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Essays on the Value of Audit Quality and Auditor Transparency for Clients

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ABSTRACT

The thesis consists of two essays that examine how revealed information on auditors is perceived by their clients and how it affects their auditor appointment choices.

The first essay, which is solo-authored, investigates how audit clients involved in financial reporting misconduct react to the regulatory exposure driven by their auditors' PCAOB inspection findings. Using a text-based measure to capture this exposure during the period of misconduct, I explore the degree of exposure avoidance shown by the clients. The findings suggest that, as a salient manifestation of this avoidance, auditor dismissals are more likely to occur in companies whose auditors' deficiencies relate to their own misconduct. The overall inspection performance of the auditor, on the other hand, has a negative impact on dismissals. Combined, these results suggest that clients involved in misconduct are not concerned about their auditors' inferior inspection performance per se, but rather about inspection findings that particularly relate to their own misconduct. Additional analyses further suggest that this behavior is attributable to powerful CFOs, and that dismissals help clients involved in misconduct to avoid litigation, at least temporarily. The findings point to some potential unintended consequences of increasing transparency in the audit industry.

The second essay, co-authored with Angela Pettinicchio, investigates if and how much the audit clients value reliable and comparable indicators of audit quality. We contribute to the recent regulatory debate on whether the market for audit services would benefit from the availability of further information on auditors. We propose and employ the PCAOB inspection findings as a strong and reliable proxy for audit quality, and explore how it affects the clients' choice of external auditors using a discrete choice demand estimation framework. Our results show that a better performance in PCAOB inspections has a positive first-order

effect on clients' preferences for auditors. Further, we exploit the framework to get preliminary additional insight on how client-specific determinants influence preferences over audit quality. The results suggest a curvilinear relationship between client size and demand for quality.

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Mert Erinç *

Abstract

This study investigates how audit clients involved in financial reporting misconduct react to the regulatory exposure driven by their auditors' PCAOB inspection findings. Using a text-based measure to capture this exposure during the period of misconduct, I explore the degree of exposure avoidance shown by the clients. The findings suggest that, as a salient manifestation of this avoidance, auditor dismissals are more likely to occur in companies whose auditors' deficiencies relate to their own misconduct. The overall inspection performance of the auditor, on the other hand, has a negative impact on dismissals. Combined, these results suggest that clients involved in misconduct are not concerned about their auditors' inferior inspection performance per se, but rather about inspection findings that particularly relate to their own misconduct. Additional analyses further suggest that this behavior is attributable to powerful CFOs, and that dismissals help clients involved in misconduct to avoid litigation, at least temporarily. The findings point to some potential unintended consequences of increasing transparency in the audit industry.

Keywords: financial reporting misconduct, regulatory exposure, audit oversight, transparency

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1 Introduction

Following the enactment of the Sarbanes-Oxley Act in 2002, the audit profession experienced a shift from a self-regulatory peer-review system to the current audit oversight regime managed by the Public Company Accounting Oversight Board (PCAOB). Since 2005, PCAOB has been conducting periodic inspections on auditors to monitor their compliance with professional standards and rules, and it reports on the deficiencies identified in its reviews of each auditor's selected engagements. The primary objective of these inspections is to urge auditors to improve the tests and procedures they use that the PCAOB has identified as problematic in inspections. Moreover, a relevant objective is to inform the audit committees of current and potential clients to consider these deficiencies in their engagement decisions and to pressure their auditors into exercising due care (PCAOB, 2015a). As a result of these inspections, PCAOB often takes action against non-complying auditors, including disciplinary proceedings and referrals to the Securities and Exchange Commission (SEC).

In this study, I investigate the effect of the PCAOB's public disclosure of inspection findings from the perspective of the clients of inspected auditors. Specifically, I explore the audit clients' opportunistic use of the inspection reports when they are involved in financial reporting misconduct in an effort to avoid public scrutiny.

Audit firms take PCAOB's feedback seriously, and redesign and improve their tests and procedures in the critical areas identified in the inspections (Aobdia, 2018). Previous literature has largely investigated PCAOB inspection reports. One stream of literature has focused on the consequences of PCAOB inspections, which can include audit fees, auditor turnover, and market share (Lennox and Pittman, 2010a; Abbott et al., 2012; Acito et al., 2017; Aobdia, 2019, 2020), audit opinions (DeFond, 2010), audit quality (DeFond, 2010; Carcello et al., 2011; Gunny and Zhang, 2013; Aobdia, 2019; Schnader et al., 2019), and investor reactions (Dee et al., 2011; Offermanns and Peek, 2011). Another stream has devoted its attention to how auditors are affected by fraud allegations against their clients (Dyck et al., 2010; Barua and Smith, 2012) and how their negative inspection findings contribute to firms' litigation risks in such circumstances (Christensen et al., 2020). Despite this, past research is silent on PCAOB inspection reports' potential – *publicly incurred* – costs, which I explore in this study from the perspective of audit clients engaging in financial reporting misconduct (hereinafter, *misconduct clients*). My main motivation for focusing on misconduct clients in

particular is the premise that the managers of such companies invest additional resources to avoid detection (Sanchirico, 2006). This subset of companies is likely to include the clients who are interested the most in the revealed information on auditors. Taking this perspective is especially useful as it enables an understanding of how the regulator-induced transparency of auditors may have some unintended consequences in addition to the benefits some have argued that it brings (Evans et al., 2011; Abbott et al., 2012; PCAOB, 2015a,b). It is reasonable to assume that misconduct clients will not be indifferent to their auditors' revealed deficiencies, as this would lead to higher levels of scrutiny and potentially a perception of high risk. In this study, I investigate whether clients' detection exposure — driven by auditors' PCAOB inspection deficiencies — leads to opportunistic auditor dismissals in the period following the inspections.

Specifically, I define *misconduct-related exposure* as the client's perceived incremental risk of misconduct detection caused by the degree of alignment between their area of misconduct and the auditors' areas of deficiency as identified in their inspection report. To focus on an observable reaction to this increased exposure, I examine the auditor dismissal decisions the misconduct clients make during the period in question.

I perform the analyses using a sample of 1,178 class action lawsuits referring to financial reporting misconduct that allegedly occurred between 2005 and 2018 in the United States. Following prior literature on financial reporting misconduct, I rely on allegations of misconduct because the actual misconduct is rarely revealed (e.g., Dyck et al., 2010; Amiram et al., 2019). To mitigate the risk of including frivolous allegations in the sample, I exclude the cases that did not survive the defendant's motion to dismiss.

In this study, I hypothesize and find that auditor dismissals are more likely for clients with higher exposure, indicating a strategic attempt to avoid scrutiny. The findings show that the likelihood of dismissal increases by 3% with a standard deviation increase in misconduct-related exposure. This magnitude is economically meaningful, considering that the dismissal rate for the sample is four percent. A separate variable, *overall inspection performance*, is employed in the analyses to test whether the dismissals of misconduct clients are driven by their concerns of inferior overall practice quality of auditors. As hypothesized, the results show that having a higher proportion of inspection deficiencies does not increase the likelihood of dismissals. On the contrary, the findings indicate a lower likelihood of dismissal for under-performing auditors. Combined, the results suggest that clients are willing to reappoint a more deficient auditor as long as their deficiencies are not in areas related to their own misconduct. This supports the argument that these

dismissals are triggered by obscurity concerns rather than audit quality concerns.

To supplement the main findings, I run a set of additional tests to explore the potential cross-sectional variation in terms of determinants and consequences of strategic dismissals. A focused analysis to track the changes in exposure levels *ex-post* reveals that a significant number of dismissing clients switch to non-Big-4 auditors, making them less exposed to PCAOB by the design of the inspection regime. In a second set of analyses, I show that misconduct clients benefit from dismissing their auditors in terms of litigation avoidance, at least temporarily. Entropy-balanced comparisons suggest that dismissing clients face litigation, on average, 207 days later than non-dismissing clients.

Finally, an investigation into the *ex-ante* client characteristics demonstrates that having a powerful CFO is a determinant factor for exposure-driven dismissals. For robustness, I show that the results are unaffected when a more conservative definition of *misconduct clients* is employed. I replicate the analysis on a subsample of cases in which Rule 10b-5 of the Securities Act, requiring proof of scienter (i.e., deceptive misstatement), was cited in the case files to strengthen the assumption underlying the strategic motivations. Overall, the findings of the study imply that during the class period, fraudulent clients may exploit the content of the inspection reports to strategically avoid increased regulatory attention.

A major challenge for operationalizing my analyses is to identify a measure capable of capturing clients' perceived risk, specifically caused by the alignment of their misconduct with the auditors' inspection deficiencies. To that end, I propose a new proxy measure to capture *misconduct-related exposure*. The variable measures the textual similarity between the auditor's most recent Part I inspection findings, where deficiencies are discussed in detail, and subsequent class action complaints filed against audit clients, where the alleged misconduct is described. The class action complaint refers to certain fiscal years during which the misconduct activities allegedly took place and in most cases this period coincided with clients' auditor appointment decisions. The similarity between the content of the complaint and the content of the auditors' most recent inspection reports available as of the appointment date provides a signal of the exposure the misconduct client faces. The auditors' inspection deficiencies lead auditors, and possibly the PCAOB, to pay increased attention to the respective deficiencies in the subsequent years (Aobdia, 2018). The more the auditor inspection deficiencies overlap with the ongoing misconduct, the more likely the auditor or the PCAOB will notice the misconduct. This infers an increased risk of detection for the client.

This study contributes primarily to the literature discussing the recently emerged demand for more

transparency regarding auditors and their engagements (Deumes et al., 2012; Dee et al., 2015; PCAOB, 2015a). Most regulators and scholars argue that more transparency on audit firms' governance and practices will reveal audit quality and allow differentiation between audit firms, and consequently increase audit quality, through clients' informed decisions (IOSCO, 2009; Deumes et al., 2012). Motivated by this, regulators have introduced several measures to enhance transparency in the audit industry. Prior research has mostly investigated the success of the PCAOB inspection reports in terms of achieving the targeted quality-based differentiation and further improving audit quality (Abbott et al., 2012; Aobdia, 2018). Focusing on how the informative content of the inspection reports can be used by misconduct clients, my findings highlight the possibility of increased transparency having unintended and obscure disadvantages alongside its well-documented advantages (Duro et al., 2019).

The study also contributes to the literature on the information value of the PCAOB inspection reports. Lennox and Pittman (2010a) argue that clients do not find the inspection reports informative as they do not find any change in audit firms' market shares following aggregate Part I finding disclosures by the PCAOB. Gunny and Zhang (2013), however, find negative market share impacts following negative inspections. Abbott et al. (2012) similarly show that the clients of deficient small auditors are more likely to dismiss these auditors in favor of other small auditors that are not deficient. My findings provide evidence that the PCAOB inspection reports can be informative for clients in a context in which they are concerned about regulatory attention.

The study's third contribution relates to the literature on financial reporting misconduct and litigation avoidance (Skinner, 1994; Rogers et al., 2011; Hanley and Hoberg, 2012; Levy et al., 2018). Much of this literature has shown that managers of public companies can behave strategically to avoid litigation (Skinner, 1994), although the behavior examined has been largely limited to disclosure behavior (e.g., Field et al., 2005; Hoberg and Lewis, 2017; Levy et al., 2018) with little emphasis on other corporate-level decisions. My findings suggest that, for misconduct companies, this strategic behavior extends to their auditor appointment decisions and can be effective. Finally, I also contribute to this literature by proposing a novel text-based measure to proxy fraudulent clients' regulatory exposure.

The rest of the paper is structured as follows. The next section provides a background to the process of PCAOB inspections and the content of the resulting reports, followed by a brief discussion of the literature related to these inspections and their consequences. Section 3 develops the hypotheses. Section 4 explains

the research design, describing the sample, the variables used and the approach adopted for hypothesis testing. Section 5 discusses the findings, and Section 6 concludes.

2 Background and Related Literature

2.1 PCAOB Inspection Reports

Enacted following major scandals in the US, the Sarbanes-Oxley Act of 2002 (SOX) introduced measures to help protect investors from fraudulent financial reporting. These measures included, among others, the creation of the PCAOB to oversee the quality of audit practices and to reestablish confidence in the auditing and accounting professions. One of the core activities of the PCAOB is the periodic inspection of registered audit firms, which are held annually for large firms with at least 100 public clients, and triennially for smaller firms that have fewer. PCAOB inspections aim to provide constructive feedback to audit firms on improvements that are needed to satisfy the minimum requirements of auditing standards (Westermann et al., 2019). The audit firms, in turn, are expected to remediate any deficiencies identified through the inspections in their subsequent audits (Aobdia, 2018). In the event the PCAOB concludes that the audit firm's failure to comply with audit standards is significant and persistent, severe sanctions and penalties may follow (Dee et al., 2011). The audits to be inspected are selected with a risk-based approach, and not all aspects of the selected audits are necessarily reviewed.

The inspections consist of two parts. Part I findings are publicly disclosed and describe the deficient aspects of all issuer audits in which the PCAOB concludes that the auditor failed to obtain sufficient and appropriate evidence to support its final audit opinion. Part II findings contain general observations regarding the audit firm's quality control system. This part is not publicly disclosed unless the audit firm fails to address them within one year after the release of the inspection report (Evans et al., 2011). The identities of the engagement parties are also masked in Part I of the inspection reports. The report is issued for the national audit firm without mentioning the offices or partners responsible for the engagements, and the issuers' names are coded alphabetically (e.g., Issuer A, Issuer B).

2.2 Review of Related Literature

Having received increased pressure to increase its interventions following high-profile accounting scandals, the public oversight authorities (e.g., PCAOB) struggle to understand the root cause of deteriorating quality in the audit industry. Lack of transparency, which refers to the unavailability of public information on the auditors' practices, independence, and corporate characteristics, emerged as an important problem in this debate (EC, 2010; PCAOB, 2012, 2015a). Researchers and authorities have argued that the absence of precise signals of quality is the underlying reason preventing clients from differentiating between auditors and leaves them no choice but to rely on less precise signals, such as the size and reputation of the auditors (Barton, 2005). This in turn reduces the incentives for audit firms to improve the quality of their practices, because their efforts may go unnoticed by their clients given the noisiness of the available signals.

With the goal of stimulating quality-based competition in the industry (PCAOB, 2015a), regulators have adopted new tools to increase transparency. In the US, the PCAOB has adopted the Form AP filing requirement for auditors, disclosing the identity of the engagement partner and of other audit firms that participated in the audit (Dee et al., 2015; Cheng et al., 2020; Lee and Levine, 2020). Currently, the PCAOB is also considering adopting a set of audit quality indicators (AQIs) for auditors to disclose (PCAOB, 2015a).[1] Unlike the POB (Public Oversight Body) inspections in most other countries, in the US, PCAOB inspections provide relatively detailed information at the auditor-firm level on auditors' compliance with auditing standards in their engagements. From the perspective of the users of these reports, a quality that distinguishes them from some of the above-mentioned transparency measures is their reliability, since they are produced and disclosed by the experts of an expectedly impartial government institution (i.e., the PCAOB).

Prior literature has investigated the PCAOB inspection reports' effectiveness in enabling quality-based differentiation across audit firms. Lennox and Pittman (2010a) argue that clients do not find the inspection reports informative as they did not find any change in audit firms' market shares following aggregate Part I Finding disclosures by the PCAOB. Gunny and Zhang (2013), however, do find negative market share impacts following negative inspection results. Similarly, Abbott et al. (2012) show that the clients of deficient small auditors are more likely to dismiss these auditors in favor of other small auditors that are not deficient.

To understand these mixed results, one should also examine auditors' as well as clients' reactions to

[1] PCAOB has recently proposed a set of audit quality indicators (AQIs) for auditors to disclose, which are intended to serve as a portfolio of audit quality measures primarily for the use of the audit committees of prospective clients.

inspection findings. Acito et al. (2017) find a positive association between the client-auditor pairs' PCAOB deficiency exposures and the audit fees, explaining it as a result of the auditors reflecting the increased audit effort in fees. They also find that the new client-auditor pairings have significantly lower deficiency exposures than their previous pairings. Using a proprietary dataset, Aobdia (2018) focuses on the auditors and clients that are parties to the inspected engagements, and shows that audit firm effort increases in subsequent periods if inspected engagements receive a Part I finding, and in non-inspected engagements of the deficient engagement's responsible partner and office, which points to some spillover effects of the PCAOB inspections on audit quality. They also find that audit effort and financial reporting quality decreases for engagements that were inspected but did not receive a Part I finding and that these clients, nevertheless, are less likely to switch auditors. This is consistent with the argument that audit firms avoid over-investing their time and effort in compliant firm audits and reallocate resources to focus more on the high-exposure areas and clients.

Overall, the existing evidence suggests that public disclosure of auditors' Part I inspection findings increased their transparency, and that audit clients use the revealed information to differentiate across auditors, and help them make informed appointment decisions. That being established, possible adverse effects resulting from the increased transparency remain unexamined. Prior literature shows that companies, especially those allegedly involved in fraud, behave strategically when disclosing information to avoid litigation (Skinner, 1994; Hanley and Hoberg, 2012; Hoberg and Lewis, 2017; Levy et al., 2018). With similar motivations, they can potentially obtain and use information strategically to their benefits. This study addresses this possibility in the context of regulatory exposure and auditor dismissals.

3 Hypotheses Development

3.1 PCAOB Inspection Deficiency Exposure

The PCAOB exposure construct I adopted in this study is tailored specifically for the context of financial reporting misconduct, which is different from how it is conceptualized in prior literature. Acito et al. (2017) construct the PCAOB exposure in a way that indicates the degree of regulatory risk a client-auditor pair faces as a result of the overlap in the accounting areas the client is exposed to, and the areas the

auditor is found deficient in. For example, this exposure is likely to be high for a client-auditor pair in which the client is an airline company involved in expensive leases of aircrafts, and in which the auditor received many deficiencies in their most recent inspection report for their tests of leases in multiple engagements.

Instead, my exposure construct reflects misconduct client's risk of being detected as a result of the overlap in the nature of its misconduct and the areas of deficiency discussed in its most recent inspection report. For example, misconduct-related exposure, as conceptualized in this study, would be high for a client manipulating its earnings through recording sales before they are realizable, when its auditor has recently received an inspection report with a number of serious deficiencies regarding revenue recognition tests. This exposure can be high regardless of the overall alignment of audit deficiencies and the nature of the client's business since the most common areas in which financial reporting misconduct is committed (e.g., fair value estimations, mergers and acquisitions, revenue recognition, inventory valuations, and contingent liability estimations) are not necessarily connected to companies' focal business operations.

Note also that unlike the exposure construct used by Acito et al. (2017), this exposure proxy is not ex-ante publicly observable. The nature of misconduct can be observed retrospectively by parties other than the perpetrator only if the misconduct is uncovered–and this includes the auditors unless they are somehow involved in the misconduct themselves.[2] On the other hand, the misconduct clients can observe the inspection findings released during the misconduct period. The private information of the inspection findings' alignment with the misconduct enables strategic behavior by clients. The hypotheses below will attempt to investigate whether these clients strategically use the PCAOB inspection report's content to support their audit engagement decisions in order to minimize their risk of detection.

3.2 Misconduct Clients' Avoidance of PCAOB Exposure

This study focuses on public companies whose detected financial misstatements were allegedly intentional. Accordingly, the companies of interest are considered here to have at least one member of top management who was aware of reasons to avoid detection. The regulatory exposure I explore, as described above, is an indirect risk of detection which could arguably go unnoticed by the perpetrators. Even if they

[2] Although there are cases in which auditors knowingly engage in audits of fraudulent clients, as far as the regulators are concerned, the auditors are considered perpetrators themselves in the event that they knew about the fraud, but nonetheless failed to take necessary actions. In such cases, the SEC issues enforcement actions not only against fraudulent firms, but also against individual CPAs.

observe the alignment in the areas of deficiency and misconduct, this does not necessarily mean that they would consider this an increase of risk that needs immediate attention. Hence, one should not assume that misconduct clients are fully aware of the risks attached and would act accordingly. This study poses several hypotheses to investigate whether this increased regulatory scrutiny, although indirect, is salient and important enough to drive some attempts at detection avoidance.

The findings of prior literature suggest that audit effort, audit quality, and audit fees all increase subsequent to inspection reports, not only in the deficient engagements but also in other engagements having offices, partners or accounting areas in common (Acito et al., 2017; DeFond and Lennox, 2017; Aobdia, 2018). My first hypothesis builds on this spillover effect, and on other studies that document increased litigation risk due to audit failures (Bonner et al., 1998; Reffett, 2010), which cumulatively support the premise that auditors become more receptive to fraud risk in areas increasing their own regulatory exposure.

As for the mechanism that drives this association, there are at least two alternatives: First, cognizant of the fact that its auditor also faces the same area-driven exposure and in the expectation that it will exert more effort to remediate it, the client may perceive it as an increased probability that its auditor will detect the misconduct.[3] Second, regardless of the inspection's impact on the audit effort, the client may interpret the areas of deficiency addressed in the report as the areas to which PCAOB will pay more attention in its auditor's subsequent inspections, and evaluate this as an increased risk of detection by the PCAOB itself. The second mechanism can be even more relevant if the client believes that detection by its auditor implies less severe consequences than does detection by the PCAOB or the SEC.

Although misconduct clients may have various ways to react to such exposure, such as communicating with the auditor or resorting to further misconduct in an effort to disguise the existing misconduct, I focus on a more extreme but observable reaction: dismissals of auditors. While such dismissals are rare and may convey a negative signal about the client's governance, they are frequent enough to be associated with audit fee negotiations, especially after the enactment of SOX in 2002.

H1a: Clients' detection exposure driven by the auditors' PCAOB inspection deficiencies increases the likelihood of auditor dismissals as a strategy to avoid scrutiny.

[3]In support of this mechanism, Jenkins et al.'s (2018) survey of audit professionals suggest that audit firms often employ forensic specialists in their risky engagements, both because they provide additional comfort to the auditor and they bring additional value to the audit in terms of fraud detection. In addition, see Patterson and Wright (2003) and Burton et al. (2011) on how proportionate liability and penalties influence the auditors' effort in engagements with significant fraud risk.

Particular deficiencies of auditors identified in an inspection are not independent of how well they conducted their other audits that year. The amount and severity of an auditor's deficiencies related to its client's misconduct may be correlated with the auditor's overall inspection performance, and one can argue that any increase in the likelihood of dismissal may be the result of the inferior overall performance. PCAOB (2015a) considers inspection performance as an important indicator of audit quality and Abbott et al. (2012) show that in a generic context, clients are more likely to dismiss auditors with inspection deficiencies. As an attempt to rule out this alternative hypothesis, building on the same theoretical arguments as H1a, I predict that a misconduct clients will be less concerned about the overall inspection performance, proxied by the total number of deficiencies identified in an inspection standardized by auditor size. Such concerns would involve the clients' evaluation of various areas of deficiency in the inspection, while I expect them to concentrate mostly on the areas and matters that directly relates to their own misconduct. Accordingly, I do not expect the overall inspection performance to increase the likelihood of dismissals.

H1b: Dismissals of auditors by misconduct clients are not driven by concerns of inferior audit quality reflected in the number of deficiencies.

4 Research Design

4.1 Data and Sample

Since almost all cases of misconduct in the US are settled without any admission of wrong-doing or court decision, I follow the prior financial misconduct studies and rely on fraud allegations filtered to eliminate frivolous cases as much as possible (Dyck et al., 2010). The sample is based on the class action lawsuits compiled in the Stanford Securities Class Action Clearinghouse (SSCAC) database. I use the private litigation sample rather than the public enforcement actions or restatements for my main analyses for two reasons. First, there is strong support in the literature for the power and relevance of class action lawsuits to proxy the actual misconduct. The prior literature suggests that accruals should be higher while companies are manipulating earnings and should decrease after the manipulation is uncovered (Desai et al., 2006; Dechow et al., 2010; Karpoff et al., 2017). Karpoff et al. (2017) show that this decrease is significantly higher for private litigation cases than it is for public litigation and restatements. Second, private litigation reduces the

risk of missing important incidents of misconduct as a result of certain law firms that are dedicated to start investigating cases whenever they observe a negative shock to stock prices. On the contrary, this may cause concerns about frivolous allegations, which I try to eliminate using the filters adopted in prior studies (Dyck et al., 2010). Finally, I use Boardex data for a supplementary cross-sectional analysis on CFOs' influence on audit committees.

Table 1 provides the details of sample construction. Since the cases will be matched with PCAOB inspection reports, I focus on the 2,300 cases that refer to misconduct allegedly committed in the years between 2005 and 2018. This sample period is a filter in itself, as it starts after the enactment of the Private Securities Litigation Reform Act of 1995 (PSLRA), which aimed to reduce frivolous suits by making discovery rights contingent on evidence (Johnson et al., 2006). The next filter is the elimination of cases that failed to survive a motion to dismiss, which leaves 2,713 firm-year observations of alleged misconduct (Cutler et al., 2019). A further 626 firm-years were dropped due to lack of either financial data (Compustat) or auditor-related data (Audit Analytics).[4] 528 firm-years were eliminated due to lack of a prior inspection report. This mainly results from the fact that most small auditors did not have any inspections during the first few years of the sample period. Since this study examines the auditor dismissals, I eliminate 16 cases in which the auditors reportedly resigned from the engagement and cases in which dismissals are due to mergers or acquisitions (Gerakos and Syverson, 2015). The infrequency of resignations is consistent with Lennox and Pittman's (2010b) findings which suggest that the large auditors are not necessarily more adept at screening out the clients with higher fraud risk. Finally, 365 observations are lost due to residual-based calculations of abnormal fees and accruals. The resulting sample consists of 1,178 firm-years with 597 distinct clients, out of which 521 clients are engaged with a Big-4 auditor.

[Table 1 here]

4.2 Measuring Misconduct-related Exposure

To measure the regulatory exposure of clients resulting from the overlap of their areas of misconduct and the areas in which the auditors were found deficient by the PCAOB, I calculate the cosine similarity between the textual content of the class action complaints and the inspection reports (Part I) for each auditor-

[4]Most of the eliminated observations lack public data because they belong to privately traded funds.

firm pair in my sample.

For ease of analysis, a document is commonly represented as a vector of normalized frequency counts of words it contains. Cosine similarity is a commonly used multidimensional text-clustering method that relies on the cosine of the angle between two non-zero vectors (Ghosh and Strehl, 2006; Loughran and McDonald, 2016; Bushman et al., 2017). In the case of two identical documents, this angle would be 0°, the cosine of which is 1. In simplistic terms, all non-identical document pairs have a cosine similarity score between 0 and 1 depending on the number of words in common. However, some adjustments are needed to alleviate the naivety of the measure to serve as a proxy for exposure. Formally, the similarity between document A and B, represented by their term frequency vectors, is calculated as:

$$Cosine \quad similarity = \frac{A \cdot B}{||A||||B||} \tag{1}$$

where the nominator $A \cdot B$ indicates the dot product of the two vectors, and the denominator $\|A\|\|B\|$ is the product of their length. Although cosine similarity is a normalized measure itself, since what is of interest is the relevance of terms for each document, a term frequency – inverse document frequency *(tf-idf)* conversion was applied to vectors. The *tf-idf* procedure converts the vectors by weighting the term frequencies in such a way that it rewards the words that occur more frequently in a document *tf* but penalizes them for occurring in many documents *idf* across the corpus. This conversion is essential for strengthening our inferences since the terms that commonly occur in almost all of the documents such as "lawsuit" and "inspection" would significantly inflate the similarity scores, although they do not provide much information to the readers.[5]

In order to clarify how the documents are matched and how the similarity variable is calculated and used in the models of this study, consider the following example: According to a class action complaint filed in 2015, a client is allegedly involved in misconduct between the years 2012-2014. In this case, the possible auditor reappointment or dismissal decision related to the misconduct is expected to occur during the fiscal years 2012, 2013 and 2014. I calculate the complaint's similarity with the most recent inspection reports of all the auditors in the audit industry for these three years, given the information set at the time. Since most

[5]The similarity calculations were done using the Python package "sckit-learn" (Pedregosa and Varoquaux, 2011). The documents were tokenized at word level. Stop-words were removed and the tokens were stemmed and trimmed. The features are limited to unigrams and bigrams.

auditors in my sample are audited annually, the scores are time variant for each hypothetical auditor-client pair. The typical timeline of events and how the respective exposure levels are calculated is described in Appendix B.

Since the dismissal decisions are made based on the comparison of the current auditor and the set of other feasible alternatives in the industry, I calculate the average similarity for each firm-year and subtract it from the focal auditor-client pair's similarity. This gives us the incremental (or abnormal) regulatory exposure faced by the client for being engaged with its auditor at the time. To test my hypotheses, this difference, $DIFEXP$, is used as the main variable of interest in the models.

4.3 Overall PCAOB Inspection Performance and Other Controls

To test the hypotheses regarding the impact of misconduct-related exposure on the likelihood of auditor dismissal, I estimate the logistic regression model below:

$$\begin{aligned}\Pr(DISMISS_{it+1}=1) = {} & \beta_1 DIFEXP_{it} + \beta_2 DEF_{it} + \beta_3 TIMESPAN_{it} + \beta_4 TENURE_{it} + \\ & \beta_5 ABFEES_{it} + \beta_6 AREDCA_{it} + \beta_7 SPEC_{it} + \beta_8 SIZE_{it} + \beta_9 ARINV_{it} + \beta_{10} ROA_{it} + \\ & \beta_{11} LEV_{it} + \beta_{12} MOD_{it} + \beta_{13} RESTATE_{it} + \beta_{14} BIG_{it} + \beta_k Industry_i + \beta_j Year_t + \varepsilon_{it}\end{aligned} \tag{2}$$

where $DIFEXP$ is the regulatory exposure adjusted for market average, as explained above. DEF is the overall inspection performance of an auditor, measured using the number of engagements identified as deficient by the PCAOB in its most recent inspection report, scaled by the total number of engagements reviewed for that inspection. $TIMESPAN$ is the number of years the company has allegedly involved in the misconduct, as indicated in the class action complaint. The rest of the controls included in the model rely on variables commonly adopted in the prior auditor turnover studies (Ettredge et al., 2007; Acito et al., 2017). $TENURE$ is the number of years the auditor has audited the company. $ABFEES$ and $AREDCA$ are abnormal fee and abnormal accruals, respectively. $SPEC$ is the indicator variable for auditor specialization based on market shares. $ARINV$ is a variable that captures the receivables and inventory of the company. ROA and LEV control for profitability and leverage. MOD is an indicator variable for cases in which the auditor issued a modified opinion for going concern reasons. $RESTATE$ is an indicator variable for presence of

restatements and *BIG* is an indicator for Big-4 auditors. Finally, the model includes industry and year fixed effects[6]. The definitions and sources of variables used in the analyses are provided in Appendix A.

[Table 2 here]

Table 2 provides descriptive information on the variables. The occurrences of dismissal account for 4 percent of the sample, which is consistent with the dismissal proportions for generic samples used in prior literature. The similarity score ranges from 0 to 0.45 and has a mean of 0.30. The maximum class period is 5, while the average class period in the sample is two years.

5 Results

Main Findings

Table 3 reports the main results for the tests regarding the impact of misconduct-related exposure on likelihood of auditor dismissals. The first two models are estimated for the entire sample, while the last two models only use the cases in which one of the Big-4 auditors is auditing the misconduct client, with and without industry fixed effects. In line with the predictions of H1a, the coefficient of $DIFEXP$ is positive and significant in all of four models, suggesting that it is more likely for a client to dismiss its auditor when the auditor's most recent inspection findings are closer to the client's area of misconduct.

[Table 3 here]

To provide an idea of how economically meaningful these coefficients are, the marginal effects (not tabulated) of Model 2 which includes both fixed effects suggest that a standard deviation increase in the relative regulatory exposure is associated with a probability increase of auditor dismissal of 3 percentage points. For my sample, this corresponds to the same magnitude of probability-decreasing effect associated with the auditor's tenure.

Moreover, in support of the hypothesis H1b, the findings also suggest that the overall inspection performance DEF does not increase the likelihood of auditor dismissal. On the contrary, it has a negative

[6]Company fixed effects are not included in the model due to lack of sufficient within-firm variation for estimating the coefficients

and significant impact on it. The marginal effects suggest that a standard deviation increase in the ratio of deficient inspections in the most recent report also decreases the probability of dismissals by 3 percentage points.

In line with the existing evidence in the literature, an auditor's industry specialization and tenure decreases the likelihood of dismissals, supporting the established argument that all else being equal, clients find it costly to switch auditors. Abnormal fees, on the other hand, are found to have an increasing impact on dismissals. This can be intuitively explained by clients' rational behavior of seeking cheaper alternatives when the service fees charged by the current auditor are unreasonably high.

CFO Influence

Recent literature on corporate governance show that power dynamics between the management and the board can have consequences regarding the audit-related decisions of clients (McCracken et al., 2008; Cohen et al., 2010; Fiolleau et al., 2013). For instance, Archambeault and DeZoort (2001) find that clients with less experienced and less independent audit committees are more likely to make suspicious auditor switches. In addition, Beck and Mauldin (2014) document the influence the powerful CFOs have on audit fee negotiations during the recession period, although all external auditor related decisions and responsibilities are bestowed on the board's audit committee by regulation. These findings of prior literature suggest that the dismissals driven by detection exposure to be more emphasized for clients whose management, and especially the CFOs, have more power over audit committees' responsibilities. Whereas, in a well-goverened client, I expect the management's detection concerns to be less influential in auditor appointment decisions.

[Table 4 here]

Adopting the tenure-based CFO power measure of Beck and Mauldin (2014), I supplement my analyses by examining the impact of having powerful CFOs on exposure-related auditor dismissal decisions. For this cross-sectional analysis, I split the sample first by the median CFO tenure, and then by the CFO's relative tenure compared with the audit committee member's average tenure, and run the same logistic regression separately for high and low CFO-power subsamples. The results provided in Table 4 suggest that the exposure's impact on dismissals prevails only for the high-CFO-power subsamples. These findings are

in line with the argument that in companies in which the shareholders and investors are better represented through strong corporate governance, the managements have fewer means to conceal their misconduct.

Exposure After Dismissals

In an attempt to confirm that the clients' motive for dismissing the auditors is in fact to decrease the exposure they face due to their auditor's inspection findings, I examine whether the exposure of the dismissing clients decreases after they dismiss their auditors. This analysis is partly undermined by data availability problems. As discussed in the relevant section earlier, the PCAOB inspects small auditors with fewer then 100 public clients triennially (every 3 years) instead of annually. Panel A of Table 5 shows that among the 55 dismissals, only 13 percent of the clients were engaged with a non-Big-4 auditor. However, a significant portion of the dismissing clients switched to a non-Big-4 auditor during their class period, bringing this percentage up to 38%. This partly contradicts with Lennox and Pittman's (2010b) lack of evidence for clients' tendency for not appointing a large auditor during misconduct, although my sample period and method of identifying fraud cases differ from their study. While this phenomenon hinders this study's ability to observe the clients' exact level of exposure *ex-post*, the fact that they switch to a less frequently inspected auditor is in line with the argument that the dismissals are driven by an interest in reducing exposure.

[Table 5 here]

Panel B of Table 5 presents the result of the analysis for the remaining 34 dismissals with ex-post exposure levels available. Although their average exposure levels after the dismissals is slightly lower than before, the paired t-tests do not exhibit a significant difference between the means. However, in line with the findings of the main results, they indicate that the clients new auditors perform worse than the dismissed auditor in their latest PCAOB inspection. The absence of a significant difference between the exposure levels may be driven by, apart from the data incompleteness of the data, the lack of feasible alternatives. Given the concentrated nature of the audit services market and the shareholder pressures to appoint a large auditor, the alternatives are often limited for clients, which may reduce their capacity to reach a feasible deal with a low-exposure auditor.

Dismissal as an Effective Strategy

The main results imply that misconduct clients may be dismissing their auditors as a strategic reaction to the increased risk of detection, although whether this reaction is helping them remains an open question. Unfortunately, the empirical boundaries applying to all fraud-related studies do not allow one to observe the misconduct clients that have avoided exposure. Since all companies in my sample eventually received a class-action complaint, in an attempt to find out whether dismissing their auditor was, in fact, an effective strategy to avoid exposure, I examine how well it served them to avoid it temporarily. To operationalize the degree of temporary avoidance, I introduce the variable *TIMELAG*, which is the number of days between the start date of the alleged misconduct and the filing date of the class-action complaint.[7]

Next, I compare the temporary avoidance of the clients who dismissed their auditor with those that did not. This requires making sure that the covariates found to be affecting the dismissal decisions are well-balanced across the dismissing and non-dismissing clients. For this purpose, I use entropy balancing (Hainmueller, 2012) to reweight my sample. Entropy balancing is a preprocessing method to adjust the inequalities across the covariate distributions. Its superiority over other balancing methods (e.g., propensity score matching) is that it allows one to balance the samples with respect to not only the means of the covariate distributions, but also to their higher moments, such as the variance, skewness, and curtosis (Hainmueller, 2012).[8] Table 6 tabulates the goodness of entropy balancing targeted to balance the means in Panel A, and both means and variances in Panel B.

[Table 6 here]

Table 6 also shows that the clients who dismissed their auditors faced litigation an average of 207 days later than the clients who did not. While this is not as favorable for them as avoiding the litigation for good, the clients have benefited from this strategy in terms of litigation avoidance, compared to keeping the auditor regardless of the exposure attached.

[7] If the company received a public litigation complaint (e.g., from the SEC) prior to the class-action complaint, the filing date used in the calculation of the variable was replaced by that of the earlier complaint.

[8] See also King and Nielsen (2019) for an examination of biases in probability score matching (PSM). I nonetheless replicated the analysis using PSM as a robustness check, and the results remain unaffected.

Robustness Check

Since this study aims to explore the strategic dismissals of firms due to misconduct-related exposure, this implies the assumption that the management knew about the company's involvement in misconduct. For the robustness analyses, I use another filter to mitigate concerns that the misstatements were unintentional and that company's management could not act strategically without knowledge of their existence.

Although US securities law has multiple sections and rules targeting financial reporting misstatements, only claims of violation pursuant to Section 10(b) of the Securities Exchange Act of 1934 and rule 10b-5 require proof of scienter (i.e., intention) (Medlin, 1976). For robustness analyses, I identify all of the class action complaints in my sample that do not cite Section 10(b) and rule 10b-5, which amount to 151 firm-years with 90 distinct companies. I replicate the tests by excluding these observations. As shown Table 7 shows, the results remain unchanged.

[Table 7 here]

6 Conclusion and Future Directions

This study aims to provide an alternative insight and contribute to the growing literature on the attempts and consequences of inducing transparency in the audit industry. Using a novel text-based measure to capture the regulatory exposure faced by allegedly fraudulent clients, particularly arising from their engagement with auditors, the study documents that the PCAOB's publicly available portions of inspection findings on auditors can be used strategically to monitor exposure and avoid public scrutiny. The findings based on the misconduct sample suggest that in a context in which regulatory interactions have potentially severe consequences, inspection reports can feed clients' auditor appointments and dismissal decisions to avoid litigation and may help them in doing so, at least temporarily. The results also imply that in such contexts, dismissals are more closely related to client's concerns of exposure regarding their misconduct, than they are with their overall quality concerns regarding the auditor. Finally, the cross-sectional tests show that having a powerful CFO helps the client company's management carry out exposure-driven dismissals.

From a regulatory perspective, these findings point to a potential unintended consequence of the public disclosure of regulators' inspection findings. While the regulator-driven transparency regarding the audit

firms and their deficiencies is useful for quality-seeking clients to differentiate between auditors, the transparency may also be useful for clients actively avoiding engagement with auditors who pose significant risks for their desired obscurity. These findings may particularly be of more interest to the European regulators who aim to improve the transparency in the audit industry, because it is arguably more convenient for misconduct clients to motivate their dismissal decisions in an environment in which mandatory firm rotation is already in place.

Extensions of this research can replicate the tests using the SEC's AAERs (Accounting and Auditing Enforcement Releases) in addition to class action lawsuits to make sure that the observed behavior pertains not only to private litigation risk but also to public litigation risk. In addition, a more thorough analysis on this topic can be achieved with a more sophisticated exposure measure based on the overlap of particular accounting areas that are of high interest to both parties of engagement. This, however, requires an exhaustive dictionary of words tailored to categorize accounting areas, incorporating the recent developments in accounting standards.

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Table 1: Sample Construction

Panel A: Elimination Steps	Firm-Years	Distinct Firms
Class Actions in SSCAC referring to misconducts from 2005 to 2018	4,220	2,300
less dismissed cases	2,713	1,347
less observations missing AA and/or Compustat data	2,087	990
less observations with auditors missing a preceding inspection report	1,559	743
less auditor resignations and M&A related turnovers	1,543	738
less observations lost due to abnormal fee and accrual calculations	1,178	597
Final Data	1,178	597
Big-4	1,014	521
Non Big-4	164	76

Panel B: Observations by Year

Year	Observations
2006	40
2007	57
2008	43
2009	40
2010	49
2011	73
2012	72
2013	99
2014	127
2015	126
2016	160
2017	166
2018	126
Total	1,178

Panel C: Observations by Industry

Fama French 12 Industry	Observations
Consumer NonDurables	48
Consumer Durables	28
Manufacturing	87
Oil, Gas, and Coal Extraction	30
Chemicals and Allied Products	28
Business Equipment	226
Telephone and Television Transmission	65
Utilities	22
Wholesale, Retail, and Some Services	64
Healthcare, Medical Equipment, Drugs	318
Finance	95
Other	167
Total	1,178

The tables describe the sample construction procedure and breakdown of observations by year and industry. The lawsuit data from Stanford Securities Class-Action Clearinghouse was matched with Audit Analytics data for auditor-related variables and Compustat data for clients' financial fundamentals.

Table 2: Descriptive Statistics

VARIABLES	N	mean	sd	min	p25	p50	p75	max
DISMISS	1,178	0.04	0.20	0.00	0.00	0.00	0.00	1.00
SIM	1,178	0.30	0.06	0.00	0.26	0.30	0.34	0.45
DIFEXP	1,178	0.02	0.03	-0.13	0.01	0.03	0.04	0.10
DEF	1,178	0.30	0.15	0.00	0.21	0.29	0.41	0.77
TIMESPAN	1,178	2.07	1.54	0.00	1.00	2.00	3.00	5.00
TENURE	1,178	1.94	0.78	0.00	1.39	2.20	2.71	2.83
ABFEES	1,178	0.17	0.57	-1.84	-0.20	0.19	0.53	1.62
AREDCA	1,178	0.10	0.21	0.00	0.02	0.05	0.11	4.56
SPEC	1,178	0.29	0.46	0.00	0.00	0.00	1.00	1.00
SIZE	1,178	21.42	2.14	15.33	19.93	21.31	22.92	25.77
ARINV	1,178	0.21	0.20	0.00	0.07	0.16	0.30	1.22
ROA	1,178	-0.07	0.35	-4.46	-0.09	0.02	0.07	0.85
LEV	1,178	0.29	0.35	0.00	0.05	0.24	0.41	5.44
MOD	1,178	0.04	0.20	0.00	0.00	0.00	0.00	1.00
RESTATE	1,178	0.11	0.31	0.00	0.00	0.00	0.00	1.00
BIG	1,178	0.86	0.35	0.00	1.00	1.00	1.00	1.00
TIMELAG	1,178	844	551	14	386	727	1282	2177
CFOPOWER	898	6.74	5.83	1.00	3.00	5.00	9.00	34.00
RELPOWER	854	-0.02	1.17	-4.72	-0.62	0.04	0.50	5.89

This table reports the descriptive statistics for all variables used in analyses. SIZE, TENURE and ABFEES variables are in logarithmic form. All continuous variables are winsorized at level 1% and 99%. See Appendix A for variable definitions.

Table 3: Logistic Results: Main Analysis

	DISMISS Full Sample	*DISMISS* Full Sample	*DISMISS* Only Big-4	*DISMISS* Only Big-4
DIFEXP	17.64***	17.57***	17.21**	17.17**
	(0.008)	(0.008)	(0.030)	(0.025)
DEF	-3.23*	-3.12*	-5.03**	-4.86**
	(0.068)	(0.084)	(0.034)	(0.046)
TIMESPAN	0.05	0.09	0.14	0.24
	(0.670)	(0.502)	(0.294)	(0.127)
TENURE	-0.76***	-0.81***	-0.91***	-0.95***
	(0.000)	(0.000)	(0.000)	(0.000)
ABFEES	0.58*	0.65**	0.56*	0.63*
	(0.072)	(0.043)	(0.090)	(0.065)
AREDCA	-0.18	-0.00	-0.17	-0.03
	(0.647)	(0.999)	(0.566)	(0.904)
SPEC	-0.90*	-0.96**	-0.86*	-1.02**
	(0.057)	(0.043)	(0.079)	(0.040)
SIZE	-0.15	-0.12	-0.19**	-0.16
	(0.101)	(0.208)	(0.044)	(0.127)
ARINV	-0.22	-0.79	0.07	-0.35
	(0.698)	(0.212)	(0.908)	(0.606)
ROA	0.35	0.13	0.16	-0.04
	(0.373)	(0.650)	(0.644)	(0.795)
LEV	0.58	0.58	0.64*	0.57
	(0.102)	(0.117)	(0.090)	(0.162)
MOD	-0.22	0.09	-0.26	0.18
	(0.764)	(0.902)	(0.709)	(0.811)
RESTATE	0.35	0.28	0.52	0.43
	(0.501)	(0.607)	(0.322)	(0.450)
BIG	-0.46	-0.46		
	(0.405)	(0.399)		
Year FE	YES	YES	YES	YES
Industry FE	NO	YES	NO	YES
Observations	1,096	1,026	953	888
Log Likelihood	-167.94	-159.56	-134.52	-126.88

Robust p-values in parentheses. *** p<0.01, ** p<0.05, * p<0.1

This table reports the results of the logistic estimation of Equation (2) with and without industry fixed effects. The third and fourth columns report robustness estimations that restricts the sample to cases in which only Big-4 auditors are involved.

Table 4: Cross-sectional Analysis: CFO Absolute and Relative Power

Panel A:	ABSOLUTE CFO POWER ($CFOPOWER$)			
	HIGH		LOW	
	DISMISS	*DISMISS*	*DISMISS*	*DISMISS*
$DIFEXP$	15.44**	15.37*	3.52	3.49
	(0.046)	(0.081)	(0.765)	(0.744)
DEF	-1.52*	-1.47	-2.82	-3.13
	(0.089)	(0.163)	(0.288)	(0.198)
$TENURE$	-0.70***	-0.68***	-1.09***	-1.32***
	(0.001)	(0.004)	(0.002)	(0.001)
Other Controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	NO	YES	NO	YES
Observations	526	468	483	437
Log Likelihood	-109.71	-101.29	-59.37	-52.84

Panel B:	RELATIVE CFO POWER ($RELPOWER$)			
	HIGH		LOW	
	DISMISS	*DISMISS*	*DISMISS*	*DISMISS*
$DIFEXP$	17.16*	23.61*	11.45	11.97
	(0.088)	(0.089)	(0.179)	(0.172)
DEF	-3.73	-3.83	-1.87	-2.08
	(0.119)	(0.120)	(0.401)	(0.399)
$TENURE$	-0.73**	-0.98**	-0.80***	-0.91***
	(0.031)	(0.037)	(0.000)	(0.000)
Other Controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	NO	YES	NO	YES
Observations	371	340	486	427
Log Likelihood	-113.49	-103.64	-49.06	-44.44

Robust p-values in parentheses. *** p<0.01, ** p<0.05, * p<0.1

This table reports the results of the logistic estimation of Equation (2) separately for the subsamples generated by splitting the sample by the median *CFOPOWER* (Panel A) and *RELPOWER* (Panel B).

Table 5: Additional Analysis: Exposure After the Dismissals

Panel A: Percentage of Big-4 Auditors Before and After the Dismissals

	Before Dismissal		After Dismissal	
	N	%	N	%
Non-Big-4	7	13	21	38
Big-4	48	87	34	62
Total	55	100	55	100

Panel B: Univariate Tests for Exposure Before and After the Dismissals

		Before Dismissal		After Dismissal			
Variable	N	Mean	Std. Dev.	Mean	Std. Dev.	Diff.	p-val
DIFEXP	34	0.032	0.025	0.029	0.045	-0.003	0.26
DEF	34	0.322	0.130	0.374	0.165	0.052*	0.05

*** p<0.01, ** p<0.05, * p<0.1

This additional analysis provides insights to how the exposure of the dismissing clients have changed after the dismissal. Panel A reports the numbers and proportions of Big-4 engagements among the dismissing clients. Panel B reports the paired t-tests for the exposure levels of clients before and after the dismissal. See Appendix A for variable definitions.

Table 6: Additional Analysis: Timelag Difference in Entropy Balanced Samples

Panel A1: Descriptives for Samples Entropy Balanced on 1st Moments

	Before Entropy Balancing				After Entropy Balancing			
	DISMISS=1		*DISMISS*=0		*DISMISS*=1		*DISMISS*=0	
	Mean	Variance	Mean	Variance	Mean	Variance	Mean	Variance
DIFEXP	0.024	0.001	0.022	0.001	0.024	0.001	0.024	0.001
DEF	0.324	0.020	0.308	0.021	0.324	0.020	0.324	0.021
TENURE	1.405	0.742	2.097	0.558	1.405	0.742	1.405	0.895
ABFEES	0.287	0.537	0.095	0.344	0.287	0.537	0.287	0.378
SPEC	0.145	0.127	0.314	0.216	0.145	0.127	0.146	0.125
SIZE	20.670	4.528	21.478	4.976	20.670	4.528	20.670	5.460
Obs.	55		846		55		846	

Panel A2: OLS Results for Samples Reweighted by Entropy Balancing

DV: *TIMELAG*	Coef.	t-stat
DISMISS	207.39***	2.66
Controls	YES	
Year & Ind FE	YES	

Panel B1: Descriptives for Samples Entropy Balanced on 1st and 2nd Moments

	Before Entropy Balancing				After Entropy Balancing			
	DISMISS=1		DISMISS=0		DISMISS=1		DISMISS=0	
	Mean	Variance	Mean	Variance	Mean	Variance	Mean	Variance
DIFEXP	0.024	0.001	0.022	0.001	0.024	0.001	0.024	0.001
DEF	0.324	0.020	0.308	0.021	0.324	0.020	0.324	0.020
TENURE	1.405	0.742	2.097	0.558	1.405	0.742	1.405	0.743
ABFEES	0.287	0.537	0.095	0.344	0.287	0.537	0.287	0.537
SPEC	0.145	0.127	0.314	0.216	0.145	0.127	0.147	0.125
SIZE	20.670	4.528	21.478	4.976	20.670	4.528	20.670	4.530
Obs.	55		846		55		846	

Panel B2: OLS Results for Samples Reweighted by Entropy Balancing

DV: *TIMELAG*	Coef.	t-stat
DISMISS	195.46***	2.69
Controls	YES	
Year & Ind FE	YES	

To provide evidence on the effectiveness of dismissing the auditors as an exposure-avoidance strategy, this additional analysis compares the number of days (time-lag) until the filing of class-action complaint of clients who switched their auditors with that of those who did not. The tables above reports the means and variances of the samples before and after they were entropy balanced on 1st moments (Panel A), and 1st and 2nd moments (Panel B) accompanied by the t-stats for the difference in time-lag for the balanced samples.

Table 7: Logistic Results: Robustness for Scienter Allegations Only (Rule 10b-5)

	DISMISS Full Sample	DISMISS Full Sample	DISMISS Only Big-4	DISMISS Only Big-4
DIFEXP	20.76***	19.73***	22.43***	21.91***
	(0.002)	(0.005)	(0.006)	(0.006)
DEF	-3.00*	-2.72	-4.85**	-4.70**
	(0.094)	(0.128)	(0.037)	(0.046)
TIMESPAN	0.08	0.10	0.17	0.26
	(0.498)	(0.425)	(0.207)	(0.117)
TENURE	-0.72***	-0.74***	-0.84***	-0.87***
	(0.001)	(0.002)	(0.001)	(0.001)
ABFEES	0.61*	0.67*	0.58	0.67*
	(0.089)	(0.053)	(0.101)	(0.069)
AREDCA	-0.27	-0.19	-0.31	-0.36
	(0.509)	(0.554)	(0.346)	(0.441)
SPEC	-1.22**	-1.29**	-1.20**	-1.38**
	(0.036)	(0.027)	(0.046)	(0.026)
SIZE	-0.17*	-0.16	-0.24**	-0.25*
	(0.077)	(0.132)	(0.024)	(0.056)
ARINV	0.14	-0.51	0.44	-0.13
	(0.804)	(0.410)	(0.494)	(0.847)
ROA	0.17	-0.08	-0.06	-0.23
	(0.687)	(0.695)	(0.833)	(0.332)
LEV	0.60*	0.56	0.67*	0.52
	(0.098)	(0.159)	(0.077)	(0.229)
MOD	-0.22	0.27	-0.42	0.15
	(0.761)	(0.736)	(0.553)	(0.846)
RESTATE	0.38	0.35	0.53	0.43
	(0.485)	(0.550)	(0.336)	(0.479)
BIG	-0.26	-0.13		
	(0.659)	(0.826)		
Year FE	YES	YES	YES	YES
Industry FE	NO	YES	NO	YES
Observations	966	893	836	766
Log Likelihood	-146.73	-138.32	-116.52	-109.35

Robust p-values in parentheses. *** p<0.01, ** p<0.05, * p<0.1 This table reports the results of the logistic estimation of Equation (2) limiting the sample to clients whose class action complaints refer to Rule 10b-5, which requires plaintiff to provide significant evidence of intentional misconduct.

Appendix A Variable Definitions

Variable	Definition
ABFEES	Abnormal audit fees, calculated as the residual from an OLS regression of the natural logarithm of audit fees on size, ROA, inventory and receivables, leverage, existence of a loss, existence of a going concern opinion, tenure, month of the fiscal year-end and audit work with industry and year fixed effects. Data from Compustat and Audit Analytics.
AREDCA	*AREDCA* is an abnormal current accruals measure taken from Ashbaugh et al. (2003). For each industry and year, current accruals scaled by beginning of year total assets are regressed on inverse total assets, change in sales, and ROA. The estimated coefficients are then used to calculate expected current accruals. AREDCA is the absolute values of the difference between the actual and expected current accruals.
DEF	Number of engagements the auditor was found deficient by the PCAOB in its most recent inspection report, divided by the total number of engagements inspected. Data from PCAOB website.
SIM	Textual similarity between the alleged misconduct as described in the class action complaint, and its auditor's deficiencies as described in the Part I findings of its most recent inspection prior to or during the years of alleged misconduct. Calculated using the cosine similarity function of scikit-learn machine learning library for Python.
DIFEXP	Similarity score of a client-auditor pair subtracted by the average of the same client's counterfactual similarity scores calculated using the inspection reports of all other auditors.
TIMESPAN	Number of years the company was allegedly involved in misconduct, as indicated in class action complaints. Data from SCAC.

Variable Definitions: Continued on next page

Variable Definitions – continued from previous page

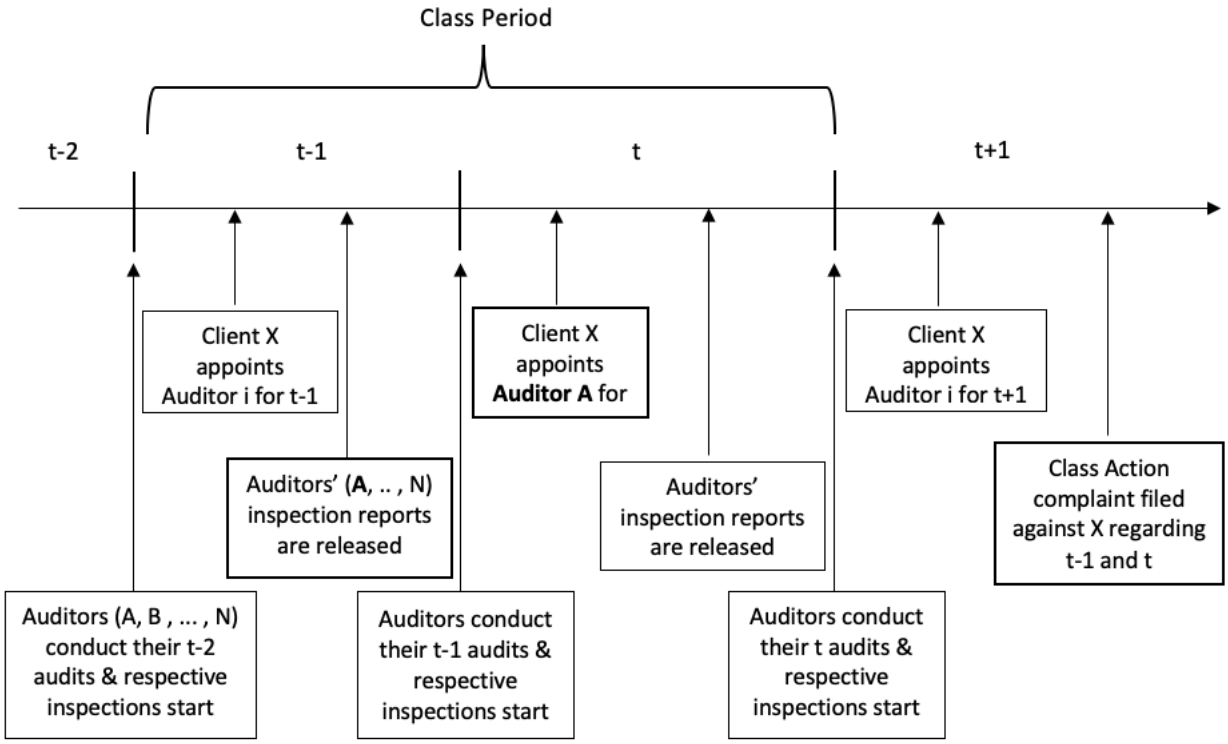
Variable	Definition
LEV	Total long-term debt divided by total assets. Data are from Compustat.
MOD	Indicator variable equal to 1 if the company received a modified opinion for going concern reasons, and 0 otherwise. Data from Audit Analytics.
RESTATE	Indicator variable equal to 1 if the company announced a restatement in the fiscal year, and 0 otherwise. Data from Audit Analytics.
ROA	Return on assets calculated as earnings before extraordinary items divided by total assets. Data from Compustat.
SIZE	Natural logarithm of total assets in millions. Data from Compustat.
SPEC	Indicator variable equal to 1 if the auditor is an industry specialist, and 0 otherwise. An auditor is considered an industry specialist when its cumulative audit fees are the largest among competitors within a specific industry-year.
TENURE	Natural logarithm of the number of years the last year's audit firm has audited the client.
ARINV	Sum of inventory and receivables divided by total assets. Data from Compustat.
BIG	Indicator variable equal to 1 if the auditor is a Big-4 audit firm, and 0 otherwise. Data from Audit Analytics.
DISMISS	Indicator variable equal to 1 if the auditor in year t is different from the auditor in year t-1, and 0 otherwise. Auditor resignations were excluded during sample construction. Data from Audit Analytics.

Variable Definitions: Continued on next page

Variable Definitions – continued from previous page

Variable	Definition
$CFOPOWER$	Number of years the client company's CFO has served the company in this position. Data from Boardex
$ACPOWER$	Average of the audit committee members' tenure on the client company's board. Data from Boardex
$RELPOWER$	Difference in standardized levels of $CFOPOWER$ and $ACPOWER$. Data from Boardex
$TIMELAG$	The number of days between the start of the alleged misconduct and the filing of the class action complaint. Data from SCAC.

Appendix B Timeline and Exposure Calculation



$$DIFEXP_{X,t} = SIM(Complaint[X], Inspection[A, t-1]) - \frac{\sum_{i=A}^{N} SIM(Complaint[X], Inspection[i, t-1])}{N}$$

The figure describes the typical timeline of events. The Class Action complaint against company X refers to a Class Period in which the financial reporting misconduct allegedly occurred. The exposure calculation of Company X given its engagement with Auditor A is based on the similarity of (1) the content of the alleged misconduct described in the complaint and (2) the inspection findings of A available to Company X at the time. The exposure is standardized by taking the difference of the actual exposure and the average of individual exposures based on each auditor's inspection reports available on the date of appointment.

Chapter 2:
Estimating the Clients' Demand for Audit Quality: Evidence from the PCAOB Inspection Findings

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Abstract

This study investigates if and how much the audit clients value reliable and comparable indicators of audit quality. We contribute to the recent regulatory debate on whether the market for audit services would benefit from the availability of further information on auditors. We propose and employ the PCAOB inspection findings as a strong and reliable proxy for audit quality, and explore how it affects the clients' choice of external auditors using a discrete choice demand estimation framework. Our results show that a better performance in PCAOB inspections has a positive first-order effect on clients' preferences for auditors. Further, we exploit the framework to get preliminary additional insight on how client-specific determinants influence preferences over audit quality. The results suggest a curvilinear relationship between client size and demand for quality.

Keywords: audit quality, demand estimation, inspection reports.

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1 Introduction

This study aims to determine whether the market for audit services exhibit an aggregate demand for higher quality audits. Establishing the existence of this demand is a critical matter, especially from a regulatory perspective. Major accounting scandals occur despite the increased scrutiny on auditors, significantly damaging the public's trust in the audit industry. Attempts of audit regulators to re-establish this trust prominently focus on increasing the practice quality of auditors by inducing quality-based competition in the audit industry.[1] However, a quality-based competition is only possible if clients demand quality.

It is still not empirically clear whether there exists an overall demand for higher audit quality. Although client-specific determinants of seeking higher quality auditors (e.g., size, leverage) have been extensively studied, the methodology and the common proxies used in doing so have several limitations. This study attempts to overcome the methodological limitations by adopting a discrete choice framework following Gerakos and Syverson (2015) and Guo et al. (2017). This framework allows to determine the stand-alone utility that clients obtain from receiving high-quality audits, as well as from other auditor-specific attributes. To address the measurement-related limitations, we employ the Public Company Accounting Oversight Board (PCAOB) inspection findings as a direct proxy for audit quality (Aobdia, 2020).

The vast majority of studies in this stream of literature use appointment of a Big N auditor as the dependent variable to indicate the clients' preference towards audit quality.[2] This approach only allows for making second-order (differential) inferences: For instance, they may help us infer that larger companies prefer higher quality auditors more than smaller companies do. However, whether the sampled companies have an overall (first-order) preference for higher quality audits regardless of their size would still remain unclear. In addition, employing Big N auditor appointment as a proxy for audit quality fails to capture its heterogeneity across the Big N auditors.

Theoretical arguments regarding preferences towards audit quality prominently expect clients to favor better quality audits. Economic theory suggests that the demand for audit in general simply depends on the value of increased monitoring for the firm to the extent to which it reduces the agency costs for its investors

[1] PCAOB (2015) initiated the debate on the feasibility of introducing Audit Quality Indicators (AQI) framework, which would require audit firms to disclose a set of audit quality metrics in a comparable manner. PCAOB argues that better signals of audit quality would allow quality-based differentiation across auditors, and in turn an organic incentive for auditors to improve their practice quality in order to attracting and retaining clients.

[2] See Habib et al. (2019) for an extensive survey of studies examining the determinants of auditor choice, where the prevalence of using Big 4 appointment indicator to proxy audit quality in the literature is worth noting.

(Wallace, 1980). On the other hand, higher audit quality is often accompanied by higher audit fees, which results in a trade-off in terms of its overall value to the clients. It is difficult to ascertain audit's actual added value empirically, due to lack of counterfactuals: It is mandatory for publicly traded firms to have their financial information audited. Hence, we cannot observe nor estimate the value a client would have obtained had it decided not to receive audit service. However, the audits are heterogeneous in nature and each auditor provides a unique service to its client Brown and Knechel's (2016). Thus, it is reasonable to expect each auditor to have differential value for clients and several key attributes that drive this difference. We exploit the heterogeneity revealed by the inspection findings to examine how much clients value the better audit quality, signalled by the better inspection performance.

The question whether (and to what extent) clients consider the direct signals of audit quality in their auditor choices is relevant for two main reasons: First, accounting oversight regulators have been struggling to find ways to induce quality-based competition in the audit industry. For this purpose, Public Company Accounting Oversight Board (PCAOB) recently introduced several audit quality indicators to provide more direct and comparable measures of audit quality for clients to take into consideration for subsequent auditor appointment decisions. These efforts are based on the assumption that clients unconditionally demand high quality audits. We believe that it is important to empirically support the validity of this assumption, and understand the extent and boundary conditions of demand for audit quality, if any.

Second, audit quality is a concept that is commonly associated with auditor's size and reputation. Given the concentrated nature of the audit industry, size and reputation often do not suffice to explain clients' preferences or how they relate to differences in audit quality. To get a better understanding, one needs to take into account all the available information that can be linked to the auditor jointly, while avoiding the assumption that the same information affects all clients equally. This paper explores the possibility that particular auditor attributes and quality-relevant information may be more relevant for the demand of a subset of clients than others. Our preliminary attempts to understand these client-specific moderators suggest a curvilinear relationship between clients' size and their demand for quality audits: The findings show that the value of an auditor's inspection performance is positive for below-median sized clients, while it is negative for larger clients although less negative for the largest clients.

The study contributes to the extensive literature on the determinants of seeking high quality audits (Habib et al., 2019). We argue and propose that, for the US setting, PCAOB inspection findings can be used

as reliable and strong proxies for audit quality. They are reliable because the inspections are conducted by the experts of an expectedly impartial government agency (i.e., the PCAOB). They are strong because they are based on the auditors' compliance with the auditing standards. This endows them a conceptual relatedness to the construct itself superior than the traditional proxies that are conditional on client misstatements, which are in turn related to compliance with accounting standards (e.g., restatements, abnormal accruals). Moreover, they are particularly useful because they allow to observe the heterogeneity across the Big N auditors with respect to audit quality, with an annual frequency.

Secondly, the study contributes to the recently emerged trend of employing structural approaches in auditing literature. Gerakos and Syverson (2015) and Guo et al. (2017) showed that discrete choice framework can be successfully applied to auditing research. We respond Gerakos and Syverson's (2017) call to adopt this method for other research questions in the field. The framework is appropriate and useful for determining the value of audit quality for clients.

Finally, our findings contribute to the debate of whether the clients benefit from the revealed information on auditors and their engagements. PCAOB (2015) intends to make more information on auditors public, arguing that it would serve the clients to make informed decisions, which in turn may improve the overall audit quality in the industry. In the context of PCAOB inspection reports, prior literature has mixed findings on whether they are informative (Lennox and Pittman, 2010, Abbott et al., 2012, Gunny and Zhang, 2013). Our findings support the argument that clients value and utilize the information revealed on auditors through inspection reports.

The rest of the paper is structured as follows: The next section provides a review of literature on audit quality proxies, PCAOB inspection results, and discrete choice framework. Section 3 develops the hypotheses. Section 4 explains the research design. Section 5 discusses the findings of our demand estimation, and Section 6 concludes the study.

2 Related Literature

2.1 Audit Quality

The lack of direct and publicly available signals for audit quality has been a major obstacle for making reliable inferences regarding its demand. Given the state of progress in this stream of research at the time, DeFond and Zhang (2014) called for further research on factors influencing clients' demand for audit quality. The respective literature is relatively extensive, while the vast majority of studies investigated the client-specific factors (Habib et al., 2019). Only a few attempts were made to address DeFond and Zhang's (2014) call to explore the auditor-specific factors.

One possible reason why the auditor-specific factors remain understudied is the unavailability of public information on auditors.[3] Several studies relied on other available information that may potentially provide signals of audit quality. For instance, findings of Goodwin and Wu (2014) and Zerni (2012) show that clients are willing to pay a fee premium to industry specialist auditors. Guo et al. (2017) uses a structural approach to estimate the magnitude of the demand for industry specialization and documents the monetary value of hiring an industry specialist auditor instead of an non-specialist. However, considering specialization as an indicator of audit quality has limitations coming from its binary and persistent nature: It does not allow examining the cross-sectional quality variation across the auditors who are not specialists in a given industry, nor the quality variation over-time as the auditors tend to maintain their positions as industry specialists for long periods.

Several other studies employ auditors' involvement in restatements as negative signals for audit quality (Eshleman and Guo, 2014) and examine how this impacts the demand for their services (Irani et al., 2015, Swanquist and Whited, 2015). Restatements may be a strong and valid proxy for reputation loss for auditors. However, as a proxy of audit quality, it also has several limitations. A restatement is essentially the result of the joint occurrence of the following three events: (1) failure of the client to comply with the accounting standards, (2) failure of the auditor to detect the client's misstatement before the financial information is released, (3) the subsequent revelation of the misstatement. While the second failure is directly related to audit quality, observing this lack of quality is conditional on client's misstatement and its revelation. However,

[3] Auditors often operate in the form of limited liability partnerships and do not have publicly traded shares. Hence, they are not subject to the standard disclosure requirements of a listed company, although the respective audit oversight authorities may require them to disclose certain information due to their public interest concerning nature

the audit quality is a construct which refers to the auditors' skeptical assessment of the reliability of client's financial statements following certain professional standards, unconditional of whether the information was in fact misstated or not.

2.2 PCAOB Inspection Findings

Our study responds DeFond and Zhang's (2014) call by employing an auditor-specific attribute which is closely tied to audit quality: Auditor's PCAOB inspection performance. One of the core activities of the PCAOB is the periodic inspection of registered audit firms, which are held annually for large firms with at least 100 public clients, and triennially for smaller firms that have fewer. PCAOB inspections aim to provide constructive feedback to audit firms on improvements that are needed to satisfy the minimum requirements of auditing standards. The audit firms, in turn, are expected to remediate any deficiencies identified through the inspections in their subsequent audits (Aobdia, 2018). The audits to be reviewed are selected with a risk-based approach, and not all aspects of the selected audits are necessarily reviewed.

The inspections consist of two parts. Part I findings are publicly disclosed and describe the deficient aspects of all issuer audits in which the PCAOB concludes that the auditor failed to obtain sufficient and appropriate evidence to support its final audit opinion. Part II findings contain general observations regarding the audit firm's quality control system. However, this part is not publicly disclosed unless the audit firm fails to address them within one year after the release of the inspection report (Evans et al., 2011). Moreover, the identities of the engagement parties are masked in Part I of the inspection reports. The report is issued for the national audit firm without mentioning the offices or partners responsible for the engagements, and the issuers' names are coded alphabetically (e.g., Issuer A, Issuer B) to protect their anonymity.

There are several advantages of using PCAOB inspection findings as quality indicators. First, they include relatively detailed information at auditor firm level on auditors' compliance with auditing standards in their engagements. Aobdia (2020) documents a negative association between auditors' quality control deficiencies and their audit quality. The clients can examine the public portions of the report to obtain such details and see how important or relevant they are for themselves. In addition, since they are produced and disclosed by the experts of an expectedly impartial government institution (i.e., the PCAOB), the information is likely to be regarded by clients as reliable.

Second, PCAOB inspection findings are not subject to the first condition we mentioned for restate-

ments regarding the existence of a client misstatement. PCAOB selects the engagements to be reviewed with a risk-based approach. However, their reviews are not about detecting the misstatements in these engagements. Instead, they aim to identify whether the auditors' tests and procedures to detect these misstatements were sufficient and appropriate, regardless of the existence of a misstatement.[4] In other words, an auditor can be found deficient even if it the client's financial statements are flawless. Since we consider audit quality as an auditor-specific attribute rather than client-specific, this makes PCAOB inspection findings a more robust proxy for audit quality, both conceptually and empirically.

2.3 Discrete Choice Framework

The standard logit classification and other traditional binary regression models using auditor dismissals (Abbott et al., 2012, Irani et al., 2015, Acito et al., 2017) or auditor market shares (Swanquist and Whited, 2015) have several limitations. First, they only indicate differential (second-order) effects. The marginal effects of the examined determinants refer to a client's incremental likelihood of choosing a high-quality auditor compared to that of another client having a lower level of the determinant. Although this inference is valuable to an extent, it is insufficient for understanding the stand-alone (or first-order) demand for audit quality.

Second, the use of auditor dismissals as a binary dependent variable makes the preference revelation conditional on auditor dismissals. However, there is valuable information to be obtained even if the sample is entirely composed of clients who decided to keep their auditors. For instance, one can infer that clients keep their auditors despite their reputation loss because the audit's value for these clients is balanced by lower audit fees charged compared to alternatives. This evaluation also requires accounting for the heterogeneity in the attributes of the alternative engagements at the time of decisions. This is not possible with the binary regression framework where the controls are only based on the actual engagements, which are not necessarily in the choice sets of the clients during the auditor dismissal or appointment. Finally, it is also not possible to test for interdependencies between auditor industry specialization and other auditor attributes (Guo et al., 2020).

In order to determine the impact of inspection performance on auditor choices as precisely as pos-

[4]Relatedly, in cases of deficiencies PCAOB cites the violated auditing standards rather than accounting standards throughout the report.

sible, we adopt the discrete choice demand estimation framework (McFadden, 1973). The discrete choice framework is commonly used in the industrial organizations and marketing literature at aggregate (Berry et al., 1995) or individual level (Train, 2009) to determine demand for certain products and services, and how this demand is affected by product's attributes. The framework considers a set of products as mutually exclusive substitutes, each providing some value to the customer depending on its own attributes and the customer's characteristics. The model structurally relies on customers' product choices as revealed preferences to determine how these attributes affect their value-ranking among the alternatives. For instance, this method can reveal how sensitive the demand for a product is to its price. It can also serve to understand how much the quality of the product matters for a customer, independent of her sensitivity to its price.

The US audit services market provides a suitable setting for the application of the discrete choice framework, given its properties. Public companies have to appoint a single auditor for the fiscal year, providing the mutual exclusiveness of the alternatives. The oligopolistic nature of the audit industry also supports the framework's assumption that the clients are aware of the alternatives available. Finally, the absence of a mandatory audit firm rotation regime in the US makes each and every auditor in the industry an available option for any client. The framework is recently introduced to the auditing research by Gerakos and Syverson (2015). Their study which investigates the value of having all four of the Big 4 auditors in the choice set for clients (unlike the case with a mandatory audit firm rotation regime). Guo et al. (2020) use this method to estimate the demand for industry specialization and found that it provides a positive value for clients. We extend the application of this framework to estimate the value of audit quality for clients.

3 Research Design

3.1 Data and Sample

Our sample consists of the US firms between 2005-2018. We start our sample period from 2005 because it is the first year the inspection reports were made publicly available by the PCAOB. Following prior literature, we exclude financial institutions. We obtain auditor-related data from Audit Analytics and data on client's financial statements from Compustat. The auditors' inspection performance data was manually extracted from their inspection reports which are publicly available on the PCAOB's website. We also use

SDC database for data on merger and acquisition (M&A) transactions.

[Table 1 here]

The final sample we use for our analysis is 42,495 firm-years. Table 1 presents the descriptive statistics and the variable definitions can be found in Appendix A. As expected, clients appointing one of the Big4 auditors comprise the majority of our sample. *MA_IND* is the percentage of MAs per industry, which we use to instrument audit fees to provide a supply shock, has a significant variation across the sample ranging from 0 to 29 percent. The average tenure of auditors is 7.5 years.

3.2 Demand Estimation Model

Following Gerakos and Syverson (2015) and Guo et al. (2017) We adopt the discrete choice model to estimate the demand for audit quality. The model assumes that the clients choose the auditor that maximizes its utility (McFadden, 1973). The partial utility of client i for choosing auditor j in year t is given by:

$$V_{ijt} = \alpha_0 INV\_DEF_{jt} + \alpha_1 SPEC_{ijt} + \alpha_2 TENURE_{ijt} + \sum_{k=1}^{4} (\beta_{1k}\delta_k + \beta_{2k}\delta_k\tau_{it}) - \alpha_3 \ln(p_{ijt}) + \xi_{jt} \quad (1)$$

The client's deterministic part of the utility defined in Equation 1 incorporates the additive inverse of auditor's inspection deficiency ratio DEF_{jt}, auditor's industry specialization $SPEC_{jt}$, auditor's tenure with the client $TENURE_{jt}$, a vector of auditor dummies δ_k for each of the Big 4 auditors which captures the auditor's "brand effect", and its interaction with several client characteristics (i.e. size, number of segments, leverage, ROA, current ratio, receivables and inventory, loss, a vector of industry indicators), the the log of the audit fee, and ξ_{jt} which denotes all other determinants relevant for the client's choice but not observable to us. Following prior literature, we assume that ξ_{jt} follows an IID Type 1 extreme value distribution and also that the different components of the utility can be aggregated by addition (Train, 2009, Gerakos and Syverson, 2015).

From an empirical point of view, the left-hand side variable of the function above (i.e., the net partial utility) is not observable. However, relying on the assumption that the clients choose the audit firm that provides the highest net utility, their revealed preferences allow us to make inferences about how the right-

hand side variables influence these choices. This is accomplished in our analysis by estimating the above equation as a logit model, where the dependent variable is a choice indicator taking the value 1 if client i chose auditor j in year t, and 0 otherwise. Our model endows each client with a choice set of the Big 4 audit firms and an outside option (Non-Big4) whose attributes we normalize to zero, except the audit fee. Note that the utility function includes the attributes (and its interactions) of not only the chosen auditors, but of all the auditors in the choice set. This is essentially how the discrete choice approach can account for how the eventual auditor preference relates to attributes of the eliminated alternatives as well as the chosen one.

3.3 Audit Fees

There are two main issues related to audit fees in this framework. First, the actual fees are only observable conditional on being chosen by the client (realized choices), but the model requires audit fees to be available for the unrealized choices as well.[5] This problem is addressed, following Gerakos and Syverson (2015), by estimating the unrealized (counterfactual) audit fees for the client-auditor pairs using the standard audit fee model.

Second, the audit fees are endogenous to audit demand through unobserved characteristics of auditors (e.g. reputation). To address these concerns, following Guo et al. (2017, 2020) we employ an instrument that can isolate the variation in fees to a strong shift in audit supply: Mergers and acquisitions (MAs) provide a supply shock in the audit industry. One of the transaction parties start being audited by the auditor of the counter-party, and one of the two auditors has to be dismissed.[6] Such incidents, in aggregate, cause an excess of audit supply which in turn pushes the audit fees down in the industry for a short period. Accordingly, we include the instrument MA_IND_{it-1} in the first-stage standard audit fee model to address the endogeneity of audit fees. It is the asset weight of the MAs occurred within an SIC3 industry in the previous year, scaled by the aggregated total assets in the industry.

$$\ln(p_{ijt}) = \beta_0 + \beta_1 MA\_IND_{it-1} + \sum_r \theta_r \tau_{rit} + \varepsilon_{ijt} \tag{2}$$

As the first stage of this instrumental variable approach, we estimate a standard audit fee model

[5] This requirement can be explained with a simple analogy: The consumer demand for a particular cereal brand depends not only on its own price, but also on the prices of other brands in the same category.

[6] The auditor of the acquirer is often maintained.

where the independent variables besides the instrument MA_IND_{it-1} are the log of client's size, number of segments, leverage, current ratio, inventory and receivables, ROA, sales growth, market to book value, loss, a indicator for whether the client is an accelerated filer, and the auditor's tenure and industry specialization. Audit firm, year and industry fixed effects were also included. Our first stage audit fee regression presented in Table 2 reveals that, consistent with findings of Guo et al. (2017), the recent prevalence of MA transactions in an industry causes a supply shock resulting in lower audit fees for clients in that industry.

[Table 2 here]

We use a two-stage residual inclusion (2SRI) as it was documented to provide more consistent estimates than the traditional two-stage predictor estimation (Terza et al., 2008, Guo et al., 2020). This involves including in the second-stage regression not only the predicted values of audit fees $\ln(\hat{p}_{ijt})$, but also the predicted residuals $\hat{\varepsilon}_{ijt}$ obtained from the first stage. We code these variables $Pr\_AUDITFEE$ and $FS\_Residual$, respectively.

4 Demand Estimation

Main Results

Our discrete choice demand estimation results are presented in Table 3. Using the predicted values of audit fees ($Pr\_AUDITFEE$) and the predicted residuals ($FS\_Residual$) from the first stage regression for all actual and counterfactual client-auditor pairs in our sample, we estimate the demand based on Equation 1. The preliminary findings suggest a positive relationship between audit quality and demand for auditors' services. Among the Big4 auditors, having a lower ratio of audit deficiencies in the latest inspection report (i.e., higher INV_DEF) increases the likelihood of being appointed by a client. Although not as strong as audit fees and tenure, inspection performance has a significant impact on auditor preferences. On average, a standard deviation increase in the inspection performance increases the auditor's likelihood of being chosen by 2% (not tabulated).

[Table 3 here]

In line with the conventional prediction of economic theory, higher audit fees affect the demand for the service negatively. In addition, tenure of the auditor has a positive impact on the demand, while the results do not suggest a significant relationship between the demand and industry specialization. The negative coefficients on auditor fixed effects should be interpreted jointly with their interactions with other client attributes (Guo et al., 2017). The significant coefficients of the interactions with mainly the clients' size and number of business segments document that there is heterogeneity across clients with respect to their preferences regarding each Big4 auditor.

Overall, the main findings confirm that clients take into consideration how well the auditors perform their audits and value better inspection results, on top of the value they attribute to the auditor's reputation and other unobserved features.

Moderating Effect of Client Size

Since the main results suggested that preferences for auditors may change depending on auditor's practice quality, we make a preliminary attempt to understand the client-specific determinants that affect their overall demand for audit quality. The literature documents a clear association between client size and auditor choice (Chow, 1982, Hay and Davis, 2004, Knechel et al., 2008). We exploit our demand estimation model, using inspection findings as a measure of audit quality, to shed light on the nature of this association.

[Table 4 here]

We interact inspection performance with client size measured as log-transformed total assets, and include a squared size variable in a separate model. The findings presented in Panel A of Table 4 suggest a curvilinear association between client size and demand for high quality audits. The model without the squared size interaction does not exhibit a significant relationship, while the model with both interactions are significant for both order-levels of size as moderators.

Interestingly, although it should be interpreted jointly with its other interactions with auditor dummies, the resulting negative main effect of size in preference for audit quality contradicts with prior literature that commonly documents a positive association. This contradiction may be explained by the discrete choice framework's ability to distinguish between the Big4 auditors' brand effect (captured by the auditor fixed effects and their interactions) from their practice quality.

Since the coefficients of the demand estimation do not allow for meaningful interpretations other than the direction of the effects, Panel B provides some insight on how the marginal effect of audit quality on auditor preferences changes across different levels of client size. The findings indicate a positive marginal effect for smaller firms and negative and much lower margins for large firms, while the decrease is slower moving towards the largest clients.[7]

5 Conclusions and Future Directions

Our study examines the value the clients attribute to audit quality, proxied by the auditors' PCAOB inspection performance. The findings of our demand estimation imply that clients have a first order preference for audit quality. This gives us two important insights: First, it shows that the clients can observe and evaluate the heterogeneity of quality across the large auditors that were commonly considered to provide a homogeneous audit quality. The second and perhaps the more important inference we can make from the findings is that, all else equal, the average client prefers to appoint the auditors that performed will in the inspections, and hence signal a higher audit quality. We also document that our discrete choice model is robust and useful in examining the client-specific determinants of seeking high quality audits.

Our findings shed light on the regulatory debate on whether clients value the information revealed in the inspection reports. The results may inform other non-US audit oversight regulators who does not currently disclose the findings of their inspections publicly. Note, however, that although we document the validity of regulators' assumption that the revealed information on auditors has the potential for affecting the dynamics of audit market competition as intended, it is still unclear whether this results in a gradual increase in the overall audit quality in the industry.

An interesting and valuable extension of this analysis would be to use the estimated parameters of the discrete choice model to determine the precise value for clients of having the inspection findings as a signal of audit quality, compared to not having them and having to assume a homogeneous audit quality across the Big N auditors.

[7]Note that the margins tabulated in Panel B should be interpreted considering that all other covariates are kept constant. However, since some demand-increasing covariates such as auditor tenure are likely to be correlated with client size, the estimated margins may be downward biased. Nevertheless, they are insightful in terms of understanding the approximate critical point of the curvilinear relationship.

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Table 1: Descriptive Statistics

VARIABLES	N	mean	sd	p01	p25	p50	p75	p99
AUDITFEE	42,495	13.52	1.45	10.12	12.52	13.65	14.51	16.63
ACC_FIL	42,495	0.70	0.47	0.00	0.00	1.00	1.00	1.00
LEV	42,495	0.75	19.78	0.00	0.01	0.18	0.37	5.29
LOSS	42,495	0.40	0.49	0.00	0.00	0.00	1.00	1.00
MA_IND	42,495	0.03	0.06	0.00	0.00	0.01	0.02	0.29
SIZE	42,495	19.54	2.53	12.41	17.95	19.74	21.30	24.63
ROA	42,495	-0.36	2.97	-7.55	-0.10	0.03	0.08	0.45
SEGMENTS	42,495	0.86	0.83	-1.30	0.21	0.85	1.53	2.49
GROWTH	42,495	0.22	0.98	-0.93	-0.04	0.07	0.21	5.50
CURRENT	42,495	2.86	3.15	0.04	1.26	1.98	3.24	17.84
MB	42,495	2.86	13.14	-29.27	1.04	1.99	3.71	46.97
SPEC	42,495	0.19	0.39	0.00	0.00	0.00	0.00	1.00
TENURE	42,495	7.57	5.02	1.00	3.00	7.00	13.00	15.00
ARINV	42,495	0.27	0.22	0.00	0.10	0.23	0.39	0.97
INV_DEF	42,495	-0.18	0.17	-0.51	-0.31	-0.15	0.00	0.00

	N	%		N	%
Big4	27,456	64.61			
			PwC	6,624	24.13
			EY	9,219	33.58
			Deloitte	5,908	21.52
			KPMG	5,705	20.78
Non-Big4	15,039	35.39			

This table reports the descriptive statistics for all variables used in analyses. Variables AUDITFEE, SIZE, and SEGMENTS are in logarithmic form. All continuous variables are winsorized at level 1% and 99%. See Appendix A for variable definitions.

Table 2: Audit Fee Regression

AUDITFEE	
MA_IND	-0.069***
	(0.006)
SIZE	0.326***
	(0.000)
SEGMENTS	0.117***
	(0.000)
LEV	0.001***
	(0.000)
ROA	-0.002
	(0.169)
ARINV	-0.031*
	(0.089)
CURRENT	-0.021***
	(0.000)
GROWTH	-0.012***
	(0.000)
MB	-0.001***
	(0.000)
TENURE	0.002*
	(0.083)
SPEC	0.022***
	(0.002)
LOSS	0.065***
	(0.000)
ACC_FIL	0.188***
	(0.000)
Constant	7.168***
	(0.000)
Audit Firm FE	Yes
Industry FE	Yes
Year FE	Yes
N	42,495
Adj. R^2	0.85

Robust p-values in parentheses. *** p<0.01, ** p<0.05, * p<0.1 This table reports the results of the first stage audit fees regression. MA_IND is the instrument and denotes the prior year prevalence of MA events in the client's industry. Variables AUDITFEE, SIZE and SEGMENTS are in logarithmic form.

Table 3: Demand Estimation

DV: CHOICE	Coef.	Std. Err.	Z-stat	*p*
Pr_AUDITFEE	-1.164***	0.163	-7.122	0.000
FS_Residual	0.295***	0.074	3.958	0.000
INV_DEF	0.691***	0.253	2.736	0.006
TENURE	5.374***	0.066	81.903	0.000
SPEC	0.110	0.118	-0.930	0.352
PwC	-34.991***	1.300	-26.918	0.000
EY	-31.264***	1.190	-26.277	0.000
Deloitte	-31.589***	1.198	-26.377	0.000
KPMG	-32.129***	1.229	-26.133	0.000
*PwC**SIZE	0.886***	0.077	11.581	0.000
*EY**SIZE	0.727***	0.071	10.305	0.000
*Deloitte**SIZE	0.729***	0.072	10.186	0.000
*KPMG**SIZE	0.760***	0.072	10.557	0.000
*PwC**SEGMENTS	0.365***	0.105	3.463	0.001
*EY**SEGMENTS	0.290***	0.088	3.298	0.001
*Deloitte**SEGMENTS	0.228**	0.096	2.373	0.018
*KPMG**SEGMENTS	0.257***	0.094	2.728	0.006
*PwC**LEV	-0.206	0.277	-0.744	0.457
*EY**LEV	-0.305*	0.159	-1.921	0.055
*Deloitte**LEV	-0.785***	0.249	-3.150	0.002
*KPMG**LEV	-0.032	0.111	-0.284	0.777
*PwC**ROA	0.183	0.239	0.762	0.446
*EY**ROA	0.103*	0.059	1.746	0.081
*Deloitte**ROA	0.012	0.040	0.291	0.771
*KPMG**ROA	0.055	0.046	1.199	0.230
*PwC**ARINV	-0.406	0.397	-1.022	0.307
*EY**ARINV	-0.584*	0.355	-1.647	0.100
*Deloitte**ARINV	0.666**	0.300	2.216	0.027
*KPMG**ARINV	-0.163	0.432	-0.377	0.706
*PwC**LOSS	0.098	0.165	0.593	0.553
*EY**LOSS	0.403***	0.142	2.830	0.005
*Deloitte**LOSS	0.043	0.138	0.309	0.757

Table 3: Continued on next page

Table 3 – Continued

	Coef.	Std. Err.	Z-stat	*p*
*KPMG**LOSS	0.344**	0.142	2.415	0.016
Durables* *PwC*	0.173	0.368	0.471	0.638
Durables* *EY*	0.461	0.373	1.234	0.217
Durables* *Deloitte*	0.766**	0.377	2.034	0.042
Durables* *KPMG*	-0.021	0.364	-0.057	0.955
Non-Durables* *PwC*	-0.014	0.670	-0.021	0.983
Non-Durables* *EY*	0.615	0.507	1.212	0.225
Non-Durables* *Deloitte*	0.552	0.516	1.071	0.284
Non-Durables* *KPMG*	0.089	0.503	0.178	0.859
Manufacturing* *PwC*	0.544	0.376	1.447	0.148
Manufacturing* *EY*	-0.040	0.383	-0.104	0.917
Manufacturing* *Deloitte*	0.321	0.392	0.818	0.413
Manufacturing* *KPMG*	-0.130	0.383	-0.338	0.735
Chemicals* *PwC*	-0.063	0.484	-0.131	0.896
Chemicals* *EY*	0.318	0.421	0.754	0.451
Chemicals* *Deloitte*	0.069	0.463	0.149	0.882
Chemicals* *KPMG*	-0.027	0.449	-0.061	0.951
Business Equipments* *PwC*	1.200**	0.531	2.262	0.024
Business Equipments* *EY*	-0.367	0.492	-0.746	0.456
Business Equipments* *Deloitte*	-0.154	0.573	-0.268	0.788
Business Equipments* *KPMG*	0.180	0.571	0.315	0.753
Telecommunications* *PwC*	0.828**	0.340	2.434	0.015
Telecommunications* *EY*	0.697**	0.346	2.017	0.044
Telecommunications* *Deloitte*	0.537	0.363	1.480	0.139
Telecommunications* *KPMG*	0.351	0.344	1.021	0.307
Utilities* *PwC*	0.625	0.552	1.134	0.257
Utilities* *EY*	0.552	0.480	1.150	0.250
Utilities* *Deloitte*	0.075	0.513	0.146	0.884
Utilities* *KPMG*	0.206	0.473	0.435	0.663
Retail* *PwC*	-0.751*	0.391	-1.922	0.055
Retail* *EY*	0.341	0.398	0.857	0.391
Retail* *Deloitte*	0.325	0.392	0.828	0.408
Retail* *KPMG*	0.121	0.380	0.318	0.751
Healthcare* *PwC*	1.147***	0.370	3.097	0.002
Healthcare* *EY*	1.345***	0.355	3.784	0.000

Table 3: Continued on next page

Table 3 – Continued

	Coef.	Std. Err.	Z-stat	*p*
Healthcare* *Deloitte*	0.278	0.386	0.721	0.471
Healthcare* *KPMG*	0.492	0.369	1.334	0.182
Year FE	Yes			
N	212,947			
N - Clusters	6,501			
Log Likelihood	-17,125			
Pseudo R^2	0.81			

Robust p-values in parentheses. *** p<0.01, ** p<0.05, * p<0.1
This table reports the results of the demand estimation as specified in Equation (1) . The variables Pr_AUDITFEE, SIZE, SEGMENT and TENURE are in logarithmic form. Pr_AUDITFEE and FS_Residual are the predicted values of audit fees and residuals, respectively, obtained from the first stage audit fee regression. *PwC*, *EY*, *Deloitte*, and *KPMG* are indicator variables for each of the Big4 auditors. These variables are also interacted with client attributes and the industry indicators.

Table 4: Additional Analysis: The Moderating Effect of Client Size

Panel A: Interacting Audit Quality with Client Size

	CHOICE	CHOICE
INV_DEF	2.660	117.5***
	(0.129)	(0.000)
INV_DEF*SIZE	-0.098*	-11.63***
	(0.083)	(0.000)
INV_DEF*SIZE^2		0.287***
		(0.000)
*PwC**SIZE	0.717***	1.003***
	(0.000)	(0.000)
*EY**SIZE	0.564***	0.761***
	(0.000)	(0.000)
*Deloitte**SIZE	0.564***	0.783***
	(0.000)	(0.000)
*KPMG**SIZE	0.588***	0.815***
	(0.000)	(0.000)
Pr_AUDITFEE	-0.818***	-1.465***
	(0.000)	(0.000)
FS_Residual	0.293***	0.278***
	(0.000)	(0.000)
TENURE	5.369***	5.346***
	(0.000)	(0.000)
Other Controls	Yes	Yes
Audit Firm FE	Yes	Yes
Year FE	Yes	Yes
N	212,947	212,947
N - Clusters	6,501	6,501
Log Likelihood	-17,134	-17,011
Pseudo R^2	0.83	0.87

Table 4 continued from previous page

Panel B: Marginal Effect of Audit Quality by Client Size

SIZE	Assets ($M)	Margin (+1 SD)	S.E.	*p*
12	0.1627	0.305***	0.030	0.000
14	1.2026	0.228***	0.022	0.000
16	8.8861	0.132***	0.013	0.000
18	65.659	0.030***	0.003	0.000
20	485.16	-0.093***	-0.004	0.000
22	3,584.9	-0.192***	-0.009	0.000
24	26,489	-0.206***	-0.010	0.000
26	195,729	-0.168***	-0.008	0.000

Robust p-values in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Panel A reports the results of the demand estimation as specified in Equation (1), but also including interactions of INV_DEF with $SIZE$ and $SIZE^2$ to examine the moderating effect of client size for seeking high quality audits. The variables $Pr\_AUDITFEE$, $SIZE$, $SEGMENT$ and $TENURE$ are in logarithmic form. $Pr\_AUDITFEE$ and $FS\_Residual$ are the predicted values of audit fees and residuals, respectively, obtained from the first stage audit fee regression. *PwC*, *EY*, *Deloitte*, and *KPMG* are indicator variables for each of the Big4 auditors. These variables are also interacted with other client attributes and the industry indicators. Panel B reports the marginal effect of INV_DEF at various levels of client size. Namely, the values under the third column indicate the percentage change in the probability of choosing an auditor when its audit quality increases by one standard deviation, given the size of the client equals the value indicated in the first column.

Appendix A Variable Definitions

Variable	Definition
CHOICE	An indicator variable taking the value of 1 if the client appointed the auditor in a given year, and 0 otherwise. The five auditor options are defined as each of the Big-4 audit firms and picking a Non-Big4 firm exists as the outside option.
AUDITFEE	Natural logarithm of audit fees. Data from Audit Analytics.
Pr_AUDITFEE	The predicted values of *AUDITFEE* obtained from the first stage audit fee regression, including the instrument *MA_IND*. Data from Audit Analytics.
FS_Residual	The predicted residuals of the first stage audit fee regression. Data from Audit Analytics.
MA_IND	Ratio of firms involved in M&A activity in the industry (SIC3) in terms of assets in the previous year. Data from SDC.
DEF	Number of engagements the auditor was found deficient by the PCAOB in its most recent inspection report, divided by the total number of engagements inspected. Data from PCAOB website.
INV_DEF	Additive inverse of *DEF* (i.e., *DEF* multiplied by -1).
SIZE	Natural logarithm of total assets in millions. Data from Compustat.
GROWTH	The percentage change in sales from year t-1 to year t. Data from Compustat.
MB	Market to book value. Data from Compustat.
CURRENT	Current Ratio, as measured by Current Assets divided by Current Liabilities. Data from Compustat.

Variable Definitions: Continued on next page

Variable Definitions – continued from previous page

Variable	Definition
ROA	Return on assets calculated as earnings before extraordinary items / total assets. Data from Compustat.
LEV	Total long-term debt divided by total assets. Data from Compustat.
SPEC	Indicator variable equal to 1 if the auditor is an industry specialist, and 0 otherwise. An auditor is considered an industry specialist when its cumulative audit fees are the largest among competitors within a specific industry-year. Data from Audit Analytics.
$TENURE$	Natural logarithm of the number of years the last year's audit firm has audited the client. A ceiling of 15 years is applied to long-tenure pairs. Data from Audit Analytics.
ARINV	Sum of inventory and receivables divided by total assets. Data from Compustat.
ACC_FIL	Indicator variable equal to 1 if the client is an accelerated filer, and 0 otherwise. Data from Compustat.
LOSS	Indicator variable equal to 1 if the client incurred a loss that year, and 0 otherwise. Data from Compustat.