review reports

Panel A of Table 1 documents the number of deficiencies disclosed in the 483 reports issued by the PCAOB to August 31, 2007. There are 210 reports (43.5%) that disclose zero weaknesses, 138 (28.6%) with a single deficiency, and the remaining 135 opinions (27.9%) list multiple defects. There are 11 PCAOB reports that disclose ten or more weaknesses and, in every case, these reports are issued to audit firms that have more than 100 clients (five of the 11 reports are issued to Big Four firms). In Section 3.3, we empirically validate that the reports of larger firms disclose more weaknesses because the PCAOB's reporting style results in a mechanical positive association between audit firm size and the number of reported weaknesses.

¹³ The peer review reports used by Hilary and Lennox (2005), which cover the period from January 1997 to September 2003, are available for download from Clive Lennox's website (ihome.ust.hk/~accl/Data.xls).

The mean number of weaknesses per PCAOB report is 1.433. In untabulated analysis, the mean number of weaknesses annually are 1.353, 1.549 and 1.337 in 2005, 2006, and 2007 respectively, and we find no significant trend in PCAOB reporting over this short timeframe. Accordingly, this evidence does not indicate that the PCAOB was targeting the weaker audit firms in its earlier inspections.

Panel B provides descriptive statistics on the disclosures in peer review reports. There are 1,726 (96.4%) unmodified opinions and, of these, 898 (50.2%) disclose no significant weaknesses at the audit firm. There are 395 (22.1%) unmodified peer reviews that disclose one weakness and the remaining 433 (24.2%) disclose multiple problems. There are 53 (3.0%) modified and only 11 (0.1%) adverse reports. The low frequency of modified and adverse opinions corroborates the criticism that reviewers rarely censure their fellow auditors.

Panel C provides a breakdown of the types of weaknesses disclosed in PCAOB and peer review reports. Of the 1,836 weaknesses disclosed by peer reviewers, 1,205 (65.6%) relate to engagement performance problems with the remaining 631 (34.3%) stemming from deficiencies in firms' quality control systems. Since quality control deficiencies are not disclosed in the public portion of PCAOB reports, all of the 692 reported weaknesses relate to engagement performance defects. Despite that quality control weaknesses are not publicly disclosed by PCAOB inspectors, the mean number of reported defects is significantly higher than in peer reviews (t-stat. = 4.548). Clean opinions (i.e., zero weaknesses) are issued in 43.5% of PCAOB reports compared to 50.2% of peer review reports and this difference is statistically significant (t-stat. = 2.613). One interpretation is that PCAOB inspectors are tougher than peer reviewers in terms of detecting and reporting problems at audit firms. However, we stress that PCAOB and peer review reports are very different in the way that they reveal audit firms' deficiencies. In particular, PCAOB reports disclose each engagement at which defects are found whereas peer review reports disclose problems that systematically impact the firm's engagements as a whole. Given the different underlying constructs, caution should be exercised when comparing the numbers of

weaknesses reported by PCAOB inspectors and peer reviewers. We return to this issue in the next section.

3.3 Audit firm size and the number of weaknesses disclosed in PCAOB reports

In this section, we show that there is a mechanical positive relation between the audit firm's size and the number of weaknesses that the firm is expected to receive in its PCAOB inspection report. Importantly, this confound obscures the link between actual audit quality and firm size. In particular, the reports issued to large audit firms tend to disclose many more weaknesses despite extensive prior theory and evidence that these firms supply higher quality audits (Francis, 2004).

Table 2 sorts the audit firms into five size categories. Col. (2) reveals that 143 reports are issued to audit firms that have just one SEC client, 119 to those with 2 or 3 clients, 116 to those with between 4 and 10 clients, 84 to those with between 11 and 99 clients, and, finally, 21 to firms with at least 100 clients. Col. (4) indicates that the PCAOB inspectors select larger samples in their investigations of larger audit firms. The inspectors analyze only public company audits, so the PCAOB's sample size is one engagement if the firm has just one SEC client. On average, the PCAOB inspects 2.294 engagements for firms with 2 or 3 clients, 3.362 engagements for those with between 4 and 10 clients, and 6.048 for those with between 11 and 99 clients. The PCAOB does not disclose the sample sizes in its inspections of firms that have at least 100 clients. However, in untabulated analysis, we calculate the number of days that the PCAOB conducts its inspection fieldwork at the audit firm. The mean (median) duration of the inspection is 5.71 (4.00) *days* when firms have fewer than 100 clients compared to 5.06 (5.0) *months* when firms have at least 100 clients. Therefore, the PCAOB inspectors spend much more time examining the work performed by the larger audit firms.

Since a PCAOB report discloses the deficiencies detected on *each* engagement in the inspectors' sample, it follows that larger firms receive reports that disclose more weaknesses.

Predictably, Col. (5) of Table 3 reveals a strong positive association between audit firm size and the mean number of reported weaknesses, which increases monotonically over the range from 0.517 for firms with one SEC client compared to 10.857 for firms with at least 100 clients.¹⁴

Next, Col. (6) presents the ratio of the number of reported weaknesses to the size of the PCAOB's sample. To some extent, this ratio controls for the fact that the PCAOB inspectors select bigger samples and therefore report more weaknesses at the larger audit firms. However, the ratio is an imprecise measure of audit firm quality for at least two reasons. First, the PCAOB does not disclose the sample sizes in its inspections of firms that have at least 100 clients, meaning that the ratio is unavailable for this very important set of audit firms. Second, the smaller firms have an advantage in the sense that they can better anticipate which engagements will be sampled by the PCAOB inspectors. For example, given that an audit firm with a single SEC client realizes that inspectors will certainly scrutinize this engagement, they can exploit this knowledge to ensure that their performance garners a clean report. Running in the opposite direction, the PCAOB inspectors may examine more thoroughly the engagements of smaller audit firms, particularly those that have just one SEC client. This may explain why the ratio of reported weaknesses to sample size is highest among the firms that have just one client (0.517 in Col. (6)).¹⁵

Overall, the above analysis suggests that scaling the number of reported weaknesses by the size of the PCAOB's sample may not provide a reliable measure of the audit firm's quality (we return to this issue in Section 4.4). Since the sample sizes are undisclosed for large firms, a conceivable alternative specification would involve scaling the number of reported weaknesses by the number of SEC clients. However, this ratio is arguably even worse because it includes in the denominator all the clients not sampled by the PCAOB inspectors. The fraction of clients not

¹⁴ For example, the PCAOB report issued to PricewaterhouseCoopers (November 17, 2005) discloses that the inspectors found deficiencies on 30 audit engagements (the highest number within our sample). The report does not disclose how many engagements were sampled by the inspectors, which prevents users from putting into context the number of reported deficiencies.

¹⁵ Another explanation is that the smallest audit firms have the worst audit quality.

sampled is increasing in the size of the audit firm. For example, in sharp contrast to the 100% sampling that occurs when firms have just one client, just 23% (= 6.048/26.381) of engagements are sampled in the inspections of firms that have between 11 and 99 clients. As a result, the ratio of the number of reported weaknesses to the number of clients is mechanically decreasing in audit firm size. Therefore, this ratio would be potentially misleading because it tends to exaggerate the quality of large firms relative to small firms.

To summarize, Table 2 suggests that it may be quite difficult for users to extract meaningful information about audit firm quality from the PCAOB's reports. The fundamental problem is that the PCAOB discloses the deficiencies on *each* engagement sampled by the inspectors and fails to provide a balanced evaluation of the firm's overall level of quality.

3.4 Audit clients gained and lost

We use auditor change data from Auditor-Trak and Audit Analytics to determine the change in each firm's market share during the 12-month window subsequent to the report's issuance date. We choose a 12-month window because auditor appointment decisions are typically made annually. Given that our auditor change data are collected up to August 31, 2007, the client gains and losses are calculated for reports issued up to August 31, 2006. After imposing this data restriction, we are left with 332 PCAOB reports when analyzing audit firms' market shares.

Like Hilary and Lennox (2005), we include only the auditor changes that result from clients' dismissals of audit firms because we are interested in *clients'* perceptions of audit quality. High-quality audit firms may resign from engagements for risky clients, although these clients may be acceptable to low-quality firms (DeFond et al., 1997), which could obscure the impact of reports on audit firms' reputations. Nevertheless, all of our core results are robust to including both audit firm resignations and client dismissals. We exclude all auditor changes involving Arthur Andersen after November 1, 2001 because these are extraneously driven by fallout from the Enron scandal. We also exclude obvious firm mergers and changes in audit firm names.

Table 3 provides descriptive statistics on audit firms' gains and losses of clients. The number of clients gained ($\#CLIENTS_GAINED_{i,+12}$) has a mean of 1.195 and a maximum of 76, while the number of clients lost ($\#CLIENTS_LOST_{i,+12}$) has a mean (maximum) value of 1.246 (147). The net change in the number of clients gained or lost ($\Delta\#CLIENTS_{i,+12}$) is obtained by subtracting $\#CLIENTS_LOST_{i,+12}$ from $\#CLIENTS_GAINED_{i,+12}$. The $\Delta\#CLIENTS_{i,+12}$ variable ranges from -114 to +53 with a mean of -0.051. The distributions for these client gain and loss variables are highly skewed and beset by the presence of outliers because the large audit firms gain or lose relatively large numbers of clients.

We address these statistical issues by constructing two alternative measures of the firm's net change in market share. First, we subtract the log of (one plus) the number of clients lost from the log of (one plus) the number of clients gained:

$$\Delta Ln(\#CLIENTS_{i,+12}) = Ln(1+\#CLIENTS_GAINED_{i,+12}) - Ln(1+\#CLIENTS_LOST_{i,+12}).$$

As shown in Table 3, the $\Delta Ln(\#CLIENTS_{i,+12})$ variable does not suffer from skewness or outliers, implying that the logarithmic transformation alleviates these statistical problems with the distribution becoming nearly symmetrical.

Second, we create a discrete variable that indicates whether the audit firm's market share increases, remains constant, or decreases:

$Sign(\Delta\#CLIENTS_{i,+12}) = +1$ if firm i experiences a net client gain, $= 0$ if no net change, $= -1$ if a net client loss in the 12-month period following the report issuance date.

Both the $\Delta Ln(\#CLIENTS_{i,+12})$ and $Sign(\Delta\#CLIENTS_{i,+12})$ variables take positive (negative) values for net client gains (losses).¹⁶

¹⁶ Hilary and Lennox (2005) measure changes in market share using these two variables and a third variable equal to the net change in the number of clients divided by (one plus) the number of clients held at the opinion date ($\% \Delta(\#CLIENTS_{i,+12})$). In our sample, the third variable is unduly influenced by outlying observations as the minimum and maximum values of $\% \Delta(\#CLIENTS_{i,+12})$ are -3.000 and 6.500, respectively. However, in untabulated results, all of our main results persist when we analyze the raw or winsorized values of $\% \Delta(\#CLIENTS_{i,+12})$.

4. PCAOB inspections

4.1 Changes in audit firms' market share following the issuance of PCAOB reports

Table 4 reports the changes in audit firms' market share during the 12 months after the release of their PCAOB reports. As shown in Panel A, the mean value of $\Delta \ln(\#CLIENTS_{i,t+12})$ is 0.067 for firms that receive clean PCAOB reports relative to 0.056 (0.036) when the reports disclose one weakness (multiple weaknesses). In all comparisons, the differences in means are economically trivial and statistically indistinguishable from zero (t-stats. = 0.197, 0.384, 0.231), implying that the disclosure of weaknesses does not predict subsequent changes in audit firms' market shares. This initial approach to our research question does not support the prediction that clients consider PCAOB opinions to be informative signals about audit firm quality.

Panel B documents the number (fraction) of firms experiencing net increases, no change, or net decreases in market share. Audit market share falls 9.4% for the firms with clean reports compared to 11.6% and 26.1% for those with reports that disclose single and multiple serious weaknesses, respectively. However, there are increases in market share for 18.8% of the firms whose reports are clean compared to 17.9% and 28.3% for those with single and multiple weaknesses, respectively.¹⁷ More formally, a test of the hypothesis that audit firms experience increases (decreases) in market share after receiving favorable (unfavorable) reports is statistically insignificant (p-value=0.383). Altogether, these results do not provide any evidence that clients perceive PCAOB reports to be informative. However, given that the univariate tests in Table 4 do not control for audit firm characteristics, we now turn to the regression analysis.

4.2 Regression results

¹⁷ Of the firms whose reports disclose multiple weaknesses, only 45.7% experience no changes in market share. In contrast, there are zero changes in market share for 70.5% (71.9%) of the firms with one (zero) weakness. The differences in these frequencies reflect the confounding effect of firm size. Specifically, the larger audit firms tend to receive less favorable PCAOB reports (Table 2) and the larger firms are more likely to experience either increases or decreases in market share because they have more clients to potentially gain or lose. We control for this potentially confounding effect of audit firm size in the regression analysis.

Our empirical strategy reflects that clients rationally respond to any *unexpected* news in the PCAOB report. We begin by estimating a model of PCAOB reporting to generate model coefficients to predict the expected number of reported weaknesses. We then examine how firms' market shares respond to the unexpected portion of the PCAOB reports (i.e., the number of reported weaknesses minus the number of predicted weaknesses).

The dependent variable in the reporting model equals the number of weaknesses reported by the PCAOB inspectors ($PCAOB_WEAK_i$). As discussed earlier (Table 3), there is a nuisance positive mechanical relation between audit firm size and the number of reported weaknesses, so audit clients should rationally anticipate that larger audit firms would receive reports that disclose more weaknesses. We control for size using the log of the number of SEC clients held by the audit firm during the year in which the report is issued ($Ln(\#CLIENTS_i)$). Our estimations also include BIG_i , which identifies audit firms with at least 100 SEC clients, to capture any lingering size variation between the very large auditors and other firms.¹⁸

To the extent that an audit firm's level of quality does not vary greatly over time, this would likely translate into a consistent pattern of favorable (or unfavorable) reports issued consecutively to the firm. If there is persistence in the level of quality for a given audit firm, we expect that PCAOB reports would disclose more (fewer) weaknesses if the firm's previous peer review report was unfavorable (favorable). We control for prior peer review reports because audit clients may rationally expect that PCAOB reports would disclose more weaknesses if the firm previously received an unfavorable peer review opinion. We predict a significant positive coefficient for the $PRIOR_WEAK_i$ variable, which equals the number of weaknesses disclosed in the firm's previous peer review report. The $PRIOR_MOD_ADV_i$ dummy variable takes the value one if the firm's previous peer review report was modified or adverse, and zero if it was

¹⁸ A natural alternative specification for BIG_i is a dummy variable coded one for Big Four audit firms and zero otherwise. However, we cannot reliably implement this approach because each Big Four firm receives only one PCAOB report in the period up to August 31, 2006.

unmodified. In 26 cases, the firm's prior peer review report is unavailable so the sample drops from 332 to 306 observations.

Importantly, PCAOB inspections and peer reviews are conducted at the level of the audit firm without identifying which company engagements were sampled. Consequently, our models are estimated at the level of the audit firm rather than the audit client, which leads to parsimonious specifications since client characteristics do not come into play. Focusing on audit firms rather than their clients as the unit of analysis also provides a fairly unique perspective. For example, in contrast to mainstream empirical auditing research in which the Big Four public accounting firms tend to dominate the samples (e.g., GAO, 2003 and Mansi et al., 2004), these firms only contribute a few observations in our setting; e.g., just 10 (2.1%) of the 483 PCAOB inspection reports issued between January 1, 2005 and August 31, 2007 involve the Big Four firms.

Results for the model of PCAOB reports are shown in Col. (1) of Table 5. The $PRIOR_WEAK_i$ coefficient is positive and highly significant (t-stat.= 4.01), which implies that the number of reported weaknesses is higher if the firm's prior peer review report disclosed more weaknesses. In other words, weaknesses tend to persist across successive reports. The coefficient on audit firm size, $Ln(\#CLIENTS_i)$, is also positive and highly significant (t-stat. = 8.03), lending support that PCAOB reports disclose more weaknesses when firms have more audit clients.¹⁹ BIG_i does not load, although our core results are virtually identical when we simply exclude this dummy variable from the analysis. In Col. (2), we replace $PRIOR_WEAK_i$ with a dummy variable for whether the prior review opinion was modified or adverse. In an admittedly low-power test since non-clean opinions are scarce, $PRIOR_MOD_ADV_i$ loads positively (albeit at only the 10% level), reinforcing that PCAOB weaknesses are increasing in the presence of an unfavorable prior peer review report.

¹⁹ Hermanson et al. (2007) find that firms with reported weaknesses are smaller in terms of the number of professional staff but larger in terms of the number of SEC clients. Our untabulated results are consistent with theirs if we estimate a model that does not control for the number of weaknesses disclosed in the firm's prior report. However, the negative relation between the number of professional staff and reported weaknesses disappears after controlling for the firm's prior report.

We rely on the coefficients in Col. (1) to calculate the unexpected number of weaknesses disclosed in the PCAOB report ($UE(PCAOB_WEAK_i)$) and this variable is included as a predictor of client gains and losses in Cols. (4) and (6). To recover the 26 observations without prior peer review reports, we use the number of reported weaknesses ($PCAOB_WEAK_i$) in Cols. (3) and (5), where the sample sizes return to 332. The dependent variables in Cols. (3)–(6) capture the sign and magnitude of the changes in firms’ market shares during the 12 months subsequent to the reports’ issuance dates. The $Sign(\Delta\#CLIENTS_{i,+12})$ variable is rank-ordered and discrete as it takes the values +1, 0, -1, so we estimate these models using ordered logit, which has no intercept term. The $\Delta Ln(\#CLIENTS_{i,+12})$ variable is continuous so we estimate these models using ordinary least squares.

We follow Hilary and Lennox (2005) by controlling for client changes during the 12 months *prior* to the report issuance date because we intend to isolate whether PCAOB reports predict an *abnormal* change in the rate at which firms gain and lose clients. If changes in audit firms’ market shares persist over time, then we would expect positive coefficients on these lagged dependent variables.²⁰ We also control for audit firm size because there is considerable size variation within the sample (Table 2), although we do not form a prediction about the $Ln(\#CLIENTS_i)$ and BIG_i coefficients.

Corroborating our univariate results, the $PCAOB_WEAK_i$ coefficients are negative but statistically insignificant in Cols. (3) and (5). Similarly, the $UE(PCAOB_WEAK_i)$ coefficients are almost identically zero and statistically insignificant in Cols. (4) and (6). Collectively, this evidence implies that clients do not perceive that PCAOB reports communicate information about audit firm quality relevant to their auditor hiring and firing decisions. The coefficients on the lagged dependent variables are positive and statistically significant, confirming that changes in firms’ market shares are persistent during the 12 months before the issuance of PCAOB reports.

²⁰ None of our inferences are affected by including in Cols. (1) and (2) of Table 5 twice lagged peer review opinions, which have statistically insignificant coefficients.

The coefficients for $\ln(\#CLIENTS_i)$ and BIG_i never load in these four regressions, indicating that changes in market share are unrelated to the size of the firm.

4.3 Further evidence of a perceived lack of information content in PCAOB reports

4.3.1 Accounting restatements

In 7.1% of the PCAOB reports under study, the inspectors disclose that the audit deficiencies caused an accounting misstatement that required restatement of the client's financial statements. Naturally, these reports may be relatively more damaging to the audit firm's reputation. To test for the presence of this phenomenon, we specify a dummy variable, $RESTATE_i$, that takes the value one if the PCAOB report discloses a restatement, and zero otherwise. The $RESTATE_i$ coefficients are statistically insignificant in both market share models (t-stat. = -0.21; z-stat. = -0.01), suggesting that even audit failures disclosed in PCAOB reports are uninformative for clients' auditor choice.

4.3.2 Disagreements between audit firms and the PCAOB inspectors

Audit firms can respond to the defects identified by the PCAOB inspectors and their responses are publicly disclosed in Part IV of the reports. Of the reports that disclose at least one weakness, we find that 57 firms (27.9%) explicitly disagree with the inspectors' findings.²¹ Although it is difficult to validate whether audit firms' grievances are genuine, it could be that clients discount the information contained in unfavorable PCAOB reports when the firms publicly disagree with the inspectors' findings. This suggests that PCAOB reports may be viewed as informative only when audit firms do not dispute the inspectors' findings. We examine this issue by re-running the models in Table 5 after dropping the 57 reports that are disputed by audit firms. All results

²¹ For example, Faircloth & Associates respond that their PCAOB inspection "was extremely unfair and critically damaging." Another two firms (Pattillo, Brown & Hill and Durland & Co) state that they are very critical of the work underlying the reports issued by the PCAOB.

are nearly identical with the $PCAOB_WEAK_i$ and $UE(PCAOB_WEAK_i)$ coefficients remaining statistically insignificant (t-stats. = 0.35, 0.66; z-stats. = -0.24, 0.30).

4.3.3 Additional sensitivity analyses

We perform five (untabulated) sensitivity tests on the results reported in Table 5 and, to preview, we continue to find without exception no evidence that PCAOB reports affect audit firms' market shares.

First, we scale the number of reported weaknesses by the size of the PCAOB's sample and we use this ratio as a predictor of changes in audit firms' market shares. We find that the ratio is not a significant predictor of audit firms' gains and losses of clients (t-stat. = -0.53; z-stat. = -1.12), which suggests that the ratio is not perceived to be a good measure of audit firm quality. In another test, we use the size of the PCAOB sample, rather than the number of SEC clients, as an independent variable in Col. (1) of Table 5. Consistent with Table 2, the coefficient on the sample size variable loads positively (t-stat. = 7.25), corroborating that the number of reported weaknesses is increasing in the number of engagements tested by the inspectors. Using the revised coefficient estimates for Col. (1), we calculate a new $UE(PCAOB_WEAK_i)$ variable and re-run the models in Cols. (2) to (5). The $UE(PCAOB_WEAK_i)$ coefficients remain statistically insignificant (t-stat. = 0.03; z-stat. = -0.49).

Second, as noted in Section 2.2, the public portion of a PCAOB report may not clearly disclose whether the inspectors found quality control weaknesses at the firm. In our sample, 27.5% of reports explicitly disclose that no quality control defects were found whereas 72.5% state that any defects are hidden in the nonpublic part of the report. We construct a dummy variable that takes the value zero if the report discloses that no quality control defects were found, and one otherwise. The coefficients on this dummy variable are statistically insignificant (t-stat. = 0.52; z-stat. = 0.28).

Third, there is a mean reporting lag of 8.37 months between the completion of the PCAOB inspection fieldwork and the issuance of the report and it is conceivable that information about the inspectors' findings leaks out before the report is officially issued to the public. We therefore re-calculate the annual changes in audit firms' market shares around the dates that PCAOB inspections are completed. After re-estimating the models in Table 5 using these alternative market share variables, we find that the PCAOB report coefficients are still statistically insignificant (t-stats. = -0.60, -0.18; z-stats. = -1.67, -1.13).

Fourth, we isolate the 26 firms in our sample without prior peer review reports since they may be more sensitive to any information in the PCAOB reports. In this drastically smaller sample, we continue to find no evidence that the PCAOB variables matter to audit firms' market shares (t-stat. = -0.06, z-stat. = -0.47).

Finally, the PCAOB reports issued to the large firms have been relatively well-publicized in newspapers (e.g., Gullapalli, 2004; Taub, 2005; Wiel, 2005a, 2005b), so any reputation effects may be stronger for this sub-sample of firms. Because there are relatively few large firms, we are unable to obtain coefficients for the $Sign(\Delta\#CLIENTS_{i,t+12})$ models, although we are able to estimate the $\Delta\ln(\#CLIENTS_{i,t+12})$ models. In these regressions, the $PCAOB_WEAK_i$ and $UE(PCAOB_WEAK_i)$ coefficients remain statistically insignificant (t-stats. = -1.50, -1.71).²²

²² In another untabulated test, we investigate whether PCAOB reports affect the fees that audit firms are able to charge to their clients. After obtaining fee data for the year prior to and the year following the issuance of the firm's PCAOB report, we calculate the percentage change in the fee charged to each client. We then aggregate to the level of the audit firm by calculating the mean percentage change in fees for each audit firm's portfolio of clients. The mean fee change is found to be *larger* for firms that receive clean PCAOB opinions compared firms whose reports disclose at least one defect, although the difference is statistically insignificant (t-stat. = 1.486). This suggestive finding does not support the view that unfavorable PCAOB reports reduce the fees that audit firms are able to charge. However, a serious limitation inherent in this test is that we cannot identify precisely the date that clients and audit firms negotiate the fees. This limitation does not apply to our evidence on audit firm market shares, because we can pinpoint the exact dates that clients dismiss audit firms. Similarly, evidence from stock market reactions also implies that PCAOB reports are not valuable for information purposes, although at least two complications cast doubt on inferences from this design. First, these untabulated results may be unreliable since the date of the report almost certainly precedes the date that the report becomes

4.4 The remedial benefits of PCAOB inspections

In this section, our focus shifts from the PCAOB's *reporting* of audit deficiencies to analyzing whether the inspections perform a remedial role in terms of improving audit quality. If the inspectors find serious problems, the PCAOB has the power to undertake disciplinary proceedings and impose sanctions on auditors. Prior cross-country research implies that legal institutions that discipline audit firms improve accounting transparency (Guedhami and Pittman, 2006). Therefore, the prospect of a visit by the PCAOB may induce the firm to conduct better audits. Moreover, the audit firm's quality may improve after the inspection as a direct result of the inspectors' findings. Anecdotally, audit firms sometimes claim in Part IV of the PCAOB report that they have implemented improvements in their policies and procedures in response to the inspectors' work.

Investigating whether PCAOB inspections genuinely improve audit quality requires measuring the change in quality around the date of the inspection. Prior research indicates that favorable (unfavorable) peer review opinions are issued to firms that have high (low) audit quality (Deis and Giroux, 1992; Hilary and Lennox, 2005; Casterella et al., 2006). Consequently, we rely on the peer review opinions issued to an audit firm to gauge the variation in its quality over time.

Figure 1 illustrates the research design. The treatment (control) group consists of firms that receive consecutive peer reviews and are (are not) subject to PCAOB inspections during the three-year intervening period. For example, a firm belongs to the treatment group if it receives peer review opinions in 2003 and 2006 and the PCAOB inspection occurs in 2005. A firm belongs to the control group if it receives peer review opinions in 2003 and 2006 and the PCAOB inspection takes place in 2007. Importantly, this approach does not require an assumption that

publicly available. Second, it is unlikely that investors monitor the PCAOB website every day to check whether a new report has become available.

peer review opinions are unbiased measures of audit firm quality. For example, the peer review program could suffer from an independence problem such that reviewers are ‘too lenient’ when reporting on firms’ defects. This should not contaminate our research design because we are examining the *change* in peer review opinions, ensuring that any bias in the level of reporting will cancel out. Moreover, any changes in the level of reporting bias should not matter since this would affect both the treatment and control groups.

If PCAOB inspections are valuable for remedial purposes, then we expect a greater improvement in audit firm quality within the treatment group relative to the control group. This translates into the prediction that the peer review opinions of the treatment sample become relatively more favorable compared to the opinions of the control group. We measure the change in firm *i*’s peer review opinion ($\Delta REVIEW_i$) using a discrete variable that we assign the value -1 if the opinion becomes more favorable, +1 if less favorable, or 0 if the opinion does not change. We code the opinion change as more favorable if the report switches from adverse to modified or unmodified, or if it switches from modified to unmodified. The opinion change is considered to be less favorable for switches in the opposite direction. If the opinion *type* does not change (e.g., both reports are unmodified), the opinion change is coded as more (less) favorable if the more recent peer review report discloses fewer (more) weaknesses. The $\Delta REVIEW_i$ variable is coded zero if the opinion type remains unchanged (e.g., both reports are unmodified) and the reports disclose the same number of weaknesses. Reflecting that we require that each firm has two consecutive peer review opinions, the sample is smaller than in the previous tables (there are 137 observations in the treatment group and 584 in the control group).

Panel A of Table 6 provides univariate tests on the link between PCAOB inspections and the change in firms’ peer review opinions. We find that 43.8% of the treatment firms receive more favorable peer review opinions compared to only 30.8% in the control group and only 16.1% of the treatment firms receive less favorable peer review opinions compared to 20.7% in the control group. Thus, peer review opinions become relatively more favorable when firms are

subject to PCAOB inspections and this finding is statistically significant (p -value = 0.026), which suggests that inspections play a remedial role by helping firms to improve their quality.

Interestingly, the peer review opinions become more favorable in both the treatment and control groups (although the improvement is significantly greater in the former). This is consistent with Colbert and Murray (1998) and Knechel et al. (2007) who find that peer review opinions become more favorable as firms receive additional reviews. The AICPA's position on this issue is that the improvement in peer review opinions is attributable to the remedial benefits of peer review.²³ An alternative, less optimistic explanation is that reviewers have gradually become less effective in detecting and reporting audit firms' defects. From a research design perspective, the challenge is to measure the change in audit quality for a control group of firms that are not subject to peer review. Without this, it is not possible to determine how much of the improvement in peer review opinions reflects the remedial effect of having a peer review. We leave to future research an examination of whether peer review has a remedial effect in terms of improving audit quality.²⁴

Panel B of Table 6 provides multivariate evidence on the remedial impact of PCAOB inspections on audit firm quality. The dependent variable is the change in peer review opinion ($\Delta REVIEW_i$) and the treatment variable ($PCAOB_i$) equals one if the firm receives a PCAOB inspection during the three-year intervening period, and zero otherwise. In Col. (2), we examine whether the remedial benefit of PCAOB inspections is associated with the detection of defects by

²³ The AICPA website has stated (May 12, 2004), "From inception [of the peer review program] to June 30, 1997, the percentage of modified and adverse reports decreased 70 percent from the initial review to the subsequent review, demonstrating the value of the initial review and the improvements that are implemented when the recommendations given during the peer review process are incorporated into a firm's system of quality control."

²⁴ The change in audit quality could be measured using a time-series panel of firms' PCAOB opinions. Specifically, we would need: (1) a control sample of firms that receive consecutive PCAOB reports and no peer review during the intervening period, and (2) a treatment sample of firms that are subject to a peer review during the period between consecutive PCAOB reports. In our sample, each small firm has one PCAOB report and there are only 8 large firms that receive consecutive PCAOB reports. Consequently, data constraints prevent us from analyzing whether peer review performs a remedial role.

the inspectors. We expect firms are more likely to increase their quality if the inspectors find problems, whereas there is less scope for improvement if the firm receives a clean report from the PCAOB. Thus, we include two treatment variables in Col. (2): (i) $PCAOB_CLEAN_i$ equals one if the firm receives an inspection and the PCAOB report discloses no defects, and zero otherwise; and (ii) $PCAOB_WEAK_i$ equals one if the firm receives an inspection and the PCAOB report discloses at least one defect, and zero otherwise. Similar to Table 5, we control for audit firm size ($\ln(\#CLIENTS_i)$ and BIG_i), although we do not form predictions about their coefficient signs.

The $PCAOB_i$ coefficient in Cols. (1) and (2) are negative and significant at less than the 1% level (z-stats. = -3.27), indicating that peer review opinions improve more for audit firms that receive PCAOB inspections. In Cols. (3) and (4), the $PCAOB_CLEAN_i$ coefficients are negative, which supports the intuition that firms are more likely to improve their quality if they face the prospect of an inspection. However, the magnitude of the $PCAOB_CLEAN_i$ coefficients is relatively small and they are not statistically significant at the 5% level (z-stats. = -1.62, -1.64). In comparison, the $PCAOB_WEAK_i$ coefficients are negative and highly significant (z-stats. = -3.09, -3.08), consistent with audit quality improving. Therefore, there is a particularly marked improvement in audit quality if the PCAOB inspectors detect weaknesses at the firm.

These findings imply that PCAOB inspections have significant remedial effects such that audit firm quality improves afterwards, particularly when the inspectors find defects. This evidence is also important because it corroborates one explanation for finding that PCAOB reports do not affect audit firms' market shares. Since the PCAOB reports are naturally backward-looking, they do not incorporate the expected improvement in audit firm quality that the inspection motivates. For example, suppose that an audit firm has below average quality and the PCAOB inspectors detect (and report) more problems than clients were expecting. In this case, the PCAOB report reflects that the firm's quality was low in the past, although it would not reliably signal the firm's future quality if it takes steps to correct the problems. Clients' decisions to hire and fire auditors should be based on their beliefs about the audit firm's likely quality in

the future rather than its quality in the past. To the extent that unfavorable PCAOB reports bring higher audit quality, the clients are less likely to base their auditor choices on the content of the PCAOB reports. If the remedial effects are so strong that they are not indicative of the firm's future quality, clients should discount the PCAOB reports completely. If the remedial effects are weaker than this, firms that are below (above) average before the inspection are likely to remain below (above) average afterward. In this case, there must be other reasons for the lack of perceived information content within PCAOB reports.

We therefore examine whether the remedial benefits of PCAOB inspections are sufficiently strong that they can fully account for the lack of informativeness. If the remedial benefits are weaker than this, we would expect persistence in the level of audit quality among the treatment firms that are subject to PCAOB inspections. We measure persistence by regressing the natural logarithm of the weaknesses in the current peer review report against the natural logarithm of the weaknesses in the prior peer review report along with the two controls for audit firm size controls, $Ln(\#CLIENTS_i)$ and BIG_i .²⁵ In untabulated results, the coefficient on the prior report is positive (0.290) and significant at less than the 1% level (t-statistic = 4.37).²⁶ This suggests that there is persistence in audit firm quality over the three-year period surrounding the PCAOB inspections. This persistence implies that the remedial benefits of inspections are not sufficiently strong that they can explain why reports about past quality are perceived to be uninformative about future quality. Accordingly, the dynamic that bad firms raise their audit quality is not solely responsible for our failure to find that PCAOB reports affect audit firms' market shares. Next, we evaluate additional explanations for this evidence.

²⁵ Unfortunately, we cannot estimate persistence using a dependent variable coded as one (zero) for modified or adverse (clean) opinions because the lagged version of this opinion variable is a perfect predictor.

²⁶ In untabulated results, the coefficient on the prior report is also positive (0.458) and highly significant (t-statistic = 11.76) within the control sample of firms that are not subject to PCAOB inspections. The persistence coefficients are smaller in the treatment group than the control group (0.290 versus 0.458), which corroborates the evidence in Table 5 that there are remedial benefits from PCAOB inspections.

5. Peer reviews

Hilary and Lennox (2005) find that clients perceive peer review opinions to be informative about audit quality and, using their methodology, we are unable to find the same result for PCAOB reports. In this section, we present evidence that the way in which peer reviewers disclose audit firms' weaknesses may be partly responsible for this divergent evidence. We also examine whether audit firms have been strategically switching away from reviewers that previously issued them unfavorable opinions.

5.1 *The perceived information content of peer review reports*

We begin by replicating Hilary and Lennox's (2005) findings using our larger, more current sample. Next, we extend their study by considering two major distinctions between the disclosures in peer review and PCAOB reports. First, PCAOB reports do not publicly disclose audit firms' quality control weaknesses, whereas peer reviewers do provide this information. Second, a peer review report provides an evaluative summary of systematic defects, with reviewers classifying their opinions as unmodified, modified or adverse, whereas a PCAOB report simply catalogues each engagement at which deficiencies are found.

Panel A of Table 7 presents univariate evidence on audit firms' gains and losses of clients after the release of peer review opinions. The mean values of $\Delta \ln(\#CLIENTS_{i,t+12})$ are +8.9%, +3.1% and -18.0% for firms that receive clean opinions, unmodified opinions with at least one weakness, and modified or adverse opinions, respectively. These large shifts in firms' market shares are significantly different across each of the three types of peer review opinion (t-stats. = 4.336, 2.299, 2.954). For the 876 firms that receive clean opinions, Panel B shows that 16.7% enjoy increases in market share, while only 7.6% suffer falls. For the 64 firms that receive either modified or adverse opinions, 26.6% experience losses in market share, while only 6.3% enjoy

gains. A Chi-square test reveals that the association between peer review opinions and subsequent changes in market share is highly significant ($p\text{-value} = 0.000$).

Table 8 provides multivariate tests of the perceived information content of peer review reports. In Col. (1), we examine the association between the number of weaknesses disclosed in peer review reports ($REVIEW_WEAK_i$) and audit firms' subsequent gains and losses of clients. Consistent with Hilary and Lennox (2005), the $REVIEW_WEAK_i$ coefficient is negative and significant at less than the 1% level, implying that firms endure larger falls in market share after they receive peer review opinions that disclose more weaknesses.

In Col. (2), we explore the perceived informational value of disclosing quality control weaknesses ($REVIEW_QCWEAK_i$). We control for the disclosure of engagement performance weaknesses ($REVIEW_EPWEAK_i$) since these are also disclosed in PCAOB reports. The $REVIEW_QCWEAK_i$ coefficient is negative and significant at less than the 1% level ($t\text{-stat.} = -2.64$), suggesting that the informational value of peer review reports stems partly from the disclosure of quality control problems. This is an important finding since it is precisely these weaknesses that are withheld from public view in PCAOB reports. Although the $REVIEW_EPWEAK_i$ coefficient is also negative and statistically significant (at the 5% level), its magnitude is small.

In Col. (3), we combine the modified and adverse reports into a single variable ($REVIEW_MOD_ADV_i$), which equals one if the opinion is either modified or adverse, and zero if unmodified. The $REVIEW_MOD_ADV_i$ coefficient is negative and highly significant ($t\text{-stat.} = -3.50$), reflecting that audit firms lose market share unless their peer review opinions are unmodified. In Col. (4), we separately examine whether both the modified and adverse types of opinion are perceived to be informative. Despite that most opinions are unmodified, we find that the $REVIEW_MOD_i$ and $REVIEW_ADV_i$ coefficients are both negative and statistically significant ($t\text{-stats.} = -3.12, -1.67$). This suggests that clients consider both types of opinion to be informative

about low audit quality, which is important because PCAOB reports do not provide any kind of evaluative summary.

In Cols. (5)–(8), where the dependent variable is the sign of the change in market share ($Sign\Delta(\#CLIENTS_{i,t+12})$), we report regression results that are entirely consistent with those in Cols. (1)–(4). Specifically, clients perceive both quality control disclosures and the type of opinion (unmodified, modified or adverse) to be informative. The $REVIEW_EPWEAK_i$ coefficient is significant at only the 10% level (t-stat. = -1.73), reinforcing that relatively little of the information content in peer review opinions comes from the disclosure of engagement performance defects.²⁷

Overall, the results in Table 8 indicate that the informational value of peer review opinions primarily stems from the disclosure of quality control defects and the evaluative summary of audit firm quality. The PCAOB does not publicly disclose this information, which may partly explain why their reports are not perceived by users to be informative.

5.2 Reviewer switching

The results in Tables 7 and 8 suggest that favorable (unfavorable) peer review reports trigger increases (decreases) in audit firms' market shares. We therefore expect that audit firms may try to influence the outcomes of the peer review process by switching their reviewers strategically to avoid unfavorable opinions. This opportunity exists because audit firms have discretion to select their own reviewers, unlike in PCAOB inspections. As such, a potential virtue of the PCAOB program is that the inspectors are chosen independently, preventing audit firms from "shopping" for more favorable reports.

²⁷ In an untabulated test, we estimate a model that predicts the number of weaknesses disclosed in the peer review opinion and we subtract the predicted number from the actual to obtain the unexpected opinion. In estimating the model, we require that the audit firm's previous peer review report is available and, as a result, the estimation sample no longer includes the reports used by Hilary and Lennox (2005). Although the sample size drops to 693 observations, the unexpected opinion coefficients are negative and statistically significant (t-stat. = -2.31; z-stat. = -2.96). Thus, peer review opinions remain highly informative even when audit firms received opinions from their reviewers three years previously.

In many respects, our analysis is similar to studies that test whether clients “shop” among auditors for more favorable audit opinions (e.g., Chow and Rice, 1982; Craswell, 1988). These studies find that clients tend to dismiss audit firms that issue modified or qualified audit opinions on their financial statements. Similarly, we predict that an opinion-shopping audit firm is more likely to switch to another peer reviewer after receiving an unfavorable opinion from the incumbent reviewer.

The dependent variable ($\Delta REVIEWER_i$) equals one if the peer review is performed by a newly appointed reviewer, and zero otherwise. Since we require that firms have consecutive peer reviews, there are 721 observations for the $\Delta REVIEWER_i$ variable and, of these, we find that 240 (33.3%) involve reviewer switches. The treatment variables capture the opinion issued in the firm’s previous review. The $PRIOR_MOD_ADV_i$ variable equals one if the firm’s previous peer review opinion was modified or adverse, and zero if the opinion was unmodified. The $PRIOR_#\WEAK_i$ variable equals the log of (one plus) the number of weaknesses disclosed in the firm’s previous peer review report. If audit firms are shopping for more favorable peer review opinions, we expect they are more likely to change reviewers after receiving unfavorable opinions. We therefore predict positive coefficients for the $PRIOR_MOD_ADV_i$ and $PRIOR_#\WEAK_i$ variables.

In Table 9, the $PRIOR_MOD_ADV_i$ coefficient in Cols. (1) and (2) is positive and significant at less than the 1% level (z-stat. = 3.82, 3.76), while the $PRIOR_#\WEAK_i$ coefficient in Cols. (3) and (4) is positive and significant at the 5% level (z-stat. = 1.96, 1.96). This evidence implies that an audit firm is more likely to switch another reviewer if its previous peer review opinion was modified or adverse, or the opinion disclosed more weaknesses. That a reviewer is more likely to be changed (retained) if it previously issued an unfavorable (favorable) opinion corroborates our other evidence that audit firms find favorable (unfavorable) opinions to be

beneficial (costly). It also supports critics who argue that the peer review program lacks objectivity because the audit firms strategically choose their own reviewers.²⁸

6. Conclusions

One of the most important provisions of the Sarbanes–Oxley Act of 2002 (SOX) was the creation of the PCAOB, which is responsible for periodically inspecting firms that audit public companies. However, empirical evidence on whether the PCAOB is effectively discharging its regulatory responsibilities on behalf of the public remains scarce. We shed light on this question by examining whether: (1) PCAOB reports are perceived to be informative about audit quality, and (2) PCAOB inspections perform a remedial role in terms of improving audit quality.

We find that audit firms' market shares are insensitive to the content of PCAOB reports. One explanation for this result is that the inspections play a remedial role by improving the quality of audit firms, especially when PCAOB inspectors identify problems. Since the inspections lead to changes to audit firm quality and the inspectors' reports are backward-looking, the reports are inevitably more noisy signals of the future differences in quality among audit firms. This provides a partial explanation for our finding that clients are not more likely to dismiss (appoint) audit firms whose PCAOB reports are unfavorable (favorable).

Another explanation is that the PCAOB's reports fail to disclose information that clients would value. Supporting this argument, we provide evidence that clients perceive the disclosure of quality control defects in peer review reports to be highly informative, which is important because this information is excluded from the public portion of PCAOB reports. Peer review

²⁸ In an untabulated test, we investigate whether the audit firm's propensity to engage in opinion shopping is affected by the occurrence of a PCAOB inspection after the issuance of the reviewer's previous opinion. This involves including in the Table 9 estimations a dummy variable ($PCAOB_i$) which equals one if there is a PCAOB inspection during the three year period between consecutive peer reviews, and zero otherwise. We also include interaction terms between the $PCAOB_i$ dummy and the prior peer review opinion variables. In all regressions, we find that the $PCAOB_i$ and interaction coefficients are statistically insignificant, while the rest of the results qualitatively persist.

reports also include an evaluative summary since the reviewers are required to render either an unmodified, modified, or adverse opinion about audit firm quality. A quality rating is absent from PCAOB reports, despite evidence that users find such ratings to be informative.

Overall, we conclude that the PCAOB inspection process has been constructive for improving audit quality, although the way in which the inspectors' findings are reported could be made more informative. This conclusion should not be taken as an implied criticism of the PCAOB since the reporting format was stipulated in SOX. Nevertheless, this legislation requires some public disclosure of firms' weaknesses, which presumably means that the legislators were eager to ensure that the PCAOB's reports would be seen as informative.

At this early stage, it is difficult to justify policy prescriptions from our evidence, especially given the short history of the PCAOB inspection process. However, our results provide some preliminary empirical support for extending the PCAOB report disclosure to include an evaluative summary, quality control weaknesses, and the inspectors' sample sizes. In addition, the PCAOB reports might benefit from disclosing the remedial steps that audit firms have committed to implement. To the extent that clients would find such disclosures to be informative, the audit firms would have stronger incentives to supply higher quality audits in order to increase their market shares. On the other hand, more informative PCAOB reports may motivate audit firms—eager to protect their reputations—to conceal problems from inspectors. In this vein, we appreciate that regulators are in the regrettable position of having to weigh remedial benefits against the informativeness of reports.

With this in mind, we highlight that the AICPA has recently recommended a change to the reporting format for peer review. Specifically, the AICPA has proposed removing the reviewers' comments about engagement performance and quality control defects from peer review reports (AICPA, 2006).²⁹ Our results suggest that this change to peer review reporting

²⁹ The AICPA has informed us that the change to peer review reporting is expected to take effect in 2008. The AICPA made the recommendations following an on-line poll of its own accounting members. According to its report (AICPA, 2006: 17), the AICPA is recommending the changes

will likely reduce publicly available information about differences in audit firm quality, particularly as modified and adverse peer review opinions are very rare.³⁰ The shift towards less disclosure in peer review reports is important because our results indicate that audit clients are unable to extract this valuable information from the PCAOB's reports.

because some members complained that the disclosed defects are “inconsistent and not easily understood or out of context.” The AICPA (2006: 17) goes on to assert that the defects “are still very important to communicate to a firm so it may use the information to improve the quality of its accounting and auditing practice. In fact, the information is more relevant to the reviewed firm than to third parties.”

³⁰ The AICPA (2006: 18) states that its Task Force “discussed whether some may interpret these recommendations as being less transparent, since the matters [formerly included] would no longer be a part of the reporting process. But the Task Force concluded that based on the nature of the matters that remain in the report, the users of the peer review report will still have the significant information they need to make informed decisions about reviewed firms.”

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TABLE 1
Audit firms' weaknesses disclosed by the PCAOB inspectors and peer reviewers.

Panel A: Weaknesses disclosed in PCAOB reports (January 1, 2005 – August 31, 2007)

| Number of weaknesses per report | Number of PCAOB reports | Number of weaknesses |
|---------------------------------|-------------------------|----------------------|
| 0 | 210 | 0 |
| 1 | 138 | 138 |
| 2 | 58 | 116 |
| 3 | 37 | 111 |
| 4 | 11 | 44 |
| 5 – 9 | 18 | 125 |
| 10 – 14 | 7 | 77 |
| ≥ 15 | 4 | 81 |
| Total | 483 | 692 |

Mean no. of weaknesses per PCAOB report = 1.433

Panel B: Weaknesses disclosed in peer review reports (January 1, 1997 – August 31, 2007)

| Number of weaknesses per report | Number of unmodified reports | Number of modified reports | Number of adverse reports | Total number of reports | Number of weaknesses |
|---------------------------------|------------------------------|----------------------------|---------------------------|-------------------------|----------------------|
| 0 | 898 | 0 | 0 | 898 | 0 |
| 1 | 395 | 7 | 0 | 402 | 402 |
| 2 | 231 | 11 | 0 | 242 | 484 |
| 3 | 121 | 14 | 0 | 135 | 405 |
| 4 | 50 | 12 | 1 | 63 | 252 |
| 5 – 9 | 31 | 9 | 10 | 50 | 293 |
| ≥ 10 | 0 | 0 | 0 | 0 | 0 |
| Total | 1,726 | 53 | 11 | 1,790 | 1,836 |

Mean no. of weaknesses per peer review report = 1.026

Panel C: Types of weaknesses disclosed in PCAOB and peer review reports

| | PCAOB inspections | Peer reviews |
|------------------------|--------------------------|--------------|
| Engagement performance | 692 | 1,205 |
| Quality controls | Not disclosed (see note) | 631 |
| Total | 692 | 1,836 |

Note:

Part 1 of the PCAOB report details any engagement performance deficiencies of such significance that, according to its inspectors, the audit firm did not obtain sufficient competent evidential matter to support its opinion on the client's financial statements. Any defects in, or criticisms of, the audit firm's quality controls are only covered in the *nonpublic* portion of the PCAOB report.

TABLE 2
Audit firm size and the number of weaknesses disclosed in PCAOB reports.

| Number of SEC clients per firm | Number of PCAOB reports | Mean number of SEC clients | Mean PCAOB sample size | Mean number of reported weaknesses | Mean ratio of reported weaknesses to PCAOB sample size | Mean ratio of reported weaknesses to number of SEC clients |
|--------------------------------|-------------------------|----------------------------|------------------------|------------------------------------|--|--|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 1 | 143 | 1.000 | 1.000 | 0.517 | 0.517 | 0.517 |
| 2 - 3 | 119 | 2.479 | 2.294 | 0.731 | 0.326 | 0.305 |
| 4 - 10 | 116 | 5.957 | 3.362 | 1.241 | 0.362 | 0.220 |
| 11 - 99 | 84 | 26.381 | 6.048 | 1.893 | 0.326 | 0.088 |
| ≥ 100 | 21 | 1438.095 | Not disclosed | 10.857 | N/A | 0.023 |
| | <u>483</u> | | (see note) | | | |

Note:

The PCAOB reports do not disclose how many audit engagements are sampled in the inspections of firms that have at least 100 SEC clients.

TABLE 3**Descriptive statistics on the numbers of audit clients gained and lost by audit firms following PCAOB and peer review reports.**

| | Mean | Std. dev. | Minimum | 10 th percentile | 90 th percentile | Maximum |
|--|--------|-----------|----------|-----------------------------|-----------------------------|---------|
| #CLIENTS_GAINED _{<i>i,t+12</i>} | 1.195 | 5.440 | 0.000 | 0.000 | 2.000 | 76.000 |
| #CLIENTS_LOST _{<i>i,t+12</i>} | 1.246 | 8.599 | 0.000 | 0.000 | 2.000 | 147.000 |
| Δ #CLIENTS _{<i>i,t+12</i>} | -0.051 | 5.270 | -114.000 | -1.000 | 1.000 | 53.000 |
| $\Delta \ln(\#CLIENTS_{i,t+12})$ | 0.053 | 0.520 | -3.332 | -0.511 | 0.693 | 2.398 |

Variable definitions:

#CLIENTS_GAINED_{*i,t+12*} = number of SEC clients gained by firm *i* in the 12-month period following the report issuance date.#CLIENTS_LOST_{*i,t+12*} = number of SEC clients lost by firm *i* in the 12-month period following the report issuance date. Δ #CLIENTS_{*i,t+12*} = #CLIENTS_GAINED_{*i,t+12*} - #CLIENTS_LOST_{*i,t+12*}. $\Delta \ln(\#CLIENTS_{i,t+12}) = \ln(1+\#CLIENTS_GAINED_{i,t+12}) - \ln(1+\#CLIENTS_LOST_{i,t+12})$.

TABLE 4
Gains and losses of clients following the issuance of PCAOB reports to audit firms.

Panel A: Mean values of $\Delta \ln(\#CLIENTS_{i,t+12})$.

| Type of PCAOB report | Number of PCAOB reports | Mean of $\Delta \ln(\#CLIENTS_{i,t+12})$ | |
|------------------------------|----------------------------|---|-----------------|
| 1. Zero weaknesses | 128 | 0.067 | |
| 2. One weakness | 112 | 0.056 | |
| 3. Multiple weaknesses | 92 | 0.036 | |
| Difference in means, (1)-(2) | | 0.011 | t-stat. = 0.197 |
| Difference in means, (1)-(3) | | 0.031 | t-stat. = 0.384 |
| Difference in means, (2)-(3) | | 0.020 | t-stat. = 0.231 |

Panel B: Firms experiencing increases, no change, or decreases in the number of audit clients.

| Type of PCAOB report | Change in the number of clients ($\Delta \#CLIENTS_{i,t+12}$) | | | Total |
|------------------------|---|------------|------------|--------------|
| | Increase | No change | Decrease | |
| 1. Zero weaknesses | 24 (18.8%) | 92 (71.9%) | 12 (9.4%) | 128 (100.0%) |
| 2. One weakness | 20 (17.9%) | 79 (70.5%) | 13 (11.6%) | 112 (100.0%) |
| 3. Multiple weaknesses | 26 (28.3%) | 42 (45.7%) | 24 (26.1%) | 92 (100.0%) |

Test of the hypothesis that audit firms experience increases (decreases) in market share after receiving favorable (unfavorable) PCAOB reports ($\chi^2 = 1.919$; p-value = 0.383).

Variable definitions:

$\#CLIENTS_GAINED_{i,t+12}$ = number of SEC clients gained by firm i in the 12-month period following the report issuance date.

$\#CLIENTS_LOST_{i,t+12}$ = number of SEC clients lost by firm i in the 12-month period following the report issuance date.

$\Delta \ln(\#CLIENTS_{i,t+12}) = \ln(1+\#CLIENTS_GAINED_{i,t+12}) - \ln(1+\#CLIENTS_LOST_{i,t+12})$.

$\Delta \#CLIENTS_{i,t+12} = \#CLIENTS_GAINED_{i,t+12} - \#CLIENTS_LOST_{i,t+12}$.

TABLE 5

Multivariate tests of the perceived information content of PCAOB reports.

The $PCAOB_#WEAK_i$ and $\Delta \ln(\#CLIENTS_{i,+12})$ models are estimated using OLS; the $Sign(\Delta \#CLIENTS_{i,+12})$ models are estimated using ordered logit. Standard errors are adjusted for heteroscedasticity (t-statistics and z-statistics are shown in parentheses).

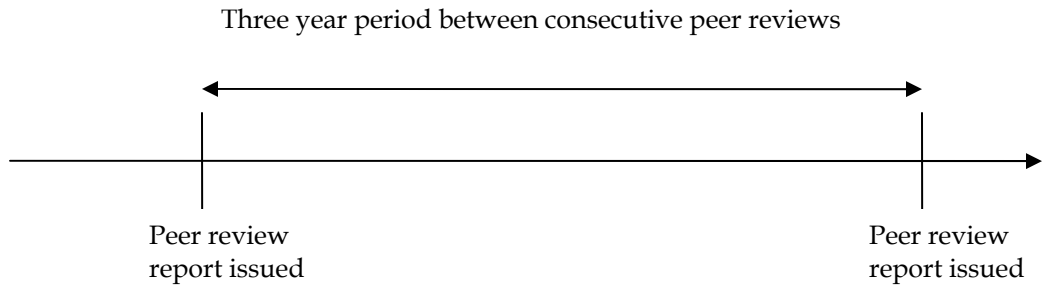
| | The dependent variable is: | | | | | |
|----------------------------------|----------------------------|--------------------|---------------------------------|--------------------|----------------------------------|--------------------|
| | $PCAOB_#WEAK_i$ | | $\Delta \ln(\#CLIENTS_{i,+12})$ | | $Sign(\Delta \#CLIENTS_{i,+12})$ | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $PRIOR_#WEAK_i$ | 0.175 (4.01)*** | | | | | |
| $PRIOR_MOD_ADV_i$ | | 0.164 (1.78)* | | | | |
| $PCAOB_#WEAK_i$ | | | -0.017 (-0.29) | | -0.242 (-0.95) | |
| $UE(PCAOB_#WEAK_i)$ | | | | 0.025 (0.40) | | -0.021 (-0.08) |
| $\Delta \ln(\#CLIENTS_{i,-12})$ | | | 0.370 (5.88)*** | 0.357 (5.55)*** | | |
| $Sign(\Delta \#CLIENTS_{i,-12})$ | | | | | 0.866 (3.59)*** | 0.855 (3.43)*** |
| $\ln(\#CLIENTS_i)$ | 0.303 (8.03)*** | 0.305 (7.72)*** | -0.042 (-0.89) | -0.064 (-1.34) | -0.013 (-0.06) | -0.129 (-0.56) |
| BIG_i | 0.369 (1.46) | 0.484 (1.84)* | 0.205 (0.61) | 0.285 (0.85) | 0.342 (0.21) | 0.428 (0.26) |
| <i>Intercept</i> | 0.032 (0.55) | 0.118 (2.21)** | 0.115 (1.92)* | 0.140 (2.33)** | | |
| Obs. | 306 | 306 | 332 | 306 | 332 | 306 |
| R2 / Pseudo-R2 | 45.1% | 42.6% | 16.2% | 15.4% | 4.1% | 3.7% |

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

Variable definitions:

$PCAOB_#WEAK_i$ = log of (one plus) the number of weaknesses disclosed in the PCAOB report issued to firm i. $PRIOR_#WEAK_i$ = log of (one plus) the number of weaknesses disclosed in the firm's previous peer review report. $PRIOR_MOD_ADV_i$ = 1 if the firm's previous peer review report was modified or adverse, zero if the report was unmodified. $UE(PCAOB_#WEAK_i) = PCAOB_#WEAK_i - E(PCAOB_#WEAK_i)$ where $E(PCAOB_#WEAK_i)$ is the predicted value of $PCAOB_#WEAK_i$ from Col. (1). $\Delta \ln(\#CLIENTS_{i,+12})$ = log of (one plus) the number of clients gained minus the log of (one plus) the number of clients lost by firm i during the 12 months following the issuance of the PCAOB report. $\Delta \ln(\#CLIENTS_{i,-12})$ = log of (one plus) the number of clients gained minus the log of (one plus) the number of clients lost by firm i during the 12 months prior to the issuance of the PCAOB report. $Sign(\Delta \#CLIENTS_{i,+12})$ = +1 if firm i experiences a net client gain, = 0 if no net change, = -1 if net client loss in the 12-month period following the report issuance date. $Sign(\Delta \#CLIENTS_{i,-12})$ = +1 if firm i experiences a net client gain, = 0 if no net change, = -1 if net client loss in the 12-month period prior to the report issuance date. $\ln(\#CLIENTS_i)$ = log of the number of SEC clients of firm i. BIG_i = one if audit firm i has at least 100 SEC clients, zero otherwise.

(a) Control group



(b) Treatment group

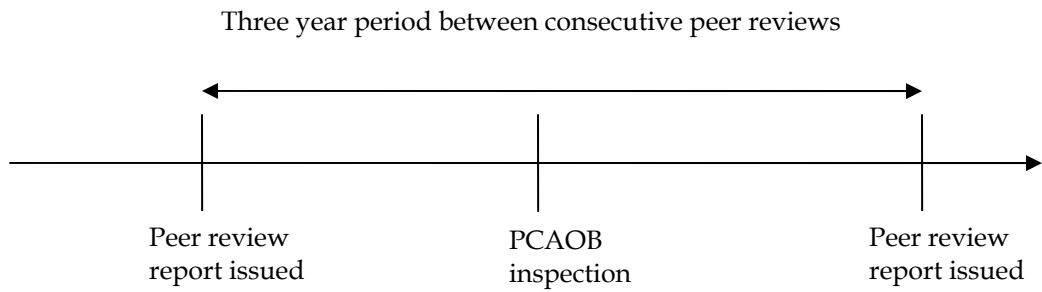


Fig. 1

The research design for testing the remedial effect of PCAOB inspections.

Table 6
The remedial effect of PCAOB inspections on audit firm quality.

Panel A: Univariate test

| | The peer review opinion issued to firm i: | | | Total |
|---------------------|--|--|--|--------------|
| | becomes more favorable ($\Delta REVIEW_i = -1$) | does not change ($\Delta REVIEW_i = 0$) | becomes less favorable ($\Delta REVIEW_i = +1$) | |
| PCAOB inspection | 60 (43.8%) | 55 (40.1%) | 22 (16.1%) | 137 (100.0%) |
| No PCAOB inspection | 180 (30.8%) | 283 (48.5%) | 121 (20.7%) | 584 (100.0%) |

Test of the hypothesis that the peer review opinion is more likely to become favorable rather than unfavorable when firms receive PCAOB inspections ($\chi^2 = 4.924$; p-value = 0.026).

Panel B: Multivariate tests (the dependent variable is $\Delta REVIEW_i$ and the models are estimated using ordered logit)

| | (1) | | (2) | | (3) | | (4) | |
|-------------------|--------|----------|--------|----------|--------|----------|--------|----------|
| | Coeff. | z-stat. | Coeff. | z-stat. | Coeff. | z-stat. | Coeff. | z-stat. |
| $PCAOB_i$ | -0.626 | -3.27*** | -0.626 | -3.27*** | | | | |
| $PCAOB_CLEAN_i$ | | | | | -0.501 | -1.62 | -0.507 | -1.64* |
| $PCAOB_WEAK_i$ | | | | | -0.697 | -3.09*** | -0.695 | -3.08*** |
| $Ln(\#CLIENTS_i)$ | 0.178 | 2.58*** | 0.199 | 3.31*** | 0.182 | 2.63*** | 0.203 | 3.35*** |
| BIG_i | 0.389 | 0.52 | | | 0.406 | 0.54 | | |
| Obs. | 721 | | 721 | | 721 | | 721 | |
| Pseudo-R2 | 1.2% | | 1.2% | | 1.3% | | 1.2% | |

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

Variable definitions:

$\Delta REVIEW_i$ = the change in peer review opinion between consecutive reviews (see Fig. 1). The $\Delta REVIEW_i$ variable is coded -1 if the peer review opinion becomes more favorable, 0 if the opinion does not change, +1 if the opinion becomes less favorable. The peer review opinion becomes more favorable if it switches from adverse to modified or unmodified or it switches from modified to unmodified (the opinion becomes less favorable for switches in the opposite direction). For a given type of opinion (e.g., unmodified), the more recent opinion is more (less) favorable if it discloses fewer (more) weaknesses. $PCAOB_i = 1$ if there is a PCAOB inspection during the period between consecutive peer reviews, 0 otherwise. $PCAOB_CLEAN_i = 1$ if the PCAOB report discloses no weaknesses at firm i, 0 otherwise. $PCAOB_WEAK_i = 1$ if the PCAOB report discloses at least one weakness at firm i, 0 otherwise. $Ln(\#CLIENTS_i)$ = log of the number of SEC clients of firm i. $BIG_i = 1$ if audit firm i has at least 100 SEC clients, zero otherwise.

TABLE 7
Gains and losses of clients following the issuance of peer review reports.

Panel A: Mean values of $\Delta \ln(\#CLIENTS_{i,t+12})$.

| Type of peer review opinion | Number of peer review opinions | Mean of $\Delta \ln(\#CLIENTS_{i,t+12})$ | |
|--|--------------------------------|--|--------------------------|
| 1. Unmodified with zero weaknesses | 876 | 0.089 | |
| 2. Unmodified with at least one weakness | 816 | 0.031 | |
| 3. Modified or adverse | 64 | -0.180 | |
| | | Difference in means, (1)-(3) | 0.268 t-stat. = 4.336*** |
| | | Difference in means, (1)-(2) | 0.057 t-stat. = 2.299** |
| | | Difference in means, (2)-(3) | 0.211 t-stat. = 2.954*** |

Panel B: Firms experiencing an increase, no change, or a decrease in the number of audit clients.

| Type of peer review opinion | Change in the number of clients ($\Delta \#CLIENTS_{i,t+12}$) | | | Total |
|--|---|-------------|-------------|--------------|
| | Increase | No change | Decrease | |
| 1. Unmodified with zero weaknesses | 146 (16.7%) | 663 (75.7%) | 67 (7.6%) | 876 (100.0%) |
| 2. Unmodified with at least one weakness | 143 (17.5%) | 548 (67.2%) | 125 (15.3%) | 816 (100.0%) |
| 3. Modified or adverse | 4 (6.3%) | 43 (67.2%) | 17 (26.6%) | 64 (100.0%) |

Test of the hypothesis that audit firms experience increases (decreases) in market share after receiving favorable (unfavorable) peer review opinions ($\chi^2 = 25.207$; p-value = 0.000).

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

Variable definitions:

$\#CLIENTS_GAINED_{i,t+12}$ = number of SEC clients gained by firm i in the 12-month period following the report issuance date as a result of outgoing firms being dismissed.

$\#CLIENTS_LOST_{i,t+12}$ = number of SEC clients lost by firm i as a result of being dismissed in the 12-month period following the report issuance date.

$\Delta \ln(\#CLIENTS_{i,t+12}) = \ln(1+\#CLIENTS_GAINED_{i,t+12}) - \ln(1+\#CLIENTS_LOST_{i,t+12})$.

$\Delta \#CLIENTS_{i,t+12} = \#CLIENTS_GAINED_{i,t+12} - \#CLIENTS_LOST_{i,t+12}$.

TABLE 8

Multivariate tests of the perceived information content of peer review reports.

The $\Delta \ln(\# \text{CLIENTS}_{i,t+12})$ models are estimated using OLS and the $\text{Sign}(\Delta \# \text{CLIENTS}_{i,t+12})$ models are estimated using ordered logit. Standard errors are adjusted for heteroscedasticity (t-statistics and z-statistics are shown in parentheses).

| | The dependent variable is: | | | | | | | |
|---|--|----------------------|----------------------|----------------------|--|---------------------|----------------------|----------------------|
| | $\Delta \ln(\# \text{CLIENTS}_{i,t+12})$ | | | | $\text{Sign}(\Delta \# \text{CLIENTS}_{i,t+12})$ | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| <i>REVIEW_#WEAK_i</i> | -0.084 (-3.92)*** | | | | -0.356 (-3.73)*** | | | |
| <i>REVIEW_#QCWEAK_i</i> | | -0.091 (-2.64)*** | | | | -0.406 (-2.50)** | | |
| <i>REVIEW_#EPWEAK_i</i> | | -0.055 (-1.96)** | | | | -0.212 (-1.73)* | | |
| <i>REVIEW_MOD_ADV_i</i> | | | -0.242 (-3.50)*** | | | | -1.108 (-3.90)*** | |
| <i>REVIEW_MOD_i</i> | | | | -0.221 (-3.12)*** | | | | -1.038 (-3.42)*** |
| <i>REVIEW_ADV_i</i> | | | | -0.345 (-1.67)* | | | | -1.451 (-2.02)** |
| $\Delta \ln(\# \text{CLIENTS}_{i,-12})$ | 0.121 (2.76)*** | 0.120 (2.75)*** | 0.118 (2.69)*** | 0.118 (2.69)*** | | | | |
| $\text{Sign}(\Delta \# \text{CLIENTS}_{i,-12})$ | | | | | 0.172 (1.00) | 0.167 (0.97) | 0.150 (0.88) | 0.150 (0.87) |
| $\ln(\# \text{CLIENTS}_i)$ | 0.057 (3.21)*** | 0.056 (3.19)*** | 0.053 (3.04)*** | 0.053 (3.04)*** | 0.273 (2.89)*** | 0.272 (2.88)*** | 0.259 (2.78)*** | 0.260 (2.78)*** |
| <i>BIG_i</i> | -0.220 (-0.98) | -0.225 (-1.01) | -0.261 (-1.16) | -0.260 (-1.16) | -1.042 (-0.55) | -1.081 (-0.57) | -1.224 (-0.62) | -1.227 (-0.62) |
| <i>Intercept</i> | 0.028 (1.87)* | 0.025 (1.71)* | -0.002 (-0.19) | -0.002 (-0.20) | | | | |
| Obs. | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 | 1,756 |
| R2 / Pseudo-R2 | 3.7% | 3.9% | 3.6% | 3.6% | 1.4% | 1.5% | 1.4% | 1.4% |

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

TABLE 8 (cont.)

Variable definitions:

$REVIEW_WEAK_i$ = log of (one plus) the number of weaknesses disclosed in the peer review report issued to firm i. $REVIEW_QCWEAK_i$ = log of (one plus) the number of quality control weaknesses disclosed in the peer review report issued to firm i. $REVIEW_EPWEAK_i$ = log of (one plus) the number of engagement performance weaknesses disclosed in the peer review report issued to firm i. $REVIEW_MOD_ADV_i$ = 1 if the peer review report issued to firm i is modified or adverse, 0 if the report is unmodified. $REVIEW_MOD_i$ = 1 if the peer review report issued to firm i is modified, 0 if the report is unmodified or adverse. $REVIEW_ADV_i$ = 1 if the peer review report issued to firm i is adverse, 0 if the report is unmodified or modified. $\Delta Ln(\#CLIENTS_{i,+12})$ = The log of (one plus) the number of clients gained minus the log of (one plus) the number of clients lost by firm i during the 12 months following the issuance of the PCAOB report. $\Delta Ln(\#CLIENTS_{i,-12})$ = The log of (one plus) the number of clients gained minus the log of (one plus) the number of clients lost by firm i during the 12 months prior to the issuance of the PCAOB report. $Sign(\Delta\#CLIENTS_{i,+12})$ = +1 if firm i experiences a net client gain, = 0 if no net change, = -1 if net client loss in the 12-month period following the report issuance date. $Sign(\Delta\#CLIENTS_{i,-12})$ = +1 if firm i experiences a net client gain, = 0 if no net change, = -1 if net client loss in the 12-month period prior to the report issuance date. $Ln(\#CLIENTS_i)$ = log of the number of SEC clients of firm i. BIG_i = one if audit firm i has at least 100 SEC clients, zero otherwise.

TABLE 9**Audit firms shopping for more favorable peer review opinions.**

The dependent variable ($\Delta REVIEWER_i$) indicates whether the audit firm changes its peer reviewer. The models are estimated using logit (z-statistics are shown in parentheses).

| | (1) | (2) | (3) | (4) |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| <i>PRIOR_MOD_ADV_i</i> | 1.717 (3.82) ^{***} | 1.703 (3.76) ^{***} | | |
| <i>PRIOR_#WEAK_i</i> | | | 0.274 (1.96) ^{**} | 0.273 (1.96) ^{**} |
| <i>Ln(#CLIENTS_i)</i> | -0.131 (-1.65) [*] | | -0.128 (-1.64) | |
| <i>BIG_i</i> | 1.163 (1.57) | | 1.108 (1.53) | |
| <i>Intercept</i> | -0.626 (-5.42) ^{***} | -0.759 (-9.32) ^{***} | -0.721 (-5.21) ^{***} | -0.850 (-7.47) ^{***} |
| Obs. | 721 | 721 | 721 | 721 |
| Pseudo-R2 | 2.1% | 1.8% | 0.8% | 0.4% |

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

Variable definitions:

$\Delta REVIEWER_i$ = 1 one if the peer review is performed by a newly appointed reviewer, 0 if it is performed by the firm's previous reviewer. *PRIOR_MOD_ADV_i* = 1 if the firm's previous peer review report was modified or adverse, zero if the report was unmodified. *PRIOR_#WEAK_i* = log of (one plus) the number of weaknesses disclosed in the firm's previous peer review report. *Ln(#CLIENTS_i)* = log of the number of SEC clients of firm i. *BIG_i* = one if audit firm i has at least 100 SEC clients, zero otherwise.