PCAOB Inspections and Audit Fees

Mona Offermanns[*]
School of Business and Economics
Maastricht University
Tongersestraat 53
NL – 5211 LM Maastricht
m.offermanns@maastrichtuniversity.nl

Preliminary version

December 2011

Audit Firm Inspections and Audit Fees

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 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 While findings of currently unpublished studies mainly relate to changes in financial reporting quality (Carcello et al., 2008) or mean audit fees at the audit firm level (Lennox, 2011), this study is the first to examine the impact of inspections on audit fees at the client level. More specifically, I investigate to what extent inspections cause a change in audit fees. 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 publicly disclosed PCAOB inspection report 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 PCAOB inspectors' views on the appropriateness of chosen audit effort and hence the likelihood of reputation damage and penalties as a result of the inspection. In response to these updated beliefs, auditors are likely to make adjustments in areas that were criticized by inspectors.

The straightforward response to prevent sanctions as result of discovered audit deficiencies is an increase in audit effort. Audit firms have certain flexibility in adjusting effort due to excess capacity, shifts of resources 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 (Elliott, 1998, Simunic, 1980), changes in effort and thus cost are reflected in audit fees. Alternatively, the auditor may charge a fee premium to cover expected future losses. The increase has to be sufficiently large to cover the non-remote risk of sanctions by the PCAOB in case of non-compliance. However, it is unlikely that clients will accept a substantial increase in fees without additional work being conducted by the auditor. I therefore predict audit effort and fees to rise for clients of deficient firms if the pressure of the PCAOB is sufficiently large.

There exist cross-sectional differences in the extent of fee pressure influencing the auditor. The higher fee pressure the more auditors are tempted to provide low cost audits and cut back on audit effort (Coram et al., 2004, Imhoff, 2003, Houston, 1999). Fee pressure is likely to be higher for clients with low demand for audit quality as low demand for monitoring of the financial reporting process is associated with lower quality audit committees and less-developed auditor selection procedures (Engel et al., 2010, Jensen and Payne, 2005). As costs are being prioritized to a much larger extent than quality, low demand for audit quality is negatively related to audit fees (Copley et al., 1994). Also, competition leads to higher fee pressure, provided that audit firms have difficulties differentiating themselves based on audit quality ex-ante (Fiolleau et al., 2009). In both cases, audit firms are more likely to cut back on audit procedures and hence, the likelihood of providing low audit effort increases. Accordingly, I expect the severity of deficiencies and hence the extent of effort adjustments to vary cross-sectionally depending on the degree of fee pressure.

To what extent deficiencies mentioned in the inspection report present a sufficient incentive for the auditor to make adjustments is uncertain for several reasons. First, there has been extensive criticism of the PCAOB inspectors' technical and in-depth expertise (Glover et al., 2009). It takes an extended period of time before the inspection results get published, 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, even though reports are informative, it remains unclear to what extent the inspection result can cause severe damage to an audit firm's reputation. Also, it is uncertain to what extent the PCAOB will use its discretion in imposing sanctions on audit firms. Therefore, I address whether audit firms are sufficiently incentivized to change their behaviour by means of an empirical analysis.

I examine residual audit fees in a cross-section of 1,302 client-year observations of triennially inspected audit firms over the period 2003 through 2009. Using the term deficient for audit firms with one or more detected deficiencies and the term clean or non-deficient for audit firms without detected deficiencies, I find that the inspections lead to an increase in audit fees for clients of deficient audit firms while controlling for client characteristics and a trend in time. The finding is robust to alternative design specifications such as an alternative measure of abnormal fees based on a prediction interval instead of a point prediction of fees. The fee increase occurs specifically in those settings where high fee pressure might have compromised audit quality, as the change in abnormal fees is larger for auditors that face high competition prior to the inspection and for clients that display 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, which suggests that the observed fee adjustments are reflective of increased audit effort rather than an enlarged fee premium for future losses.

As additional analysis, I examine changes in the degree of industry specialization of the audit firms' client portfolios to assess alternative audit firm reactions to deficient inspection reports. The results show that deficient audit firms obtain more specialized portfolios relative to audit firms with clean inspection reports after the inspection report was published with the portfolio adjustments being achieved mainly via client acceptance rather than discontinuance decisions. I also conduct further tests to rule out concerns that audit firms with deficient inspection reports would not be able to raise their fees because of the risk of losing clients given clients' preference for audit firms with clean inspection reports.

Overall, in spite of publicly voiced doubts regarding the usefulness of PCAOB inspections, there is evidence of changes in audit firm behaviour. As long as investors and inspectors apply similar standards of audit quality, the inspection process identifies cases of substandard effort and 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 the investors' point of view, the change in audit firm behaviour caused by the inspection process may not be in the best interest of investors.

The remainder of the paper proceeds as follows. Section 2 describes prior literature on the effects of PCAOB inspections. Afterwards, testable hypotheses are developed. The research design is outlined in section 4, which is followed by a discussion of the results. Section 6 contains sensitivity checks and section 7 provides conclusions and limitations.

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 and I use the word clean or non-deficient for reports without any deficiencies.

Prior research addresses the relationship between PCAOB inspections and audit quality in different ways. From a conceptual point of view, researchers and practitioners state arguments for and against the inspection process' capability 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 (Gunny and Zhang, 2011, Carcello et al., 2008, 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, 2011, Glover et al., 2009, Newman and Oliverio, 2009, Hodowanitz and Solieri, 2005, Palmrose, 2005).

In addition to the conceptual discussion, a number of studies examine the association between inspection outcomes and indicators of audit quality empirically.[1] Clients of audit firms with deficiencies discovered during the inspection process display higher levels of abnormal accruals (Gunny and Zhang, 2011, Van de Poel et al., 2009). Gunny et al. (2007) find that non-Big4 auditors with high abnormal audit fees and high total fees are more likely to have engagement-specific deficiencies. 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., 2011, Gunny and Zhang, 2011). More insights regarding the effect of the inspection process, however, can be obtained from examining reactions to the inspection rather than client characteristics of clean and deficient audit firms.

Preliminary assessments of the inspection process' impact are derived from audit firm reactions to inspection activity. Negative inspection outcomes for small audit firms have resulted in deregistration with the PCAOB (Daugherty et al., 2009, Read et al., 2004). And audit firms without public clients have voluntarily registered with the PCAOB in order to signal audit quality (Read et al., 2004). This supports 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, 2010a). Audit firms' written replies to inspection reports provide some indication that certain firms react to deficient audit reports by improving their audit processes. However, they also indicate that either some of the PCAOB criticism is not valid or not all audit firms are willing to change their audit procedures (Jessup and Young,

---

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

2009). Results based on audit firms' public responses should be evaluated carefully, however, as they might be influenced by response-bias and the audit firms' underlying incentives. For example, audit firms might have the desire to diminish the reputational damage resulting from a deficient inspection by downplaying the deficiency or criticizing inspectors.

For that reason, a number of studies have addressed audit firm reactions based on presumably more objective measures of audit quality. Carcello (2008) finds that absolute abnormal accruals decrease following inspections irrespective of the inspection result. As the observed decrease in accruals is unrelated to the inspection result, however, it does not appear to be clearly linked to the inspections. Also, measures of financial reporting quality are strongly influenced by incentives of client management. An examination of audit fees can provide a test of audit firm reactions to the inspections that is less distorted by client reporting incentives. According to Lennox (2011), mean fees of small audit firms with identified engagement-specific deficiencies stay lower compared to non-deficient firms and do not increase following the inspection when controlling for an upward trend in time.

This study's analysis differs from Lennox (2011) in three ways. First, it is conducted at the client level while controlling for a more comprehensive set of client characteristics that might drive variations in fees. Second, I employ a different measure of deficient audit firms that includes quality control defects which are more likely to permeate throughout the whole audit firm and apply to all of an audit firm's clients rather than just a subset of engagements. Third, an analysis at the client level allows to investigate cross-sectional differences in fee adjustments across clients in association with the inspection outcome.

III. THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

According to inspectors' judgments, audit firms with a deficient inspection report have conducted audits with effort below the PCAOB's quality standards (hereafter referred to as insufficient effort). According to the PCAOB (2011), deficient audit firms did not "obtain sufficient competent evidential matter to support its audit opinion". 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 associated expected losses 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 and fees charged 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, Johnstone and Bedard, 2003, Seetharaman et al., 2002, Reynolds and Francis, 2001). 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 behaviour.

Expected losses arise from potential loss of clients and regulatory penalties. Offermanns and Peek (2011) show that the inspection reports are informative to investors and that they 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

8

likely to switch to an auditor without GAAP-related deficiencies (Abbott et al., 2008). On the other hand, inspection reports are not intended to categorize audit firms into two groups of high and low quality firms due to the non-random selection of engagements and topics for review. Also, Lennox and Pittman (2010) find no evidence of a change in audit firms' market shares as a result of deficient inspection results. Thus, the threat from client switching behaviour in response to the deficiencies mentioned in the inspection report might be limited.

Even though clients might not switch after a deficient report was published, the PCAOB is authorized to conduct disciplinary proceedings, impose sanctions, and communicate inspection results to regulatory and law enforcement agencies (Gunny and Zhang, 2011, Wegman, 2006, Farrell and Shadab, 2005). 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, or 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 auditor.[2]

In response to this change, I expect auditors to address the issues criticized by inspectors to prevent sanctions and penalties and to rebuild their reputation. While the auditor may charge a fee premium to cover expected future losses which will also affect audit fees, this is

---

[2] While the threat of an inspection provides an ex-ante incentive for auditors to change their behaviour, 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. Also, while firms are informed about inspections a number of months in advance, they only learn during the inspection about certain engagements selected for inspection. Hence, anticipation of issues likely to be criticized is difficult prior to inspection, and especially prior to the first inspection round.

unlikely to satisfy inspectors. The risk of regulatory penalties as a result of PCAOB inspections is less remote than the risk of litigation, given that a problem has already been detected. Also, clients are unlikely to accept fee changes without adjustments to audit work. For that reason, an increase in effort appears to be the straightforward way to address the deficiency.

The audit production process comprises technology and effort as fixed and variable factors of production, respectively (Hope et al., 2011). Even though advances in audit technology have rendered auditing less labour 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 of resources 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.[3]

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

Even though auditors with deficient inspection reports might be associated with low quality, I argue that they are able to raise fees in face of competition for a number of reasons.

---

[3] Efficiency improvements would work against finding a change in abnormal audit fees.

First, the inspection gives audit firms a convincing argument for fee increases when having the annual meeting with the audit committee to determine current year's audit fees. Second, 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, clients' switching cost deters auditor changes as long as the benefit of switching does not exceed its cost. The theoretical arguments are supported by empirical evidence provided by Lennox and Pittman (2010). Also, additional tests described in the results section do not indicate an increase in the demand for audit firms with clean inspection reports.

Thus, I argue that firms with detected audit deficiencies will respond by increasing fees such that post-inspection fees are higher than pre-inspection fees.[4] Hence, I state the main hypothesis as follows:

Hypothesis 1: 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 conditions.[5] Cross-sectional differences in fee pressure are likely associated with the severity of deficiencies. All other things equal, the lower the fees

---

[4] 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 inspectors' 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.

[5] I expect substandard effort due to human error to be distributed randomly across clients.

the lower the amount of effort compensated. With higher 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 stay within the planned audit cost. High 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 (Engel et al., 2010, Lennox and Pittman, 2010, Jensen and Payne, 2005, Carcello et al., 2002, Copley et al., 1994). 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 lays below inspector's standards likely increases with the level of competition faced by the auditor. As a result, the extent of effort and fee adjustments required to address inspectors' criticisms is likely to be larger for audit firms that face high competition prior to the inspection. As PCAOB inspections change the audit environment for all audit firms, also competitor audit firms' incentives to provide a low audit fee are reduced and thus fee raises are possible in settings of high competition. Hence, I argue that deficient firms confronted with high competition prior to the inspection are associated with higher increases in audit fees following the inspection, leading to the following hypothesis:

Hypothesis 2a: The difference between deficient and non-deficient audit firms' increase in client audit fees rises 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 high 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 signalling needs as drivers of demand for high quality auditors (Hope et al., 2011, Knechel et al., 2008, DeFond, 1992, Francis and Wilson, 1988, Watts and Zimmerman, 1983). Thus, clients with low demand for audit quality are required to be audited by law but obtain few benefits from the audit.

Low demand for monitoring of the financial reporting process is associated with lower compensation of audit committee members (Engel et al., 2010) and less developed auditor selection procedures (Jensen and Payne, 2005). Lower quality audit committees might be less committed to vigilant oversight and thus less likely to signal high expectations regarding the auditor's provision of quality, resulting in less effort on the auditor's side (Carcello et al., 2002). A low quality auditor selection process results in cost being prioritized to a much larger extent than quality. Hence, low demand for audit quality is negatively related to audit fees (Copley et al., 1994). 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 predict 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:

Hypothesis 2b: The difference between deficient and non-deficient audit firms' increase in client audit fees declines with the client's pre-inspection demand for audit quality.

IV. RESEARCH DESIGN

4.1 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 years 2000 through 2009. The sample thus consists of the observations contained in the intersection of these three data sources.[6] All observations with zero audit fees, with missing 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

---

[6] 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 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.

conducted between May 2004 and May 2007. Out of these, 475 observations are for the period 2000 through 2002 and 1,302 observations for the period 2003 through 2009.

4.2 Empirical model

To examine changes in 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 'normal' audit fees predicted based on client characteristics. As predicted fees need to be based on the audit pricing function absent of PCAOB effects,[7] I estimate the following pooled audit fee regression model for the years 2000 through 2002 using ordinary least squares regression:

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

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 inventories 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

---

[7] Using the period during which inspections were conducted to predict fee residuals would result in an inappropriate benchmark and downward bias in the results (Freckleton, 2002). However, to address potential concerns regarding the influence of other SOX-related requirements on fees, I conduct sensitivity tests to examine whether the results obtain in spite of the potential downward bias using a fee prediction model based on the years 2003 through 2009.

engagements are OPINION, FOREIGN, and BUSY. OPINION equals one when a going-concern opinion is issued as reported in the Audit Analytics 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. Finally, SHORTTENURE is one in the first three years of the auditor-client relationship to account for possible low-balling.

I predict audit fees for the years 2003 until 2009 using the coefficients estimated in regression (3.1). This approach assumes that any changes in the coefficients between the estimation and the prediction periods due to factors other than the PCAOB inspections, if existing, are time wise not correlated with the individual inspections at the audit firms.[8] I obtain the predicted value of LOGAUDITFEE and reverse the logarithm to yield the predicted value of AUDITFEE. I then 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 contains possible audit firm-specific quality effects such as fee premia for industry specialists (Francis et al., 2005, Casterella et al., 2004, Craswell et al., 1995) 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.[9] This design uses the client firm as its own control. The change in abnormal fees is scaled by the

---

[8] Even if changes on the respective fee drivers occurred simultaneously with the individual inspections at the different audit firms, this would only influence the results in the unlikely case that deficient audit firms' clients scored consistently higher than clean audit firms' clients on the fee drivers.

[9] Audit firms indicate in their response letters to the draft inspection reports, that they have already implemented certain changes to address inspectors' criticisms. Hence, it is likely that some adjustments to effort and fees are made already after the inspection and not only after the date on which the inspection report is made public.

number of years 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 (ΔABNFEE).

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 A_1, 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 A_3, 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 being distributed similarly over time.

(Insert Landscape Figure 1 about here)

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 and would have to impact clients of deficient firms to a stronger degree than clients of non-deficient firms to drive the observed fee effect.

To test the first hypothesis, I regress the change in abnormal fees (ΔABNFEE) 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

17

compliance with SOX section 404b (cf. Raghunandan and Rama, 2006).[10] 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 fulfil the size criterion for accelerated-filers ($75million market capitalization) in the pre-inspection year but have to comply with 404b in the post-inspection year.[11] FROM_404b identifies clients that fulfil the size criterion in the pre-inspection year but do not in the post-inspection year. Hence, I estimate the following regression model:

$$
\begin{aligned}
\Delta ABNFEE = \alpha_0 + \alpha_1 DEF \\
+ \alpha_2 TO\_ICINEF + \alpha_3 FROM\_ICINEF \\
+ \alpha_4 TO\_404b + \alpha_5 FROM\_404b + \alpha_{6j} YEAR_j + \varepsilon
\end{aligned}
\tag{2}
$$

I predict the coefficient for DEF (α_1) to be significantly positive if inspections cause deficient audit firms to raise fees more than non-deficient audit firms.

For testing hypothesis 2a, I measure the degree of competition faced by the audit firm prior to the inspection. Following Kallapur et al. (2010), I calculate 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 clients, I define the audit market

---

[10] Section 404b requires management's evaluation of the effectiveness of internal controls to be audited by the external auditor. 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.

[11] Accelerated filers need to comply with section 404b for all year-ends on or after 15th November 2004. Non-accelerated filers do not need to comply with section 404b. 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.

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:

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

where N is the total number of small audit firms in the MSA, s_i is the size of the audit firm i as measured by number of clients, and S is the total size of the audit market in the MSA. I report the sensitivity of the 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 2a by regressing the change in abnormal fees on DEF, COMPETITION, and the interaction term DEFxCOMPETITION. As in model (3.2), I control for a time trend in audit fees and changes in fees related to ineffective internal controls and compliance with section 404b as shown below:

$$\begin{aligned}
\Delta ABNFEE = \alpha_0 &+ \alpha_1 DEF + \alpha_2 COMPETITION \\
&+ \alpha_3 DEFxCOMPETITION \\
&+ \alpha_4 TO\_ICINEF + \alpha_5 FROM\_ICINEF \\
&+ \alpha_6 TO\_404b + \alpha_7 FROM\_404b + \alpha_{8j} YEAR_j + \varepsilon
\end{aligned} \qquad (4)$$

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.

The test of hypothesis 2b is based on a measure of demand for audit quality. The demand for audit quality is driven by the desire to attain a lower cost of capital as the auditor acts as

monitoring mechanism and improves the quality of disclosed financial information and reduces agency costs (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 (Knechel et al., 2008, Abbott et al., 2008, Hay and Davis, 2004, DeFond, 1992, Firth and Smith, 1992, Healy, 1985), 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. Hence, the larger the firm, the more important gets the role of the auditor. Higher levels of leverage are associated with agency conflicts between creditors and shareholders because of the potential transfer of wealth and with creditors' 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. Growth in sales is associated with increased complexity as well as potential loss of organizational control.

I create a dummy variable that identifies low demand clients (LOWDEM). It is one whenever a client scores below the median on at least two out of the following four characteristics prior to the inspection: (1) leverage, (2) total assets, (3) inventory, receivables, and payables as percentage of assets, and (4) yearly percentage growth in sales. The test of hypothesis 2b is obtained by regressing the change in abnormal fees on DEF, the indicator for clients of audit firms with deficiencies, LOWDEM, the indicator for low-demand clients, and on the interaction of the two (DEFxLOWDEM). Again, I control for a time trend in audit fees

20

as well as fee changes related to ineffective internal controls and compliance with section 404b:

$$\Delta ABNFEE = \alpha_0 + \alpha_1 DEF + \alpha_2 LOWDEM + \alpha_3 DEFxLOWDEM$$
$$+ \alpha_4 TO\_ICINEF + \alpha_5 FROM\_ICINEF \qquad (5)$$
$$+ \alpha_6 TO\_404b + \alpha_7 FROM\_404b + \alpha_{8j} YEAR_j + \varepsilon$$

I expect a significantly positive value for α_3 if the change in abnormal fees is larger for clients of deficient firms that display low demand for audit quality in the pre-inspection period. I examine the sensitivity of the results to a more refined measure of LOWDEM based on an additional fifth category, the percentage of shares held by ordinary investors (free float). 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 unavailability, however, I refrain from using it in the main analysis.

V. RESULTS

5.1 Descriptives and audit fee model

Panel A of Table 1 provides an overview of the sample characteristics for the estimation period 2000 through 2002. 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 is at 51 percent and average ROA is -0.91.[12] 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.

Panel B of Table 1 shows the estimation result of the audit fee model for the years 2000 through 2002.[13] 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.

(Insert Table 1 about here)

The sample for the period 2003 through 2009 contains 139 audit firms. Out of those, 109 auditors have deficiencies while 30 auditors are without detected deficiencies. The number of

---

[12] 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.
[13] 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.

clients per audit firm varies between one and seventeen clients with an average of two clients. Table 2 lists descriptive statistics. Mean audit fees of $104,065 are higher compared to the estimation period. The average client is larger, with mean total assets of $27.5 million, slightly more profitable with ROA of -0.85 and reports more business segments than in the estimation period. 7% percent of the engagements have had the same auditor for three years or less.[14] 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 firms' clients with low demand for audit quality have lower audit fees than clients with high demand for audit quality, while clean firms' high- and low-demand clients do not have significantly different fees. This provides an initial indication that deficient audit firms where inclined to provide low effort when facing high fee pressure or low demand clients prior to the inspection.

(Insert Table 2 about here)

Table 3 provides an overview of abnormal audit fees (ABNFEE) for the years 2003 through 2009.[15] The table shows mean abnormal fees for clean and deficient audit firms pre- and post-inspection. Mean abnormal fees of clean and deficient audit firms' clients do not

---

[14] The low value of SHORTTENURE 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.

differ significantly pre-inspection. Abnormal fees of both clean and deficient audit firms' clients increase from pre- to post- inspection but deficient audit firms' fees increase to a stronger degree. Clients of deficient firms have significantly higher abnormal fees compared to clients of clean audit firms in the post-inspection period. This is consistent with the argument that audit firms deemed deficient by inspectors take action following the inspection.

(Insert Table 3 about here)

5.2 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 change 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' clients increase significantly more than fees of non-deficient firms' clients 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 when the auditor needs to give an opinion on the effectiveness of internal controls. Moreover, the year dummies are insignificant.

Column (II) of Panel A shows the test of hypothesis 2a. 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 at COMPETITION=0 (0.065, n.s.), clients of clean audit firms that have 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 at DEF=0 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 at COMPETITION=0 (0.230, p<0.01). The size of the fee change for clients of deficient audit firms increases with rising levels of competition faced by the audit firm prior to the inspection as shown by the effect for COMPETITION at DEF=1 (0.335, p<0.01). Thus, the difference between clean and deficient firms' fee increases gets more pronounced with competitive fee pressure. This provides support for hypothesis 2a.

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 2a based on all three specifications of the Herfindahl index (aggregate number of clients, assets, or fees).

(Insert Table 4 about here)

Column (III) of Panel A shows the test of hypothesis 2b. The intercept of 0.191 (p<0.05) represents the change in fees for clean audit firms' 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 CLEAN at LOWDEM=0 and DEF at LOWDEM=1. 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 (DEF at LOWDEM=1). Hence, the difference clean and deficient audit firms' clients fee increases is most pronounced for clients with low demand for audit quality. The significant interaction term DEFxLOWDEM provides support for hypothesis 2b.

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 2b. 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 high fee pressure caused by competition or low demand for audit quality. For the firms in the sample, the yearly increase in abnormal fees for deficient audit is comparable in magnitude to the increase due to compliance with section 404b.

5.3 Personnel adjustments

To provide further evidence that the observed fee increases reflect increases in effort rather than a fee premium to account for future expected losses, I examine changes in human resources for a subset of audit firms. Public Accounting Report (2008) 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 audit firm. I analyze changes in the number of employees using the twenty audit firms in my dataset that are included the top 100 lists for the years 2004 until 2008.

To calculate the change in personnel, I make use of a similar procedure as used for the change in abnormal fees. To obtain the change in professionals (ΔPROFESSIONALS) 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 ΔPARTNERS.

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 (ΔREVENUE) and the change in the number of clients (ΔCLIENTS). 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 firm revenue from tax or other services or the number of clients. Hence, I estimate the following regression equations:

$$\Delta PROFESSIONALS = \alpha_0 + \alpha_1 DEF + \alpha_2 \Delta REVENUE + \alpha_3 \Delta CLIENTS \\ + \alpha_{4j} YEAR_j + \varepsilon \qquad (6)$$

$$\Delta PARTNERS = \alpha_0 + \alpha_1 DEF + \alpha_2 \Delta REVENUE + \alpha_3 \Delta CLIENTS \\ + \alpha_{4j} YEAR_j + \varepsilon \qquad (7)$$

I also extend the model to include COMPETITION and the interaction term DEFxCOMPETITION to examine the extent to which adjustments in personnel echo the stronger adjustment of audit fees in settings of high pre-inspection fee pressure. Since this analysis is based on audit firm-specific observations of employees, an analysis based on variations in client-specific demand for audit quality is not applicable.

The results displayed in column (I) and (III) of Table 5 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 column (I) with ΔPROFESSIONALS as the dependent variable, while being insignificant in column (II) with ΔPARTNERS as the dependent variable. The extended models in column (II) and (IV) confirm the described relationships with the exception that DEF attains a significant positive coefficient of 1.473 ($p < 0.01$) also in the regression with ΔPARTNERS as the dependent variable. COMPETITION has a significantly negative effect in both models (-0.136, $p < 0.01$ and -0.37, $p < 0.05$) and the interaction term DEFxCOMPETITION is significant (0.249, $p < 0.05$) only in the model with ΔPROFESSIONALS as dependent variable. The results suggest that deficient

28

audit firms hire additional personnel following the inspection. The effect holds in particular for professionals as the number of partners is less flexible. The increase in hired professionals reflects the stronger rise of audit fees in settings where audit quality might have been compromised prior to the inspection.

(Insert Table 5 about here)

5.4 Additional analysis: Demand for audit firms with clean inspection reports

To rule out potential concerns, that audit firms with deficient inspection reports would not be able to raise their fees because of the risk of losing clients given clients' preference for audit firms with clean inspection reports, I examine the characteristics of switching clients in a supplementary analysis. Therefore, I use a sample of client observations that switch their auditor, selected based on the same criteria as this study's main sample without the requirement that a continuous auditor-client pair has to exist from before the year 2003 until one year after the inspection. Untabulated tests show that the frequency of switches from deficient audit firms does not increase after the inspection report is announced. Also, there is no significantly higher number of clients switching from a deficient audit firm to clean audit firms after the inspection report is announced. New clients at clean audit firms that have switched after a deficient inspection report was issued to their prior audit firm do not, on average, pay a significantly higher fee at their new auditor than they did at their previous auditor. Hence, there is no evidence for a fee premium for perceived higher quality at audit firms with a clean inspection report. Overall, these supplementary tests do not provide indication for a flight of clients from deficient audit firms to clean audit firms.

5.5 Additional analysis: Portfolio adjustments

While the results of the prior sections provide evidence for an increase in audit fees in response to the increased risk caused by the inspection, it is unclear whether audit firms can raise fees sufficiently to cover the full incremental effort that would be needed to fully cover the additional risk without losing clients. The PCAOB Board is concerned about indications that audit firms do not sufficiently address all deficiencies by means of increases in effort (Doty 2011). In fact, Elder et al. (2009) provide evidence that auditors use an array of alternative client risk management strategies with discontinuance being used for the more extreme levels of risk.

Prior literature also recognizes the use of auditor expertise as possible risk management strategy (Asare et al. 2005; Hackenbrack and Knechel 1997). With in-depth knowledge of a particular industry, the auditor develops a thorough understanding of unique risks and audit approaches for the industry and can thus better evaluate the audit risk, financial risk, and management's judgments incorporated in financial reporting decisions associated with clients within that industry. In fact, auditors with industry expertise are more likely to detect errors (Owhoso et al. 2002) and deliver higher quality audits (Bruynseels et al. 2011; Knechel et al. 2007; Carcello and Nagy 2004; Wright and Wright 1997). Deficient audit firms may thus address the increase in risk by adjusting their portfolio such as to focus on clients within its area of industry specialization.

I examine whether deficient audit firms accept new clients within the firm's specialization industry and discontinue clients outside the firm's specialization industry to a stronger degree than audit firms with a non-deficient inspection report after the inspection. To obtain the best possible representation of the complete client portfolios, I extend the sample

used for the prior analysis by removing the restriction requiring data availability in the prediction period[16]. This yields a sample of 4,219 client-years associated with 1,137 audit firm portfolio years, 1,280 clients, and 216 audit firms.

A first test is based on the difference between the year-specific means of newly accepted and discontinued clients at the audit firm level as shown in the following equation[17]:

$$ISPECIALIST\_DEV_{it} = \left[\frac{\sum_a ISPECIALIST_{ait}}{n_{ait}} - \frac{\sum_d ISPECIALIST_{dit}}{n_{dit}} \right] \tag{8}$$

where i denotes the audit firm, t denotes the year, and a and d stand for the newly accepted and discontinued clients, respectively. Thus, n_{ait} denotes the number of newly accepted clients of audit firm i in year t. ISPECIALIST is a measure of industry specialization based on Krishnan (2001), that focuses on the auditor's choice of investment in a certain industry. I define an auditor as industry specialist if an auditor's portfolio share of total assets represented by clients in a particular industry is at least twenty percent larger than 1/n with n being the number of industries the audit firm's clients operate in. To take into account differences in audit firm and industry sizes, I additionally define ISPECIALIST to equal one if more than one fifth of an audit firm's portfolio belongs to a certain industry and if the auditor audits more than one fifth of the overall industry.

A positive (negative) value of ISPECIALIST_DEV indicates that new clients are more (less) likely to be within the audit firm's area of industry specialization than discontinued clients. As a result, a positive change in ISPECIALIST_DEV shows that the difference between new and discontinued clients gets larger and thus the portfolio gets more risky. I

---

[16] However, I exclude audit firms that exit the market for public clients and those that merge with another audit firm during the period of investigation to remove any confounding effects of cases where the complete client portfolio disappears.

[17] Both acceptance and discontinuance decisions are the outcome of a negotiation process between the client and the auditor. Hence, auditor- and client-initiated decisions can not be clearly distinguished at a conceptual level and are combined in the analysis. The auditor's ability to adjust portfolio risk may for example be reduced if potential clients do not display the desired risk characteristics. Also, an auditor might decide to resign as result of its client's unwillingness to accept a fee raise or might decide to cut fees in order to keep a client that considers switching.

estimate the following regression model with indicators for observations in the post-inspection report date period (POST), for audit firms without deficiencies (CLEAN), and the interaction term POSTxCLEAN:

$$ISPECIALIST\_DEV_{it} = \alpha_0 + \alpha_1 POST + \alpha_2 CLEAN + \alpha_3 POSTxCLEAN + \varepsilon \qquad (9)$$

Results are displayed in Table 6. CLEAN obtains a significantly positive coefficient (0.560, p<0.05) and the interaction term POSTxCLEAN attains a significant negative coefficient (-1.375, p<0.01). While prior to the inspection, a larger fraction of clean audit firms' newly accepted clients lies within the firm's area of industry specialization as compared to the discontinued clients, this effect reverses after the inspection. Thus, after the inspection, deficient audit firms' portfolios get more specialized relative to clean audit firms' portfolios as deficient firms focus on the portfolio share of clients within their area of industry specialization[18].

(Insert Table 6 about here)

The measure of ISPECIALIST_DEV does not allow to distinguish whether the change in the overall audit firm's portfolio is driven by either new clients, discontinued clients, or both. Also, this test is restricted to a subset of audit firms with available information on switching and new clients in the same year for at least one financial year prior to and for at least one financial year after the inspection report publication year. For that reason, I conduct an additional test based on separate sets of new and discontinued client observations, respectively. For each client group (new/discontinued), the following logistic regression

---

[18] I repeat the tests basing the measure of industry specialization on the number of clients rather than total assets of clients, yielding similar results. The results are further robust to defining an auditor as industry specialist when the auditor's portfolio industry share is at least 1/n, 10 percent larger, or 30 percent larger than 1/n. and to adjusting the cut-off level for the audit firm's portfolio industry share and overall industry share to 15 and 25 percent.

model of the respective indicator variable on CLEAN, POST, and the interaction term CLEANxPOST is estimated:

$$ISPECIALIST = \alpha_0 + \alpha_1 POST + \alpha_2 CLEAN + \alpha_3 POSTxCLEAN + \alpha_4 NLCLIENTS + \varepsilon \qquad (10)$$

NCLIENTS controls for the number of clients within the audit firm's portfolio as the likelihood for a client to be a within an audit firm's area of industry specialization is associated with portfolio size. The results in Table 6 show that the regression with new client observations obtains significant coefficients for CLEAN (1.254, $p<0.01$) and for the interaction term POSTxCLEAN (-1.144, $p<0.05$). The control variable NCLIENTS has a statistically significant coefficient (-0.016, $p<0.05$) and an odds ratio below one, indicating that the likelihood for a new client to be within the audit firm's area of industry specialization decreases with the audit firm's portfolio size. The odds ratios show that new clients of clean audit firms are less likely to be within the auditor's area of industry specialization after the inspection, while the opposite holds for deficient audit firms. The regression with discontinued client observations does not yield significant coefficients for POST, CLEAN, or the interaction term[19].

The analysis indicates that clean and deficient audit firms display significantly different behaviour with regard to portfolio industry specialization in response to the inspection. Deficient audit firms obtain more specialized portfolios relative to audit firms with a clean inspection report after the inspection report was published. The additional tests reveal that audit firms achieve portfolio adjustments in response to inspections mainly via their client acceptance decisions. Possibly, audit firms are reluctant to disrupt established client-relationships and prefer to be more critical in the selection of newly accepted clients. The

---

[19] Results remain unchanged when examining auditor resignations and client dismissals separately.

following section examines the sensitivity of the main results to a number of alternative methodological approaches.

VI. SENSITIVITY CHECKS

6.1 Post-Sox fee prediction model

As the estimation period for the fee model is based on pre-SOX data, 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 conduct additional tests to address potential concerns that a pre-SOX fee prediction model does not properly account for fee changes caused by SOX requirements apart from the PCAOB inspections. I repeat all tests using fee residuals from a fee prediction model based on the post-SOX years 2003 through 2009. The results are qualitatively similar and conclusions regarding all hypotheses persist. To evaluate the impact of additional design choices on the results, the following sections contain a number of further tests to confirm the results of the main hypothesis.

6.2 Fees outside the prediction interval

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. Hence, I generate a more conservative 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 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 (ΔABNFEE2) is calculated as the difference between available year observations pre- and post-inspection scaled by the number of years that lie between them.[20] I estimate regression (2) with ΔABNFEE2 as dependent variable. DEF has a significantly positive coefficient indicating that clients of deficient firms are associated with larger fee increases. Thus, the results confirm the prior conclusions regarding the main hypothesis.

6.3 Post-SOX models of audit fees

I also run an audit fee model using only observations in the Post-Sox period from 2003 onwards. 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 term POSTxDEF, controls for client characteristics used in model (3.1), and year dummies. A significantly positive interaction term obtains even after including industry dummies and audit firm fixed effects. This model is considered inferior to the design used in the main analysis however, as the inclusion of additional interaction terms to test hypotheses 2a and 2b would raise potential issues of multicollinearity and bias.

I use an unbalanced panel in the prior test to rule out any potential confounding effects of the second inspection. For that reason, 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

---

[20] ΔABNFEE2 is winsorized at the 1st and 99th percentile.

with data available in all years of the period 2003 through 2006, thus before the second-inspection round has started. The results are not displayed but again confirm the prior conclusions regarding the main hypothesis.

VII. CONCLUSION

In view of recent regulatory changes that establish independent inspections of US audit firms, this paper 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 more than those of client audit firms' clients from pre- to post-inspection, controlling for client characteristics and a trend in time. More specifically, the larger increase in fees of 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. The results are consistent with an overall increase in auditor effort for deficient audit firms, especially in settings where 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, which further corroborates that the fee increase reflects effort adjustments rather than a fee premium to cover future expected losses.

A few data limitations and avenues for future research 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 three (estimation, pre-, and post-inspection periods). Further, the lack of available data on 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 the investors' perspective. 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, 2010a). In this context, the increase in fees in particular for clients with low demand for audit quality is potentially worrying as the additional audit effort on non-complex clients might not be needed by investors. In their response letters, audit firms have complained that inspectors' expectations cause audits to get prohibitorily 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 inspectors' 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 study adds to the literature on the cost and benefits of independent reviews of audit firms at a time where review systems are established and refined across the world and where 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 about changes in client-level fees. The study contributes to the literature by showing that the established US inspection system seems to provide sufficient incentives for audit firms to adjust their behaviour and increase audit effort. 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 potentially adverse effects of high fee pressure caused by competition and client-specific demand characteristics. The insights 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.

REFERENCES

Abbott, L.J., Gunny, K. & Zhang, T.C. (2008). When the PCAOB Talks, Who Listens? Evidence from Client Firm Reactions to Adverse, GAAP-deficient PCAOB Inspection Reports. Working paper, University of Memphis, University of Colorado at Boulder and Singapore Management University.

Abdel-Khalik, A.R. (1993). Why Do Private Companies Demand Auditing? A Case for Organizational Loss of Control. *Journal of Accounting, Auditing and Finance,* Vol. 8, No. 1**,** pp. 31-52.

Bell, T.B., Landsman, W.R. & Shackelford, D.A. (2001). Auditors' Perceived Business Risk and Audit Fees: Analysis and Evidence. *Journal of Accounting Research,* Vol. 39, No. 1**,** pp. 35-43.

Botosan, C. (1997). Disclosure Level and the Cost of Equity Capital. *The Accounting Review,* Vol. 72, No. 3**,** pp. 323-349.

Carcello, J.V., Hermanson, D.R., Neal, T.L. & Riley Jr, R.A. (2002). Board Characteristics and Audit Fees. *Contemporary Accounting Research,* Vol. 19, No. 3**,** pp. 365-384.

Carcello, J.V., Hollingsworth, C. & Mastrolia, S. (2008). The Effect of PCAOB Inspections on Big4 Audit Quality. Working paper, University of Tennessee and Clemson University.

Casterella, J.R., Francis, J.R., Lewis, B.L. & Walker, P.L. (2004). Auditor Industry Specialization, Client Bargaining Power, and Audit Pricing. *Auditing: A Journal of Practice and Theory,* Vol. 23, No. 1**,** pp. 123-140.

Causholli, M., Knechel, W.R., Lin, H. & Sappington, D.E.M. (2010). Competitive Procurement of a Credence Good: The Case of Auditing. Working paper, University of Kentucky, University of Florida and University of Houston.

Chaney, P.K., Jeter, D.C. & Shaw, P.E. (2003). The Impact on the Market for Audit Services of Aggressive Competition by Auditors. *Journal of Accounting and Public Policy,* Vol. 22**,** pp. 487-516.

Copley, P.A., Doucet, M.S. & Gaver, K.M. (1994). A Simultaneous Equations Analysis of Quality Control Review Outcomes and Engagement Fees for Audits of Recipients of Federal Financial Assistance. *The Accounting Review,* Vol. 69, No. 1**,** pp. 244-256.

Coram, P., Ng, J. & Woodcliff, D.R. (2004). The Effect of Risk of Misstatement on the Propensity to Commit Reduced Audit Quality Acts under Time Budget Pressure. *Auditing: A Journal of Practice and Theory,* Vol. 23, No. 2**,** pp. 161-169.

Craswell, A.T., Francis, J.R. & Taylor, S.L. (1995). Auditor Brand Name Reputations and Industry Specializations. *Journal of Accounting and Economics,* Vol. 20, No. 3**,** pp. 297-322.

Daugherty, B., Dickins, D. & Tervo, W.A. (2009). The Impact of PCAOB Inspections on Triennially Inspected Auditing Firms. Working paper, University of Wisconsin.

Daugherty, B. & Tervo, W. (2010a). PCAOB Inspections of Smaller CPA Firms: The Perspective of Inspected Firms. *Accounting Horizons,* Vol. 24, No. 2**,** pp. 189-219.

Davis, L.R. & Ricchiute, D.N. (1993). Audit Effort, Audit Fees, and the Provision of Nonaudit Services to Audit Clients. *The Accounting Review,* Vol. 68, No. 1**,** pp. 135-150.

DeFond, M.L. (1992). The Association Between Changes in Client Firm Agency Costs and Auditor Switching. *Auditing: A Journal of Practice and Theory,* Vol. 11, No. 1**,** pp. 16-31.

Elder, R., Zhang, Y., Zhou, J. & Zhou, N. (2009). Internal Control Weaknesses and Client Risk Management. *Journal of Accounting, Auditing & Finance,* Vol. 24, No. 4**,** pp. 543-579.

Elliott, R.K. (1998). Assurance Services and the Audit Heritage. *Auditing: A Journal of Practice and Theory,* Vol. 17**,** pp. 1-7.

Engel, E., Hayes, R.M. & Wang, X. (2010). Audit committee compensation and the demand for monitoring of the financial reporting process. *Journal of Accounting and Economics,* Vol. 49, No. 1-2**,** pp. 136-154.

Farrell, J. & Shadab, H. (2005). The Focus of Future PCAOB Auditor Inspections. *CPA Journal* No. June**,** pp. p. 9.

Fiolleau, K., Hoang, K., Jamal, K. & Sunder, S. (2009). Engaging Auditors: Field Investigation of a Courtship. Working paper, University of Alberta and Yale University.

Firth, M. & Smith, A. (1992). Selection of Auditor Firms by Companies in the New Issue Market. *Applied Economics,* Vol. 24**,** pp. 247-255.

Francis, J.R. (2004). What do we know about audit quality? *British Accounting Review,* Vol. 36, No. 4**,** pp. 345-368.

Francis, J.R., Reichelt, K. & Wang, D. (2005). The Pricing of National and City-Specific Reputations for Industry Expertise in the U.S. Audit Market. *The Accounting Review,* Vol. 80, No. 1**,** pp. 113-136.

Francis, J.R. & Wilson, E.R. (1988). Auditor Changes: A Joint Test of Theories Relating to Agency Costs and Auditor Differentiation. *The Accounting Review,* Vol. 63, No. 4**,** pp. 663-682.

Freckleton, R.P. (2002). On the Misuse of Residuals in Ecology: Regression of Residuals vs. Multiple Regression. *Journal of Animal Ecology,* Vol. 71**,** pp. 542-545.

Gilbertson, D.L. & Herron, T.L. (2009). PCAOB Enforcements: A Review of the First Three Years. *Current Issues in Auditing,* Vol. 3, No. 2**,** pp. A15-A34.

Glover, S.M., Prawitt, D.F. & Taylor, M.H. (2009). Audit Standard Setting and Inspection for U.S. Public Companies: A Critical Assessment and Recommendations for Fundamental Change. *Accounting Horizons,* Vol. 23, No. 2**,** pp. 221-237.

Gramling, A.A., Krishnan, J. & Zhang, Y. (2011). Are PCAOB Identified Audit Deficiencies Associated with a Change in Reporting Decisions of Triennially Inspected Audit Firms? *Auditing: A Journal of Practice and Theory, forthcoming*.

Gunny, K., Krishnan, G. & Zhang, T.C. (2007). Is Audit Quality Associated with Auditor Tenure, Industry Expertise, and Fees? Evidence from PCAOB Opinions. Working paper, University of Colorado at Boulder, Lehigh University and Singapore Management University.

Gunny, K. & Zhang, T.C. (2011). PCAOB Inspection Reports and Audit Quality. Working paper, University of Colorado at Boulder and Singapore Management University.

Hay, D. & Davis, D. (2004). The Voluntary Choice of an Auditor of Any Level of Quality. *Auditing: A Journal of Practice and Theory,* Vol. 23, No. 2**,** pp. 37-53.

Hay, D.C., Knechel, W.R. & Wong, N. (2006). Audit Fees: A Meta-analysis of the Effect of Supply and Demand Attributes. *Contemporary Accounting Research,* Vol. 23, No. 1**,** pp. 141-191.

Healy, P.M. (1985). The Effect of Bonus Schemes on Accounting Decisions. *Journal of Accounting and Economics,* Vol. 7**,** pp. 85-107.

Hodowanitz, J. & Solieri, S.A. (2005). Guarding the Guardians. *Strategic Finance,* Vol. 87, No. 2**,** pp. 47-53.

Hope, O.-K., Langli, J.C. & Thomas, W.B. (2011). Agency Conflicts and Auditing in Private Firms. In *3rd EIASM Workshop on Audit Quality.* Bellagio, Italy: Working paper, University of Toronto, Norwegian School of Management and University of Oklahoma.

Houston, R.W. (1999). The Effects of Fee Pressure and Client Risk on Audit Seniors' Time Budget Decisions. *Auditing: A Journal of Practice and Theory,* Vol. 18, No. 2.

Imhoff, J.E.A. (2003). Accounting Quality, Auditing, and Corporate Governance. *Accounting Horizons,* Vol. 17**,** pp. 117-128.

Jensen, K.L. & Payne, J.L. (2005). Audit Procurement: Managing Audit Quality and Audit Fees in Response to Agency Costs. *Auditing: A Journal of Practice and Theory,* Vol. 24, No. 2**,** pp. 27-48.

Jessup, C.M. & Young, T.F. (2009). An Analysis of Firm Responses to PCAOB Inspection Reports. In *AAA Auditing Section Midyear Meeting.* San Diego: Working paper, Southern Illinois University and Horace Mann Educators Corporation.

Johnstone, K.M. & Bedard, J.C. (2003). Risk Management in Client Acceptance Decisions. *The Accounting Review,* Vol. 78, No. 4**,** pp. 1003-1025.

Kallapur, S., Sankaraguruswamy, S. & Zang, Y. (2010). Audit Market Concentration and Audit Quality. Working paper, Indian School of Business, National University of Singapore and Singapore Management University.

Knechel, W.R., Niemi, L. & Sundgren, S. (2008). Determinants of Auditor Choice: Evidence from a Small Client Market. *International Journal of Auditing,* Vol. 12**,** pp. 65-88.

Krishnan, J. (2001). A Comparison of Auditors' Self-reported Industry Expertise and Alternative Measures of Industry Specialization. *Asia-Pacific Journal of Accounting and Economics,* Vol. 8**,** pp. 127-142.

Larcker, D.F. & Richardson, S.A. (2004). Fees Paid to Audit Firms, Accrual Choices, and Corporate Governance. *Journal of Accounting Research,* Vol. 42, No. 3**,** pp. 625-658.

Lennox, C. (2011). PCAOB Inspections of Small Audit Firms and Audit Quality. Working Paper, Hong Kong University of Science and Technology.

Lennox, C. & Pittman, J. (2010). Auditing the Auditors: Evidence on the Recent Reforms to the External Monitoring of Audit Firms. *Journal of Accounting and Economics,* Vol. 49, No. 1/2**,** pp. 84-103.

Lyon, J.D. & Maher, M.W. (2005). The Importance of Business Risk in Setting Audit Fees: Evidence from Cases of Client Misconduct. *Journal of Accounting Research,* Vol. 43, No. 1**,** pp. 133-151.

Maher, M.W., Tiessen, P., Colson, R. & Broman, A.J. (1992). Competition and Audit Fees. *The Accounting Review,* Vol. 67, No. 1**,** pp. 199-211.

Menon, K. & Williams, D.D. (2001). Long-Term Trends in Audit Fees. *Auditing: A Journal of Practice and Theory,* Vol. 20, No. 1**,** pp. 115.

Nelson, M.W. (2006). Ameliorating Coflicts of Interest in Auditing: Effects of Recent Reforms on Auditors and their Clients. *Academy of Management Review,* Vol. 31, No. 1**,** pp. 30-42.

Neter, J., Wasserman, W. & Kutner, M.H. (1983). *Applied Linear Regression Models*: Richard D. Irwin, Inc.

Newman, B.H. & Oliverio, M.E. (2009). PCAOB Inspections: Perceptions of Triennial Firms with No-Deficiency Inspections. Working Paper, Pace University.

Offermanns, M. & Peek, E. (2011). Investor Reactions to PCAOB Inspection Reports. Maastricht University, Working Paper.

Office of Management and Budget (2009). OMB Bulletin No. 10-02. Executive Office of the President (Ed.). Washington, D.C. 20503.

Palmrose, Z.-V. (2005). Maintaining the Value and Viability of Independent Auditors as Gatekeepers Under SOX: An Auditing Master Proposal. Working paper, University of Southern California.

Public Accounting Report (2008). Public Accounting Report's Top 100. CCH Incorporated.

Public Company Accounting Oversight Board (2005). Inspection Report of Beckstead & Watts, LLP, 9/28/2005. Washington.

Public Company Accounting Oversight Board (2009). http://www.pcaobus.org/Inspections/index.aspx.

Public Company Accounting Oversight Board (2011). http://pcaobus.org.

Raghunandan, K. & Rama, D.V. (2006). SOX Section 404 Material Weakness Disclosures and Audit Fees. *Auditing: A Journal of Practice and Theory,* Vol. 25, No. 1**,** pp. 99-114.

Read, W.J., Rama, D.V. & Raghunandan, K. (2004). Local and Regional Audit Firms and the Market for SEC Audits. *Accounting Horizons,* Vol. 18, No. 4**,** pp. 241-254.

Reynolds, J.K. & Francis, J.R. (2001). Does Size Matter? The Influence of Large Clients on Office-level Auditor Reporting Decisions. *Journal of Accounting and Economics,* Vol. 30**,** pp. 375-400.

Sanders, G., Allen, A. & Korte, L. (1995). Municipal Audit Fees: Has Increased Competition Made a Difference? *Auditing: A Journal of Practice and Theory,* Vol. 14, No. 1**,** pp. 105-114.

Schelleman, C. & Knechel, W.R. (2010). Short-Term Accruals and the Pricing and Production of Audit Services. *Auditing: A Journal of Practice and Theory,* Vol. 29, No. 1.

Seetharaman, A., Gul, F.A. & Lynn, S.G. (2002). Litigation Risk and Audit Fees: Evidence from UK Firms Cross-listed on US Markets. *Journal of Accounting and Economics,* Vol. 33, No. 1**,** pp. 91-115.

Simunic, D.A. (1980). The Pricing of Audit Services: Theory and Evidence. *Journal of Accounting Research,* Vol. 18, No. 1**,** pp. 161-190.

Simunic, D.A. & Stein, M.T. (1996). The Impact of Litigation Risk on Audit Pricing: A Review of the Economics and the Evidence. *Auditing: A Journal of Practice and Theory,* Vol. 15, No. 2**,** pp. 119-134.

Sirois, L.-P. & Simunic, D.A. (2010). Auditor Size and Audit Quality Revisited: The Importance of Audit Technology. Working paper, HEC Montreal and University of British Columbia.

Stefaniak, C. & Houston, R. (2009). Investigating the Effects of Post-Audit Review Salience on Auditor Judgments: A Comparative Analysis of Audit Planning Decisions Resulting From PCAOB Inspections and Internal Quality Reviews. In *AAA Auditing Midyear Meeting.* San Diego: Working paper, Oklahoma State University and University of Alabama.

Texas Society of Certified Public Accountants (2000). Management of an Accounting Practice Survey. Dallas.

U.S. Congress (2002). Sarbanes-Oxley Act (SOX), Public Law 107-204. *107th Congress, 2nd Session, July 24, 2002*.

US Government Accountability Office (2008). Audits of Public Companies - Continued Concentration in Audit Market for Large Public Companies Does Not Call for Immediate Action.

Van de Poel, K., van Opijnen, M., Maijoor, S. & Vanstraelen, A. (2009). Public Oversight and Audit Quality: Evidence from Public Oversight of Audit Firms in the Netherlands. In *AAA Auditing Section Midyear Meeting* San Diego: Working paper, University of Antwerp and Maastricht University.

Watts, R.L. & Zimmerman, J.L. (1983). Agency Problems, Auditing, and the Theory of the Firm: Some Evidence. *Journal of Law and Economics,* Vol. 26**,** pp. 613-634.

Wegman, J. (2006). Government Regulation of Accountants: The PCAOB Enforcement Process. Working paper, University of Idaho.

FIGURE 1

Inspections of audit firms A_n

First round: ⇑ Second round: ⇑

Estimation Period

| 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |

TIME

C_1-A_1 PRE   POST

C_2-A_1 PRE   POST

C_1-A_2 PRE   POST

C_1-A_3 PRE   POST

C_1-A_4 PRE   POST

C_1-A_5 PRE   POST

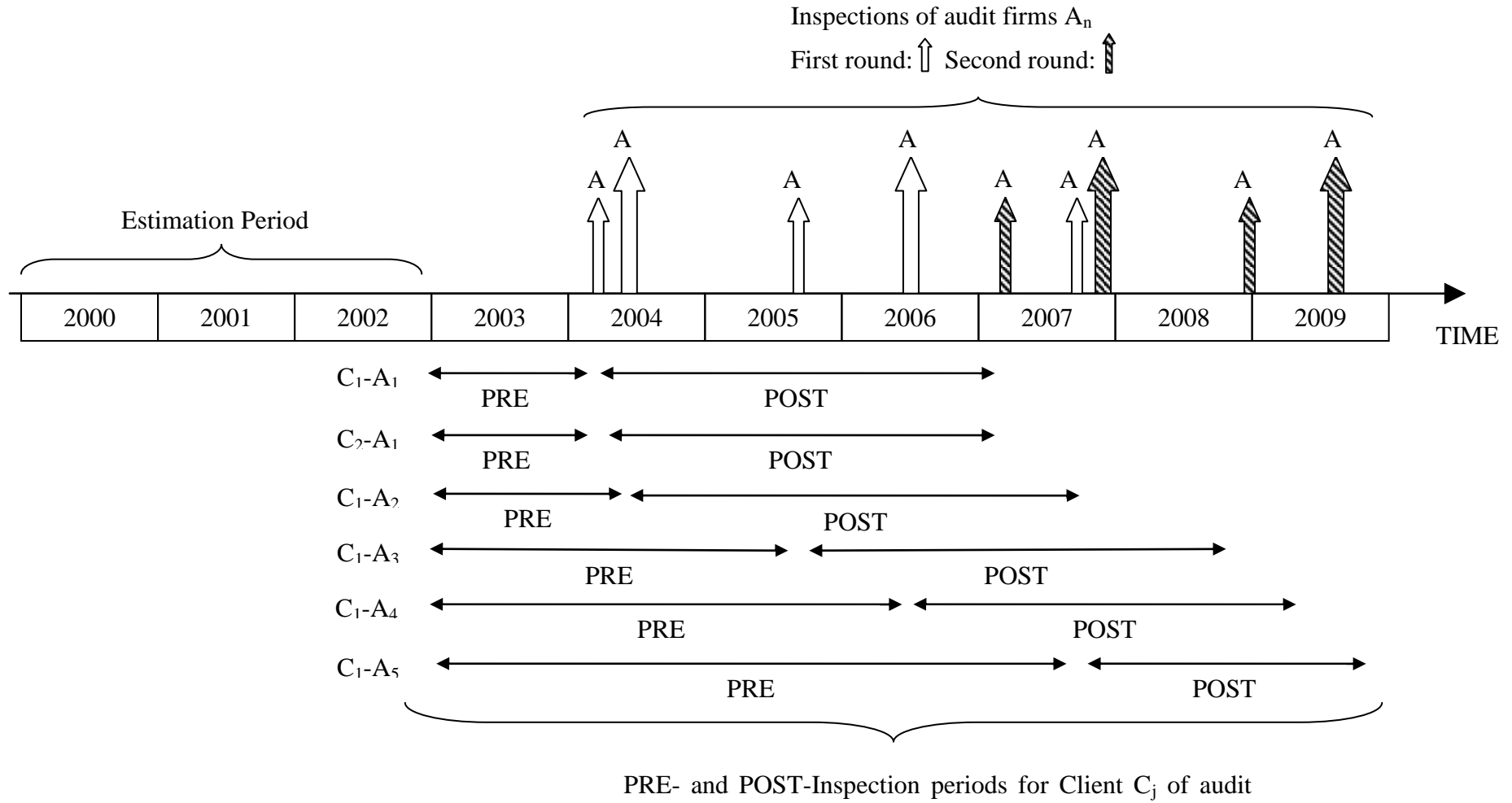PRE- and POST-Inspection periods for Client C_j of audit

TABLE 1 Audit fee prediction model

Panel A: Descriptive statistics for the estimation period 2000–2002

	N	Mean	StdDev	Minimum	Median	Maximum
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

Dependent variable: LOGAUDITFEE	Coefficient	T-statistic
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	

Notes: Panel A shows descriptive statistics for all observations in the estimation period 2000 through 2002. All continuous variables have been winsorized at the 5th and 95th percentile. 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. SHORTTENURE equals one for engagements with tenure of three or less years. And DEF indicates whether the client was audited by an audit firm with a deficient inspection result. **Panel B** shows the result 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. 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.

*, **, *** Significant at the 0.10, 0.05, 0.01 levels, respectively.

TABLE 2 Descriptive statistics

Panel A: Descriptive statistics for all client observations in the sample period 2003–2009

	N	Mean	StdDev	Minimum	Median	Maximum
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

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

	CLEAN		DEFICIENT		Difference in means	T-statistic
	N	Mean	N	Mean		
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)

Notes: ICINEF and 404b identify observations having ineffective internal controls and fulfilling the size criteria to comply with SOX section 404b, respectively. SHORTTERMACC is the percentage of short term accruals measured as inventories, receivables, and payables scaled by total assets. SALESGROWTH is the yearly percentage growth in sales. FREEFLOAT equals the percentage of total shares in issue available to ordinary investors. The remaining variables are defined in Table 1. Continuous variables have been winsorized at the 5th and 95th percentile. *, **, *** Significant at the 0.10, 0.05, 0.01 levels, respectively.

TABLE 3 Univariate results

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

Notes: This table 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 logarithm 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 are provided in brackets underneath *, **, *** Significant at the 0.10, 0.05, 0.01 levels, respectively.

TABLE 4 Differences in abnormal audit fees

Panel A: Regression model of changes in abnormal audit fees

	(I) ΔABNFEE	(II) ΔABNFEE	(III) ΔABNFEE
Intercept	0.085	0.065	0.191
	(1.11)	(0.84)	(2.15)**
DEF	0.141	0.165	0.032
	(3.03)***	(3.48)***	(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	0.425	0.390
	(3.03)***	(3.03)***	(3.16)***
FROM_ICINEF	-0.093	0.052	-0.070
	(-1.51)	(0.32)	(-0.90)
TO_404b	0.151	0.148	0.164
	(2.58)**	(2.52)**	(2.43)**
FROM_404b	0.061	0.055	0.153
	(0.68)	(0.62)	(1.18)
YEAR2005	0.010	0.025	-0.026
	(0.14)	(0.34)	(-0.34)
YEAR2006	0.036	0.049	0.010
	(0.51)	(0.68)	(0.13)
YEAR2007	0.008	0.018	-0.014
	(0.11)	(0.25)	(-0.18)
YEAR2008	-0.025	-0.019	-0.02
	(-0.31)	(-0.24)	(-0.23)
YEAR2009	0.032	0.038	-0.024
	(0.32)	(0.38)	(-0.23)
R-squared	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 sizes in different groups

	ΔABNFEE	ΔABNFEE
CLEAN at COMPETITION=0	0.065	
	(0.84)	
DEF at COMPETITION=0	0.230	
	(3.48)***	
COMPETITION at DEF=0	-0.063	
	(-0.45)	
COMPETITION at DEF=1	0.335	
	(2.85)***	
CLEAN at LOWDEM=0		0.191
		(2.15)**
DEF at LOWDEM=0		0.223
		(3.03)***
CLEAN at LOWDEM=1		0.013
		(0.13)
DEF at LOWDEM=1		0.276
		(3.43)***

Notes: Panel A displays the results of three regressions of abnormal audit fee changes. ΔABNFEE measures the change in abnormal audit fees based on the difference between available year observations of ABNFEE pre- and post- 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 the 1st and 99th percentile. DEF indicates clients of deficient audit firms. 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 trend in time. Column (II) contains the variable COMPETITION, 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) contains LOWDEM, an indicator variable for client firms with low demand for audit quality, that equals one whenever a client lies below the median on at least two out of the following four characteristics: total assets, leverage, short term accruals, and yearly percentage growth in sales. 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. **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. T-values are listed in brackets underneath.
*, **, *** Significant at the 0.10, 0.05, 0.01 levels, respectively.

TABLE 5 Changes in audit firm personnel

	ΔPROFESSIONALS		ΔPARTNERS	
	(I)	(II)	(III)	(IV)
Intercept	-0.042	-0.062	-0.551	-0.592
	(-0.51)	(-0.79)	(-2.62)**	(-2.88)***
DEF	0.084	0.598	0.102	1.473
	(2.82)**	(4.47)***	(1.61)	(3.19)***
ΔREVENUE	0.627	0.109	1.258	0.117
	(4.98)***	(4.07)***	(2.45)**	(2.62)**
ΔCLIENTS	-0.053	-0.053	0.288	0.273
	(-1.07)	(-1.01)	(1.31)	(1.17)
COMPETITION		-0.136		-0.370
		(-3.09)***		(-2.54)**
DEFxCOMPETITION		0.249		-0.259
		(2.81)**		(-0.58)
Y2005	-0.066	-0.062	0.352	0.322
	(-0.78)	(-0.73)	(1.66)	(1.46)
Y2006	0.008	0.015	0.599	0.553
	(0.09)	(0.17)	(2.82)**	(2.40)**
Y2007	-0.015	-0.006	0.441	0.387
	(-0.17)	(-0.07)	(2.31)**	(1.85)*
R-squared	0.539	0.549	0.357	0.382
Number of observations	97	97	97	97

Notes: This table displays the results of regressing the change in the number of audit firm professionals (ΔPROFESSIONALS) and the number of audit partners (ΔPARTNERS) on an indicator for deficient audit firms (DEF) and a number of control variables. ΔPARTNERS measures the change in the number of partners of an audit firm from pre- to post-inspection. ΔPROFESSIONALS measures the change in the number of professionals employed by the audit firm from pre- to post-inspection. ΔREVENUE measures the change in audit firm overall audit fee revenue. ΔCLIENTS 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 regressions in column (II) and (IV) extend the models in column (I) and (III), respectively, by adding COMPETITION and the interaction term COMPETITIONxDEF. 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 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 audit firm-level. T-values are stated in brackets underneath the coefficients.

*, **, *** Significant at the 0.10, 0.05, 0.01 levels, respectively.

TABLE 6 Analysis of adjustments in client portfolios

	(I) ISPECIALIST_ DEV		(II) New clients ISPECIALIST	(III) Discontinued clients ISPECIALIST
Coefficients:				
INTERCEPT	0.045		0.157	0.722
	(0.46)		(1.42)	(11.31)***
POST	-0.229		0.046	0.155
	(-1.60)		(0.07)	(0.37)
CLEAN	0.560		1.254	0.199
	(2.62)**		(13.46)***	(0.18)
POSTxCLEAN	-1.375		-1.144	1.058
	(-5.78)***		(4.38)**	(1.35)
NCLIENTS			-0.016	-0.063
			(3.69)*	(22.38)***
R-squared	0.163	Likelihood ratio	24.201	35.829
Number of observations	73		772	329
Odds ratios:				
POST at CLEAN=0			1.047	1.167
POST at CLEAN=1			0.334	3.361
CLEAN at POST=0			3.504	1.221
CLEAN at POST=1			1.116	3.515
NCLIENTS			0.984	0.939

Notes: This table shows the results of regressions analyzing adjustments in audit firm client portfolios. Column (I) displays the results of a regression of audit firm-year specific mean differences between new and discontinued clients on indicators for financial years after the inspection report date (POST) and audit firms with clean inspection reports (CLEAN) and an interaction of the two (POSTxCLEAN). POST is defined based on the audit firm portfolio year such that years after the publication year of the inspection report are categorized as post. Differences are calculated such that more positive (negative) differences indicate higher (lower) values of new compared to discontinued clients. ISPECIALIST_DEV is calculated by sutracting the mean of ISPECIALIST of discontinued clients out of the firm's prior year portfolio from the mean of ISPECIALIST of the newly accepted clients within of the audit firm's current year portfolio. Column (II) displays results of logistic regressions that examine the likelihood that a the auditor is a specialist on a new client's industry based on pre- and post-inspection period (POST) and the auditor's inspection result (CLEAN). Column (III) displays results of a similar regression as column (II) using leaving clients instead of new clients instead. ISPECIALIST indicates whether the audit firm is a specialist in the client's industry. NCLIENTS is a measure of the number of clients within an audit firm's portfolio and controls for the association between the likelihood of industry specialization and portfolio size. T-values are listed in brackets underneath.

*, **, *** Significant at the 0.10, 0.05, 0.01 levels, respectively.