



Auditing the auditors: Evidence on the recent reforms to the external monitoring of audit firms [☆]

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ABSTRACT

This paper analyzes audit firm supervision since the Public Company Accounting Oversight Board (PCAOB) began conducting inspections. First, we find that audit clients do not perceive that the PCAOB's inspection reports are valuable for signaling audit quality. Second, we document that the information content of peer review reports fell after they became narrower in scope with the initiation of PCAOB inspections. Third, we isolate that the signaling role of peer review reports mainly stems from information that PCAOB inspectors do not publicly disclose. Collectively, our evidence implies that less is known about audit firm quality under the new regulatory regime.

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1. Introduction

The recent major reforms to the external monitoring of US audit firms motivate our research on the economic implications of the shifting regulatory landscape. For nearly 25 years, audit firms were only subject to self-regulation under peer review. However, the surge in prominent financial reporting failures around the turn of the century renewed concerns about the effectiveness of self-regulation and, in particular, whether monitoring separate from the profession is essential for ensuring high-quality auditing.¹ The Sarbanes–Oxley Act of 2002 (SOX) supplanted self-regulation by requiring the independent inspection of audit firms by the Public Company Accounting Oversight Board (PCAOB). DeFond and Francis (2005), Palmrose (2006), and Nelson (2006), among others, call for research on whether the recent changes to the

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¹ Zeff (2003) recounts that the profession implemented self-regulation in reaction to the US Congress proposing to enact legislation in June 1978 that would have imposed external regulation of registered audit firms closely resembling today's PCAOB. Anantharaman (2007) provides a timeline delineating major events in the oversight of audit firms since 1977.

institutions responsible for monitoring audit firms have proven beneficial. In this paper, we examine the informational value of the different forms of oversight governing audit firms in the years surrounding the launch of the PCAOB inspections.

Since evidence on the operating characteristics of the new regulatory regime remains scarce, we start by dissecting the transition from self-regulation to impartial inspection under the PCAOB. First, we show that the PCAOB relied on peer review reports to target lower-quality audit firms in their initial round of inspections. Second, our data reveal that many firms elected to leave the peer review program after the PCAOB began conducting inspections despite the fact that audit firms with public company clients can submit to both PCAOB inspections and peer reviews.² Indeed, we find that the worst audit firms, which we measure with the presence of an adverse or modified opinion and the number of weaknesses in their prior peer review report, were more likely to abandon the program.

The peer review program has endured criticism for affording audit firms the discretion to select their own reviewers, raising suspicions that they strategically influence the ensuing report outcomes. To shed light on the importance of inspector independence, we examine whether audit firms were 'gaming' the peer review system through their reviewer choice. Since 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 filed 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. Apart from corroborating prior research that peer review reports are informative, this evidence implies that audit firms were avoiding reviewers who previously gave unfavorable opinions against them. In contrast, the PCAOB prevents such opportunism since audit firms cannot influence the selection of their inspectors, the inspectors do not have current ties to audit firms, and the PCAOB is an independently funded organization.³

Although the PCAOB is insulated from the accounting profession, several commentators cast doubt on whether the PCAOB and its inspectors have adequate technical expertise to properly regulate audit firms (e.g., Wallison, 2005). Moreover, the public portion of a PCAOB report divulges only the firm's engagement weaknesses, *not* its quality control problems while a peer review report publicly discloses *both* details. In addition, the PCAOB report does not provide an evaluative summary of the firm's overall level of quality while peer reviewers express either an unmodified, modified, or adverse opinion. We expect that the absence of full public disclosure and an evaluative summary undermines the informational value of PCAOB reports. If audit clients view PCAOB reports as being informative about differences in audit firm quality, we expect that clients would appoint (dismiss) audit firms that receive favorable (unfavorable) reports. For example, an audit firm can pass its favorable PCAOB inspection report to existing and potential clients in an attempt to bolster its reputation and market share. Also, audit committees sometimes insist on reviewing reports about audit firm quality before making appointment decisions (Woodlock and Claypool, 2001). In fact, reputable news media, including *The Wall Street Journal* (e.g., Weil, 2005a, 2005b), have extensively broadcast the PCAOB reports of the large audit firms. Finally, clients are able to download reports from the PCAOB's website, ensuring that all reports are publicly available.

In univariate tests, we document that the audit engagement weaknesses disclosed in PCAOB reports fail to 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 and find that PCAOB reports identify 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 predicted by the model. Reinforcing our univariate evidence, we continue to find that audit firms' market shares are insensitive to their PCAOB reports.

After the PCAOB began its inspections of public company audits, the scope of peer reviews was largely confined to the audits of private companies to avoid duplication in regulatory monitoring. Given the evidence in Hilary and Lennox (2005) that peer review reports were highly informative signals of audit quality in the period to September 30, 2003, we extend their analysis to December 31, 2007 to isolate whether clients continue to value the peer review reports despite their narrower scope. Our evidence indicates that audit firm choice by public companies hinges less on the peer review reports issued in recent years, implying that the perceived information content of peer reviews falls under the restricted reporting format. Moreover, audit firms began leaving the peer review program after the introduction of PCAOB inspections, especially if their previous peer review opinions had been unfavorable. Accordingly, we conclude that peer reviews have become less relevant to public companies for gauging differential audit firm quality.

Next, we analyze whether the informational value of peer review opinions stems from disclosures that PCAOB reports fail to provide. The peer review reports disclose serious problems with audit firms' quality control systems, while this

² We describe audit firms as exiting the peer review program when they no longer participate according to data available on the American Institute of Certified Public Accountants (AICPA) website to December 31, 2007, although these firms may not have formally withdrawn from the program.

³ 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 contrasts with recent experience under 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).

information is withheld from the public portion of PCAOB reports. Also, unlike PCAOB inspectors, peer reviewers provide an overall assessment of the audit firm's quality in the form of an unmodified, modified, or adverse opinion. We help empirically resolve whether these differences in reporting explain why only peer review opinions are perceived to be informative. We demonstrate that the PCAOB's failure to disclose certain information—specifically, the quality control weaknesses and overall ratings of audit firms—explains why clients do not find the inspection reports to be informative.

Collectively, our findings suggest that the reporting model adopted by the PCAOB is not viewed by audit clients as being informative about audit firm quality. This conclusion is consistent with comments made by J. Michael Cook (*CFO magazine*, 2007), the former CEO of Deloitte, "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." Similarly, Hodowanitz and Solieri (2006) 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."

Our study contributes to the literature in four ways. First, we provide initial evidence on whether public companies perceive that PCAOB reports are informative about audit firm quality. Second, we isolate which specific disclosures in peer review reports affect audit firm choice. This evidence is constructive for identifying ways to improve the informational content of PCAOB reports to ensure that clients learn more about differential audit firm quality. Third, we analyze how the transition to independent PCAOB inspections has affected external monitoring under the AICPA and the PCAOB. Finally, we provide evidence that the PCAOB perceives peer review reports to be informative about audit firm quality, which triangulates the evidence in Hilary and Lennox (2005) relating to audit clients' perceptions.

The rest of this paper is organized as follows. Section 2 describes the PCAOB inspection and peer review programs along with the related academic literature. Section 3 outlines the sample and provides descriptive statistics. Sections 4 and 5 provide evidence on the informational value of PCAOB inspection and peer review reports, respectively. The conclusions in Section 6 include some preliminary public policy implications of our research.

2. Background

2.1. Self-regulation versus independent regulation by the PCAOB

The auditing profession became self-regulated during the 1970s in the aftermath of several accounting scandals involving fraudulent financial reporting and illegal acts. After hearings at the US Senate and House of Representatives, the 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 3 years.

Peer reviews primarily focus on the overall quality of the audit firm with reviewers collecting information from manuals, checklists, staff interviews, and audit engagement working papers. Peer reviewers render an opinion on the firm and they disclose any systematic weaknesses found. 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, while 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 were neglecting to strictly monitor audit firms.

The self-regulated peer review program has been criticized for its reluctance to impose 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).⁴ 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. Key features of the new regulatory environment include that the PCAOB's funding comes from fees levied on public companies (in proportion to their market capitalization) and the activities of the PCAOB are overseen by the SEC. In this regulatory structure, the SEC continues to monitor public companies, while the PCAOB monitors the audit firms.

The inspectors are not current employees of audit firms, although the PCAOB (2004) stresses that they average 12 years of public practice experience. Moreover, the inspectors are selected by the PCAOB, rather than by the firms themselves, to preserve their independence from the public accounting profession. However, Palmrose (2006: 24), among others, questions the competence of the PCAOB inspectors relative to peer reviewers:

⁴ The Public Oversight Board (2002, pp. 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." DeFond and Francis (2005) highlight that Deloitte & Touche issuing a "clean" peer review report on Arthur Andersen in December 2001—shortly before Andersen admitted shredding documents related to the Enron engagement—partly precipitated the shift to audit firm oversight by the PCAOB.

Inspection is another PCAOB activity that requires extensive accounting and auditing expertise. The Public Oversight Board (POB), the prior self-regulatory body, relied on a peer review process, which utilized practicing audit partners and more senior managers from an outside audit firm to conduct reviews. This made sense given the need for broad and deep, current expertise in accounting, auditing, internal controls, audit firm practices and methodologies, client industries, etc. However, because it did not use paid employees who had severed all ties to their former accounting firms, the POB peer review process was criticized for lacking at least the perception of independence. So, while the PCAOB decided to hire its own inspectors, it has traded-off expertise for perceived independence. This is a very significant trade-off.

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. Importantly, the AICPA shifted the focus of the peer review process toward the audits of private companies since the PCAOB handles inspections of public company audits. However, the PCAOB inspection and peer review programs continue to share some characteristics. For example, both the inspectors and reviewers examine the audit firm's quality control system and its performance on 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 keep the identities of audit clients anonymous and the reports are publicly available from the PCAOB and AICPA websites, respectively.

Beyond the types of engagements examined, there are other major differences between the PCAOB and peer review programs. Audit firms are required to undergo peer review every 3 years while PCAOB inspections are performed annually for firms that audit at least 100 public companies and triennially for smaller audit firms. The programs also 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.⁵ In contrast, a PCAOB report lists *each* serious defect found within the 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 in Section 104 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." Some argue that the lack of transparency could render the PCAOB's reports uninformative to market participants. For example, Coates (2007, p. 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."

A PCAOB report includes the name and basic details of the audit 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 audit 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 exclude this information.

2.2. Prior research

Hilary and Lennox (2005) provide 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 shortcomings of peer reviews, clients interpret the reports as being informative signals of audit firm quality. Casterella et al. (2009) examine the association between peer review opinions and *actual* audit quality. Using proprietary data from a 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. Evidently, peer review opinions are correlated with audit firms' actual quality and clients value the opinions for conveying quality differences.

Hermanson et al. (2007) contribute the first descriptive evidence on the reports issued by 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, suggesting that inspectors catch at least some of the serious audit failures. Finally, Gunny and Zhang (2007) examine the links between clients' earnings quality and the reports issued by peer reviewers during 1997–2003 and PCAOB inspectors during 2005–2006. They find a negative association between earnings quality and the PCAOB's disclosure of GAAP violations but they do not find a significant association using peer review reports. Gunny and Zhang conclude that only PCAOB inspections reports help distinguish earnings quality.

⁵ Palmrose (2006, p. 20) laments that, "Neither the [PCAOB] inspection process nor the public portions of the inspection reports are intended to provide a balanced assessment of the overall effectiveness of the audits of public companies by each of the registered firms."

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

Panel A: Weaknesses disclosed in PCAOB reports					
Number of weaknesses per report		Number of PCAOB reports		Number of weaknesses	
0		250			0
1		147			147
2		67			134
3		41			123
4		11			44
5–9		18			125
10–14		7			77
≥ 15		4			81
Total		545			731
Mean no. of weaknesses per PCAOB report = 1.341					
Panel B: Weaknesses disclosed in peer review reports					
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	1018	0	0	1018	0
1	433	7	0	440	440
2	255	12	0	267	534
3	130	14	0	144	432
4	50	12	1	63	252
5–9	32	9	9	50	289
≥ 10	0	0	0	0	0
Total	1918	54	10	1982	1947
Mean no. of weaknesses per peer review report = 0.982					
Panel C: Types of weaknesses disclosed in PCAOB and peer review reports					
		PCAOB inspections		Peer reviews	
Engagement performance		731		1293	
Quality controls		Not disclosed (see note)		654	
Total		731		1947	

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.

3. The sample and descriptive statistics

3.1. The sample

The PCAOB sample comprises 545 inspection reports issued up to December 31, 2007. There are 509 firms that receive just one PCAOB report during this period because they have fewer than 100 SEC clients. Of the 15 audit firms that receive multiple PCAOB reports, 9 firms receive two reports and 6 are issued three reports. Next, we update Hilary and Lennox (2005)'s sample, which consists of 1001 peer review reports issued between January 1997 and September 2003, by compiling from the AICPA website subsequent peer review reports issued up to December 31, 2007.⁶ 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. Consequently, our sample is a time-series panel of peer review reports posted to the AICPA website from January 1, 1997 to December 31, 2007.

3.2. PCAOB and peer review reports

Panel A of Table 1 documents the number of deficiencies disclosed in the 545 reports issued by the PCAOB. There are 250 reports (45.9%) that disclose zero weaknesses, 147 (27.0%) mention a single deficiency, and the remaining 148 opinions (27.1%) list multiple defects. The mean number of weaknesses per PCAOB report is 1.341. There are 11 PCAOB reports that

⁶ The data used by Hilary and Lennox (2005) is available for download from Clive Lennox's website (ihome.ust.hk/~accl/Data.xls).

disclose ten or more weaknesses and, in every case, these reports are issued to audit firms that have at least 100 clients. In Section 3.4, we demonstrate that the reports of larger firms disclose more weaknesses because the PCAOB's reporting style engenders a mechanical positive association between audit firm size and the number of reported weaknesses.

Panel B presents descriptive statistics on the disclosures in the 1982 peer review reports. There are 1918 (96.8%) unmodified opinions, including 1018 (53.1%) that identify no significant weaknesses at the audit firm. There are 433 (22.6%) unmodified peer reviews that disclose one weakness and the remaining 467 (24.3%) disclose multiple problems. There are 54 (2.7%) modified and only 10 (0.5%) adverse reports. The low frequency of modified and adverse opinions corroborates the criticism that reviewers seldom censure their fellow auditors.

Panel C provides a breakdown of the types of weaknesses disclosed in PCAOB and peer review reports. Of the 1947 weaknesses disclosed by peer reviewers, 1293 (66.4%) relate to engagement performance problems with the remaining 654 (33.6%) stemming from deficiencies in firms' quality control systems. Since quality control deficiencies are omitted from the public portion of a PCAOB report, all of the 731 reported weaknesses relate to engagement 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. = 4.41). 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 the reporting models adopted by the PCAOB and by peer reviewers are very different. In particular, the PCAOB reports disclose each engagement defect while 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.

3.3. The PCAOB's targeting of audit firms that received unfavorable peer review opinions

The PCAOB reports in our sample were issued between January 1, 2005 and December 31, 2007 (Table 2). However, the PCAOB inspections began earlier with the first took place in May 2004 and another 97 inspections conducted during the rest of 2004. The number of inspections falls over time in our sample (Panel A, Table 2) because some of the reports for

Table 2

The PCAOB's targeting of audit firms that received unfavorable peer review opinions.

Panel A: Descriptive statistics on PCAOB inspections and reports					
Year	PCAOB reports	PCAOB inspections	Audit firms received peer review reports prior to their PCAOB inspections	% of prior peer review reports that were modified or adverse	Mean weaknesses disclosed in prior peer review reports
	(1)	(2)	(3)	(4)	(5)
2004	0	98	82	12.20%	1.841
2005	173	281	243	2.88%	1.070
2006	206	110	104	0.00%	0.673
2007	166	56	43	0.00%	0.628
Total	545	545	472		

Panel B: The dependent variable ($PCAOB_INV_YEAR_i$) indicates the year in which the PCAOB inspection took place (see Panel A, Col. 2). The sample consists of 545 PCAOB inspections and the models are estimated using ordered logit (z-statistics are shown in parentheses beneath the coefficient estimates)			
	(1)	(2)	(3)
$PRIOR_i$	0.109 (0.34)	0.485 (1.45)	0.445 (1.32)
$PRIOR_i * MOD_ADV_i$	-2.132 (-4.52)***		-1.507 (-2.95)***
$PRIOR_i * \#WEAK_i$		-0.758 (-5.20)***	-0.606 (-3.93)***
$\ln(\#CLIENTS_i)$	0.122 (1.27)	0.113 (1.15)	0.118 (1.23)
BIG_i	-1.617 (-1.98)**	-1.265 (-1.64)	-1.364 (-1.73)*
$LITIG_i$	0.367 (0.63)	0.348 (0.64)	0.329 (0.59)
Pseudo- R^2 (%)	1.96	2.40	3.06

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

Variable definitions: $PCAOB_INV_YEAR_i$ = the year in which the PCAOB investigation takes place (2004, 2005, 2006 or 2007, see Panel A). $PRIOR_i$ = 1 if the audit firm received a peer review report prior to its PCAOB inspection, 0 otherwise. $PRIOR_i * MOD_ADV_i$ = 1 if the firm's previous peer review report was modified or adverse, 0 otherwise. $PRIOR_i * \#WEAK_i$ = log of (one plus) the number of weaknesses disclosed in the firm's previous peer review report (0 if there was no prior report). $\ln(\#CLIENTS_i)$ = log of (one plus) the number of SEC clients of firm i . BIG_i = 1 if audit firm i has at least 100 SEC clients, 0 otherwise. $LITIG_i$ = 1 if the audit firm was subject to a lawsuit during the year of its PCAOB inspection, 0 otherwise.

inspections initiated in 2006 and 2007 had not been issued by December 31, 2007. Cols. (1) and (2) in Panel A highlight the delay between the date of the PCAOB inspection and the issuance of its report. The mean (median) lag between the end of the inspection and the filing of the PCAOB report is 8.5 months (7.7 months) while the mean (median) duration of the inspection fieldwork is 11.7 days (4.0 days).

Col. (3) summarizes that audit firms received peer review reports before their PCAOB inspections in 472 (86.6%) of the 545 cases. Importantly, Cols. (4) and (5) indicate a strong relation between the content of the audit firm's peer review report and the timing of the PCAOB inspection. For example, of the 82 firms that were inspected in 2004 and received prior peer review reports, 12.20% of the review reports were either modified or adverse. In contrast, only 2.88% of the prior review reports were modified or adverse for the audit firms that were inspected in 2005. None of the audit firms inspected in 2006 or 2007 received modified or adverse opinions in their prior peer review reports. A similar pattern emerges in Col. (5), which tabulates the mean number of weaknesses disclosed in the peer reports issued prior to audit firms' inspections by the PCAOB. The 2004 inspections were conducted at audit firms whose prior peer reviews disclosed 1.84 weaknesses, on average, but the mean number of weaknesses falls monotonically over time to 1.07 in 2005, 0.67 in 2006, and 0.63 in 2007. These findings suggest that the PCAOB was targeting in the early phase of its inspections the audit firms whose peer review reports identified audit quality problems. That is, the PCAOB relied on peer review reports when choosing which audit firms to initially inspect. This suggests that the PCAOB regarded the peer review reports as being informative about audit firm quality. Consequently, this finding triangulates the evidence in Hilary and Lennox (2005) that audit clients also perceived peer review reports as informative.

Panel B of Table 2 more formally tests this proposition in a multivariate framework, where we control for audit firm size ($\ln(\#CLIENTS_i)$) and BIG_i) and whether the audit firm was subject to a lawsuit in the year of its inspection ($LITIG_i$). The dependent variable ($PCAOB_INV_YEAR_i$) specifies the year in which the PCAOB investigation occurs. The dummy variable ($PRIOR_i$) equals one if the audit firm received a peer review report prior to its PCAOB inspection, and zero otherwise. The interaction term, $PRIOR_i^*MOD_ADV_i$, takes the value one if the firm's previous peer review report was modified or adverse (zero if the report was unmodified or there was no prior report). The $PRIOR_i^*WEAK_i$ variable equals the log of one plus the number of weaknesses disclosed in the firm's previous peer review report (zero if there was no prior report).⁷

In Panel B, we estimate negative and highly significant coefficients on the interaction variables, reinforcing that the PCAOB initially targeted audit firms with poor peer review opinions. The $PRIOR_i$ coefficient fails to load, implying that the presence of a prior peer review report did not systematically affect the timing of the PCAOB inspection. Accordingly, this evidence reflects that the content of the prior peer review report rather than its mere existence affects whether the audit firm was inspected by the PCAOB in 2004, 2005, 2006, or 2007.

3.4. 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 makes the raw number of reported weaknesses a relatively poor measure of the audit firm's quality. In particular, the reports issued to large audit firms tend to disclose many more weaknesses than do the reports issued to small firms despite extensive prior theory and evidence that the larger firms supply higher quality audits (Francis, 2004).

Panel A of Table 3 sorts the audit firms into five size categories. Col. (2) reveals that 157 reports are issued to audit firms that have just one SEC client, 127 to those with 2 or 3 clients, 137 to those with between 4 and 10 clients, 102 to those with between 11 and 99 clients, and, finally, 22 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 2.28 engagements for firms with 2 or 3 clients, 3.41 engagements for those with between 4 and 10 clients, and 5.90 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. The median duration of the inspection is *four days* when firms have fewer than 100 clients compared to *five months* when firms have at least 100 clients. Therefore, the PCAOB inspectors spend much more time examining the work performed by the larger 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) in Panel A of Table 3 reveals a strong positive association between audit firm size and the mean number of reported weaknesses.

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 firms. However, the ratio remains 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 important set of audit firms. Second, the PCAOB inspectors may more thoroughly examine the

⁷ We use logs for each variable that has a right-skewed distribution and we add a one before taking logs because some observations have values of zero.

Table 3
Determinants of the number of weaknesses disclosed in PCAOB reports.

Panel A: PCAOB sample sizes and the number of weaknesses disclosed in PCAOB reports						
Number of SEC clients per firm (1)	Number of PCAOB reports (2)	Mean number of SEC clients (3)	Mean PCAOB sample size (4)	Mean number of reported weaknesses (5)	Mean ratio of reported weaknesses to PCAOB sample size (6)	Mean ratio of reported weaknesses to number of SEC clients (7)
1	157	1.000	1.000	0.484	0.484	0.484
2–3	127	2.480	2.283	0.732	0.303	0.322
4–10	137	6.044	3.409	1.095	0.194	0.322
11–99	102	27.000	5.902	1.775	0.083	0.314
≥100	22	1379.545	Not disclosed (see note)	10.500	N/A	0.023
545						
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.						
Panel B: The dependent variable ($PCAOB_#WEAK_i$) equals the log of (one plus) the number of weaknesses disclosed in the PCAOB report issued to audit firm i . The models are estimated using ordinary least squares (t -statistics are shown next to the coefficient estimates)						
	Coefft.	(1) t -Stat.	Coefft.	(2) t -Stat.	Coefft.	(3) t -Stat.
$PRIOR_i$	-0.347	-5.13***	-0.405	-6.06***	-0.400	-6.02***
$PRIOR_i * MOD_ADV_i$	0.229	2.52**	0.238	2.68***	0.229	2.62***
$PRIOR_i * #WEAK_i$	0.224	8.25***	0.229	5.91***	0.227	5.84***
$LITIG_i$	-0.004	-0.03	-0.020	-0.13	-0.016	-0.11
$Ln(\#CLIENTS_i)$	0.224	8.25***			0.064	1.37
BIG_i	0.545	3.07***				
$PCAOB_SAMPLE_i$			0.320	9.20***	0.247	4.16***
Intercept	0.316	4.14***	0.454	6.45***	0.411	5.32***
Obs.		545		523		523
Year dummies		Yes		Yes		Yes
R^2 (%)		48.21		28.04		28.33

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

The sample in Col. (1) consists of all the 545 PCAOB reports. Cols. (2) and (3) exclude 22 PCAOB reports that are issued to audit firms with at least 100 SEC clients because these reports do not disclose the PCAOB's sample sizes (see Panel A).

Variable definitions: $PCAOB_#WEAK_i$ = the log of (one plus) the number of weaknesses disclosed in the PCAOB report issued to audit firm i . $PRIOR_i$ = 1 if the audit firm received a peer review report prior to its PCAOB inspection, 0 otherwise. $PRIOR_i * MOD_ADV_i$ = 1 if the firm's previous peer review report was modified or adverse, 0 otherwise. $PRIOR_i * #WEAK_i$ = log of (one plus) the number of weaknesses disclosed in the firm's previous peer review report; 0 if there was no prior peer review report. $LITIG_i$ = 1 if the audit firm was subject to a lawsuit during the year of its PCAOB inspection, 0 otherwise. $Ln(\#CLIENTS_i)$ = log of (one plus) the number of SEC clients of firm i . BIG_i = 1 if audit firm i has at least 100 SEC clients, 0 otherwise. $PCAOB_SAMPLE_i$ = log of the number of audit engagements sampled by the PCAOB inspectors (see Col. (4), Panel A).

engagements of smaller audit firms, particularly those that have just one SEC client. Consistent with this explanation, the ratio of reported weaknesses to sample size is highest among the firms that have just one client (0.48 in Col. (6)).

An alternative specification would involve scaling the number of reported weaknesses by the number of SEC clients. However, this ratio is arguably worse because it includes in the denominator all of the clients not sampled by the PCAOB inspectors and the fraction of clients not 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, only 21.9% (= 5.90/27.00) 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 as an indicator of audit quality because it tends to exaggerate the quality of large audit firms relative to small firms.

To summarize, Panel A suggests that it is difficult for users of PCAOB reports to extract meaningful information about audit firm quality. The fundamental problem is that the PCAOB discloses the deficiencies on *each* engagement sampled by its inspectors and fails to provide a balanced evaluation of the firm's overall level of quality. In short, the reporting format adopted by the PCAOB is not designed to be very informative about the inspectors' findings.

In Panel B of Table 3, we estimate models of PCAOB reporting. The dependent variable equals the log of (one plus) the number of weaknesses reported by the PCAOB inspectors ($PCAOB_#WEAK_i$). As shown in Panel A, there is a positive relation between audit firm size and the number of reported weaknesses. So we control for size using the log of the number of SEC clients held by the firm during the year in which the report is issued ($Ln(\#CLIENTS_i)$). Our estimations also include BIG_i , which identifies firms with at least 100 SEC clients, to capture any lingering size variation between the very large auditors and other firms.⁸

⁸ 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 the Big Four firms receive only ten PCAOB reports in the period up to December 31, 2007.

The dummy variable $PRIOR_i$ equals one if the audit firm received a peer review report prior to its PCAOB inspection, and zero otherwise. We assign the interaction term, $PRIOR_i^*MOD_ADV_i$, the value one if the firm's previous peer review report was modified or adverse (zero if the report was unmodified or there was no prior report). The $PRIOR_i^*WEAK_i$ variable equals the log of one plus the number of weaknesses disclosed in the firm's previous peer review report (zero if there was no prior report). If audit firm quality is persistent over time, the PCAOB report would indicate more weaknesses if the firm's prior peer review report was modified or adverse, or it disclosed more weaknesses. Therefore, persistence in audit firm quality would result in positive coefficients for $PRIOR_i^*MOD_ADV_i$ and $PRIOR_i^*WEAK_i$. Further, the PCAOB report is more likely to indicate no weaknesses if the firm received a clean prior peer review report compared to the case where no peer review report was issued, in which case the $PRIOR_i$ coefficient would be negative. On the other hand, there may be no persistence in audit firm quality if the peer review program engenders remedial benefits by inducing firms to conduct better audits when its reviewers identify deficiencies. Given that it is unclear whether persistence or remediation will dominate in the regressions, we avoid making directional predictions for the coefficients on $PRIOR_i$, $PRIOR_i^*MOD_ADV_i$, and $PRIOR_i^*WEAK_i$.

The results in Panel B indicate that PCAOB reports disclose more weaknesses if the audit firm is large or if its prior peer review report was unfavorable. Cols. (2) and (3) provide evidence at the 1% level that the positive association between audit firm size and the number of reported weaknesses is driven by the fact that inspectors test more engagements if the audit firm has more SEC clients. Specifically, the $PCAOB_SAMPLE_i$ coefficients are positive and significant at the 1% level in Cols. (2) and (3). The $Ln(\#CLIENTS_i)$ coefficient becomes statistically insignificant in Col. (3) when we control for the number of engagements sampled by the PCAOB inspectors. $PRIOR_i$ loads negatively while both $PRIOR_i^*MOD_ADV_i$ and $PRIOR_i^*WEAK_i$ load positively, implying that PCAOB reports disclose fewer (more) weaknesses if audit firms previously received better (worse) peer review opinions.⁹

3.5. Audit firms exiting the peer review program

In Table 4, we populate Panel A with the peer review report observations by year. Hilary and Lennox (2005) collected their peer review data in 2003 and the AICPA makes available only the audit firm's latest peer review report. Since peer reviews are conducted every 3 years, most of the reports in their sample are issued in the years 2001–2003, with hardly any available for the 1997–1999 timeframe. We update their sample to include all the peer review reports lodged on the AICPA website between 2004 and 2007. A steep fall over time in the volume of peer review reports is evident in Col. (1) of Panel A (316 in 2004, 260 in 2005, 249 in 2006, and 11 in 2007), implying that audit firms are increasingly doing without peer reviews that are only required if they continue their membership with the AICPA.

The AICPA responded to the advent of PCAOB inspections by modifying its peer review program with the Center for Public Company Audit Firms (CPCAF) Peer Review Program succeeding the SEC Practice Section Peer Review Program. The CPCAF is designed to review and evaluate audit engagements that do not fall under the purview of the PCAOB, especially the audits of private companies. Accordingly, the reporting format of peer review opinions changed during 2004, with reviewers examining only the engagements of non-SEC clients. Hereafter, we label these as the “old” and “new” reporting formats for peer review.

Cols. (2) and (3) report the number of peer review reports issued under each reporting format. Although the CPCAF was established on January 1, 2004, 34 reports were issued in early 2004 under the old format. However, the vast majority (282) of peer review reports issued in that year were under the new reporting format, reflecting the start of PCAOB inspections in May 2004. Altogether, there are 1280 peer reviews under the old format (where SEC engagements were reviewed) and another 702 under the new format (where only non-SEC engagements were reviewed). Later, we analyze whether the change to the reporting format affects the information value of peer review opinions, which we calibrate with the perceptions of SEC clients.

The sudden drop in the number of peer reviews suggests that many firms were reluctant to be monitored by both the PCAOB and the AICPA. We shed light on this issue by examining the determinants of $EXIT_i$, which we code one if the audit firm did not receive a peer review report during 2005–2007, and zero otherwise. The sample comprises 981 audit firms that received peer review reports within the 2002–2004 timeframe. We include two dummy variables in these models to analyze firms' decisions to continue submitting to peer review: $INSPECT_i$ equals one if the audit firm receives a PCAOB inspection report during the 2004–2007 period and zero otherwise, while $INSPECT_EARLY_i$ equals one if the audit firm receives a PCAOB inspection report within the 3-year period after the date of its peer review report during the 2002–2004 period and zero otherwise.¹⁰ If firms wait until after their first PCAOB inspection to exit the peer review program, we predict negative and positive coefficients for $INSPECT_i$ and $INSPECT_EARLY_i$, respectively.

We postulate that audit firms would be more likely to leave the peer review program if they had previously received unfavorable peer review opinions because these can be costly in terms of reducing audit firms' market shares (Hilary and Lennox, 2005). The MOD_ADV_i variable equals one if the firm's peer review report during 2002–2004 was modified or

⁹ The number of observations drops to 523 (= 545–22) in Cols. (2) and (3) because the PCAOB does not divulge its sample sizes in the 22 reports issued to large audit firms.

¹⁰ There is variation in $INSPECT_i$ since some of the 981 audit firms in the peer review sample are not later inspected by the PCAOB given that they have no public clients.

Table 4
Audit firms exiting the AICPA's peer review program.

Panel A: Yearly distribution of peer review reports			
Year	Peer review reports (1)	Peer review reports (old reporting format) (2)	Peer review reports (new reporting format) (3)
1997	1	1	0
1998	6	6	0
1999	12	12	0
2000	216	216	0
2001	346	346	0
2002	354	354	0
2003	311	311	0
2004	316	34	282
2005	260	0	260
2006	249	0	249
2007	11	0	11
Total	1982	1280	702

Panel B: The dependent variable ($EXIT_i$) indicates whether the audit firm exited the peer review program during the period 2005–2007. The sample consists of 981 audit firms that received peer review reports during the period 2002–2004 (see Panel A). The models are estimated using logit (z-statistics are shown in parentheses beneath the coefficient estimates)

	(1)	(2)	(3)
$INSPECT_i$	-1.653*** (-4.59)	-1.697 (-4.76)***	-1.643 (-4.57)***
$INSPECT_EARLY_i$	0.754 (2.02)**	0.810 (2.19)**	0.736 (1.97)**
MOD_ADV_i	1.774 (4.39)***		1.600 (3.73)***
$\#WEAK_i$		0.390 (2.82)***	0.223 (1.49)
$\ln(\#CLIENTS_i)$	-0.020 (-0.22)	-0.033 (-0.36)	-0.038 (-0.41)
BIG_i	-1.653 (-2.46)**	-1.837 (-2.70)***	-1.704 (-2.52)**
$LITIG_i$	0.284 (0.47)	0.232 (0.38)	0.310 (0.51)
Year dummies	Yes	Yes	Yes
Pseudo- R^2 (%)	36.19	36.37	36.37

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

Variable definitions: $EXIT_i = 1$ if the audit firm did not receive a peer review report during the period 2005–2007; 0 otherwise. $MOD_ADV_i = 1$ if the audit firm's peer review report during 2002–2004 was modified or adverse, 0 if the report was unmodified. $\#WEAK_i = \log$ of (one plus) the number of weaknesses disclosed in the audit firm's peer review report during 2002–2004. $INSPECT_i = 1$ if the audit firm receives a PCAOB inspection in the period 2004–2007, 0 otherwise. $INSPECT_EARLY_i = 1$ if the audit firm receives a PCAOB inspection within the 3-year period subsequent to the date of its peer review report during the period 2002–2004, 0 otherwise. $\ln(\#CLIENTS_i) = \log$ of (one plus) the number of SEC clients of firm i . $BIG_i = 1$ if audit firm i has at least 100 SEC clients, 0 otherwise. $LITIG_i = 1$ if the audit firm was subject to a lawsuit during the year of its peer review, 0 otherwise.

adverse, and zero if it was unmodified. The $\#WEAK_i$ variable is the log of (one plus) the number of weaknesses disclosed in the audit firm's peer review report during 2002–2004. We predict positive coefficients for the MOD_ADV_i and $\#WEAK_i$ variables because we expect that firms receiving unfavorable peer review opinions were more likely to exit the program. These regressions control for audit firm size since we expect that larger auditors are more likely to value monitoring by peer reviewers. We also include year dummy variables to control for variation over time in the rate of exit.

The regression results reported in Panel B of Table 4 include that $INSPECT_EARLY_i$ loads positively at the 5% level, implying that audit firms were more likely to exit the peer review program if their PCAOB inspection precedes their next (triennial) peer review. In other words, audit firms appear to consider peer review redundant after their first PCAOB inspection. In contrast, the coefficient on $INSPECT_i$ is consistently negative and statistically significant at the 1% level, suggesting that audit firms are more apt to stay in the peer review program if their first PCAOB inspection takes place after their next scheduled peer review. Collectively, we attribute this evidence to firms relying on their next peer review to help them prepare for their initial PCAOB inspection. Since all PCAOB-registered audit firms had undergone at least one PCAOB inspection by December 31, 2007, it follows that few chose to remain in the peer review program afterward.

Consistent with the intuition that lower-quality audit firms were more eager to leave the peer review program, we find that both MOD_ADV_i and $\#WEAK_i$ load positively at the 1% level in Panel B. In the other direction, we find that the audit

firms with at least 100 SEC clients tend to keep participating in the peer review program through 2007; i.e., the BIG_i coefficients load negatively at the 5% level or better. This result squares with prior research implying that the larger public accounting firms have stronger incentives to protect their reputations.

3.6. Opinion-shopping by audit firms

The results in Table 4 indicate that audit firms were more likely to exit the program if they received unfavorable peer review reports. A plausible alternative to exiting would be to distort the outcome of the peer review process by switching reviewers strategically to avoid unfavorable opinions. In many respects, our analysis is similar to research examining whether clients “shop” among auditors for more favorable audit opinions (e.g., Chow and Rice, 1982; Craswell, 1988; Lennox, 2000). 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 audit firm is more likely to switch to another peer reviewer after receiving an unfavorable opinion.

The dependent variable ($\Delta REVIEWER_i$) equals one if the peer review is performed by a newly appointed reviewer, and zero otherwise. We require that firms have consecutive peer reviews in order to identify any reviewer changes, so there are 907 observations for the $\Delta REVIEWER_i$ variable with 301 (33.2%) of these involving switches. The treatment variables capture the opinion issued in the firm’s previous peer review. $PRIOR_MOD_ADV_i$ equals one if the firm’s previous peer review opinion was modified or adverse, and zero otherwise. $PRIOR_#\WEAK_i$ 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. In the multivariate analysis, this translates into predicted positive coefficients for $PRIOR_MOD_ADV_i$ and $PRIOR_#\WEAK_i$.

Table 5

Audit firms shopping for more favorable peer review opinions.

Panel A: Prior peer review opinions and reviewer changes						
		$\Delta REVIEWER_i$		Total		
		= 0	= 1			
$PRIOR_MOD_ADV_i$	= 0	598 (98.7%)	283 (94.0%)	881		
	= 1	8 (1.3%)	18 (6.0%)	26		
Total		606 (100.0%)	301 (100.0%)	907		
Test of the null hypothesis that there is no relation between the type of prior peer review opinion and the audit firm’s decision to change reviewer ($\chi^2 = 15.7$; p -value = 0.000).						
Panel B: Multivariate tests						
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 beneath the coefficient estimates)						
	(1)	(2)	(3)	(4)	(5)	(6)
$PRIOR_MOD_ADV_i$	1.558 (3.61)***		1.486 (3.35)***	1.546 (3.55)***		1.480 (3.31)***
$PRIOR_#\WEAK_i$		0.200 (1.59)	0.090 (0.68)		0.191 (1.52)	0.080 (0.61)
$PRIOR_PCAOB_i$	0.115 (0.31)	0.117 (0.32)	0.115 (0.31)			
$PRIOR_PCAOB_i * \#\WEAK_i$	-0.242 (-0.69)	-0.251 (-0.72)	-0.265 (-0.75)			
$\ln(\#\CLIENTS_i)$	-0.048 (-0.71)	-0.046 (-0.69)	-0.050 (-0.73)			
BIG_i	0.655 (0.83)	0.716 (0.88)	0.668 (0.84)			
$LITIG_i$	0.151 (0.32)	0.097 (0.20)	0.138 (0.29)			
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo- R^2 (%)	2.28	1.27	2.32	2.17	1.16	2.20

The sample consists of 907 audit firms that receive consecutive peer review reports.

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

Variable definitions: $\Delta REVIEWER_i = 1$ 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, 0 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. $PRIOR_PCAOB_i = 1$ if the audit firm received a PCAOB report prior to its decision to change the peer reviewer, 0 otherwise. $PRIOR_PCAOB_i * \#\WEAK_i = \log$ of (one plus) the number of weaknesses disclosed in the firm’s previous PCAOB report; 0 if there was no prior PCAOB report. $\ln(\#\CLIENTS_i) = \log$ of (one plus) the number of SEC clients of firm i . $BIG_i = 1$ if audit firm i has at least 100 SEC clients, 0 otherwise. $LITIG_i = 1$ if the audit firm was subject to a lawsuit during the year of its peer review, 0 otherwise.

In an initial pass at this issue, we report a contingency table analysis in Panel A of Table 5. This univariate evidence strongly rejects the null hypothesis that there is no relation between prior modified/adverse opinions and the audit firm's decision to replace its peer reviewer. In the logit regressions in Panel B, the *PRIOR_MOD_ADV_i* coefficients are positive and statistically significant at the 1% level, while the *PRIOR_#WEAK_i* coefficients are also positive but insignificant. This multivariate evidence reinforces that an audit firm is more likely to switch to another reviewer if its previous peer review opinion was modified or adverse.¹¹ The result 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 validates the criticism that the peer review program lacks objectivity because the audit firms strategically choose their own reviewers.

4. Audit clients gained and lost after the issuance of PCAOB reports

4.1. Sample

We rely on auditor change data from Auditor-Trak and Audit Analytics to determine the change in each audit firm's market share during the 12-month window subsequent to the date the PCAOB report was issued. We choose a 12-month window because auditor appointment decisions are typically made annually. Given that the PCAOB reports are issued for the period up to December 31, 2007, the client gains and losses are calculated up to December 31, 2008.

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 tend to resign from the engagements of risky clients, although these clients remain acceptable to low-quality firms (DeFond et al., 1997), which could obscure the impact of PCAOB inspections on audit firms' reputations. Importantly, analyzing strictly dismissals dispels any concern that client screening by audit firms is spuriously responsible for evidence on our research questions. 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.

Our analysis is grounded in the assumption that, *ceteris paribus*, most clients prefer high-quality audit firms. In support of this assumption, prior studies find that equity and debt financing is cheaper when companies choose more reputable audit firms (e.g., Feltham et al., 1991; Pittman and Fortin, 2004). More relevant for our purposes, there is extensive evidence that audit firms suffer falls in market shares after their reputations are impaired (e.g., Firth, 1990; Barton, 2005; Hilary and Lennox, 2005; Weber et al., 2008).

4.2. Univariate results

Panel A of Table 6 provides descriptive statistics on audit firms' gains and losses of clients. The number of clients gained (*#CLIENTS_GAINED_{i,+12}*) has a mean of 2.35 and a maximum of 71, while the number of clients lost (*#CLIENTS_LOST_{i,+12}*) has a mean (maximum) value of 2.73 (145). The net change in the number of clients gained or lost (*Δ#CLIENTS_{i,+12}*) is obtained by subtracting *#CLIENTS_LOST_{i,+12}* from *#CLIENTS_GAINED_{i,+12}*. The *Δ#CLIENTS_{i,+12}* variable ranges from −115 to +35 with a mean of −0.38. 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 Panel A, the *Δln(#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 symmetric. Second, we create a discrete variable that indicates whether the audit firm's market share increases, remains constant, or decreases:

Sign(Δ#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 *Δln(#CLIENTS_{i,+12})* and *Sign(Δ#CLIENTS_{i,+12})* take positive (negative) values for net client gains (losses).¹²

Panels B and C report the changes in audit firms' market shares during the 12 months after the release of their PCAOB reports. The mean value of *Δln(#CLIENTS_{i,+12})* is 0.091 for firms that receive clean PCAOB reports relative to 0.054 (−0.022) when the reports identify one weakness (multiple weaknesses). In all comparisons, the differences in means are statistically indistinguishable from zero at the 5% level, implying that the disclosure of weaknesses fails to predict

¹¹ In untabulated tests, we estimate models of peer review outcomes to predict the opinions that would have been received had the audit firms made different switch decisions (Krishnan, 1994; Lennox, 2000). We find evidence—albeit at only the 10% level—that firms would have received worse opinions if they had made alternative switch decisions, lending some support to the intuition that audit firms exploit switch decisions to obtain better opinions.

¹² 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 although, in untabulated results, all of our main results persist when we analyze the raw or winsorized values of $\% \Delta(\#CLIENTS_{i,+12})$.

Table 6Clients gained and lost by audit firms during the 12 months following the issuance of PCAOB reports ($N = 545$, 2005–2007).

Panel A: Descriptive statistics for the numbers of clients gained and lost by audit firms							
	Mean	Std. dev.	Minimum	10th percentile	50th percentile	90th percentile	Maximum
#CLIENTS_GAINED _{<i>i</i>,+12}	2.348	8.507	0.000	0.000	0.000	3.000	71.000
#CLIENTS_LOST _{<i>i</i>,+12}	2.732	12.504	0.000	0.000	0.000	4.000	145.000
Δ #CLIENTS _{<i>i</i>,+12}	-0.383	7.548	-115.000	-1.000	0.000	2.000	35.000
$\Delta \ln(\#CLIENTS_{i,+12})$	0.050	0.591	-2.398	-0.693	0.000	0.693	2.708
$\text{Sign}(\Delta \#CLIENTS_{i,+12})$	0.064	0.643	-1.000	-1.000	0.000	1.000	1.000

Panel B: Mean values of $\Delta \ln(\#CLIENTS_{i,+12})$ following the issuance of PCAOB reports							
Type of PCAOB report	Number of PCAOB reports	Mean of $\Delta \ln(\#CLIENTS_{i,+12})$					
1. Zero weaknesses	248	0.091			Difference in means, (1)–(3)	0.113	t -Stat. = 1.733
2. One weakness	148	0.054			Difference in means, (1)–(2)	0.037	t -Stat. = 0.746
3. Multiple weaknesses	149	-0.022			Difference in means, (2)–(3)	0.076	t -Stat. = 0.975

Panel C: Numbers of audit firms experiencing increases, no change, or decreases in the number of clients following the issuance of PCAOB reports				
Type of PCAOB report	Change in the number of clients ($\text{Sign}(\Delta \#CLIENTS_{i,+12})$)			
	Increase	No change	Decrease	Total
1. Zero weaknesses	53 (21.4%)	168 (67.7%)	27 (10.9%)	248 (100.0%)
2. One weakness	30 (20.3%)	100 (67.6%)	18 (12.2%)	148 (100.0%)
3. Multiple weaknesses	48 (32.2%)	50 (33.6%)	51 (34.2%)	149 (100.0%)

Test of the hypothesis that audit firms experience increases (decreases) in market share after receiving favorable (unfavorable) PCAOB reports (Wald $\chi^2 = 1.988$; p -value = 0.157).

Variable definitions: #CLIENTS_GAINED_{*i*,+12} = number of SEC clients gained by firm *i* in the 12-month period following the report issuance date. #CLIENTS_LOST_{*i*,+12} = number of SEC clients lost by firm *i* in the 12-month period following the report issuance date. $\Delta \#CLIENTS_{i,+12} = \#CLIENTS_GAINED_{i,+12} - \#CLIENTS_LOST_{i,+12}$. $\Delta \ln(\#CLIENTS_{i,+12}) = \ln(1 + \#CLIENTS_GAINED_{i,+12}) - \ln(1 + \#CLIENTS_LOST_{i,+12})$. $\text{Sign}(\Delta \#CLIENTS_{i,+12}) = +1$ if firm *i* experiences a net client gain, = 0 if no net change, = -1 if net client loss in the 12-month period after the report issuance date.

subsequent changes in audit firms' market shares. This initial evidence fails to support the prediction that clients consider PCAOB reports to be informative signals about audit firm quality. Panel C documents the number (fraction) of firms experiencing net increases, no change, or net decreases in market share following the issuance of PCAOB reports. Audit market share falls for 10.9% of the firms with zero reported weaknesses compared to 12.2% and 34.2% after reports disclose single and multiple serious weaknesses, respectively. However, there are increases in market share for 21.4% of the firms whose reports are clean compared to 20.3% and 32.2% for those with single and multiple weaknesses, respectively. More formally, a test of the hypothesis that audit firms experience increases (decreases) in market share after receiving favorable (unfavorable) reports is statistically insignificant. Altogether, these results do not provide any evidence that clients perceive PCAOB reports to be informative.

4.3. Regression results

PCAOB inspections 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 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 research in which the Big Four accounting firms tend to dominate the samples (e.g., GAO, 2003; Mansi et al., 2004), these firms contribute only a few observations in our setting since just 10 (1.8%) of the 545 PCAOB inspection reports under study involve the Big Four firms.

In our multivariate framework for evaluating the information content of PCAOB reports, we follow Hilary and Lennox (2005) by controlling for client changes during the 12 months prior to the issuance dates because we intend to isolate whether these 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, we would expect positive coefficients on these lagged dependent variables. 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. We control for the role of litigation with the dummy variable LITIG_{*i*}, coded one when there is a lawsuit pending against the firm during the year of its PCAOB inspection and zero otherwise. Finally, we control for the presence and content of the firm's peer review report received prior to its PCAOB inspection. The PRIOR_{*i*} dummy variable equals one if the audit firm received a peer review report prior to its PCAOB

Table 7
Multivariate tests of the perceived information content of PCAOB reports.

	Dependent variable = $\Delta \ln(\# \text{CLIENTS}_{i,t+12})$			Dependent variable = $\text{Sign}(\Delta \# \text{CLIENTS}_{i,t+12})$		
	(1)	(2)	(3)	(4)	(5)	(6)
$\text{PCAOB_}\# \text{WEAK}_i$	−0.054 (−1.05)			−0.278 (−1.39)		
$\text{PCAOB_WEAK_RATIO}_i$		−0.030 (−0.56)			−0.146 (−0.72)	
$UE(\text{PCAOB_}\# \text{WEAK}_i)$			−0.084 (−1.54)			−0.329 (−1.52)
PRIOR_i	0.137 (1.31)	0.144 (1.32)	0.156 (1.48)	0.574* (1.78)	0.692 (2.08)**	0.667 (2.12)**
$\text{PRIOR}_i^* \text{MOD_ADV}_i$	0.172 (0.12)	−0.017 (−0.11)	0.003 (0.02)	0.041 (0.08)	−0.249 (−0.44)	−0.032 (−0.06)
$\text{PRIOR}_i^* \# \text{WEAK}_i$	−0.040 (−0.86)	−0.042 (−0.91)	−0.053 (−1.18)	−0.235 (−1.39)	−0.261 (−1.48)	−0.300 (−1.81)*
$\Delta \ln(\# \text{CLIENTS}_{i,-12})$	0.337 (6.17)***	0.312 (5.20)***	0.334 (6.13)***			
$\text{Sign}(\Delta \# \text{CLIENTS}_{i,-12})$				0.669 (3.66)***	0.565 (3.01)***	0.663 (3.61)***
$\ln(\# \text{CLIENTS}_i)$	−0.030 (−0.93)	−0.027 (−0.78)	−0.041 (−1.28)	0.022 (0.18)	0.076 (0.54)	−0.033 (−0.26)
BIG_i	0.184 (0.86)		0.155 (0.73)	1.140 (1.12)		0.988 (0.99)
LITIG_i	0.070 (0.38)	0.194 (0.86)	0.071 (0.39)	−0.463 (−0.65)	0.077 (0.10)	−0.465 (−0.64)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
$R^2/\text{pseudo-}R^2$ (%)	14.36	14.36	14.60	3.87	3.87	3.93

The $\Delta \ln(\# \text{CLIENTS}_{i,t+12})$ models are estimated using OLS while the $\text{Sign}(\Delta \# \text{CLIENTS}_{i,t+12})$ models are estimated using ordered logit (t -statistics and z -statistics are shown in parentheses beneath the coefficient estimates).

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

$\Delta \ln(\# \text{CLIENTS}_{i,t+12}) = \log$ 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. $\text{Sign}(\Delta \# \text{CLIENTS}_{i,t+12}) = +1$ 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 issuance of the PCAOB report. $\text{PCAOB_}\# \text{WEAK}_i = \log$ of (one plus) the number of weaknesses disclosed in the PCAOB report issued to audit firm i . $\text{PCAOB_WEAK_RATIO}_i = \text{PCAOB_}\# \text{WEAK}_i - E(\text{PCAOB_}\# \text{WEAK}_i)$ where $E(\text{PCAOB_}\# \text{WEAK}_i)$ is the predicted value of $\text{PCAOB_}\# \text{WEAK}_i$ from Col. (1) of Panel B, Table 5. $\text{PRIOR}_i = 1$ if the audit firm received a peer review report prior to its PCAOB inspection, 0 otherwise. $\text{PRIOR}_i^* \text{MOD_ADV}_i = 1$ if the firm's previous peer review report was modified or adverse, 0 otherwise. $\text{PRIOR}_i^* \# \text{WEAK}_i = \log$ of (one plus) the number of weaknesses disclosed in the firm's previous peer review report; 0 if there was no prior peer review report. $\Delta \ln(\# \text{CLIENTS}_{i,-12}) = \log$ 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. $\text{Sign}(\Delta \# \text{CLIENTS}_{i,-12}) = +1$ 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 issuance of the PCAOB report. $\ln(\# \text{CLIENTS}_i) = \log$ of (one plus) the number of SEC clients of firm i . $\text{BIG}_i = 1$ if audit firm i has at least 100 SEC clients, 0 otherwise. $\text{LITIG}_i = 1$ if the audit firm was subject to a lawsuit during the year of its PCAOB inspection, 0 otherwise.

inspection, and zero otherwise. The interaction, $\text{PRIOR}_i^* \text{MOD_ADV}_i$, takes a value of one if the firm's previous peer review report was modified or adverse (zero otherwise), while $\text{PRIOR}_i^* \# \text{WEAK}_i$ equals the log of (one plus) the number of weaknesses disclosed in its previous peer review report (zero if there was no prior report).

The $\Delta \ln(\# \text{CLIENTS}_{i,t+12})$ -dependent variable is continuous. So we estimate the models in Cols. (1)–(3) of Table 7 using ordinary least squares. The dependent variable in Cols. (4)–(6) captures the sign of the changes in firms' market shares during the 12 months subsequent to the reports' issuance dates. The $\text{Sign}(\Delta \# \text{CLIENTS}_{i,t+12})$ variable is ordered and discrete as it takes the values +1, 0, −1. So we estimate these models using ordered logit.

We measure the content of PCAOB reports using three different variables. The $\text{PCAOB_}\# \text{WEAK}_i$ variable is the log of (one plus) the number of weaknesses disclosed in the PCAOB report issued to audit firm i . The number of reported weaknesses is mechanically increasing in the size of the PCAOB's sample (Table 3). So we construct a second variable equal to the number of weaknesses in the PCAOB report issued to audit firm i divided by the number of engagements sampled by the inspectors ($\text{PCAOB_WEAK_RATIO}_i$). This ratio is unavailable for the large audit firms because their reports do not disclose the PCAOB's sample sizes. We therefore construct a third measure that is available for all firms by estimating the *unexpected* news in the PCAOB report ($UE(\text{PCAOB_}\# \text{WEAK}_i)$). We predict the number of expected weaknesses using the coefficient estimates in the model of PCAOB reporting (Col. (1) of Panel B, Table 3) and then calculate the residuals (i.e., the number of reported weaknesses minus the number of predicted weaknesses).

Corroborating our univariate results, the $\text{PCAOB_}\# \text{WEAK}_i$ coefficients are negative but statistically insignificant in Cols. (1) and (4) of Table 7. The $\text{PCAOB_WEAK_RATIO}_i$ and $UE(\text{PCAOB_}\# \text{WEAK}_i)$ coefficients are also statistically insignificant in the remaining four columns. Collectively, the evidence that PCAOB reports do not affect clients' auditor hiring and firing

decisions suggests that the reports are not perceived to be informative signals of audit quality.¹³ The coefficients on $\Delta \ln(\# \text{CLIENTS}_{i,-12})$ and $\text{Sign}(\Delta \# \text{CLIENTS}_{i,-12})$ are positive and statistically significant, confirming that changes in firms' market shares are persistent during the 12 months before and after the issuance of PCAOB reports. The $\text{PRIOR}_i^* \text{WEAK}_i$ and $\text{PRIOR}_i^* \text{MOD_ADV}_i$ coefficients are not statistically significant at the 5% level. The lack of statistical significance reflects that the 12-month period following the PCAOB report date does not typically overlap with the 12-month period following the previous peer review date (recall that peer review reports are issued at 3-year intervals). The coefficients for $\ln(\# \text{CLIENTS}_i)$ and BIG_i never load in these regressions, indicating that changes in market share are unrelated to the size of the firm.

4.4. Further evidence on the information content of PCAOB reports

4.4.1. Post-SOX changes in audit quality

Recent research suggests that audit quality improved in the post-SOX era (e.g., Cohen et al., 2008; Lobo and Zhou, 2006), raising the possibility that the PCAOB reports lack information content because the documented weaknesses become less serious over time. We tackle this competing explanation with a set of tests that help clarify whether the PCAOB reports increasingly disclose less serious weaknesses. This involves estimating annual logit models for 2005–2007 in which we specify the dependent variable to indicate the presence of a restatement and the independent variable is the log of the number of weaknesses listed in the inspection report. If the PCAOB was shifting toward reporting less serious weaknesses (i.e., relatively fewer restatements), this would be apparent in the positive association between restatements and reported weaknesses subsiding over time. In untabulated results, the coefficient estimates on logged weaknesses indicate no trend over the 3-year period.¹⁴

4.4.2. Severity of PCAOB report weaknesses

In Table 7, we implicitly treat all weaknesses identified by the PCAOB inspectors as economically equivalent, although sophisticated users likely calibrate their severity when forming perceptions about audit firm quality. Consequently, we sharpen our analysis by re-estimating these models after replacing $\text{PCAOB_}\# \text{WEAK}_i$, $\text{PCAOB_WEAK_RATIO}_i$, and $\text{UE}(\text{PCAOB_}\# \text{WEAK}_i)$ with test variables that capture the underlying severity construct. We begin by coding five dummy variables that reflect the relative severity of weaknesses listed in the PCAOB reports: (1) *ERROR* equals one if the PCAOB report discloses that the audit firm failed to detect and correct an accounting error and/or the audit firm issued an incorrect opinion, and zero otherwise; (2) *NO_TEST* equals one if the PCAOB report discloses that the audit firm failed to undertake a test or it failed to undertake an evaluation, and zero otherwise; (3) *INADEQUATE_TEST* equals one if the PCAOB report discloses that the audit firm's test or evaluation was inadequate or inappropriate, and zero otherwise; (4) *PERFORM_AND_DOCUMENT* equals one if the PCAOB report includes a phrase such as "failed to perform and document" or "no evidence in the audit documentation, and no persuasive other evidence, that the Firm had performed", and zero otherwise; (5) *PERVASIVE* equals one if the PCAOB report identifies a "...pervasive failure to plan, document and perform", and zero otherwise. We consider that the description pervasive reflects weaknesses that are widespread within the firm.

We re-run the Table 7 models after entering each of these dummy variables in separate regressions. Reinforcing that clients do not perceive PCAOB inspection reports as informative, none of these five variables load at conventional levels in any of the ten regressions. In additional untabulated tests, we find that clients do not react differently to PCAOB reports that disclose restatements or GAAP violations. Overall, we fail to find any evidence that clients condition their audit firm choice on the content of PCAOB inspection reports.

4.4.3. 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 86 firms (22.5%) explicitly disagree with the findings. Although it is difficult to verify whether these grievances are genuine, clients might discount the information contained in unfavorable PCAOB reports when the firms publicly disagree with the inspectors' findings. However, all results are nearly identical, including the $\text{PCAOB_}\# \text{WEAK}_i$, $\text{PCAOB_WEAK_RATIO}_i$, and $\text{UE}(\text{PCAOB_}\# \text{WEAK}_i)$ coefficients remaining statistically insignificant, when we re-estimate the Table 7 models after dropping the 86 disputed reports.

¹³ We document in Table 2 that the PCAOB was targeting audit firms that received unfavorable peer review opinions in its first wave of inspections. To examine whether this explains the lack of information content in PCAOB reports, we partition audit firms into early and late inspections using the inspection date of the median firm in our sample. We re-estimate the models in Table 7 separately for the sub-samples of early and late PCAOB inspections and, in both cases, the PCAOB report variables are statistically insignificant.

¹⁴ There is also no trend when we re-specifying the dependent variable to reflect the presence of either a restatement or a GAAP violation. We apply a similar empirical strategy to gauge whether peer reviewers were more frequently reporting less severe weaknesses over time. In successive annual regressions, we again find no discernible trend in the coefficient estimates on logged weaknesses, suggesting that the peer review reports are not increasingly identifying less severe weaknesses.

4.4.4. Delays in PCAOB reporting

There is a median reporting lag of 8.7 months between the completion of the PCAOB inspection fieldwork and the issuance of the report. So it is conceivable that information about the inspectors' findings leaks before the report is officially released 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-running the models in Table 7 using these alternative market share variables, we still find that the PCAOB report coefficients are still statistically insignificant.

4.4.5. The PCAOB reports issued to large audit firms

The PCAOB reports issued to large firms have been relatively well-publicized in newspapers (e.g., Taub, 2005; Weil, 2005a, 2005b). So we analyze whether any reputation implications are stronger for this sub-sample of firms. Because there are relatively few firms with more than 100 clients, 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 reports remain statistically insignificant. Similarly, we find that the PCAOB report variables are insignificant when the models are estimated on the firms that have fewer than 100 clients. We also re-estimate the models after partitioning the sample on the median size of the audit firm (i.e., three clients). We find that PCAOB reports remain uninformative in both the small and large audit firm samples.

4.4.6. Demand for low-quality auditors

Our analysis assumes that the average client prefers a high-quality audit firm. Since this assumption may not be justified for all clients, we attempt to identify those preferring to switch to low-quality audit firms. Using the data reported in Audit Analytics, we find 484 dismissals in which the 8-K filings disclose illegal acts, unreliable management, disagreements over accounting issues, SEC inquiries or formal investigations, accounting restatements, concerns about the validity of audit opinions, and limitations on audit scope. We re-calculate the changes in market shares for each audit firm after dropping these dismissals. After re-estimating the models reported in Table 7, we continue to find that PCAOB reports are not significantly associated with clients' audit firm change decisions.

5. Audit clients gained and lost following the issuance of peer review reports

In this section, we complement our evidence on the perceived lack of information content in PCAOB reports by analyzing whether clients continue to value peer review reports. We also examine whether the impact of peer review reports on audit firm appointment decisions declined after the reporting format began to narrowly focus on private company audits in 2004.

5.1. Univariate results

Table 8 presents univariate evidence on firms' gains and losses of clients after the release of peer review opinions. As shown in Panel B, the mean values of $\Delta\ln(\#CLIENTS_{i,t+12})$ are +8.5%, +3.9%, and –17.6% 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. = 4.28, 1.97, 3.01). For the 1,018 firms that receive clean opinions, Panel C shows that 16.6% enjoy increases in market share, while only 8.0% suffer falls. For the 64 firms that receive either modified or adverse opinions, 26.6% experience losses, while only 6.2% enjoy gains. A Chi-square test reveals that the association between peer review opinions and subsequent changes in market share is highly significant.

5.2. The information content of peer review opinions under the old and new reporting formats

Next, we analyze whether the information value of peer review opinions changed after the reporting format was revised in 2004 to exclude the public company engagements. As shown in Panel A of Table 4, there are 1280 (702) old (new) format reports.

Table 9 reports the changes in audit firms' market shares under the old and new reporting formats. In Cols. (1) and (7), the MOD_ADV_i coefficients are significantly negative, reflecting that modified and adverse opinions were perceived to be informative under the old reporting format. In Cols. (2) and (8), the MOD_ADV_i coefficients remain significantly negative, suggesting that modified and adverse opinions are still perceived to be informative under the new reporting format. However, the negative MOD_ADV_i coefficients are much closer to zero under the new format. In Cols. (3) and (9), we focus on whether the modified and adverse opinions have become less informative. The $MOD_ADV_i^*NEW_i$ coefficients are positive and statistically significant, consistent with a fall in their information value. In Cols. (4) and (10), the $\#WEAK_i$ coefficients load negatively at the 1% level, implying that the reported number of weaknesses is considered to be informative under the old reporting format. In sharp contrast, the $\#WEAK_i$ coefficients become insignificant under the new reporting format according to Cols. (5) and (11).

Table 8Clients gained and lost by audit firms during the 12 months following the issuance of peer review reports ($N = 1982, 1997\text{--}2007$).

Panel A: Descriptive statistics for the numbers of clients gained and lost by audit firms							
	Mean	Std. dev.	Minimum	10th percentile	50th percentile	90th percentile	Maximum
#CLIENTS_GAINED _{<i>i,t+12</i>}	1.146	5.194	0.000	0.000	0.000	2.000	82.000
#CLIENTS_LOST _{<i>i,t+12</i>}	1.113	7.779	0.000	0.000	0.000	2.000	156.000
Δ #CLIENTS _{<i>i,t+12</i>}	0.033	4.557	−108.000	−1.000	0.000	1.000	51.000
$\Delta \ln(\#CLIENTS_{i,t+12})$	0.055	0.513	−3.367	−0.405	0.000	0.693	2.485
$\text{Sign}(\Delta \#CLIENTS_{i,t+12})$	0.051	0.533	−1.000	−1.000	0.000	1.000	1.000
Panel B: Mean values of $\Delta \ln(\#CLIENTS_{i,t+12})$ following the issuance of peer review reports							
Type of peer review report	Number of peer review reports		Mean of $\Delta \ln(\#CLIENTS_{i,t+12})$				
1. Unmodified with zero weaknesses	1018		0.085				
2. Unmodified with at least one weakness	900		0.039				
3. Modified or adverse	64		−0.176				
			Difference in means, (1)–(3)		0.261	t-Stat. = 4.283	
			Difference in means, (1)–(2)		0.046	t-Stat. = 1.971	
			Difference in means, (2)–(3)		0.215	t-Stat. = 3.005	
Panel C: Numbers of audit firms experiencing increases, no change, or decreases in the number of clients following the issuance of peer review reports							
Type of peer review report	Change in the number of clients ($\text{Sign}(\Delta \#CLIENTS_{i,t+12})$)						
	Increase	No change	Decrease	Total			
1. Unmodified with zero weaknesses	169 (16.6%)	768 (75.4%)	81 (8.0%)	1018 (100.0%)			
2. Unmodified with at least one weakness	163 (18.1%)	601 (66.8%)	136 (15.1%)	900 (100.0%)			
3. Modified or adverse	4 (6.2%)	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 reports ($\chi^2 = 23.98$; p -value = 0.000).							

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

5.3. Further analysis on the information content of peer review opinions

In Table 10, we isolate the specific disclosures that are responsible for the perceived information content of peer review opinions. Given the recent shift in peer review reporting, we tabulate results for both the full sample (i.e., covering 1997–2007) and a reduced sample that excludes the 702 observations under the new format. Cols. (1), (3), (5), and (7) reveal that both the type of opinion (unmodified, modified, or adverse) and the number of reported weaknesses matter to clients' audit firm choice.

In Cols. (2), (4), (6), and (8), we explore the perceived informational value of disclosing quality control weaknesses (#QCWEAK_{*i*}) and engagement performance weaknesses (#EPWEAK_{*i*}). The #QCWEAK_{*i*} coefficients are negative and statistically significant at the 5% level or better while the #EPWEAK_{*i*} coefficients are also negative but do not consistently load. In all estimations, the #EPWEAK_{*i*} coefficients are considerably smaller than the #QCWEAK_{*i*} coefficients (−0.089 vs. −0.042; −0.400 vs. −0.165; −0.101 vs. −0.055; −0.560 vs. −0.157), reinforcing that much of the information content in peer review opinions comes from the revelation of quality control defects. Collectively, this evidence implies that relatively little of the information content in peer review opinions is rooted in the disclosure of engagement performance defects. This is important because this is the only kind of information disclosed in PCAOB reports. Altogether, the results in Table 10 indicate that the informational value of peer review opinions primarily stems from the evaluative summary and the disclosure of quality control defects. The PCAOB does not publicly divulge this information, which helps explain why their reports do not convey significant information about differential audit firm quality.

5.4. Changes over time in the sample of audit firms

Read et al. (2004) find that 47 small audit firms stopped performing public company audits in 2002–2003 primarily to avoid scrutiny by the PCAOB. If these audit firms were of relatively low quality, the departure of these firms could have resulted in less heterogeneity in audit firm quality during the post-SOX period. This could explain why the new format peer review reports and the PCAOB reports have lower information content subsequent to SOX. To investigate this issue, we run our tests for the information content of peer review reports after dropping the audit firms that stop performing audits.

Table 9The perceived information content of peer review opinions issued under the old reporting format ($N = 1280$) and the new reporting format ($N = 702$).

	Dependent variable = $\Delta \ln(\#CLIENTS_{i,t+12})$						Dependent variable = $Sign(\Delta \#CLIENTS_{i,t+12})$					
	Old format (1)	New format (2)	Full sample (3)	Old format (4)	New format (5)	Full sample (6)	Old format (7)	New format (8)	Full sample (9)	Old format (10)	New format (11)	Full sample (12)
MOD_ADV_i	-0.251 (-3.29)***	-0.051 (-2.06)**	-0.242 (-3.21)***				-1.165 (-3.76)***	-0.275 (-2.33)**	-1.149 (-3.74)***			
$MOD_ADV_i * NEW_i$			0.185 (2.29)**						0.835 (2.54)**			
$\#WEAK_i$				-0.092 (-3.63)***	-0.011 (-0.32)	-0.095 (-3.77)***				-0.399 (-3.52)***	-0.102 (-0.59)	-0.392 (-3.51)***
$\#WEAK_i * NEW_i$						0.081 (1.80)*						0.285 (1.34)
NEW_i			0.019 (0.18)			-0.009 (-0.08)			0.143 (0.32)			0.031 (0.07)
$\Delta \ln(\#CLIENTS_{i,-12})$	0.068 (1.28)	0.226 (3.67)***	0.130 (3.19)***	0.077 (1.45)	0.225 (3.67)***	0.134 (3.32)***						
$Sign(\Delta \#CLIENTS_{i,-12})$							0.237 (1.16)	0.173 (0.69)	0.216 (1.37)	0.278 (1.36)	0.170 (0.68)	0.239 (1.51)
$\ln(\#CLIENTS_i)$	0.067 (2.97)***	0.047 (1.94)*	0.062 (3.74)***	0.070 (3.05)***	0.048 (1.98)**	0.064 (3.84)***	0.288 (2.59)***	0.347 (2.72)***	0.314 (3.76)***	0.303 (2.66)***	0.354 (2.78)***	0.325 (3.84)***
BIG_i	-0.291 (-0.88)	-0.324 (-1.19)	-0.353 (-1.59)	-0.255 (-0.77)	-0.318 (-1.16)	-0.330 (-1.47)	-1.149 (-0.60)	-3.258 (-1.08)	-2.153 (-1.24)	-0.992 (-0.53)	-3.185 (-1.06)	-2.025 (-1.19)
$LITIG_i$	-0.180 (-1.16)	0.217 (1.42)	0.025 (0.21)	-0.178 (-1.17)	0.217 (1.41)	0.025 (0.22)	-1.300 (-1.62)	0.472 (0.67)	-0.333 (-0.57)	-1.310 (-1.64)	0.465 (0.66)	-0.348 (-0.60)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$R^2/\text{pseudo-}R^2$ (%)	3.7	13.0	6.0	3.7	13.0	6.2	2.2	2.9	2.4	2.1	2.9	2.17

The $\Delta \ln(\#CLIENTS_{i,t+12})$ models are estimated using OLS and the $Sign(\Delta \#CLIENTS_{i,t+12})$ models are estimated using ordered logit (t -statistics and z -statistics are shown in parentheses beneath the coefficient estimates).

***, **, * = statistically significant at the 1%, 5%, 10% levels (two-tailed tests). Variable definitions: $\Delta \ln(\#CLIENTS_{i,t+12})$ = 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 peer review report. $Sign(\Delta \#CLIENTS_{i,t+12})$ = +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 issuance of the peer review report. MOD_ADV_i = 1 if the peer review report issued to firm i is modified or adverse, 0 if the report is unmodified. $\#WEAK_i$ = log of (one plus) the number of weaknesses disclosed in the peer review report issued to firm i . NEW_i = 1 if the peer review report was issued under the new reporting format; = 0 if old reporting format. $\Delta \ln(\#CLIENTS_{i,-12})$ = 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 peer review 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 prior to the issuance of the peer review report. $\ln(\#CLIENTS_i)$ = log of (one plus) the number of SEC clients of firm i . BIG_i = 1 if audit firm i has at least 100 SEC clients, 0 otherwise. $LITIG_i$ = 1 if the audit firm was subject to a lawsuit during the year of its peer review, 0 otherwise.

Using data from Audit Analytics, we find that 103 audit firms filed 8-K forms stating that they were withdrawing from public company audits in the period between SOX and the end of 2007. We find that peer review reports remain highly significant predictors of changes in audit firms' market shares after these exiting firms are left out of the sample. In another test, we examine the information content of peer review reports for the sub-sample of firms that subsequently receive reports from the PCAOB. We again find that peer review reports are informative and there is no significant difference in the information content between audit firms that receive (do not receive) PCAOB reports.

6. Conclusions

One of the most important provisions of the Sarbanes–Oxley Act of 2002 created the PCAOB, which now handles the periodic inspections of the firms that audit public companies, reversing almost 25 years of professional self-regulation. However, empirical evidence on whether the PCAOB is effectively discharging its regulatory responsibilities remains elusive. We analyze from an information perspective the implications of these major changes in the regulations governing audit firms.

We find that audit firms' market shares are insensitive to the content of PCAOB reports, implying that public companies discount their information value. To identify an underlying explanation for this evidence, we examine whether the PCAOB's failure to disclose certain information is behind clients ignoring the inspection reports. We document that clients interpret the disclosure of quality control defects in peer review reports as highly informative, which is important because the public portion of PCAOB reports excludes these findings. Peer review 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, although our evidence suggests that the ratings in peer review opinions are perceived by clients to be informative.

Table 10

The perceived information content of quality control and engagement performance weaknesses disclosed in peer review opinions.

	Full sample ($N = 1982$)				Old reporting format ($N = 1280$)			
	Dependent variable = $\Delta \ln(\#CLIENTS_{i,t+12})$		Dependent variable = $Sign(\Delta \#CLIENTS_{i,t+12})$		Dependent variable = $\Delta \ln(\#CLIENTS_{i,t+12})$		Dependent variable = $Sign(\Delta \#CLIENTS_{i,t+12})$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
MOD_ADV_i	-0.182 (-2.47)**		-0.894 (-2.91)***		-0.187 (-2.39)**		-0.906 (-2.77)**	
$\#WEAK_i$	-0.056 (-2.64)***		-0.236 (-2.40)**		-0.071 (-2.73)***		-0.296 (-2.51)**	
$\#QCWEAK_i$		-0.089 (-2.54)**		-0.400 (-2.45)**		-0.101 (-2.53)**		-0.560 (-3.06)***
$\#EPWEAK_i$		-0.042 (-1.59)		-0.165 (-1.42)		-0.055 (-1.69)*		-0.157 (-1.11)
$\Delta \ln(\#CLIENTS_{i,-12})$	0.130 (3.20)***	0.133 (3.27)***			0.072 (1.35)	0.076 (1.43)		
$Sign(\Delta \#CLIENTS_{i,-12})$			0.221 (1.40)	0.232 (1.47)			0.250 (1.23)	0.269 (1.33)
$\ln(\#CLIENTS_i)$	0.066 (3.97)***	0.065 (3.89)***	0.329 (3.93)***	0.325 (3.82)***	0.072 (3.15)***	0.070 (3.04)***	0.310 (2.79)***	0.305 (2.69)***
BIG_i	-0.328 (-1.48)	-0.318 (-1.44)	-2.042 (-1.20)	-1.999 (-1.20)	-0.278 (-0.84)	-0.258 (-0.79)	-1.107 (-0.59)	-1.044 (-0.59)
$LITIG_i$	0.021 (0.18)	0.022 (0.19)	-0.366 (-0.63)	-0.354 (-0.61)	-0.186 (-1.22)	-0.182 (-1.19)	-1.351 (-1.68)*	-1.309 (-1.64)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2 /pseudo- R^2 (%)	5.3	5.0	2.5	2.3	3.7	3.3	2.5	1.90

The $\Delta \ln(\#CLIENTS_{i,t+12})$ models are estimated using OLS and the $Sign(\Delta \#CLIENTS_{i,t+12})$ models are estimated using ordered logit (t -statistics and z -statistics are shown in parentheses beneath the coefficient estimates).

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

Variable definitions: $\Delta \ln(\#CLIENTS_{i,t+12})$ = 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 peer review report. $Sign(\Delta \#CLIENTS_{i,t+12}) = +1$ 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 issuance of the peer review report. $MOD_ADV_i = 1$ if the peer review report issued to firm i is modified or adverse, 0 if the report is unmodified. $\#WEAK_i = \log$ of (one plus) the number of weaknesses disclosed in the peer review report issued to firm i . $\#QCWEAK_i = \log$ of (one plus) the number of quality control weaknesses disclosed in the peer review report issued to firm i . $\#EPWEAK_i = \log$ of (one plus) the number of engagement performance weaknesses disclosed in the peer review report issued to firm i . $\Delta \ln(\#CLIENTS_{i,-12})$ = 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 peer review 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 prior to the issuance of the peer review report. $\ln(\#CLIENTS_i)$ = log of (one plus) the number of SEC clients of firm i . $BIG_i = 1$ if audit firm i has at least 100 SEC clients, 0 otherwise. $LITIG_i = 1$ if the audit firm was subject to a lawsuit during the year of its peer review, 0 otherwise.

We also evaluate whether the AICPA's peer review program has remained informative given that the initiation of PCAOB inspections led the AICPA to narrow the scope of its peer reviews to focus on the audits of private companies. Importantly, we find that peer review reports issued under the new reporting format have become less valuable according to client perceptions. Further, we show that many audit firms are abandoning the peer review program rather than submit to both forms of oversight. Indeed, our evidence includes that audit firms were more likely to leave the program after receiving adverse or modified peer review opinions. Although the PCAOB is supposed to improve the transparency of auditing in the aftermath of several high-profile financial reporting failures, our research collectively implies that the public knows less about differences in audit quality under the new regulatory regime.¹⁵ This conclusion is not a tacit criticism of the PCAOB since the reporting format was stipulated in SOX. Nevertheless, this legislation requires some public disclosure of audit firms' weaknesses, which presumably reflects that lawmakers 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 which stands in contrast to the long history of self-regulated peer reviews. However, our results lend preliminary empirical support to extending the disclosures in PCAOB reports to include an evaluative summary of the audit firm, quality control weaknesses, and the inspectors' sample sizes. To the extent that clients would find such disclosures to be informative about audit quality, the audit firms would have stronger incentives to supply higher quality audits in order to increase their market shares.

¹⁵ According to the PCAOB website (www.pcaob.org/News_and_Events/News/2004/10-26.aspx), its mandate is to "protect the interests of investors and further the public interest in the preparation of informative, fair and independent audit reports".

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