

Audit Firm Inspections and Audit Fees

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ABSTRACT

This study examines the impact of audit firm reviews on audit fees. If inspections cause auditors to update their beliefs concerning inspector's quality standards and the resulting likelihood of penalties, auditors are expected to increase effort in response. Using a sample of 1,777 client-year observations associated with 139 first-time inspections, I find an increase in fees of deficient audit firms' clients following the inspection. The higher increase in fees of deficient firms compared to clean firms occurs in particular for clients with low demand for audit quality and for audit firms that face high competition prior to the inspection. This indicates that adjustments occur especially in settings where high fee pressure might have compromised audit quality. Further, I observe an increase in the number of professionals employed by deficient audit firms. This is consistent with the argument that the increase in fees reflects additional audit work. The evidence thus suggests an increase in auditor effort in response to the inspection. Hence, as long as investors' and inspector's quality standards are aligned, inspections appear to improve audit quality.

Keywords: PCAOB inspections, audit fees, audit quality

I. INTRODUCTION

In light of past financial scandals, regulators around the world have passed stricter laws to ensure appropriate financial reporting and audit quality. In particular, following the adoption of SOX, the newly created and widely debated Public Company Accounting Oversight Board (PCAOB) has implemented a system of periodic independent inspections of audit firms in the U.S. The purpose of these inspections is to improve audit quality (U.S. Congress, 2002). Whether this can be achieved depends on the extent to which the inspection process triggers changes in auditor behavior. While findings of prior studies mainly relate to changes in financial reporting quality (Carcello et al., 2008) or total audit fees at the audit firm level (Lennox, 2009), this study is the first to examine the impact of inspections on audit fees at the client level. More specifically, using fees as a measure of effort, I investigate to what extent inspections cause a change in auditor effort. Provided that inspector's and investor's quality standards are aligned, increases in auditor effort indicate improvements in audit quality. The insights obtained help to evaluate the costs and benefits of the inspection process. They can be useful to regulators and oversight bodies in setting guidelines regarding the future development of auditor review systems and the implementation of newly established systems in other countries.

The PCAOB inspection process generates a publicly visible report that contains information about each audit firm. Discovered audit deficiencies can lead to a change in the auditor's incentive structure for two reasons. First, an auditor's reputation can be harmed, and second, regulatory sanctions and penalties can follow. I argue that auditors update their assessment of inspectors' view on the appropriateness of the chosen audit effort and the likelihood of reputation damage and penalties as a result of the inspection. In response to

these updated beliefs, auditors are likely to increase effort in areas that were criticized by inspectors (hereafter referred to as insufficient effort).

Especially in face of fee pressure, audit firms are tempted to provide low cost audits which forces auditors to cut back on audit effort. I expect fee pressure to be higher for clients with a low demand for audit quality as they use fees as the main selection criterion. Also, competition leads to fee pressure, provided that audit firms have difficulties differentiating themselves based on audit quality ex-ante (Fiolleau et al., 2009). In both cases, firms are pressured to offer a low fee in the bidding process to obtain engagements and the auditor sees himself forced to cut back on audit procedures to stay within the planned audit cost. Hence, the likelihood of providing insufficient audit effort increases. Accordingly, effort adjustments are expected to be largest in those settings of high fee pressure. Audit firms have certain flexibility in adjusting effort due to excess capacity, shifts from non-public clients, hiring of new employees, and more work done by existing team members. Given the assumption that the market for audit services is competitive, adjustments in audit effort are reflected in audit fees.

To what extent deficiencies mentioned in the inspection report present a sufficient incentive for the auditor to adjust effort is uncertain for several reasons. First of all, there has been extensive criticism of the inspectors' technical and in-depth expertise (Glover et al., 2009). It takes an extended period of time before the inspection results get published (Offermanns and Peek, 2010), the identity of the inspected clients remains unknown, and the high quality Big4 audit firms have repeatedly received deficient inspection reports in the US. Thus, the inspection result is unlikely to be perceived as signal of an audit firm's overall audit quality. Also, it is uncertain to what extent the PCAOB will use its discretion in imposing sanctions on audit firms. If the pressure of the PCAOB is sufficiently large, audit effort and

fees are expected to rise for clients of deficient firms, and particularly under conditions of high pre-inspection fee pressure.

I examine residual audit fees in a cross-section of 1,302 client-year observations of triennially inspected audit firms over the period 2003-2009. Abnormal audit fees of deficient auditors' clients increase significantly from the period prior to the inspection to the period following the inspection (hereafter referred to as pre- and post-inspection), while abnormal fees of clients of non-deficient audit firms are not significantly different in the two periods. I further find that the change in abnormal fees increases with competition faced by the client's auditor prior to the inspection and decreases with the client's demand for audit quality prior to the inspection. The fee increase for clients of deficient audit firms holds when using an alternative measure of abnormal fees incorporating a prediction interval instead of a point prediction and when using alternative design specifications. Also, I investigate employee changes and find that deficient audit firms are associated with an increase in the number of professionals.

Overall, in spite of publicly voiced doubts regarding any effects of PCAOB inspections, there is evidence of changes in audit firm behavior. I find that the inspections lead to an overall increase in audit fees for clients of deficient audit firms while controlling for client characteristics and a trend in time. I further find that fee increases occur specifically in those settings where high fee pressure might have compromised audit quality. At the same time, deficient audit firms are associated with an increase in the number of professionals employed. These results suggest that deficient audit firms react to inspections by increasing audit effort. If investors and inspectors apply similar standards of audit quality, identified deficiencies relate predominantly to cases of effort below quality standards and the inspection process helps to improve audit quality. If, however, the additional work required by inspectors

does not lead to a reduction in audit risk that is worth the increase in fee from an investor's point of view, the change in audit firm behavior caused by the inspection process may not be in the best interest of investors.

The remainder of the paper proceeds as follows. The next section describes prior literature on the effects of PCAOB inspections. Afterwards, testable hypotheses are developed. The methodology used to test the hypotheses is reported in the subsequent section, which is followed by a discussion of the results. Finally, conclusions and limitations are provided.

II. INSPECTIONS – BACKGROUND AND PRIOR LITERATURE

As of 2004, the PCAOB conducts full annual inspections of audit firms that provide audit reports for more than 100 issuers and triennial inspections of the remaining smaller audit firms (hereafter referred to as small audit firms). Along with the evaluation of an audit firm's quality control policies and procedures, the inspection process involves a review of selected audits of issuers, which are selected based on characteristics of the issuer, its industry, practice office, partner, or prior inspection results (PCAOB, 2009). The result of the inspection process is publicly disclosed by means of an inspection report for each audit firm. While not disclosing the identity of inspected clients, the inspection report contains information about detected engagement-specific deficiencies and the existence of quality control deficiencies. Details about quality control deficiencies are only published, however, if the audit firm does not address the PCAOB's concerns sufficiently within a one-year period. In the course of this paper, I use the term deficient for inspection reports that contain one or more deficiencies.

Prior research has investigated the potential impact of PCAOB inspections on audit quality in three different ways. From a conceptual point of view, researchers and practitioners have stated arguments for and against the capability of the inspection process to identify audit deficiencies and improve audit quality. Some expect to see quality improvements due to independent and objective inspection personnel with complete access to client documentation, and more resources at their disposal than under the peer review system (Carcello et al., 2008, Gunny and Zhang, 2009, Francis, 2004). Others criticize the inspection process because of limited staff and expertise, inadequate transparency of procedures and inspection outcomes, and slow timing of feedback (Lennox, 2009, Glover et al., 2009, Hodowanitz and Solieri, 2005, Palmrose, 2005, Newman and Oliverio, 2009). In addition to the conceptual discussion, more studies are emerging that address the issue empirically.

A number of studies examine the association between inspection outcomes and indicators of audit quality. Clients of audit firms with deficiencies discovered during the inspection process display higher levels of abnormal accruals (Gunny and Zhang, 2009, Van de Poel et al., 2009) and deficient audit firms charge lower audit fees (Lennox, 2009). In contrast, Gunny, Krishnan, and Zhang (2007) find that engagement-specific deficiencies are positively associated with abnormal audit fees and total fees for non-Big4 auditors. Furthermore, clients of auditors with deficiencies are not more likely to meet analyst forecasts and the available evidence is inconclusive on whether they are less likely to receive a going-concern opinion (Gramling et al., 2008, Gunny and Zhang, 2009). Also, the Big4 audit firms, which are usually associated with high quality audits, have been associated with deficiencies in all inspection rounds. Thus, evidence on the ability of the inspections to identify high and low quality audit firms is mixed¹. Hence, it remains an open question to what extent the

¹ While the PCAOB specifically considers engagement-specific quality, the selected engagements might still be representative of all of the audit firm's engagements and deficiencies in the audit procedures might recur for

inspection outcome provides a sufficient threat to reputation that triggers changes in audit firm behavior.

Preliminary assessments of the inspection process' impact on audit firms are derived from audit firm reactions to inspection activity. Findings show that negative inspection outcomes for small audit firms have resulted in deregistration with the PCAOB (Daugherty et al., 2009a, Read et al., 2004) and that audit firms without public clients have voluntarily registered with the PCAOB in order to signal audit quality (Read et al., 2004). These support the notion that PCAOB oversight and inspections are effective. On the other hand, surveyed small audit firms do not see an improvement in audit quality or public confidence in the audit profession resulting from the inspection process (Daugherty and Tervo, 2009b). Audit firm's written replies to inspection reports provide some indication that certain firms react to deficient audit reports by improving their audit process. However, they also indicate that either some of the PCAOB criticism is not valid or not all audit firms are willing to improve audit quality by changing their audit procedures (Jessup and Young, 2009).

Prior research regarding the inspection process' impact on audit quality indicates that absolute abnormal accruals decrease following inspections irrespective of the inspection result (Carcello et al., 2008), and that overall fees of small audit firms with identified audit deficiencies stay lower compared to non-deficient firms following the inspection (Lennox, 2009). In sum, it remains unclear whether the inspection outcome prompts audit firms to improve audit quality. In order to gain knowledge on the effectiveness of the inspection process, this study examines to what extent changes in audit fees are observable following the inspection and whether they are associated with inspection outcomes.

other clients. Also, deficiencies in the audit firm's quality control policies and procedures are likely to affect all clients.

III. THEORY AND HYPOTHESIS DEVELOPMENT

Audit firms with a deficient inspection result were judged to have supplied audits with effort below inspectors' quality standards (insufficient effort). According to the PCAOB, deficient audit firms did not "obtain sufficient competent evidential matter to support its audit opinion" (2009). As shown by Causholli et al. (2010), the provision of insufficient effort can occur when clients are unable to observe the exact quality of their audit and when the expected losses from the provision of insufficient effort are sufficiently small. Audit fees are observable and provide some indication of the effort conducted by the auditor. However, due to the credence good attributes of an audit, the level of effort needed to achieve a minimum standard of audit quality for the particular client remains fairly unknown to external parties and the client. For that reason, independent inspections are designed to check whether the amount of effort provided is in accordance with quality standards.

The auditor determines the level of effort supplied at each audit based on risk factors and reputation concerns (Schelleman and Knechel, 2010, Stefaniak and Houston, 2009, Hay et al., 2006, Nelson, 2006, Lyon and Maher, 2005, Larcker and Richardson, 2004, Seetharaman et al., 2002, Reynolds and Francis, 2001, Johnstone and Bedard, 2003). The detection of deficiencies by the PCAOB inspectors may cause a change in the auditor's assessment of expected losses from insufficient effort and may therefore lead to a change in auditor behavior.

Expected losses can arise from loss of clients and from regulatory penalties. Offermanns and Peek (2010) show that the inspection reports are informative to investors and are associated with changes in perceived uncertainty about financial reporting quality. Moreover, client firms with effective audit committees or with high potential agency conflicts are more likely to switch to an auditor without GAAP-related deficiencies (Abbott et al.,

2008). On the other hand, inspection reports are not intended to be a signal of an audit firm's overall audit quality due to the non-random selection of engagements and topics for review. Also, Lennox and Pittman (2009) find no evidence of a change in audit firm's market share as a result of deficient inspection results. Thus, the threat from client switching behavior in response to the deficiencies mentioned in the inspection report might be limited.

Even though clients might not switch after a deficient report, the PCAOB is authorized to conduct disciplinary proceedings, impose sanctions, and communicate inspection results to regulatory and law enforcement agencies (Farrell and Shadab, 2004, Wegman, 2006, Gunny and Zhang, 2009). In fact, the PCAOB has demonstrated its preparedness to impose sanctions for violations of standards in connection with inspections in several cases by revoking the registration of audit firms and censuring, suspending, and barring auditors (PCAOB, 2011, Gilbertson and Herron, 2009). Moreover, audit firms also have an incentive to prevent publication of detected quality control deficiencies. These are only published when not addressed properly by the firm within a year and might be associated with harmful client losses given that these deficiencies apply to the audit firm as opposed to selected engagements. Overall, detected deficiencies raise the probability that sanctions and penalties are imposed, thus causing a likely change in the expected losses faced by the auditor².

In response to the change in expected losses, auditors will address the issues criticized by inspectors to prevent sanctions and penalties and to rebuild their reputation³. The audit

² While the threat of an inspection provides an ex-ante incentive for auditors to change their behavior, there was a high level of uncertainty surrounding the type of clients to be inspected, the kind of issues to be addressed, and the strictness of inspectors. Hence, anticipation of issues likely to be criticized is difficult prior to inspection, and especially prior to the first inspection round.

³ Alternatively, the auditor may charge a fee premium to cover expected future losses (cf. Simunic and Stein, 1996) which will also affect audit fees, but this is unlikely to satisfy inspectors. For that reason, an increase in effort is the straightforward way to address the deficiency and avoid a deficient inspection result in the second round.

production process comprises technology and effort as fixed and variable factors of production, respectively (Sirois and Simunic, 2010). Even though advances in audit technology have rendered auditing less labor intensive (Elliott, 1998), human resource compensation still is the major part of audit fees (Texas Society of Certified Public Accountants, 2000). Audit firms have flexibility in adjusting human resource inputs as a result of excess capacity, shifts from non-public clients, and new employee hires. Firms can thus alter audit effort by assigning more or better experienced personnel to a client's team, or let the existing team members conduct more work. In any case, fees will increase as extra hours or more expensive hours are billed to the client.

Using fees as a proxy for effort is based on the assumption that the market for audit services is competitive (Craswell et al., 1995, Simunic, 1980, Elliott, 1998). In fact, prior studies confirm that especially the market for smaller audit firms is highly fragmented and competitive (GAO, 2008, Sirois and Simunic, 2010). Competition implies that fee changes are mainly caused by changes in costs rather than profit margin. Prior evidence corroborates that fees are reflective of audit effort (Menon and Williams, 2001, Davis and Ricchiute, 1993, Schelleman and Knechel, 2010, Simunic and Stein, 1996, Bell et al., 2001).

To the extent that audit firms have idle capacity or can expand their human resource levels, they will increase effort and thus fees following the receipt of a deficient inspection report⁴. Fee raises by auditors associated with a deficient inspection result which could possibly be perceived as signal of low quality are feasible in face of competition for a number of reasons. First, a deficient inspection report does not necessarily imply inferior audit quality for all audit engagements of an audit firm. Second, the inspection gives audit firms a

⁴ While efficiency improvements are also possible, this would work against finding a change in abnormal audit fees.

convincing argument for fee increases when having the annual meeting with the audit committee to determine current year's audit fees. Third, clients with deficient audits likely accept fee rises since they are unlikely to get a lower fee at another audit firm. A client with a once deemed deficient audit is likely to remain within the inspector's focus. The potential new audit firm, being informed by the old auditor about the fact that the audit was deemed deficient by inspectors, is thus unlikely to risk the provision of a deficient audit in the next inspection round. Furthermore, client's switching costs deter switches as long as the benefit of switching does not exceed its cost.

Thus, firms with detected audit deficiencies are expected to respond by making adjustments to fees⁵. Hence, I state the main hypothesis as follows:

H1: Clients of deficient audit firms are associated with higher increases in audit fees from pre- to post-inspection than clients of non-deficient audit firms.

While inspectors' quality standards for raising deficiencies are unknown, deficiencies related to low audit effort rather than differential interpretation of auditing standards are likely to occur predominantly under certain conditions⁶. Fee pressure can lead to deficient audits when audit firms are pressured to offer a low fee in the bidding process to obtain engagements. All other things equal, the lower the fees the lower the amount of effort compensated. With fee pressure, there is a smaller time budget and higher reluctance to request for additional audit hours, which forces the auditor to cut back on audit procedures to

⁵ As part of the inspection process, all inspected audit firms may get comments from inspectors about audit procedures that need improvement but only the serious deficiencies are publicly disclosed in the inspection report. The inspectors are likely to specifically investigate areas of prior deficiencies in the following inspection round. Hence, both clean and deficient auditors are likely to address certain comments and increase effort as a result of the inspection process. As the audit firms with deficient inspection results need to address more severe deficiencies and experience higher pressure due to the publicity of the deficiencies, they are likely to make larger adjustments to effort.

⁶ I expect substandard effort due to human error to be distributed randomly across clients.

stay within the planned audit cost. Fee pressure can lead to reductions in quality of audit staff, fewer budgeted hours, less substantive tests of details, more reliance on internal audit departments of questionable quality, acceptance of doubtful evidence, inadequate samples, and thus more lenient reporting (Imhoff Jr, 2003, Houston, 1999, Gramling, 1999, Coram et al., 2004, Koch et al., 2011). Hence, the likelihood of deficient audits increases in settings of high fee pressure. I identify two drivers of fee pressure based on supply and demand characteristics.

Higher levels of competition are associated with lower fees (Maher et al., 1992, Sanders et al., 1995) and can even lead to reductions in audit quality under certain conditions (Chaney et al., 2003). As explained by Fiolleau et al. (2009), it is hard for the audit firm to differentiate itself from its competitors ex-ante and thus the firm with the lowest price often wins the job even though the client uses quality as selection criteria. Hence, fee pressure and thus the extent to which effort lags below inspector's standards likely increases with the level of competition faced by the auditor. Thus, deficient firms that face high competition are expected to be associated with higher increases in audit fees following the inspection, leading to the following hypothesis.

H2a: The difference between clean and deficient audit firms' increase in clients' abnormal audit fees increases with the degree of competition faced prior to the inspection.

A deficient inspection result does not, by definition, indicate substandard audit performance on all of an audit firm's clients. Next to supply effects, also demand effects can cause fee pressure. The auditor is needed to provide an independent assessment of the accuracy of accounting information. The larger the information asymmetry between the firm and outside providers of financing, the higher the value attached to the external auditor. Prior studies have identified agency cost and associated signaling needs as drivers of demand for

high quality auditors (Watts and Zimmerman, 1983, Francis and Wilson, 1988, DeFond, 1992, Knechel et al., 2008, Hope et al., 2011). Variation in the client-specific inherent demand for audit quality leads to different priorities in the auditor selection process. Clients with low demand for audit quality are required to be audited by law but do not find the audit to be of much value. Since they do not value audit quality, they prioritize low audit fees as the major selection criterion when choosing an auditor. The audit firm that wants to win the client needs to offer a lower fee than the competing auditors. Thus, fee pressure and consequently the extent to which procedures lie below inspector's quality standards is likely to be higher for clients with low demand for audit quality. As a result, I expect to find the difference in the increases in client fees for clean versus deficient audit firms to be more pronounced for low-demand clients, leading to the following hypothesis:

H2b: The difference between clean and deficient audit firms' increase in clients' abnormal audit fees decreases with the client's demand for audit quality prior to the inspection.

IV. RESEARCH DESIGN

Sample selection

The sample selection is based on the inspection reports for US audit firms available on the PCAOB website by April 2010. I match the inspected audit firms with their respective audit clients in Audit-Analytics and add financial information from Compustat for the financial years 2000 through 2009. The sample thus consists of the observations contained in the intersection of these three data sources⁷. All observations with zero audit fees, with missing

⁷ As Audit-Analytics neither contains all inspected audit firms nor the full set of an audit firm's clients, it is not possible to match the inspected audit firms with all of their clients. Furthermore, information is incomplete for

data, or categorized within the Financials (SIC codes 6000-6700) or Utilities (SIC codes 4000-4900) industries are removed. Further, I exclude annually inspected audit firms as they represent a different segment of the audit market without variation in inspection results and with a deviating inspection cycle. To ensure proper representation of client firms in all time periods, I keep only auditor-client combinations with at least one financial year-end following the first inspection, at least one financial year-end between 2003 and the start of the first inspection, and at least one financial year-end in the period between 2000 and 2002. As the audit firms are likely to make adjustments in their procedures and effort allocations at some point between the first and the second inspection, I include all client financial year-ends following the first inspection and prior to the start of the second inspection. This yields a final sample of 1,777 client-year observations for 288 clients and 139 audit firms associated with inspections conducted between May 2004 and May 2007. Out of these, 475 observations are for the period 2000 through 2002 and 1302 observations for the period 2003 through 2009.

Empirical model

To examine changes in effort and fees in response to PCAOB inspections, it is important to control for changes in underlying client characteristics. Accordingly, I measure abnormal audit fees as the deviation from predicted fees based on client characteristics. I estimate the following pooled audit fee regression model for the years 2000 through 2002 using ordinary least squares regression.

$$\begin{aligned}
 LOGAUDITFEE = & \alpha_0 + \alpha_1 LOGASSETS + \alpha_2 LEVERAGE + \alpha_3 INVREC + \alpha_4 ROA \\
 & + \alpha_5 LOSS + \alpha_6 SEGMENTS + \alpha_7 OPINION + \alpha_8 FOREIGN + \alpha_9 BUSY \\
 & + \alpha_{10} SHORTTENURE + \varepsilon
 \end{aligned} \tag{1}$$

certain client observations due to missing data or missing identifiers for matching the different databases. Because of these reasons, a number of inspection reports are excluded from the analysis.

In this model, LOGAUDITFEE is measured as the natural logarithm of audit fees as reported in Audit-Analytics. The client-specific explanatory variables are selected based on the meta analysis of audit fee studies by Hay et al. (2006) and are measured using data obtained from Compustat. As measure of client size I include LOGASSETS, the natural logarithm of total assets. To account for client risk, I include LEVERAGE, the sum of the company's current and long term debt divided by total assets and INVREC, the sum of Inventory and Receivables scaled by total assets. Indicators of client performance are ROA, measured as net income divided by total assets, and LOSS, a dummy variable for a loss in the current year. Client complexity is measured by SEGMENTS, the number of business segments reported. Additional dummy variables indicative of higher levels of audit effort needed on specific engagements are OPINION, FOREIGN, and BUSY. OPINION equals one when a going-concern opinion is issued as reported in the AuditAnalytics database. FOREIGN equals one whenever foreign income taxes are paid. And BUSY is set to one for audits conducted during the busy season with financial year-ends in December.

I predict audit fees for the years 2003 until 2009 using the coefficients estimated in regression (1), assuming that the coefficients on audit fee drivers remain fixed over time⁸. I obtain the predicted value of LOGAUDITFEE and reverse the log to yield the predicted value of AUDITFEE. I subtract the predicted value from the actual value of AUDITFEE to get abnormal audit fees (ABNFEE), a measure of the audit fee component unexplained by client-specific characteristics. This fee component contain audit-firm specific quality effects such as fee premia for industry specialists (cf. Francis et al., 2005, Craswell et al., 1995, Casterella et

⁸ Even if the coefficients did change, this would only matter for the analysis in case deficient audit firms' clients scored consistently higher than clean audit firms' clients on the fee drivers. To further rule out that the coefficients are not static over time, I run an audit fee model over all years 2000-2009 where the coefficients are allowed to vary in the pre- and post-inspection periods. No fee driver has a significantly different coefficient in the post-inspection period.

al., 2004) and client-specific effects not controlled for in the model. As long as these effects do not change systematically with the inspection outcome, the use of ABNFEE is appropriate to address the question at hand.

The change in abnormal fees is calculated as the difference between ABNFEE for all available pairs of pre- and post-inspection financial year-ends for each client. Financial year-ends after the first day of the inspection period are categorized as post-inspection. This design uses the client firm as its own control. The change in abnormal fees is scaled by the number of years lying between the two observations to obtain an equivalent of a yearly change and is divided by the pre-inspection value of AUDITFEE to achieve a measure of the relative change in abnormal fees (Δ ABNFEE).

In my empirical models I take advantage of the specific timing of the inspections at different dates for different clients over several years. This is illustrated in Figure 1. For all clients of audit firm A1, for example, the pre-inspection period consists of financial year-ends ending before the start of the first inspection in year 2004 while the post-inspection period contains financial year-ends after 2004 and before the second inspection at the beginning of 2007. For all clients of audit firm A3, on the other hand, the pre-inspection period contains all financial year-ends before the start of the first inspection in year 2005 while the post-inspection period includes all financial year-ends after 2005 and before the second inspection at the end of 2008. As the inspections are spread over several years, there is a low chance of an alternative event causing the observed effect. Any alternative event, for example the implementation of a regulatory change, would have to be spread over time in a similar fashion as the inspections to drive the results.

To test the first hypothesis, I regress the change in abnormal fees (Δ ABNFEE) on an indicator for deficient audit firms (DEF), year dummies, and control variables. I control for

higher fees commonly associated with ineffective internal controls (Elder et al., 2009) and compliance with SOX section 404b (cf. Raghunandan and Rama, 2006)⁹. *TO_ICINEF* identifies clients that have effective internal controls in the pre-inspection year and have ineffective internal controls in the post-inspection year. *FROM_ICINEF* identifies clients that change from ineffective to effective internal controls. Similarly, *TO_404b* is a dummy for clients that do not fulfill the size criterion (\$75million market capitalization) for accelerated-filers in the pre-inspection year but have to comply with 404b in the post-inspection year¹⁰. *FROM_404b* identifies clients that fulfill the size criterion in the pre-inspection year but do not in the post-inspection year. Hence, I estimate the following regression model:

$$\Delta ABNFEE = \alpha_0 + \alpha_1 DEF + \alpha_2 TO_ICINEF + \alpha_3 FROM_ICINEF + \alpha_4 TO_404b + \alpha_5 FROM_404b + \alpha_j YEAR_j + \varepsilon \quad (2)$$

I expect the coefficient for *DEF* (α_1) to be significantly negative if inspections cause deficient audit firms to increase fees more than clean audit firms.

For testing the second hypothesis I use a measure of competition faced by the audit firm prior to the inspection. Following Kallapur et al. (2010), I calculate a measure of local audit market concentration as the Herfindahl index of small audit firms at the city (Metropolitan statistical area) level for each year. I follow the U.S. Census Bureau's definition of Metropolitan statistical areas (MSAs) as defined in OMB Bulletin No. 10-02 (2009). As small audit firms cannot effectively compete with large audit firms for large

⁹ It is not possible to control for these aspects in the fee prediction model as no data on internal controls was available prior to SOX in 2002.

¹⁰ A company is an accelerated filer if it has aggregate market value of voting and nonvoting common equity held by non-affiliates of \$75 million or more as of the last business day of the issuer's most recently completed second fiscal quarter. A company exits the accelerated filer status if it has aggregate market value of voting and nonvoting common equity held by non-affiliates of \$50 million or less as of the last business day of the issuer's most recently completed second fiscal quarter. Due to the unavailability of free-float data for the sample I approximate the size criteria by using total market capitalization at financial year-end.

clients, I define the audit market based on all clients smaller or equal in size (total assets) to the largest client of a small audit firm (Kallapur et al., 2010). The Herfindahl index is defined as follows:

$$H = \sum_{i=1}^N [s_i / S]^2 \quad (3)$$

where N is the total number of small audit firms in the MSA, s_i is the size of the audit firm I measured by number of clients, and S is the total size of the audit market in the MSA. I report sensitivity of results to alternative specifications of the Herfindahl index based on aggregate size of client firm's assets and fees and to an alternative definition of the audit market consisting of clients of small audit firms only. COMPETITION is measured as the median_scaled Herfindahl index multiplied by minus one to allow for easier interpretation. Higher values for COMPETITION indicate lower levels of concentration and thus higher levels of competition in the local market.

I test hypothesis two by regressing the change in abnormal fees on DEF, COMPETITION, and the interaction term DEFxCOMPETITION. As in model (2), I control for a time trend in audit fees and changes in fees related to ineffective internal controls and compliance with section 404b.

$$\begin{aligned} \Delta ABNFEE = & \alpha_0 + \alpha_1 DEF + \alpha_2 COMPETITION + \alpha_3 DEFxCOMPETITION \\ & + \alpha_4 TO_ICINEF + \alpha_5 FROM_ICINEF + \alpha_6 TO_404b + \alpha_7 FROM_404 + \alpha_j YEAR_j + \varepsilon \end{aligned} \quad (4)$$

I expect a significantly positive value for α_3 if the change in abnormal fees is larger for deficient firms that have faced intense competition in the pre-inspection period.

A test of the third hypothesis is obtained by regressing the change in abnormal fees on DEF, the indicator for clients of audit firms with deficiencies, LOWDEM, a dummy that

identifies high-demand clients, and on the interaction of the two (DEFxLOWDEM). The demand for audit quality is driven by the desire to attain a lower cost of capital in financing as the auditor improves the quality of financial statements and disclosures and reduces agency costs by monitoring (Hay and Davis, 2004). Improved financial statement information reduces the risk to investors (Botosan, 1997). The audit can also serve as organizational control mechanism in companies with increasing levels of hierarchy (Abdel-Khalik, 1993). Following prior literature (Healy, 1985, Firth and Smith, 1992, DeFond, 1992, Abbott et al., 2008, Knechel et al., 2008, Hay and Davis, 2004), I identify clients with low demand for audit quality based on a number of criteria. Company size (total assets) is associated with unobservability of management's action and loss of organizational control. Higher levels of leverage are associated with agency conflicts between creditors and shareholders because of the potential transfer of wealth and with creditor's demand for reliable financial statement information for enforcement of debt covenants. Higher percentages of short-term accruals (inventory, receivables, and payables as percentage of total assets) indicate higher vulnerability to manipulation and transactional complexity, both increasing the need for high reliability of financial reports. And growth in sales is associated with increased complexity as well as potential loss of organizational control.

Hence, LOWDEM is one whenever a client falls into less than two out of the following four categories prior to the inspection: the upper five deciles of (1) leverage, (2) total assets, (3) inventory, receivables, and payables as percentage of assets, and (4) yearly percentage growth in sales. Again, I control for a time trend in audit fees and changes in fees related to ineffective internal controls and compliance with section 404b.

$$\Delta ABNFEE = \alpha_0 + \alpha_1 DEF + \alpha_2 LOWDEM + \alpha_3 DEF \times LOWDEM + \alpha_4 TO_ICINEF + \alpha_5 FROM_ICINEF + \alpha_6 TO_404b + \alpha_7 FROM_404 + \alpha_j YEAR_j + \varepsilon \quad (5)$$

I report sensitivity of results to a more refined measure including a fifth category, the percentage of shares held by ordinary investors (freefloat). Higher proportions of free float indicate lower holdings of company officers, directors and controlling-interest investors as well as related institutional investors controlled by directors or executives. As ordinary shareholders do not have access to inside information and require reliable financial statement information, a higher proportion of free float is associated with higher demand for audit quality. As the use of free float reduces the number of observations considerably due to data availability I refrain from using it in the main analysis.

RESULTS

Descriptives and audit fee model

Panel A of Table 1 provides an overview of the sample characteristics for the estimation period 2000-2002. All continuous variables are winsorized at 5% and 95%. Audit fees paid by the clients lie between \$19,307 and \$330,000 with a mean of \$72,430. The average client in the period has total assets of slightly less than \$21.2 million with inventory and receivables representing 29 percent of that amount. Average leverage lies at 51 percent and average ROA at -0.91^{11} . The average client reports one business segment. Overall, 64 percent of the observations are loss-making, 32 percent receive going-concern opinions, and 7 percent report foreign income. Moreover, 64 percent of the audits are conducted during busy season in December and 62 percent of the engagements have had the same auditor for three years or less. Also, 85 percent of the audits are conducted by audit firms with deficiencies.

¹¹ The high negative value for ROA is likely to be partly driven by the financial crisis. Gunny et al. (2007) find a mean negative ROA and a high fraction of loss firms in a comparable sample for the period 2005-2007.

(Insert Table 1 about here)

Panel B of Table 1 shows the estimation results of the audit fee model for the years 2000 until 2002¹². The model based on 475 observations explains 45 percent of the variation in audit fees. I focus the discussion of results on the significant coefficients, all of which are in the direction commonly found in prior literature (Hay et al., 2006). LOGASSETS has a significantly positive coefficient of 0.333 ($p < 0.01$) indicating that larger clients pay higher fees. ROA attains a significantly negative coefficient of -0.116 ($p < 0.01$), which shows that clients with lower profitability are associated with higher audit fees. SEGMENTS has a significantly positive coefficient of 0.094 ($p < 0.01$) as more complex clients pay higher audit fees. Moreover, the significantly positive coefficients on FOREIGN (0.192, $p < 0.05$) and BUSY (0.103, $p < 0.05$) indicate that higher audit fees are charged to clients with operations in foreign countries and with audits conducted during busy season.

Table 2 lists descriptive statistics for the period 2003-2009. The sample contains 139 audit firms. Out of those, 109 auditors have deficiencies while 30 auditors are without detected deficiencies. The number of clients per audit firm varies between one and seventeen clients with an average of five clients. Mean audit fees of \$104,065 are higher than during the estimation period. The average client is larger, with mean total assets of \$27.5 million, slightly more profitable as shown by average ROA of -0.85¹³ and reports more business segments. Also, auditor tenure is higher as only 7% percent of the engagements have had the

¹² When adding DEF as additional indicator variable, it remains insignificant and the main results are unchanged. Hence, deficient firms do not charge significantly different fees in the estimation period when controlling for client characteristics.

¹³ The high negative value for ROA is likely to be partly driven by the financial crisis. Gunny et al. (2007) find a mean negative ROA and a high fraction of loss firms in a comparable sample for the period 2005-2007.

same auditor for three years or less¹⁴. The average client has sales growth of 23 percent, has short term accruals that amount to 50 percent of total assets, and has 74 percent of shares held by ordinary investors. Panel B compares clients of deficient and clean audit firms. Deficient audit firms have more clients and clients of deficient audit firms pay significantly higher fees, have more assets and report more segments.

Untabulated results reveal that prior to the inspection, deficient firm's clients with low demand for audit quality have lower audit fees than clients with high demand for audit quality while client firm's high- and low- demand clients do not have significantly different fees. This provides an initial indication that deficient audit firms were giving in to fee pressure of low demand clients prior to the inspection. Given these characteristics, I address the impact of inspections on fees by examining changes in abnormal fees that control for the underlying client characteristics.

(Insert Table 2 about here)

Table 3 provides an overview of abnormal audit fees (ABNFEE) for the years 2003-2009¹⁵. The table shows mean abnormal fees for clean and deficient audit firms pre- and post-inspection. Mean abnormal fees of clients of clean and deficient audit firms do not differ significantly pre-inspection. Abnormal fees of deficient audit firms increase more from pre- to post- inspection such that clients of deficient firms have significantly higher abnormal fees compared to clients of clean audit firms following the inspection. This is consistent with the argument that audit firms deemed deficient by inspectors take action following the inspection.

¹⁴ This is driven by the sample selection procedure that requires clients to have the same auditor already during the estimation period.

¹⁵ The fact that average abnormal audit fees are positive in all four categories can be explained by the general increase in fees in the post-SOX period while the prediction is based on coefficients from a pre-Sox model. To make sure this does not drive the results, the analysis of fee changes uses the client's post-Sox abnormal fees as control.

(Insert Table 3 about here)

Multivariate results

Panel A of Table 4 shows the results of the regressions used to test the three hypotheses. All models use the change in abnormal audit fees (ΔABNFEE), hereafter referred to as change in fees, as dependent variable. The regression in column (I) contains 1,430 observations and yields an R-square of seven percent. DEF has a significantly positive coefficient of 0.141 ($p < 0.01$) indicating that fees of deficient firms increase significantly more than fees of non-deficient firms following the inspection. This provides support for the first hypothesis. The significantly positive coefficient on TO_ICINEF (0.423, $p < 0.01$) shows, as expected, that fees increase for clients with ineffective internal controls. Also, the significantly positive coefficient on TO_404b (0.151, $p < 0.05$) indicates a fee increase whenever the auditor needs to give an opinion on the effectiveness of internal controls. Moreover, the year dummies are insignificant. To what extent the change in fees for deficient audit firms is predominantly observed under conditions of fee pressure is addressed in the following section.

(Insert Table 4 about here)

Column (II) of Panel A shows the test of hypothesis two. DEF yields a significant positive coefficient of 0.165 ($p < 0.01$). While COMPETITION itself is not significant, the interaction term DEFxCOMPETITION is significant with a coefficient of 0.398 ($p < 0.05$). The coefficients for the control variables obtain similar values as in regression (I).

Panel B provides further insights regarding the interpretation of the interaction terms. As shown by the effect for CLEAN (0.065, n.s.), clients of clean audit firms that faced the median level of competition prior to the inspection are not associated with fee increases. Moreover, there is no variation in fee increase for clients of clean audit firms depending on

the level of competition since the effect for COMPETITION CLEAN is insignificant (-0.063, n.s.). In contrast, at the median value of competition, clients of deficient firms are associated with fee increases following the inspection as shown by the value for DEF (0.230, $p < 0.01$). The size of the fee change for clients of deficient audit firms increases with rising levels of competition (0.335, $p < 0.01$) faced by the audit firm prior to the inspection. Thus, the difference between clean and deficient firm's fee increases gets more pronounced with competitive fee pressure. This provides support for hypothesis two.

I test the sensitivity of the results to alternative specifications of the COMPETITION variable. Basing the Herfindahl index on aggregate size of client firm's assets or fees yields coefficients similar in magnitude, but the t-statistics of the interaction terms remain below significance levels. Defining the audit market as consisting of only small audit firms' clients confirms the support for hypothesis one based on all three specifications of the Herfindahl index (aggregate number of clients, assets, or fees).

Column (III) of Panel A shows the test of hypothesis three. The intercept of 0.191 ($p < 0.05$) represents the change in fees for clean audit firm clients with high demand for audit quality. To interpret the coefficients for DEF (0.032, n.s.), LOWDEM (-0.178, $p < 0.05$) and DEFxLOWDEM (0.231, $p < 0.05$), I refer to the effect sizes displayed in Panel B. A significant fee increase is observable for high-demand clients of both clean and deficient audit firms as shown by the significant effect sizes in the two categories HIGHDEM CLEAN and HIGHDEM DEF. While fees do not increase significantly for low-demand clients of clean audit firms, fees increase significantly for low-demand clients of deficient audit firms. Hence, the results indicate that the difference in the increase in fees observed for clean and deficient audit firms is stronger for clients with low demand for audit quality. The significant interaction term DEFxLOWDEM provides support for hypothesis three. As I expect

insufficient effort to occur with higher probability for clients with low demand for audit quality, this suggests that audit firms' fee raises in response to inspectors' criticism are reflective of increases in effort.

An alternative specification of the LOWDEM variable uses the upper five deciles of free float as fifth category for identifying clients with high demand for audit quality. With a reduced number of 808 observations, the main effect of LOWDEM is not significant any longer but the interaction effect DEFxLOWDEM remains significantly positive, confirming the support for hypothesis three. The results also obtain when excluding total assets from the definition of LOWDEM to make sure the effect is not mainly driven by size.

Overall, the results indicate that deficient audit firms increase their fees significantly following the inspection while larger increases are observable in settings of fee pressure caused by competition or low demand for audit quality. The yearly increase in abnormal fees for deficient audit firms relative to the prior level of audit fees is comparable in magnitude to the increase due to compliance with section 404b for the firms in the sample.

ADDITIONAL TESTS

Personnel adjustments

To provide further evidence that the observed fee increases are reflective of increases in effort, I examine changes in human resources for a subset of audit firms. Public Accounting Report publishes a yearly list of the top 100 public accounting firms in the US with information on the number of partners (PARTNERS) and professionals (PROFESSIONALS) working for the firm. I analyze changes in the number of employees using the twenty audit firms in my dataset that are included in any of the top 100 lists for the years 2004 until 2008.

To calculate the change in professionals (Δ PROFESSIONALS) for each audit firm, I take the difference between the pre- and post- values of PROFESSIONALS for each available pair of pre- and post-inspection financial year-ends for every audit firm. By means of this design, I use the audit firm as its own control. The change in professionals is scaled by the number of years lying between the two observations to obtain an equivalent of a yearly change and is divided by the pre-inspection value of PROFESSIONALS to achieve a measure of the relative change in professionals. The same procedure is followed to obtain Δ PARTNERS.

I regress both measures of change in audit firm employees on an indicator variable for deficient audit firms (DEF) and a number of control variables as shown below. I control for employee changes due to changes in audit firm growth and changes in the client portfolio as measured by the change in revenue (Δ REVENUE) and the change in the number of clients (Δ CLIENTS). If deficient firms react to inspections by adjusting effort they likely need to increase their human resource capacity by hiring additional employees. A significantly positive coefficient on DEF indicates that deficient audit firms are associated with an increase in professionals or partners, respectively that is not related to a growth in audit fees or the number of clients. Hence, I estimate the following regression equations.

$$\begin{aligned}\Delta\text{PROFESSIONALS} &= \alpha_0 + \alpha_1\text{DEF} + \alpha_2\Delta\text{REVENUE} + \alpha_3\Delta\text{CLIENTS} + \alpha_j\text{YEAR}_j + \varepsilon \\ \Delta\text{PARTNERS} &= \alpha_0 + \alpha_1\text{DEF} + \alpha_2\Delta\text{REVENUE} + \alpha_3\Delta\text{CLIENTS} + \alpha_j\text{YEAR}_j + \varepsilon\end{aligned}\quad (6\&7)$$

The results displayed in Table 4 reveal that both professional and partner changes are strongly related to the change in revenue (0.627, $p < 0.01$ and 1.258, $p < 0.05$) while being unrelated to the change in the number of clients. DEF has a significantly positive coefficient of 0.084 ($p < 0.05$) in the first regression with Δ PROFESSIONALS as the dependent variable,

while being insignificant in the second regression with Δ PARTNERS as the dependent variable. The results suggest that deficient audit firms hire additional professionals following the inspection.

(Insert Table 5 about here)

Fees outside the prediction interval

To make sure that the results are not driven by design choices, I conduct a number of additional tests to confirm the results of the main hypothesis. When generating an individual point prediction of fees, one needs to acknowledge that the prediction is associated with uncertainty due to random disturbance and the use of estimated regression coefficients from a sample (Neter et al., 1983). The uncertainty can be incorporated by creating a confidence interval around the predicted value. While actual fees might deviate from the point prediction of fees, they might still lie within the prediction interval. This section contains an additional test to check whether the results still hold when using a more conservative measure of abnormal fees based on the prediction interval around the point prediction of fees rather than the point prediction itself.

I generate the alternative measure of abnormal fees outside the prediction interval (ABNFEE2) by subtracting the border value of the 95 percent prediction interval from all audit fee values outside the prediction interval. Audit fee values that lie within the prediction interval are set to zero. The upper border of the prediction interval gets subtracted from all audit fee values above it and the lower border of the prediction interval gets subtracted from all audit fee values below. The change in abnormal fees (Δ ABNFEE2) is calculated as the difference between available year-observations pre- and post-inspection scaled by the number of years that lie between them. Δ ABNFEE2 is winsorized at 1% and at 99%.

I regress $\Delta ABNFEE2$ on indicator variables for deficient audit firms (DEF) and control for fee changes associated with ineffective internal control opinions and compliance with 404b. Year dummies are included to control for a trend in time. This results in the following regression model.

$$\begin{aligned} \Delta ABNFEE2 = & \alpha_0 + \alpha_1 DEF + \alpha_2 TO_ICINEF + \alpha_3 FROM_ICINEF \\ & + \alpha_4 TO_404b + \alpha_5 FROM_404b + \alpha_j YEAR_j + \varepsilon \end{aligned} \quad (8)$$

The results displayed in Table 6 confirm the prior conclusions. DEF has a significantly positive coefficient indicating that clients of deficient firms are associated with larger fee increases. Thus, the pattern of higher abnormal fees for deficient firms in the post-inspection period recurs also with the more conservative measure of abnormal fees.

(Insert Table 6 about here)

Post-Sox model of biannual fee changes

As the estimation period for the fee model is prior to SOX, it is possible that the coefficients of the prediction model do not truly reflect the post-SOX fee relationship. Even though I include control variables for the two major effects on audit fees (ICINEF and 404b) in the prior regression models, I also test a model of biannual audit fee changes as off 2003 to address this issue. However, as it is not clear whether a two-year period gives audit firms appropriate time to implement changes following the inspection, the alternative specification of the test used in the main analysis is still preferred. I create a measure of the biannual change in the natural logarithm of audit fees ($\Delta LAUDITFEE$). $\Delta LAUDITFEE$ is regressed on an indicator variable for clients of deficient audit firms (DEF), an indicator variable for changes over an inspection (INSPECTION), the interaction $DEF \times INSPECTION$, controls for the changes in the underlying client characteristics used in model (1), and the control

variables used in model (2). The results are displayed in table 7. While audit fee changes of both clean and deficient firms' clients are positive in general, clients of clean firms are associated with a smaller increase over the inspection as indicated by the coefficient on INSPECTION (-0.012, $p < 0.05$). Clients of deficient firms, on the other hand, are associated with a larger increase over the inspection, as shown by the interaction coefficient INSPECTION*DEF (0.015, $p < 0.05$). The results again confirm hypothesis one.

(Insert Table 7 about here)

Post-Sox model of audit fees

I also run an audit fee model using only observations in the Post-Sox period as of 2003. I regress the natural log of audit fees (LAUDITFEE) on an indicator for clients of deficient audit firms (DEF), an indicator for the post-inspection period (POST), the interaction POSTxDEF, controls for client characteristics, and year dummies. A significantly positive interaction term obtains even after including industry dummies and audit firm fixed effects. As I use an unbalanced panel in the prior tests in order to rule out any potential confounding effects of the second inspection, I check the sensitivity of the results to using a reduced set of clients which form a balanced panel. I run the model described above using only clients with data available in all years of the period 2003-2006, thus before the second-inspection round has started. The results are not displayed but again confirm the prior conclusions.

CONCLUSION

In view of recent regulatory changes that require independent inspections of public audit firms, this study examines to what extent inspections cause a change in audit fees. In line with the theoretical arguments, this study's findings reveal that audit fees of deficient audit firms'

clients increase from pre- to post-inspection, controlling for client characteristics and a trend in time. More specifically, the larger increase in fees for deficient audit firms is more pronounced in settings of high fee pressure created by high competition or low demand for audit quality prior to the inspection. At the same time, deficient audit firms are associated with an increase in the number of professionals employed. These results suggest that inspections lead to an overall increase in auditor effort for deficient audit firms, especially in settings where fee pressure might have compromised audit quality.

A few data limitations need to be addressed. It would be desirable to have a fully balanced sample of audit clients across the ten-year period. However, due to data availability, a reasonable sample size is only achievable by including clients as soon as at least one year of information is available for each of the estimation, the pre-, and the post-inspection periods. Further, the lack of available data ownership structure or salaries prevents a feasible analysis using a more refined measure of demand for audit quality. As the PCAOB does not disclose the identity of the inspected clients, it is impossible to directly investigate fee changes for the client-engagements where particular deficiencies were raised. Obtaining information on the inspected clients would allow a more direct test of the effect of inspections on auditor effort and fees. This point is left for future research.

It further needs to be acknowledged that inspectors' judgments and quality standards may be influenced by a different set of incentives than auditors' or investors' judgments. More specifically, inspectors are likely to care less about efficiency since they do not bear the cost of the audit. Also, they might put more emphasis on avoiding audit failures while at the same time aiming for continued reporting of deficiencies to defend their existence. It is thus possible that the additional work required by inspectors may in fact not be in the best interest of investors as it does not lead to a reduction in audit risk worth the fee increase from an

investor's point of view. This would be in line with statements of audit firms about inspections causing a development towards a 'form over substance audit [...] that loses sight of the real audit objective' and about increases in audit hours and fees without an improvement in audit quality (Daugherty and Tervo, 2009b, p.16). Also, in their response letters, audit firms have complained that inspectors expectations cause audits to get prohibitory expensive for small clients (PCAOB, 2005). Nevertheless, as above mentioned statements originate from affected firms they are unlikely to serve well as an objective evaluation criteria of inspector's quality standards. To what extent inspectors' quality standards reflect investors' view of the costs and benefits of audit work remains to be addressed by future research.

This paper adds to the literature on the costs and benefits of independent reviews of audit firms at a time where review systems are established and refined across the world and where considerable doubts regarding the effects of PCAOB inspections have been voiced. While prior studies have either looked at client-level fees prior to inspections or at fees at the audit firm level, this is the first study to provide insights into changes in client-level fees. The paper contributes to the literature by showing that the design of the established US inspection system seems to provide sufficient incentives for audit firms to adjust their behavior. Also, the observable fee changes present insight into the size of one cost component faced by clients and investors as result of the inspections. Moreover, the paper extends the literature on the adverse effects of competition and client-specific demand characteristics on audit quality. The insights from the inspections can be useful to regulators and oversight bodies throughout the world in setting guidelines regarding the detailed implementation and future development of audit firm reviews.

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FIGURE 1

Timeline Depiction of the Measurement Periods around Inspections and the Estimation Period

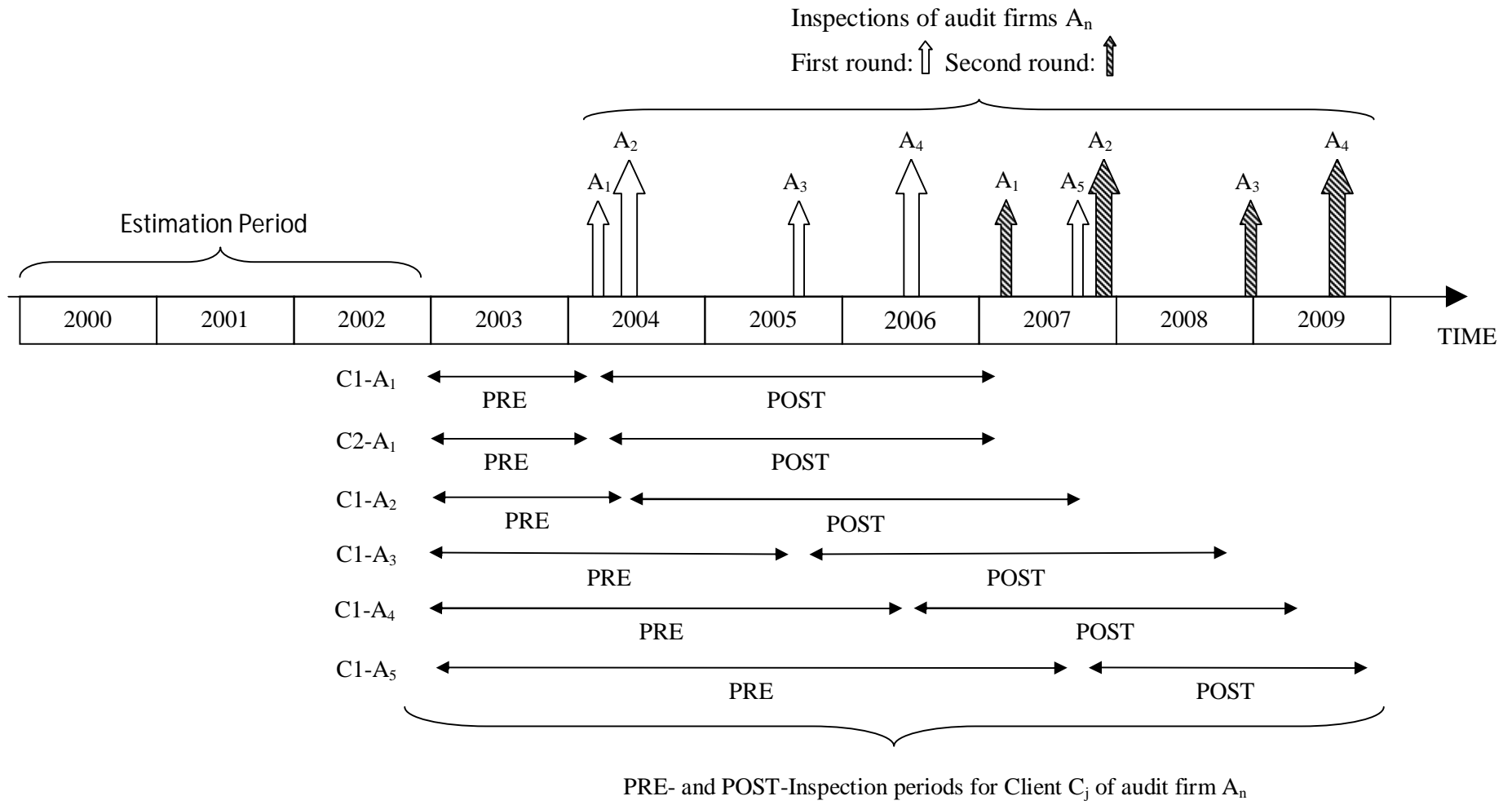


TABLE 1. Audit Fee Prediction Model**Panel A: Descriptive Statistics for the estimation period 2000-2002**

	<i>N</i>	<i>Mean</i>	<i>StdDev</i>	<i>Minimum</i>	<i>Median</i>	<i>Maximum</i>
AUDITFEE	475	72,430	57,869	19,307	55,283	330,000
ASSETS	475	21,161,619	36,203,726	1,000	8,533,000	251,059,000
LEVERAGE	475	0.513	0.853	0.000	0.232	3.650
INVREC	475	0.293	0.243	0.000	0.270	0.745
ROA	475	-0.906	1.856	-7.361	-0.107	0.218
LOSS	475	0.636	0.482	0.000	1.000	1.000
SEGMENTS	475	0.857	1.040	0.000	1.000	6.000
OPINION	475	0.318	0.466	0.000	0.000	1.000
FOREIGN	475	0.074	0.262	0.000	0.000	1.000
BUSY	475	0.634	0.482	0.000	1.000	1.000
SHORTTENURE	475	0.617	0.487	0.000	1.000	1.000
DEF	475	0.853	0.355	0.000	1.000	1.000

Panel B: Pooled regression model of audit fees in estimation period 2000-2002

	<i>LOGAUDITFEE</i>
INTERCEPT	5.342 (15.33)***
LOGASSETS	0.333 (16.10)***
LEVERAGE	-0.019 (-0.54)
INVREC	0.057 (0.55)
ROA	-0.116 (-6.01)***
LOSS	0.043 (0.75)
SEGMENTS	0.094 (4.00)***
OPINION	0.094 (1.48)
FOREIGN	0.192 (2.07)**
BUSY	0.103 (2.07)**
SHORTTENURE	0.071 (1.42)
Adjusted R-squared	0.445
Number of observations	475

(This table is continued on the next page)

TABLE 1 – Continued

Notes:

Panel A shows descriptive statistics for all observations in the estimation period 2000 through 2002. All continuous variables are winsorized at 5% and 95%. Variables are defined as follows: AUDITFEE is the amount of audit fees paid by the client for the audit in the particular financial year. ASSETS are total assets of the client firm. LEVERAGE is measured as the sum of current and long-term debt divided by total assets and INVREC is the sum of inventory and receivables of the client divided by total assets. ROA is net income divided by total assets. The indicator variable LOSS takes a value of one when net income is below zero. SEGMENTS reports the number of business segments reported by the client. OPINION indicates whether a going concern opinion was issued and BUSY indicates whether the financial year-end lies in December. FOREIGN has a value of one when the client reports foreign income. And SHORTTENURE equals one for engagements with tenure of three or less years. DEF indicates whether the client was audited by an audit firm with a deficient inspection result.

Panel B shows the coefficients of a pooled OLS regression analysis of the natural logarithm of audit fees on common fee determinants. The fee determinants are defined as described in Panel A with two exceptions. LOGAUDITFEE is the natural logarithm of audit fees and LOGASSETS is measured as the natural logarithm of total assets. This regression includes observations for 288 audit clients. T-values are stated in brackets underneath the coefficients. Significance levels are indicated as follows: * = $p < 0.1$, ** = $p < 0.05$, *** = $p < 0.01$.

TABLE 2. Descriptive Statistics**Panel A: Descriptive Statistics for the sample period 2003-2009**

	<i>N</i>	<i>Mean</i>	<i>StdDev</i>	<i>Minimum</i>	<i>Median</i>	<i>Maximum</i>
AUDITFEE	1302	104,065	84,019	19,307	74,850	330,000
ASSETS	1302	27,450,720	52,268,535	2,000	9,239,500	706,365,000
LEVERAGE	1302	0.513	0.920	0.000	0.160	3.650
INVREC	1302	0.274	0.238	0.000	0.212	0.745
ROA	1302	-0.847	1.846	-7.361	-0.111	0.218
LOSS	1302	0.621	0.485	0.000	1.000	1.000
SEGMENTS	1302	1.575	1.232	0.000	1.000	9.000
OPINION	1302	0.310	0.463	0.000	0.000	1.000
FOREIGN	1302	0.068	0.251	0.000	0.000	1.000
BUSY	1302	0.650	0.477	0.000	1.000	1.000
SHORTTENURE	1302	0.067	0.250	0.000	0.000	1.000
ICINEF	1302	0.017	0.129	0.000	0.000	1.000
404B	1302	0.154	0.361	0.000	0.000	1.000
DEF	1302	0.846	0.361	0.000	1.000	1.000
SHORTTERMACC	1302	0.500	0.429	0.033	0.389	1.645
SALESGROWTH	1150	0.230	0.681	-0.768	0.100	2.292
FREEFLOAT	950	73.476	23.411	6.000	78.000	100.000
NCLIENTS	1302	4.422	4.473	1.000	2.000	17.000

Panel B: Variable means by inspection result for the sample period 2003-2009

	<i>CLEAN</i>		<i>DEFICIENT</i>		<i>Difference in mean</i>	<i>t-statistic</i>
	<i>N</i>	<i>Mean</i>	<i>N</i>	<i>Mean</i>		
AUDITFEE	201	83,611	1101	107,799	-24,188	(-4.60)***
ASSETS	201	14,956,881	1101	29,731,612	-14,774,732	(-6.24)***
LEVERAGE	201	0.614	1101	0.494	0.120	(1.58)
INVREC	201	0.297	1101	0.270	0.027	(1.32)
ROA	201	-0.957	1101	-0.827	-0.130	(-0.92)
LOSS	201	0.632	1101	0.619	0.013	(0.33)
SEGMENTS	201	1.428	1101	1.602	-0.174	(-1.98)*
OPINION	201	0.338	1101	0.305	0.033	(0.93)
FOREIGN	201	0.045	1101	0.072	-0.027	(-1.63)
BUSY	201	0.672	1101	0.646	0.026	(0.71)
SHORTTENURE	201	0.070	1101	0.066	0.004	(0.17)
ICINEF	201	0.015	1101	0.017	-0.002	(-0.24)
404B	201	0.129	1101	0.159	-0.030	(-1.07)
SHORTTERMACC	201	0.540	1101	0.493	0.047	(1.34)
SALESGROWTH	158	0.163	992	0.241	-0.078	(-1.52)
FREEFLOAT	143	74.853	807	73.232	1.621	(0.76)
NCLIENTS	201	1.866	1101	4.889	-3.023	(-18.26)***

(This table is continued on the next page)

TABLE 2 – Continued

Notes:

Panel A shows descriptive statistics for the sample period 2003-2009. All continuous variables are winsorized at 5% and at 95%. Variables are defined as follows: AUDITFEE is the amount of audit fees paid by the client for the audit in the particular financial year. ASSETS are total assets of the client firm. LEVERAGE is measured as the sum of current and long-term debt divided by total assets and INVREC is the sum of inventory and receivables of the client divided by total assets. ROA is net income divided by total assets. The indicator variable LOSS takes a value of one when net income is below zero. SEGMENTS reports the number of business segments reported by the client. OPINION indicates whether a going concern opinion was issued and BUSY indicates whether the financial year-end lies in December. FOREIGN has a value of one when the client reports foreign income. And SHORTTENURE is one for engagements with tenure of three or less years. DEF indicates whether the client was audited by an audit firm with a deficient inspection result. ICINEF identifies observations with ineffective internal controls and 404b indicates fulfills the size criteria to comply with section 404b of SOX. SHORTTERMACC measures the percentage of short term accruals measured as inventories, receivables, and payables scaled by total assets. SALESGROWTH is the yearly percentage growth in sales. And FREEFLOAT equals the percentage of total shares in issue available to ordinary investors. NCLIENTS counts the number of clients per audit firm.

Panel B shows variable means by inspection result (clean versus deficient) and tests of differences in means. Variable definitions are the same as in Panel A. T-values are stated in brackets. Significance levels are indicated as follows: * = $p < 0.1$, ** = $p < 0.05$, *** = $p < 0.01$.

TABLE 3. Univariate results**Panel A: Abnormal audit fees by category**

		<i>Pre</i>		<i>Post</i>		<i>Pre-Post</i>
<i>Clean</i>	<i>A</i>	20,779	<i>B</i>	40,332	<i>A-B</i>	-19,552 (-1.71)*
<i>Deficient</i>	<i>C</i>	22,846	<i>D</i>	72,981	<i>C-D</i>	-50,135 (-7.64)***
<i>Clean - Deficient</i>	<i>A-C</i>	-2,067 (-0.35)	<i>B-D</i>	-32,649 (-2.77)***		

Notes:

Panel A shows mean abnormal audit fees for the four different categories created by PRE versus POST and CLEAN versus DEFICIENT and the mean difference in abnormal fees between the four categories. Abnormal audit fees are obtained by reversing the log on the residuals from the fee model displayed in Table 1. PRE and POST distinguish the time periods prior to and after the inspection. The categories CLEAN and DEFICIENT refer to the inspection result for the audit firm. T-values in brackets underneath indicate significant difference from zero with significance levels shown as follows: * = $p < 0.1$, ** = $p < 0.05$, *** = $p < 0.01$

TABLE 4. Differences in abnormal audit fees**Panel A: Regression model of changes in abnormal audit fees**

	(I)	(II)	(III)
	$\Delta ABNFEE$	$\Delta ABNFEE$	$\Delta ABNFEE$
INTERCEPT	0.085 (1.11)	0.065 (0.84)	0.191 (2.15)**
DEF	0.141 (3.03)***	0.165 (3.48)***	0.032 (0.52)
COMPETITION		-0.063 (-0.45)	
DEFxCOMPETITION		0.398 (2.19)**	
LOWDEM			-0.178 (-2.13)**
DEFxLOWDEM			0.231 (2.3)**
TO_ICINEF	0.423 (3.03)***	0.425 (3.03)***	0.390 (3.16)***
FROM_ICINEF	-0.093 (-1.51)	0.052 (0.32)	-0.070 (-0.90)
TO_404b	0.151 (2.58)**	0.148 (2.52)**	0.164 (2.43)**
FROM_404b	0.061 (0.68)	0.055 (0.62)	0.153 (1.18)
YEAR2005	0.010 (0.14)	0.025 (0.34)	-0.026 (-0.34)
YEAR2006	0.036 (0.51)	0.049 (0.68)	0.010 (0.13)
YEAR2007	0.008 (0.11)	0.018 (0.25)	-0.014 (-0.18)
YEAR2008	-0.025 (-0.31)	-0.019 (-0.24)	-0.02 (-0.23)
YEAR2009	0.032 (0.32)	0.038 (0.38)	-0.024 (-0.23)
R-square	0.070	0.077	0.067
Number of observations	1430	1430	1228

(This table is continued on the next page)

TABLE 4 – Continued

Panel B: Effect by inspection result

	$\Delta ABNFEE$	$\Delta ABNFEE$
CLEAN	0.065 (0.84)	
COMPETITION CLEAN	-0.063 (-0.45)	
DEF	0.230 (3.48)***	
COMPETITION DEF	0.335 (2.85)***	
HIGHDEM CLEAN		0.191 (2.15)**
LOWDEM CLEAN		0.013 (0.13)
HIGHDEM DEF		0.223 (3.03)***
LOWDEM DEF		0.276 (3.43)***

(This table is continued on the next page)

TABLE 4 – Continued

Notes:

Panel A displays the results of three regressions of abnormal audit fee changes. Regression (I) models the change in abnormal audit fees (ΔABNFEE) as a function of an indicator variable for clients of deficient audit firms (DEF). ABNFEE is obtained by taking the deviation of the actual value of LOGAUDITFEE from predicted value for LOGAUDITFEE based on a fee prediction model with estimated coefficients from a three-year estimation period (2000 until 2002). The change in abnormal fees (ΔABNFEE) is calculated as the difference between available year-observations post-inspection and pre-inspection scaled by the number of years that lie between them and by the value of audit fees in the pre period. ΔABNFEE is winsorized at 1% and at 99%.

TO_ICINEF indicates clients that change from no internal control deficiency to having an internal control deficiency. FROM_ICINEF has a value of one when a client changes from having an internal control deficiency to having no internal control deficiency. TO_404b and FROM_404b indicate whether a client changed from not fulfilling the size criteria for compliance with SOX section 404b to fulfilling the criteria for section 404b compliance (TO_404b) and vice versa (FROM_404b). Year dummies are included to control for a potential trend in time.

The regression in column (II) extends the model in column (I) by adding COMPETITION and the interaction term COMPETITION \times DEF. COMPETITION indicates the degree of competition an audit firm faces prior to the inspection. It is measured as the median-scaled Herfindahl index for the Metropolitan Statistical Area where the audit firm is located multiplied by minus one. The regression in column (III) extends model (I) by adding an indicator variable for firms with low demand for audit quality prior to the inspection (LOWDEM) and an interaction term (LOWDEM \times DEF). LOWDEM is one whenever a client falls in less than two of the following four categories: the upper five deciles of ASSETS, LEVERAGE, SHORTTERMACC, and SALESGROWTH.

Panel B provides further information on the effect sizes within the different categories created by the interaction terms. It displays the effect of COMPETITION within the DEF and CLEAN categories based on the results of regression (II) in Panel A. It further shows the effect size within the four different categories created by LOWDEM and DEF based on the results of regression (III) in Panel A.

The regressions in column (I) and (II) include observations associated with 288 audit clients and 139 audit firms. The regression in column (III) is based on 259 audit clients and 129 audit firms. Standard errors are adjusted for clustering at the client-level in all three regressions. T-values are stated in brackets underneath the coefficients. Significance levels are indicated as follows: * = $p < 0.1$, ** = $p < 0.05$, *** = $p < 0.01$.

TABLE 5. Changes in audit firm personnel

Regression model of changes in the number of professionals and partners		
	(1)	(2)
	Δ PROFESSIONALS	Δ PARTNERS
INTERCEPT	-0.042 (-0.51)	-0.551 (-2.62)**
DEF	0.084 (2.82)**	0.102 (1.61)
Δ REVENUE	0.627 (4.98)***	1.258 (2.45)**
Δ CLIENTS	-0.053 (-1.07)	0.288 (1.31)
Y2005	-0.066 (-0.78)	0.352 (1.66)
Y2006	0.008 (0.09)	0.599 (2.82)**
Y2007	-0.015 (-0.17)	0.441 (2.31)**
R-square	0.539	0.357
Number of observations	97	97

Notes:

Panel A displays the results of regressing the change in the number of audit firm professionals (Δ PROFESSIONALS) and the number of audit partners (Δ PARTNERS) on an indicator for deficient audit firms (DEF) and a number of control variables. Δ PARTNERS gives the change in the number of partners of an audit firm from pre- to post-inspection. Δ PROFESSIONALS gives the change in the number of professionals employed by the audit firm from pre- to post-inspection. Δ REVENUE measures the change in audit firm overall audit fee revenue. Δ CLIENTS controls for a change in the number of audit clients of the audit firm. The year dummies Y2005, Y2006, and Y2007 are based on the financial year-end of the audit firm and are included to control for a growth trend over time. The regression contains all available combinations of pre- and post-inspection year observations for each audit firm, respectively, yielding 97 change observations for 20 audit firms. Standard errors are adjusted for clustering at the auditfirm-level. T-values are stated in brackets underneath the coefficients. T-values are stated in brackets underneath the coefficients. Significance levels are indicated as follows: * = $p < 0.1$, ** = $p < 0.05$, *** = $p < 0.01$.

TABLE 6. Audit fee changes outside the prediction interval

Panel A: Regression model of changes in audit fees beyond the prediction interval

	$\Delta ABNFEE2$
INTERCEPT	0.012 (0.76)
DEF	0.026 (2.99)***
TO_ICINEF	0.067 (2.42)**
FROM_ICINEF	-0.008 (-0.27)
TO_404b	0.015 (1.63)
FROM_404b	-0.001 (-0.04)
YEAR2005	-0.009 (-0.60)
YEAR2006	-0.004 (-0.27)
YEAR2007	-0.017 (-1.06)
YEAR2008	-0.015 (-0.91)
YEAR2009	-0.016 (-0.97)
R-square	0.080
Number of observations	1430

(This table is continued on the next page)

TABLE 6 – Continued

Notes:

This table provides the results of regression similar to Regression (I) in Table 4 but with a different measure of abnormal audit fees. The regression models the change in abnormal audit fees (Δ ABNFEE2) as a function of an indicator variable for clients of deficient audit firms (DEF). Δ ABNFEE2 measures the change in abnormal fees where abnormal audit fees are based on the deviation from a prediction interval rather than a point prediction. ABNFEE2 is (1) the deviation of the actual value of LOGAUDITFEE from the border of the 95% prediction interval around the audit fee point prediction generated by using the coefficients of the audit fee model in Table 1 or (2) zero in case the actual value of LOGAUDITFEE falls within the prediction interval. The change in abnormal fees (Δ ABNFEE2) is calculated as the difference between available year-observations post-inspection and pre-inspection scaled by the number of years that lie between them. Δ ABNFEE2 is winsorized at 1% and at 99%.

TO_ICINEF indicates clients that change from no internal control deficiency to having an internal control deficiency. FROM_ICINEF has a value of one when a client changes from having an internal control deficiency to having no internal control deficiency. TO_404b and FROM_404b indicate whether a client changed from not fulfilling the size criteria for compliance with SOX section 404b to fulfilling the criteria for section 404b compliance (TO_404b) and vice versa (FROM_404b). Year dummies are included to control for a potential trend in time.

The regression includes observations associated with 288 audit clients and 139 audit firms. Standard errors are adjusted for clustering at the client-level. T-values are stated in brackets underneath the coefficients. Significance levels are indicated as follows: * = $p < 0.1$, ** = $p < 0.05$, *** = $p < 0.01$.

TABLE 7. Audit fee change model**Regression model of biannual audit fee changes**

	Δ LAUDITFEE
INTERCEPT	0.020 (4.22)***
INSPECTION	-0.012 (-2.17)**
DEF	-0.002 (-0.39)
INSPECTION*DEF	0.015 (2.37)**
TO_ICINEF	0.028 (3.05)***
FROM_ICINEF	-0.044 (-5.49)***
TO_404b	0.01 (2.61)***
FROM_404b	0.006 (0.85)
Δ LOGASSETS	0.023 (9.61)***
Δ LEVERAGE	0.005 (2.36)**
Δ INVREC	0.013 (1.42)
Δ ROA	-0.003 (-2.96)***
TO_LOSS	0.006 (1.28)
FROM_LOSS	0.006 (1.37)
Δ SEGMENTS	-0.002 (-1.04)
TO_OPINION	0.012 (2.14)**
FROM_OPINION	0.003 (0.46)
TO_FOREIGN	0.004 (0.50)
FROM_FOREIGN	-0.011 (-1.68)*
TO_BUSY	-0.010 (-0.96)
FROM_BUSY	-0.022 (-3.26)***
FROM_SHORTTENURE	-0.003 (-0.55)
R-square	0.268
Number of observations	724

(This table is continued on the next page)

TABLE 7 – Continued

Notes:

This table shows the results of a biannual audit fee change model. Δ AUDITFEE measures the biannual change in the natural log of audit fees. The model controls for changes in all audit fee determinants used in the audit fee model in Table 1 (Δ LOGASSETS, Δ LEVERAGE, Δ INVREC, Δ ROA, TO_LOSS, FROM_LOSS, Δ SEGMENTS, TO_OPINION, FROM_OPINION, TO_FOREIGN, FROM_FOREIGN, TO_BUSY, FROM_BUSY, FROM_SHORTTENURE). The model also contains the control variables used in Regression (I) in Table 4. TO_ICINEF indicates clients that change from no internal control deficiency to having an internal control deficiency. FROM_ICINEF has a value of one when a client changes from having an internal control deficiency to having no internal control deficiency. TO_404b and FROM_404b indicate whether a client changed from not fulfilling the size criteria for compliance with SOX section 404b to fulfilling the criteria for section 404b compliance (TO_404b) and vice versa (FROM_404b). Year dummies are included to control for a potential trend in time but their coefficients are not displayed for reasons of brevity.

The regression includes observations associated with 288 audit clients and 139 audit firms. Standard errors are adjusted for clustering at the client-level. T-values are stated in brackets underneath the coefficients. Significance levels are indicated as follows: * = $p < 0.1$, ** = $p < 0.05$, *** = $p < 0.01$.