Economic consequences of public oversight of the auditing profession

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Insights from the Capital and Audit Market

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ECONOMIC CONSEQUENCES OF PUBLIC OVERSIGHT OF THE AUDITING PROFESSION:

Insights from the Capital and Audit Market

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Lei

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Chapter 1: Introduction

1.1 Introduction

In response to high profile financial reporting scandals that marked the turn of the 21st century, independent public oversight of the auditing profession was installed in many countries around the world. Motivated by the debate on the effectiveness of public oversight, which is not uncontested, and the relatively limited empirical evidence, I examine in this dissertation economic consequences of public oversight. In particular, I focus on the impact of disclosure of inspection outcomes on information asymmetry and the cost of capital in the equity and debt market, as well as on auditor behavior.

The agency relationship is one of the oldest and commonest codified modes of social interaction (Ross 1973). According to agency theory, when managers hold little equity in the firm and shareholders are too dispersed to enforce value maximization, corporate assets may be deployed to benefit managers rather than shareholders (Morck et al. 1988), which is commonly recognised as agency costs. An important mechanism to reduce agency costs is through contracting. While these contracts may be implicit or explicit, they are often based on accounting numbers (Lennox 2005). However, this may not be sufficient as the accounting numbers on which contracts are based are prepared by managers. It gives managers incentives to manipulate the accounting numbers when the numbers are not sufficient to guarantee manager's compensation. As a result, auditing conducted by independent auditors are demanded to control the risk of misstatements in the accounting numbers (Jensen and Meckling 1976; Lennox 2005; Watts and Zimmerman 1983).

While an audit is designed to provide an independent view on the reliability of the information provided in the financial statements, this function of audit is based on the premise that investors trust the auditors. The higher the audit quality, the less likely that financial statements contains material mistakes. However, if an audit is perceived to be of low quality, the information provided is discounted. It may increase costs of capital, reduce capital market participation and reduce the availability of capital which harms financial stability and the wellbeing of individual companies (Offermanns 2011). While audit quality is not directly observable to investors, auditor reputation and auditor size are commonly used proxies for audit quality (Barton 2005; Francis and Wilson 1988).

There used to be a common notion that the threat of reputational losses and litigation from investors in case of audit failure is sufficiently high to keep audit firms from providing substandard audit quality (Offermanns and Peek 2011). However, the Enron scandal, which became public in 2001 and is cited as the biggest audit failure, lead to the dissolution of Arthur Andersen which was one of the biggest audit firms in the world. Consequently, the scandal gave rise to the debate on the effectiveness of auditing and resulted in stricter regulations and legislation in the US. One of the most important regulatory changes was the passing of the Sarbanes-Oxley Act (hereafter referred to as SOX), which includes the foundation of the Public Accounting Oversight Board (hereafter referred to as PCAOB).

Founded in 2003, the PCAOB carries the mission to oversee the audits of public companies in order to protect the interests of investors and further the public interest in the preparation of

informative, accurate, and independent audit reports (PCAOB 2011). By doing that, the PCAOB aims to restore investors' confidence in the auditing profession. The most important responsibility of the PCAOB is to conduct periodical inspections on audit firms who have public clients. Prior to the introduction of PCAOB inspection, audit firms were self-regulated through peer reviews. According to SOX, audit firms must register with the PCAOB to prepare or issue an audit report for a public company or another issuer, or a broker-dealer, or to play certain roles in those audits. Specifically, audit firms who have more than 100 public clients are inspected by the PCAOB annually and the remaining audit firms are inspected triennially. The inspectors evaluate audit firms' quality control policies and procedures as well as review audit engagements selected based on characteristics of the client, its industry, practice office, partner or prior inspection results (PCAOB 2009).

After the inspections, the PCAOB publishes its findings in an inspection report for each audit firm, without disclosing the selected clients' identity. There are three parts in an inspection report. Part I of an inspection report contains information about engagement-specific deficiencies. These deficiencies can either be related to failures in performing audit procedures according to the General Accepted Auditing Standards or failures in detecting a material error according to the General Accepted Accounting Principles. Part II of an inspection report indicates whether deficiencies are identified in audit firm's quality control system. However, the PCAOB only publicly discloses those quality control deficiencies if audit firms fail to remediate the deficiencies in a 12-month period.

Following the steps taken in the US, many other countries began to install public oversight in auditing profession. Taking Europe as an example, the revised 8th EU Directive (2006) put an end to self-regulation of the auditing profession in all EU member states. According to the Directive, all member states of EU were required to install public oversight before June 2008 (European Union 2006). At an international level, the International Forum of Independent Audit Regulators (IFIAR), established in 2006, currently comprises independent audit regulators from 52 jurisdictions representing Africa, North America, South America, Asia, Oceania, and Europe, with the mission to serve the public interest and enhance investor protection by improving audit quality globally.

While independent public oversight bodies have a clear mission, it remains unclear whether the potential benefits of the newly installed public oversight bodies outweigh its costs. Taking the PCAOB inspections as an example, there are direct and indirect costs associated with it. The direct costs are reflected in the PCAOB's budget. Under Section 109 of the Sarbanes-Oxley Act, the PCAOB is required to establish, with the approval of the Commission, a reasonable accounting support fee to fund its operations. The fee is assessed annually on issuers and registered broker-dealers. The accounting support fees have increased significantly over time and currently reached US$ 268 million in 2017 starting from US$ 50 million in 2003 (SEC, 2016). The indirect costs can be related to potential increases in audit fees after the installment of the PCAOB inspection. To gain further insights on the potential benefits of public oversight, I investigate how the publication of the public oversight inspection reports impact stock market liquidity and audit firm behavior in the US in my first and second study of this dissertation, respectively. Additionally, to shed some light on whether institutional

differences matter for public oversight, I examine in the third study of this dissertation how investors react to the inspection reports in the Netherlands.

1.2 The informational value of public oversight

One of the main tasks of public oversight is to provide information about audit quality to investors (DeFond 2010). Different oversight bodies have different ways of disclosing their inspection findings. However, it is far from clear how capital markets perceive the information in the inspection reports, which is the only mechanism through which inspections are visible and communicated to investors. To gain more insights on this issue, I examine the informational value of public disclosure of public oversight inspection results for the capital markets in the first and third study of this dissertation.

Specifically, in my first study, I examine how the publication of PCAOB inspection reports impact stock market liquidity over time, using the first three rounds of the PCAOB inspections. In particular, I assume audit quality is not perfectly observable before the publication of the inspection reports. Hence, if the PCAOB inspection report provides an informative, low-cost, and easy to interpret signal to help investors update their belief about audit quality, stock market liquidity can be expected to increase. Other than through changed perceived audit quality, PCAOB inspections may also impact stock market liquidity through increased actual audit quality, as high audit quality limits managers' discretionary accounting choices and increases accounting information precision (Barron and Qu 2014). Consistent with this argument, prior literature indicated that audit quality increases after the installment of PCAOB inspections (Carcello et al. 2011; Gunny and Zhang 2013; Gipper et al. 2015; Aobdia 2015).

As discussed above, many countries worldwide began to install public oversight following the example of PCAOB inspections. However, given institutional differences between countries, it is salient to investigate whether inspections achieve similar effects in different countries. Thus, while in my first study, I test how the publication of PCAOB inspections impact liquidity in the US, I investigate capital market reactions to public oversight in a non-US setting in my third study. More specifically, I focus on the Dutch setting and investigate whether the publication of inspection results and disclosure of fines imposed on the Big 4 audit firms provide relevant information for capital market investors.

As a member state of the EU, the Netherlands installed public oversight in 2006, which is regulated by the Audit Firm Supervision Act (AFS Act 2006). According to the Act, all audit firms performing statutory audits need to be inspected by the Netherlands Authority for the Financial Markets (hereafter referred to as AFM). Similar to PCAOB inspections, AFM inspections cover selected audit engagements and quality control systems of audit firms. However, there are important differences between them. Although the set-up of the inspection structure in the Netherlands is similar to the set-up in the US, there are some important differences between them. Firstly, the AFM inspects private clients as well as public clients, while the PCAOB only inspects public clients. Secondly, the AFM publishes its inspection outcomes on Big 4 audit firms in the Netherlands using a single report, while the PCAOB

discloses a single report for each audit firm. Thirdly, quality control deficiencies are directly disclosed in the AFM inspection reports, while not disclosed until the audit firm did not remediate them in a 12-month period in the PCAOB inspection reports. Moreover, litigation risks, which are considered to be the most significant drive of improving audit quality after the inspection reports are published in the US (Acito et al. 2017; Gipper et al. 2015), are much lower in the Netherlands. The differences in the format of inspections and in the institutional environment are the underlying motivation of the study to advance our insights on the effects of public oversight in a non-US setting.

1.3 Public oversight and audit firm behavior

Other than its intention to restore investors' confidence in the auditing profession, in other words to increase perceived audit quality, public oversight also aims to improve actual audit quality. However, the extent to which this can be achieved depends on the extent to which the inspection process triggers changes in auditor behavior, especially when deficiencies are found during the inspection. In my second study of this dissertation, I examine how smaller audit firms that are subject to triennial inspection respond to the findings of PCAOB inspections. More specifically, I examine whether inspections affect the audit fees of smaller audit firms charged to their clients, conditioning on the content of the inspection reports.

Conceptually, engagement specific deficiencies as well as audit firm quality control deficiencies discovered during inspections and publicly disclosed in PCAOB inspection reports can lead to changes in the auditor's incentive structure and behavior, in response to the increased litigation risks and regulatory sanctions (DeFond and Lennox 2011). Based on the assumption that the audit market in the US is competitive, the increased costs should be reflected in audit fees. However, a deficient PCAOB inspection report may lead to reputation damage for audit firms, which may have an adverse effect on clients' valuations (Dee et al. 2011) or may cause the firm to exit the audit market (DeFond and Lennox 2011). From this point of view, although faced with increased costs, deficient audit firms will have difficulties to pass the additional cost to their clients by increasing audit fees. Thus, I explore how the changes in audit fees are conditional on the content of the inspection reports. Moreover, the increased engagement costs related to compliance with PCAOB standards (e.g., documentation requirements) as well as the additional investment in upgrading audit firms' quality control system to meet PCAOB standards may not necessarily further increase after each inspection round unless the PCAOB becomes stricter over time. Hence, I also examine how audit fees changes over time.

1.4 Research method and data

For my first study, I employed bid-ask spread, price impact, zero returns and total trading cost to proxy for stock market liquidity. All the data were retrieved from CRSP. For my second study, I obtained audit fee data from AuditAnalytics. For my third study, I collected financial

information for the public companies in the Netherlands from DataStream to calculate abnormal returns. For my first and second study, I manually coded the content of the PCAOB inspection reports, which can be retrieved from the PCAOB website.

1.5 Main findings and controbutions

The findings of my dissertation show that the publication of the PCAOB inspection results in the US can impact stock market liquidity as well as audit firm behavior. However, the inspection reports appear to have limited informational value for investors in the Netherlands.

Specially, in my first study, I find that stock market liquidity decreases after the disclosure of the first round inspection results, implying that sophisticated and more informed investors might be better able to process the information in the beginning. If in turn unsophisticated investors have difficulty in interpreting the information, the return premium they demand increases. After the second round of inspections, the results show a significant increase in liquidity. This is in line with the intention of regulators to reduce uncertainty and improve audit quality. However, after the publication of the third round inspection results, liquidity appears to be no longer significantly influenced as most of the uncertainty is resolved and future reports contain less new information that can help investors in updating their views on audit quality. I further find that the magnitude of decrease in liquidity after the first round inspection does not depend on the content of the inspection reports, suggesting that the direct information effect is dominating in the first round inspection. For second round inspection reports, I observe an increase only for companies with auditors who did not disagree with PCAOB findings. Moreover, in case auditors do state a disagreement, liquidity increases, suggesting a bad signal of future audit quality.

My first study contributes to the existing literature in several ways. First, I provide insights on the perceived usefulness of inspection reports as signals of audit quality. Second, I provide early empirical evidence on the long-term capital market effects around the publication of the inspection reports. My study also provides some evidence that can guide regulators concerning whether or not to publicly disclose the inspection reports and/or publicly disclose sanctions imposed on audit firms.

The results of my second study indicate that audit fees increase on average after the publication of inspection reports. This finding holds across the first three inspection rounds. Moreover, the increase is mainly driven by audit firms without engagement deficiencies or without publicly disclosed quality control deficiencies. However, for audit firms with disclosed quality control deficiencies, audit fees decrease which suggest reputation damage. In my additional analysis, I find that deficient audit firms experienced a decrease in the number of CPAs, which may suggest a seeking for lower labor cost. On the contrary, for clean audit firms, I document an increase in the number of CPAs, which would be consistent with higher auditor effort. Interestingly, I find that while clean audit firms are able to increase audit fees and the number of CPAs, their number of public clients decreases. If a clean PCAOB inspection report

is an indication of higher audit quality, this finding would suggest that in the small audit firm market, there appears to be a strong focus of clients on lowering audit fees instead of seeking for higher audit quality.

My second study contributes to the growing body of literature on the economic effects of PCAOB inspections by focusing on the smaller audit firm market segment and by considering different dimensions of audit firm behavior. While recent studies mainly document positive effects of PCAOB inspections for annually inspected audit firms (Acito et al. 2017; Carcello et al. 2011), I show that the evidence for the small audit firm market is not unequivocal positive, which is likely driven by the lower demand for audit quality in this market segment.

The results of my third study indicate that cumulative average abnormal returns (CAAR) around the publication of the public oversight inspection results are not significantly different from zero for the first AFM inspection and four fines announcements, suggesting that these reports are not informative to investors. For the second AFM inspection report, on average, CAAR is significantly negative, indicating that perceived audit quality decreased and auditors suffer from reputation damage after the disclosure. Furthermore, using cross-sectional regressions, I find no support that cumulative abnormal returns (CARs) are different across the clients audited by different Big 4 audit firms. Overall, the results of my third study provide limited support that AFM inspection reports change capital market investors' perceived audit quality.

My third study contributes to the literature on investigating the effect of public oversight, and is one of the few studies relating to a non-US setting. I provide empirical evidence that the publication of the AFM inspection reports and fines announcements against the Big 4 audit firms do not change perceived audit quality in the capital market in the Netherlands, while prior research suggests that the PCAOB inspection reports and fines decisions are valued in the US market. To the best of my knowledge, this is the first paper to explore capital market reactions to public oversight in a non-US setting. I also look into the debt market reaction to inspections, which is important for practice since debt plays a key role in companies' financing activities (Pittman and Fortin 2004). My third study highlights the importance to consider different institutional environments and inspection formats when assessing the impact of public oversight, which is important for both regulators and researchers.

1.6 Outline of the dissertation

In the next three chapters, I present each of the three studies described above. Chapter 2 describes the first study on whether information asymmetry is influenced by the publication of PCAOB inspection reports. Chapter 3 presents my second study on how audit firms react to PCAOB inspection reports, conditional on the content of the inspection reports. Chapter 4 describes how the capital market reacts to public oversight in the Netherlands. Finally, I conclude with a summary of the main findings of these studies, their contribution to the literature and suggestions for future research.

Chapter 2: The Impact of PCAOB Inspections on Stock Market Liquidity over Time

Abstract[1]

This study examines whether and how the publication of PCAOB inspection reports of triennially inspected audit firms changes the dynamics of client-company stock market liquidity over time. We find that liquidity decreases after the first round inspections regardless of the inspection outcomes, suggesting that the direct information effect is dominating. For the second round inspections, we observe an increase in liquidity only for companies audited by clean auditors and deficient auditors who do not disagree with the PCAOB's findings. The third round inspections do not appear to affect liquidity any longer. Overall, our results imply that PCAOB inspection reports change investors' perceptions of future audit quality. Moreover, investors learn how to interpret the reports, but that ultimately the informational value fades out after multiple rounds as most of the uncertainty is already resolved and future reports contain less new information for investors to update their views on audit quality.

[1] This chapter is based on a working paper together with Ann Vanstraelen and Patrick Vorst.

2.1 Introduction

In this paper we examine the impact of publicly reporting PCAOB inspection results on stock market liquidity over time. The Public Company Accounting Oversight Board (PCAOB), which was created by the Sarbanes-Oxley Act of 2002, put an end to the self-regulation of the auditing profession that was dominant for many decades. Subsequently, many other countries followed the US example by installing independent public oversight in varying forms. These initiatives are currently at different stages of development. However, in contrast to the US, most countries do not publicly disclose the inspection reports and/or sanctions imposed on audit firms. Ex ante, it is not clear what the economic consequences are of the level of transparency on inspection outcomes (Maijoor and Vanstraelen 2012). Moreover, despite its potential merits, public oversight has been, especially in the beginning, subject to criticism and skepticism, such as a lack of expertise, inadequate transparency on the procedures used and delays in the publication of inspection outcomes on an audit firm's quality control system (Glover et al. 2009; Daugherty and Tervo 2010).

Motivated by the debate on the effectiveness of public oversight, which is not uncontested, and the limited, though growing number of empirical studies (Abernathy et al. 2013), we investigate the impact of public disclosure of inspection reports on stock market liquidity. If the publication of inspection reports provides an accurate signal about audit quality and changes investors' perceptions of future audit quality, disclosure can have direct capital market consequences. To empirically examine this, we use a US setting since the US is one of the few countries where inspection reports of audit firms are publicly disclosed and where inspections have been in place for nearly a decade. This allows us to also investigate how the publication of PCAOB inspection reports of triennially inspected audit firms changes the dynamics of client-company stock market liquidity over time. We focus on companies audited by smaller audit firms (defined as audit firms that have less than 100 issuers as clients and that are inspected triennially by the PCAOB) since not much is known about the quality of these firms, despite the fact that they play a significant role in the competitive landscape of local markets and influence the ability of Big 4 audit firms to collect a fee premium (Bills and Stephens 2016). Furthermore, in contrast to annually inspected audit firms, there is variation in their inspection outcomes. Despite the deficient inspection reports issued for annually inspected audit firms, it is well- documented that global audit firm networks deliver higher audit quality compared to smaller audit firms (Francis et al. 1999; Francis and Yu 2009)[2]. At the same time, the common assumption to consider smaller audit firms as a homogeneous group seems inappropriate as some audit firms receive clean PCAOB opinions while for others deficiencies are flagged. Hence, small audit firms are an interesting group that warrants further investigation.

[2] We note that, using matching models, Lawrence, Minutti-Meza, and Zhang (2011) suggest that the difference in audit quality between Big 4 and non-Big 4 auditors largely reflect client characteristics and, more specifically, client size.

We focus on stock market liquidity because it is directly linked to the cost of capital (Butler, Grullon and Weston, 2005). Theory predicts that improved financial reporting quality reduces adverse selection costs, resulting in a more efficient allocation of resources and a lower cost of external financing (Myers and Majluf 1984). This is true even though the source of information asymmetry may be firm-specific. Prior literature has shown that if investor competition is low, as is likely the case in the small audit firm setting, firm-specific information asymmetry has a direct effect on the cost of capital (Armstrong et al. 2011; Akins et al. 2012). We investigate whether inspection reports serve as a signal of audit quality and reduce uncertainty on financial reporting quality.

Our sample consists of client companies of triennial inspected US audit firms consisting of 701 clients related to 200 first round inspection reports, 659 clients related to 175 second round inspection reports and 498 clients related to 124 third round inspection reports, which are issued between 2005 and 2014. Using this sample, we analyze the effect of the publication and the content of the inspection reports on stock market liquidity, of which the direction of change is an empirical question. We employ bid-ask spread, price impact, the likelihood of zero return days, and total trading costs as proxies for stock market liquidity.

One important feature of the PCAOB inspections on small audit firms is the natural staggered setting, in which the PCAOB inspects the small audit firms at different points in time. Using this setting, we are not only able to compare the stock market liquidity change from pre- to post- inspection for those client companies with auditors already being inspected by the PCAOB, but we can use the liquidity in other companies whose auditor has not been inspected yet at that time as a benchmark. We use the publication date of the inspection report to determine whether the information regarding the inspection results is released to the market. Both benchmarks help us to control for contemporaneous capital-market effects that are unrelated to the publication of the PCAOB inspection reports. Moreover, we also include year- and industry-fixed effects to account for the unobserved time- and industry-invariant characteristics.

We find that stock market liquidity decreases after the disclosure of the first round of inspection results, implying, on average, more market-wide uncertainty about audit quality. After the second round of inspections, we find a significant increase in liquidity. This is in line with the intention of regulators to reduce uncertainty about audit quality and ultimately improve audit quality. However, after the publication of the third round inspection results, stock market liquidity is no longer significantly influenced as most of the uncertainty is resolved and future reports contain less new information that helps investors in updating their views on audit quality. We further find that the magnitude of the decrease in liquidity after the first round inspections does not depend on the content of the inspection reports, suggesting that the direct information effect is dominating in these first round inspections. After the publication of the second round inspection reports, we observe increases in liquidity for companies with auditors who did not disagree with PCAOB findings and companies whose auditors have received clean inspection reports. This implies that for the second round inspections, investors expect better audit quality for these two types of audit firms. Interestingly, in case auditors disclose a disagreement with PCAOB findings, stock market liquidity does not improve. For those

auditors, investors arguably expect them not to take the necessary measures to improve audit quality, which can explain the absence of a change in stock liquidity.

Our study contributes to the existing literature in several ways. First, we provide insights on the perceived usefulness of inspection reports as signals of audit quality. This is important in light of the current debate regarding the merits of public oversight and the informativeness of the publications on public oversight outcomes. Second, while previous literature focused more on the effect that the PCAOB has on audit quality from the audit firm side, we provide early empirical evidence on the long-term capital market effects around the publication of the inspection reports. Our study also provides some evidence that can guide regulators concerning whether or not to publicly disclose the inspection reports and/or publicly disclose sanctions imposed on audit firms.

The remainder of the paper is organized as follows. Section 2 reviews the prior literature and develops the hypotheses. Section 3 presents the research sample and methodology to test the hypotheses. Section 4 discusses the empirical results. Section 5 includes the additional analysis. Section 6 concludes and outlines the implications and limitations of the study.

2.2 Prior literature and development of hypotheses

The PCAOB was installed by the Sarbanes-Oxley Act in 2002 as a means to improve audit quality and protect investors' interests. However, opinions on the effectiveness of PCAOB inspections are mixed. The PCAOB has been criticized for its lack of expertise and transparency, long delay of the inspection report publication (Glover et al. 2009; Palmrose 2005) and less informative reports than the AICPA peer reviews (Lennox and Pittman 2010). In addition, the PCAOB was not perceived as cost effective since it uses the same approach for both big and small audit firms and the small firms do not believe that PCAOB inspections improve their audit practice (Daugherty and Tervo 2010).

Despite these criticisms, other studies find evidence to support the effectiveness of PCAOB inspections. For example, non-Big 4 audit firms with PCAOB identified deficiencies are more likely to issue going concern (GC) opinions for their financially distressed clients subsequent to the PCAOB inspection than prior to the inspection (Gramling et al. 2011). The more conservative behavior of auditors suggests that auditors became stricter on the important reporting issues in clients' financial statements. The finding that over 600 small auditors exit the market following SOX lead DeFond and Lennox (2011) to conclude that PCAOB inspections improve audit quality by incentivizing low quality auditors to exit the market. Aobdia (2015) finds that both auditors and client issuers strongly react to the issuance of PCAOB inspection reports with identified audit deficiencies. In particular, the audit firm increases subsequent audit effort and the issuer client is more likely to switch auditors, often to firms with high perceived quality. Gipper, Leuz, and Maffett (2015) conclude that the PCAOB increases the credibility of financial reporting by showing that capital market responses to unexpected earnings increase significantly following the introduction of the PCAOB inspection regime.

A major link between economic theory and contemporary accounting thought is the notion that a firm's commitment to more disclosure should decrease information asymmetry and thus increase liquidity (Leuz and Verrecchia 2000; Daske et al. 2008). In this study, we investigate the relation between public disclosure of PCAOB inspection reports on audit firms and stock market liquidity to examine whether investors value the information provided by publicly available inspection reports.

Information asymmetry exists when investors possess different amounts of information about a firm's value (Akerlof 1970). It allows investors with superior information to trade profitably at the expense of other investors. To compensate for these expected losses, uninformed investors demand a return premium that is increasing in the risk of informed trading (O'Hara 2003). As a result, information asymmetry implies higher trading cost and less liquidity in the market. Thus, information asymmetry represents a real economic cost to companies in the form of a higher cost of capital.

Accounting reporting regulation aims to reduce information asymmetry and improve stock market liquidity by providing managers with a common language to communicate with investors. Prior empirical studies suggest that financial reporting regulations that increase the level of disclosure or its precision are associated with higher levels of liquidity. For example, Bushee and Leuz (2005) find that after a regulatory change mandating OTCBB (Over-The-Counter Bulletin Board) firms to comply with reporting requirements under the 1934 Securities Exchange Act, information asymmetry decreases significantly. Mohd (2005) finds that after the introduction of SFAS No. 86 in the US, which requires the capitalization of certain software development costs, information asymmetry decreases for software firms relative to that of other high-tech firms. Taking an international perspective, by turning from German GAAP to US GAAP or IAS, which are commonly recognized as imposing a higher level of disclosure, information asymmetry in German companies decreases (Leuz and Verrecchia 2000). Daske et al. (2008) also conclude that IFRS adopters experience statistically significant increases in market liquidity after IFRS became mandatory.

While regulated financial reports aim to provide new and relevant information to investors, the conflict of interest between managers and investors creates an environment in which auditors can provide investors with independent assurance about the precision of the financial information disclosed by managers. Auditing narrows the scope of reporting strategies managers can choose from and reduces uncertainty about accounting information precision in the financial statements. For example, empirical studies in and outside the US show that higher quality auditing enhances earnings quality (e.g., Francis et al. 1999; Van Tendeloo and Vanstraelen 2005). Moreover, the value of high quality auditing is also reflected in reduced information asymmetry and a lower cost of capital (Holthausen and Leftwich 1983; Willenborg 1999; Mansi et al. 2004; Khurana and Raman 2004; Clinch et al. 2012; Zhou 2007).

There are several ways in which the publication of PCAOB inspection reports may influence liquidity. First, if the PCAOB inspection report provides an informative, low-cost, and easy to interpret signal of audit quality, stock market liquidity can be expected to increase. Prior to the publication of the report, estimating audit quality (and hence firm reporting quality)

may have been a difficult task for smaller uninformed investors. To the degree that the disclosure of the inspection report levels the playing field for smaller uninformed investors and larger informed investors, information asymmetry can be expected to decrease and liquidity can be increased. Second, besides the direct informational effect, market liquidity can also be influenced by PCAOB inspections through improvements in audit quality. Studies reporting beneficial effects of the PCAOB include a decrease in abnormal accruals for client companies, a higher probability of issuance of a GCO for financially distressed clients after a deficient PCAOB inspection report, increased audit effort for deficient engagements, and increased credibility of financial reporting (Carcello et al. 2011; Gunny and Zhang 2013; Gipper et al. 2015; Aobdia 2015). Based on these findings, the improved financial reporting quality after the disclosure of the inspection reports can lead to increases in market liquidity. Moreover, we argue both effects could happen to all clients as PCAOB inspection reports do not disclose the specific name of the inspected engagement. Thus, investors are not likely to perceive the news of the inspection reports as an isolated incident to a specific client of the audit firm.

However, there are also studies criticizing PCAOB inspections. In particular, the PCAOB has been criticized for its lack of expertise and transparency, long delay of the inspection report publication (Glover et al. 2009; Palmrose 2005) and less informative reports than the AICPA peer reviews (Lennox and Pittman 2010). Hence, instead of creating an equal ground, the disclosure of the PCAOB inspection reports could cause an increase in information asymmetry. To the degree that larger and more informed investors are better able to interpret the information in the inspection report, smaller investors will be made worse off by the public disclosure. This in turn may cause these uninformed investors to increase the return premium they demand, thereby decreasing market liquidity. Furthermore, the disclosure of the PCAOB inspection reports can potentially change investors' perceptions towards future audit quality, which can influence market liquidity. As we have no priors on which of these effects dominates, we formulate our first hypothesis as follows:

H1: *The publication of PCAOB inspection reports changes stock market liquidity.*

Since the PCAOB is issuing inspection reports for more than a decade now, we further distinguish between whether the report relates to a first-time inspection of an audit firm or a repeated inspection (i.e. second or third inspection round). The informational effects of publicly disclosing second- and third-round PCAOB inspection reports on stock market liquidity arguably depend on what happens initially. If the initial PCAOB inspection reports are informative and easy to process, additional reports may only have a small incremental effect on stock market liquidity. Most of the uncertainty would then be resolved after the publication of the first inspection report and future reports may contain less new information that help investors in updating their views on audit quality. Second, when even unsophisticated investors are able to fully interpret information in the first report, there is no learning effect for small/unsophisticated investors. All investors are able to fully interpret the information in the inspection report as of the first report that is published. Alternatively, if PCAOB inspection reports are difficult to process, information asymmetry may first raise which means a decrease in liquidity, and subsequently decrease with additional reports being published if investors learn to better process the information in the report. Hence, it is an empirical question how

stock market liquidity is affected after the first, second and third inspection round. Therefore, we formulate our second hypothesis as follows:

H2: *The effect of PCAOB inspection reports on stock market liquidity changes over time.*

Being the only visible outcome of the inspection, a deficient PCAOB inspection report implies that the audit firm did not fully comply with GAAS recommended audit procedures or that GAAP violations were found in the financial statements of certain client firms. At the same time, the PCAOB also gives the audit firms an opportunity to defend themselves. Audit firms can provide responses to the PCAOB inspection findings and these responses are included at the end of the inspection reports. The responses can generally be classified into two categories. First, the audit firm can state that they do not agree with the inspection findings. Second, and the most frequently used, the audit firm can claim that the deficiencies identified in the inspection report were due to professional judgment or documentation and the firm has already undertaken certain procedures (such as procedures according to AU390) to address the problem.

Prior literature indicates that investors are less likely to reach consensus towards negative information without prior experience (Chen et al. 2000). As a result, the magnitude of a change in market liquidity through the informational effects of the PCAOB inspections can be expected to be affected by the outcome of the report. This may be stronger for firms with deficient reports as it is arguably a more ambiguous and difficult to interpret signal. In addition to the factors described above, there is another factor that can affect liquidity during the years following the publication of the inspection report. If the publicly available PCAOB inspection reports induce audit firms to improve audit quality, stock market liquidity can also be affected. High audit quality limits managers' discretionary accounting choices and increases accounting information precision. Barron and Qu (2014) find that information precision can reduce information asymmetry among investors and thus improve market liquidity. According to prior literature, PCAOB inspections do have an incremental effect on audit quality (Gramling et al. 2011; DeFond and Lennox 2011; Aobdia 2015; Gipper et al. 2015). As a result, besides the direct effect of information provided by the inspection reports on market liquidity, inspections may also improve audit quality thereby further increasing liquidity. This effect is arguably stronger for deficient auditors as they may have more incentives to improve audit quality than those without deficiencies due to the highly competitive audit market in the US. However, if the audit firm responds that they do not agree with the deficient inspection findings, the anticipated decrease maybe less profound as investors may view it as a bad signal of unwillingness to improve audit quality and lower their expectations of future audit quality. This could lead to a decreased anticipated financial reporting quality and thus lower market liquidity.

Collectively, we expect that the magnitude of change in liquidity after the publication of the inspection report depends on the content of the inspection report. We formulate our third hypothesis as follows:

H3: *The stock market liquidity change after the publication of the inspection report is different across clients of deficient audit firms stating disagreement with the PCAOB's findings, clients of deficient audit firms not stating disagreement with PCAOB's findings and clients of clean audit firms.*

2.3 Data and methodology

2.3.1 Data

We hand-collect all first-round, second-round and third-round PCAOB inspection reports published on the PCAOB website from 2005 to 2014. To test our third hypothesis, for each inspection report, we further manually code the type of the report as "Deficient" or not, depending on whether any GAAS-related deficiency or GAAP-related deficiency is disclosed in Part I of the PCAOB inspection report[3]. We also manually code the audit firm responses as "Disagree" or not. If the audit firms state that they disagree or if they state that they do not fully agree with the PCAOB's findings, we code the responses as 1 for "Disagree". All other responses are labeled as 0 for "Disagree". We then match the reports with client information from AuditAnalytics. Finally, we obtain security market information through CRSP and exclude all auditor-client combinations which are not in CRSP. We further restrict our sample to only include auditor-client combinations with at least one financial year-end available prior to the report publication date. The final sample consists of 701 clients related to 200 first round inspection reports, 659 clients related to 175 second round inspection reports and 498 clients related to 124 third round inspection reports. Using this sample, we obtain analyst following data from I/B/E/S and institutional holdings data from Thomson Reuters Institutional (13f) Holdings.

2.3.2 Dependent variables

As outlined before, economic theory suggests that information asymmetry lowers market liquidity and increases the cost of capital in the stock market. Previous accounting and economics studies use various proxies to measure stock market liquidity (Leuz 2003; Brown et al. 2004; Krishnaswami and Subramaniam 1999; Daske et al. 2008; Christensen et al. 2013). Following Daske et al. (2008), we use four proxies to measure stock market liquidity: bid-ask spread, price impact, zero returns and total trading costs.

Bid-ask spread is a commonly used proxy for information asymmetry and it is a direct measure of the cost of trading that is well established in prior literature (Leuz and Verrecchia 2000; Leuz 2003; Mohd 2005; Fu et al. 2012). The bid-ask spread addresses the adverse selection problem that arises from transactions in a firm's shares in the presence of asymmetrically informed investors (Leuz and Verrecchia 2000). Lower bid-ask spreads

[3] Due to an insufficient number of observations, we are unable to investigate the market reaction to quality control deficiencies for small audit firms.

represent lower levels of information asymmetry and thus higher market liquidity. Following Daske et al. (2008), we calculate the bid-ask spread as the yearly median of daily quoted spreads. The daily quoted spreads are measured at the end of each trading day as the difference between the bid and ask price divided by the midpoint.

Price impact is used as an indicator of liquidity. It is computed as the yearly median of the liquidity measure proposed by Amihud (2002), which is the daily absolute stock return divided by US$ trading volume.[4] This variable captures the ability of an investor to trade in a stock without moving its price. Higher price impact means lower liquidity.

Zero returns is calculated as the proportion of trading days with zero daily stock returns out of all potential trading days in a given year. Lesmond, Ogden, and Trzcinka (1999) argue that a manifestation of illiquidity will be infrequent trading as reflected in the number of days without price movements. In other words, a higher proportion of zero return days represents lower liquidity in the capital market.

The last proxy we use as dependent variable is total trading costs[5], which is an estimate of total round trip transaction costs (including bid-ask spreads, commissions, as well as implicit costs from short-sale constraints or taxes) based on a yearly time-series regression of daily stock returns on the aggregate market returns (Lesmond et al. 1999). This measure is based on the logic that informed investors do not trade when the cost of trading exceeds the value of new information. Since private information is not observable, we use log-likelihood estimation to derive a proxy of total trading costs using a panel of firms' daily stock returns and equal-weighted local market index returns. A higher cost of trading implies lower liquidity in the capital market.

Finally, following Daske et al. (2008), we aggregate the four proxies into a single liquidity factor employing factor analysis with one oblique rotation, and use it as a dependent variable in the analysis for simplification. We employ factor analysis and use the factor scores from the first factor with the highest Eigenvalue (and the only one that is greater than one) as dependent variable. of the dataset.

2.3.3 Research design and control variables

To test our first and second hypothesis, we define three dummy variables as our variables of interest for the three rounds of inspections: Post1, Post2 and Post3. Post1 (Post2/Post3) takes a value of one if the observation belongs to the one year period after the publication date of the first (second/third) round inspection reports and a value of zero if the observation belongs to the one year period before the publication date of the first (second/third)

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[4] Following Amihud (2002), we compute price impact as the daily absolute price change in percent divided by US$ trading volume. For expositional purpose the trading volume is measured at US$1,000.

[5] Following previous research, we require at least 24 daily returns and 20% of the daily returns to be different from zero per firm-year observation.

round inspection reports. We use these three variables to capture the capital-market effects of the publication of the inspection reports without considering the content of the inspection reports. For our third hypothesis, we combine our manually coded variable, "Deficient", with the variable capturing the audit firm's response in case of a deficient report, "Disagree/Other", to create three new variables of interest to test the impact of the content of the inspection reports on stock market liquidity: Def_disagee, Def_other, and Clean. Def_disagree has a value of one if the observation has a deficient auditor who disagreed with the inspection findings after the publication of the inspection report, zero otherwise. Def_other has a value of one if the observation has a deficient auditor who did not disagree with the inspection findings after the publication of the inspection report, zero otherwise. Clean takes a value of one if the observation has a clean auditor after the publication of each round's inspection report, zero otherwise.

To capture other firm characteristics that influence liquidity, we follow prior literature and control for firm size, share turnover, return variability, and analyst following (Leuz and Verrecchia 2000; Daske et al. 2008).[6] First, large companies have a greater amount of information available (Atiase 1987). Therefore, we expect firm size (Size) to be negatively associated with our stock market liquidity proxies. Firm size (Size) is measured as the yearly average of daily stock market price times the number of shares outstanding (in US$ millions). Second, lower liquidity is related to lower share turnover (ShareTurnover), which is calculated as the annual US$ trading volume divided by market value of outstanding equity, as uninformed investors in the market would not choose to trade with a higher risk of a loss. Third, stock market liquidity is positively related to stock price volatility (Volatility), measured by the annual standard deviation of daily stock returns, as investors are more uncertain when stocks are volatile. We expect the number of analysts (Analyst) following the client companies to be negatively related to stock market liquidity as analysts increase the amount of firm information that is publicly known and boost the trading (Roulstone 2003). We also control for the percentage of stock owned by institutional holdings (Inst_holding). For the second and third inspection analysis, we also control for the previous inspection results. Def1/2 has a value of one if the audit firms have a deficient report in the first/second round inspection, zero otherwise. Finally, we include industry (using the SIC two digit industry classification) and year effects to capture common effects on our dependent variables in a particular year and industry.

All variables are defined as stated in Appendix 1.

To test the first and second hypothesis, the regression model[7] looks as follows:

[6] We define firm size here as the yearly average of the market capitalization. In an untabulated analysis, we also use the yearly median of the market capitalization and the results hold.

[7] As is common in previous literature, we estimate the models in a log-linear specification. We use the natural logarithm of the continuous variables and lag the independent variables by one period.

$$\text{IA Proxy}_{\text{i,t}} = \alpha_0 + \alpha_1 Post_{i,t} 1/2/3 + \alpha_2\, Size_{\text{i,t}-1} + \alpha_3 ShareTurnover_{\text{i,t}-1} + \alpha_4\, Volatility_{\text{i,t}-1} + \alpha_5 Analyst_{\text{i,t}-1} + \alpha_5 Inst\_holding_{\text{i,t}-1} + Year\ fixed\ effects + Industry\ fixed\ effects + \delta \quad (2.1)$$

For the testing of hypothesis 3, we make use of the following regression model:

$$\text{IA Proxy}_{\text{i,t}} = \alpha_0 + \alpha_1 Def\_disagree_i + \alpha_2 Def\_other_i + \alpha_3 Clean_{\text{i}} + \alpha_4 Size_{\text{i,t}-1} + \alpha_5 ShareTurnover_{\text{i,t}-1} + \alpha_6\, Volatility_{\text{i,t}-1} + \alpha_7 Analyst_{\text{i,t}-1} + \alpha_8 Inst\_holding_{\text{i,t}-1} + Year\ fixed\ effects + Industry\ fixed\ effects + \delta \quad (2.2)$$

The PCAOB started to inspect small audit firms in 2005. Since the number of small audit firms is quite large, the inspections were conducted at different time points. This natural staggered setting gives us the opportunity to use client companies of small auditors that were not yet inspected by the PCAOB as a benchmark. As a result, the setting mitigates to a large extent the concern that the effects we are trying to identify are caused by other factors that are not related to the publication of the PCAOB inspection reports.

2.4 Empirical results

2.4.1 Descriptive statistics

Table 2.1 describes the report type related characteristics for both the inspection reports and the client companies. Panel A provides an overview of characteristics of the inspection reports in the sample. The total sample includes 499 inspection reports of which 200 are first round inspection reports, 175 are second round inspection reports and 124 are third round inspection reports. Out of the 200 first round reports, 113 (56 percent) have PCAOB identified deficiencies and among these 26 (13 percent) stated disagreement with the PCAOB, while out of the 175 second round reports, only 60 (34 percent) have deficiencies and among them 12 (6 percent) stated disagreement with the PCAOB. For the third round inspection, 61 (49 percent) out of the 124 inspection reports have deficiencies and among them 10 (8 percent) stated disagreement with the PCAOB. Hence, there appears to be a clear indication of improvement after the second round of inspections, as only 43 percent of the reports are clean in the first round while the proportion increases to 66 percent in the second round. However, the deficiency rate increases again after the third round. Overall, 234 out of 499 (47 percent) reports have PCAOB identified audit deficiencies in the full sample. Interestingly, the proportion of audit firms disagreeing with the PCAOB inspection findings has dropped significantly after the first round from 13 percent to 6 ($p<0.05$) and 8 ($p<0.10$) percent in the second and third round, respectively.

Table 2.1, panel B provides the report related statistics of the client companies in the sample. For the first round of inspections, there are in total 701 client companies included of which 99 (14 percent) are audited by audit firms receiving deficient reports and who indicate a

disagreement with the PCAOB, and 320 (46 percent) are audited by audit firms receiving deficient reports without indicated disagreement. For the second round of inspections, there are 659 client companies included in the sample of which 34 (5 percent) are audited by audit firms receiving deficient reports and whose auditor states a disagreement with the PCAOB, and 268 (41 percent) are audited by audit firms receiving deficiency reports without indicated disagreement. For the third round of inspections, there are 498 client companies included in the sample of which 22 (4 percent) are audited by audit firms receiving deficient reports and stating a disagreement with the PCAOB, and 268 (54 percent) are audited by audit firms receiving deficient reports without indicated disagreement. Similar to the descriptive statistics of panel A, a comparison of the first and the second inspection rounds indicates a significant improvement in the percentage of clean audit firms, but the percentage drops again for the third inspection round.

Table 2.1: Descriptives for PCAOB inspection results

Panel A: Inspection reports

	First-round		Second-round		Third-round		Total	
Inspection results	N	Percentage	N	Percentage	N	Percentage	N	Percentage
Def_disagree	27	13.50	12	6.86	10	8.06	49	9.82
Def_other	86	43.00	48	27.43	51	41.13	185	37.07
Clean	87	43.50	115	65.71	63	50.81	265	53.11
Total	200	100.00	175	100.00	124	100.00	499	100.00

Panel B: Report related characteristics of client companies

	First-round		Second-round		Third-round		Total	
Inspection results	N	Percentage	N	Percentage	N	Percentage	N	Percentage
Def_disagree	99	14.12	34	5.16	22	4.42	155	8.34
Def_other	320	45.65	268	40.67	268	53.81	856	46.07
Clean	282	40.23	357	54.17	208	41.77	847	45.59
Total	701	100.00	659	100.00	498	100.00	1858	100.00

All variables definitions are included in Appendix 1.

Table 2.2 presents descriptive statistics on the variables used in the regression analysis for the three rounds of inspections. The mean (median) value of bid-ask spread is 0.0425 (0.0378)/0.0504 (0.0461)/0.0366 (0.0317) for the first/second/third inspection respectively. The mean (median) value of price impact is 0.00156 (0.000270)/0.00313 (0.000462)/0.00111 (0.000205) suggesting that, on average, a US$ 1,000 trade moves stock prices by 0.156% (0.027%)/0.313% (0.046%)/0.111% (0.021%) for the first/second/third inspection respectively. The mean (median) value of zero return is 0.0694 (0.0595)/ 0.0659 (0.0558)/ 0.0571 (0.0520). Finally, the mean (median) value for total trading costs for the three inspection rounds is 0.00990 (0.00557)/ 0.0123 (0.00784)/ 0.00659 (0.000429). Overall, the descriptives of the liquidity measures show a pattern of decrease in liquidity around the second inspection and an increase around the third inspection.

Table 2.2: Descriptive Statistics

VARIABLES	N	mean	p50	sd	min	max
Panel A: First inspection						
Bid_ask_spread	1,402	0.0425	0.0378	0.0272	0.00604	0.145
Price Impact	1,402	0.00156	0.000270	0.00413	1.74e-06	0.0303
Zero Return	1,402	0.0694	0.0595	0.0518	0.00395	0.250
Total Trading Costs	1,402	0.00990	0.00557	0.0122	0.000174	0.0695
Size	1,402	130.9	73.57	178.9	5.772	1,123
Share Turnover	1,402	1.250	0.474	2.274	0.0375	15.21
Volatility	1,402	0.0338	0.0287	0.0203	0.00707	0.107
Analyst	1,402	0.998	0.000	1.870	0.000	10.000
Inst_holding	1,402	0.154	0.0860	0.192	0.000	0.875
Panel B: Second inspection						
Bid_ask_spread	1,318	0.0504	0.0461	0.0257	0.0117	0.141
Price Impact	1,318	0.00313	0.000462	0.00786	1.53e-06	0.0513
Zero Return	1,318	0.0659	0.0558	0.0469	0.000	0.234
Total Trading Costs	1,318	0.0123	0.00784	0.0141	0.000444	0.0799
Size	1,318	113.1	53.20	153.1	3.111	866.0
Share Turnover	1,318	1.180	0.454	2.218	0.0413	15.49
Volatility	1,318	0.0495	0.0436	0.0272	0.0117	0.162
Analyst	1,318	1.256	0.000	2.091	0.000	10.000
Inst_holding	1,318	0.192	0.121	0.209	0.000	0.877

Table 2.2 Continued

Panel C: Third inspection						
Bid_ask_spread	996	0.0366	0.0317	0.0201	0.00809	0.104
Price Impact	996	0.00111	0.000205	0.00258	7.95e-07	0.0178
Zero Return	996	0.0571	0.0520	0.0377	0.000	0.190
Total Trading Costs	996	0.00659	0.00429	0.00681	2.02e-07	0.0356
Size	996	144.8	55.68	256.9	3.623	1,577
Share Turnover	996	1.287	0.544	2.421	0.0468	16.04
Volatility	996	0.0367	0.0323	0.0197	0.0103	0.112
Analyst	996	1.666	1.000	2.546	0.000	12.000
Inst_holding	996	0.228	0.152	0.224	0.000	0.903

All continuous variables winsorized at the 1% and 99% level.
All variables definitions can be found in Appendix 1.

2.4.2 Univariate analysis

We start our analysis with a univariate comparison of our liquidity measurements before and after each round of inspection based on t-tests. Consistent with our main analysis, the period before each round of inspection refers to one year period before the publication date of the first (second/third) round inspection reports and the period after each round of inspection refers to the one year period after the publication date of the first (second/third) round inspection reports. The results are presented in Table 2.3. After the first inspection, we find a significant increase in bid-ask spread, price impact and total trading cost. Consistently, our liquidity factor increases significantly, suggesting that stock market liquidity is poorer after the first inspection. After the second inspection, although we observe a weak decrease in bid-ask spread, liquidity does not change significantly as measured by price impact, zero returns, total trading cost and our liquidity factor. After the third inspection, all our liquidity measurements decrease significantly, except for zero returns, suggesting increased liquidity. Overall, the univariate results provide some preliminary support for our first and second hypotheses.

Table 2.3 Univariate Analysis

	First Inspection			Second Inspection			Third Inspection		
	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff
Log_Bid-ask spread	-3.493	-3.250	0.243***	-3.094	-3.135	-0.041*	-3.431	-3.480	-0.049*
Log_Price impact	-8.590	-8.088	0.502***	-7.847	-7.812	-0.035	-8.592	-8.868	-0.276**
Zero return	0.070	0.069	-0.001	0.065	0.067	-0.002	0.059	0.055	-0.004*
Log_Trading cost	-5.357	-5.102	0.255***	-4.932	-4.934	-0.002	-5.633	-5.712	-0.079
Liquidity factor	-0.088	0.088	0.176***	-0.001	0.006	0.007	0.048	-0.044	-0.092*

All continuous variables winsorized at the 1% and 99% level.
All variables definitions can be found in Appendix 1.

2.4.3 Multivariate analysis

We estimate the stock market liquidity proxies on our variables of interest and control variables using OLS, and report t-statistics based on Huber-White standard errors. All continuous variables are winsorized at the 1st and 99th percentile. All the control variables are one-year-lagged values. For all the regression analyses, we further include year and industry dummies to control for year and industry fixed-effects.

Table 2.4, panel A, reports the results for the first round of inspections. The models explain between 39% and 81% of the variation. In all the regression models, the coefficients on Period1 are highly significant and positive, except for the regression with zero returns as the dependent variable. These results suggest that the stock market liquidity decreases after the publication of the first round inspection reports.

Table 2.4, panel B, reports the results for the second round of inspections. The models explain between 42% and 80% of the variation. In all the regression models, the coefficients on Period2 are highly significant and negative, except for the regression with zero returns as the dependent variable. Overall, the results suggest that stock market liquidity increases after the publication of the second round inspection report.

Finally, Table 2.4, panel C, reports the results for the third round of inspections. The models explain between 35% and 85% of the variation. In all the regression models, the coefficients on Period3 are insignificant. The results suggest that stock market liquidity does no longer significantly change after the publication of the third round inspection report.

In terms of economic significance, using the price impact as an example, the magnitude of the coefficient on Post1 indicates that the total trading cost increased by 0.207% relative to the pre-inspection. Biais, Glosten, and Spatt (2005) and Bhattacharya, Desai and Venkataraman (2013) provide some perspective on interpreting these economic magnitudes. They note that while the cost of any individual transaction can seem small, the overall economic effect of trading cost on the cost of capital for corporations and the portfolio allocations for investors is nontrivial, due to the huge volume of transactions. As an example, they report that a trading

cost of only five cents for a $25 stock (approximate trading costs of 20 basis points) in 2002 implies a corresponding flow of 18 billion dollars for NYSE-listed firms alone. As a result, we argue that in our setting the impact of the publication of PCAOB inspection reports on the liquidity cost appears to be economically significant.

Table 2.4: Pooled regression results

VARIABLES	Log_Bid-ask spread	Log_Price impact	Zero return	Log_Trading cost	Liquidity factor
Panel A: First inspection					
Post1	0.158***	0.464***	-0.00107	0.207***	0.150***
	(4.436)	(8.478)	(-0.813)	(3.519)	(3.956)
Log($Size_{t-1}$)	0.0459*	-1.179***	-0.0205***	-0.481***	-0.442***
	(1.749)	(-20.72)	(-6.523)	(-7.101)	(-8.048)
Log($Share\_turnover_{t-1}$)	-0.00425	-0.809***	-0.0136***	-0.286***	-0.272***
	(-0.193)	(-27.67)	(-13.95)	(-8.659)	(-12.18)
Log($Volatility_{t-1}$)	0.791***	0.770***	0.00347	0.665***	0.430***
	(23.75)	(11.53)	(0.537)	(5.197)	(4.384)
Log($Analyst_{t-1}$)	0.0668***	-0.0508	-0.00288	-0.0278	-0.0329
	(3.007)	(-1.135)	(-1.256)	(-0.483)	(-0.802)
Log($Inst\_holding_{t-1}$)	-0.165*	-0.234	-0.0117	-0.537**	-0.373**
	(-1.781)	(-1.007)	(-1.103)	(-2.348)	(-2.121)
Constant	-1.304***	-1.907***	0.214***	-1.326***	3.154***
	(-5.765)	(-3.204)	(10.34)	(-2.857)	(9.166)
Observations	1,402	1,402	1,402	1,402	1,402
R-squared	0.712	0.814	0.420	0.599	0.640
Fixed effects	Year/industry	Year/industry	Year/industry	Year/industry	Year/industry
R2 adjusted	0.698	0.805	0.393	0.580	0.623

Table 2.4 continued					
Panel B: Second inspection					
Post2	-0.0985***	-0.232***	-0.00154	-0.139***	-0.110***
	(-4.742)	(-3.904)	(-0.770)	(-3.379)	(-3.180)
Def1	0.0339	0.148**	-0.000920	0.101**	0.0763**
	(1.457)	(2.219)	(-0.411)	(2.201)	(1.970)
Log($Size_{t-1}$)	-0.00582	-1.215***	-0.0167***	-0.397***	-0.387***
	(-0.428)	(-31.21)	(-12.77)	(-14.81)	(-17.11)
Log($Share\_turnover_{t-1}$)	0.0348***	-0.697***	-0.0112***	-0.174***	-0.189***
	(3.134)	(-21.93)	(-10.46)	(-7.961)	(-10.24)
Log($Volatility_{t-1}$)	0.527***	0.409***	0.00417*	0.593***	0.432***
	(20.64)	(5.601)	(1.703)	(11.78)	(10.18)
Log($Analyst_{t-1}$)	0.00741	-0.169***	-0.00254	-0.0828*	-0.0749**
	(0.342)	(-2.720)	(-1.221)	(-1.935)	(-2.079)
Log($Inst\_holding_{t-1}$)	-0.188**	-0.293	-0.00876	-0.397**	-0.314**
	(-2.121)	(-1.152)	(-1.028)	(-2.266)	(-2.132)
Constant	-1.273***	-3.152***	0.0976***	-2.132***	2.232***
	(-4.270)	(-3.692)	(3.409)	(-3.623)	(4.505)
Observations	1,318	1,318	1,318	1,318	1,318
R-squared	0.505	0.805	0.446	0.567	0.605
Fixed effects	Year/industry	Year/industry	Year/industry	Year/industry	Year/industry
R2 adjusted	0.480	0.795	0.419	0.545	0.585
Panel C: Third inspection					
Post3	0.0307	-0.0593	-0.00158	0.0686	0.000405
	(1.479)	(-1.035)	(-0.815)	(0.868)	(0.0119)
Def2	-0.0152	-0.0531	0.000785	-0.0361	-0.0109
	(-0.663)	(-0.841)	(0.366)	(-0.413)	(-0.290)
Log($Size_{t-1}$)	-0.0177	-1.038***	-0.0110***	-0.388***	-0.316***
	(-1.326)	(-28.17)	(-8.770)	(-7.617)	(-14.42)
Log($Share\_turnover_{t-1}$)	-0.0134	-0.757***	-0.009***	-0.313***	-0.251***
	(-1.127)	(-23.06)	(-8.639)	(-6.914)	(-12.89)
Log($Volatility_{t-1}$)	0.683***	0.751***	0.00487*	0.736***	0.419***
	(24.80)	(9.901)	(1.890)	(7.024)	(9.300)

Table 2.4 continued

Log(Analyst$_{t-1}$)	0.0911***	-0.262***	0.000747	0.126	0.0185
	(4.471)	(-4.658)	(0.392)	(1.619)	(0.554)
Log(Inst_holding $_{t-1}$)	-0.0151	-0.421*	-0.0172**	-1.338***	-0.516***
	(-0.165)	(-1.666)	(-2.008)	(-3.831)	(-3.434)
Constant	-0.399	-2.121***	0.116***	-0.624	3.010***
	(-1.367)	(-2.635)	(4.251)	(-0.561)	(6.294)
Observations	996	996	996	996	996
R-squared	0.682	0.858	0.390	0.463	0.667
Fixed effects	Year/industry	Year/industry	Year/industry	Year/industry	Year/industry
R2 adjusted	0.663	0.850	0.352	0.430	0.646

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1
All continuous variables winsorized at the 1% and 99% level.
All variables definitions can be found in Appendix 1.

Our finding that stock market liquidity decreases after the publication of the first round inspection reports and increases after the second round of inspections suggests the presence of a learning effect. After the publication of the first round inspection reports investors have difficulties in interpreting the information. However, after the second round of inspections, investors learn how to interpret and process the information disclosed. Hence, information asymmetry decreases which leads to increases in liquidity. The findings on the third round inspection reports suggest that no new information is provided, and thus that the information value appears to fade out after multiple inspection rounds. Overall, we conclude that the results provide support for H1 and H2.

To further analyze the impact on stock market liquidity, we distinguish between audit firms with no deficiencies, audit firms disagreeing with the observed deficiencies, and audit firms not disagreeing with observed deficiencies. We estimate the OLS regression with Model 2.2. Table 2.5, panel A, presents the results for the first inspection round. In all the regression models, the coefficients on Def_disagree, Def_other and Clean are highly significant and positive, except for the one using zero returns as the dependent variable. These results confirm an overall increase in information asymmetry after the publication of the first round inspection reports. Additionally, the F-tests show that there is limited support that the magnitude of increase is significantly different between the three groups.

Table 2.5, panel B, provides the results for the second round inspections. The coefficients on Def_disagree are not significant except in the zero return model where the coefficient is significantly positive, implying that stock market liquidity does not improve for companies with deficient auditors who disagree with the PCAOB findings. The coefficients on Def_other are all significantly negative except in the zero return model. Hence, liquidity

increases for companies with deficient auditors who did not indicate a disagreement with PACOB findings. For Clean, the coefficients are also all significantly negative except in the zero return model. Additionally, the magnitude of increase in liquidity is not significantly different between the latter two groups. This implies that investors expect better quality for clean auditors and deficient auditors not contesting the PCAOB findings. Overall, we conclude that after the second round inspections stock market liquidity increases significantly for companies with clean auditors and for companies with deficient auditors, conditional on the auditors not disagreeing with the PCAOB findings in their response letters. Using an F-test, we find that the magnitude of increase is not significantly different between these two groups. However, the F-test does show that the magnitude of increase in liquidity is higher for client companies of audit firms not disagreeing with PCAOB findings compared to client companies of audit firms disagreeing with PCAOB findings.

Table 2.5, panel C, provides the results for the third round inspections. Overall, we find little support that changes in stock market liquidity after the publication of the third inspection report are different between companies with deficient auditors and companies with clean auditors. The results are also consistent with our main analysis for the third inspection round, indicating no significant change in liquidity.

Table 2.5: Regression with inspection reports content

Panel A: First inspection

VARIABLES	Log_ Bid-askspread	Log_Price impact	Zero return	Log_Trading cost	Liquidity factor
Def_disagree	0.221***	0.704***	-0.00132	0.252**	0.190***
	(3.805)	(7.158)	(-0.391)	(2.681)	(2.946)
Def_other	0.167***	0.433***	-0.000333	0.217***	0.155***
	(6.018)	(6.579)	(-0.180)	(3.563)	(3.996)
Clean	0.127**	0.413***	-0.00179	0.180**	0.129**
	(2.126)	(4.910)	(-1.288)	(2.437)	(2.567)
Log($Size_{t-1}$)	0.0468*	-1.177***	-0.0204***	-0.481***	-0.442***
	(1.816)	(-19.82)	(-6.545)	(-7.046)	(-7.983)
Log($Share\_turnover_{t-1}$)	-0.00432	-0.809***	-0.0136***	-0.286***	-0.272***
	(-0.195)	(-27.41)	(-13.99)	(-8.646)	(-12.15)
Log($Volatility_{t-1}$)	0.790***	0.777***	0.00336	0.664***	0.430***
	(23.76)	(11.53)	(0.519)	(5.182)	(4.387)
Log($Analyst_{t-1}$)	0.0639***	-0.0625	-0.00286	-0.0298	-0.0348
	(2.887)	(-1.304)	(-1.229)	(-0.508)	(-0.829)
Log($Inst\_holding_{t-1}$)	-0.162*	-0.226	-0.0117	-0.535**	-0.372**
	(-1.744)	(-0.984)	(-1.105)	(-2.344)	(-2.121)

Table 2.5 continued

Constant	-1.275***	-1.855***	0.215***	-1.301***	3.173***
	(-5.399)	(-3.169)	(10.42)	(-2.823)	(9.237)
Observations	1,402	1,402	1,402	1,402	1,402
R-squared	0.712	0.815	0.420	0.599	0.640
Fixed effects	Year/industry	Year/industry	Year/industry	Year/industry	Year/industry
R2 adjusted	0.699	0.806	0.392	0.580	0.623
F-test Def_disagree-Def_other	0.054	0.271***	0.0001	0.035	0.035
F-test Def_other-Clean	0.040	0.020	0.0015	0.037	0.026
Panel B: Second inspection					
Def_disagree	-0.0554	0.0985	0.0179***	0.220	0.214
	(-1.013)	(0.442)	(2.934)	(1.391)	(1.660)
Def_other	-0.127***	-0.344***	-0.00301	-0.207***	-0.167***
	(-3.769)	(-4.196)	(-1.053)	(-5.606)	(-5.387)
Clean	-0.0804***	-0.178*	-0.00227	-0.120*	-0.0969
	(-3.385)	(-1.790)	(-0.965)	(-1.718)	(-1.612)
Def1	0.0361	0.159**	-0.000589	0.110**	0.0836**
	(1.383)	(2.228)	(-0.277)	(2.284)	(2.066)
Log($Size_{t-1}$)	-0.00666	-1.218***	-0.0167***	-0.400***	-0.389***
	(-0.501)	(-31.29)	(-8.849)	(-9.442)	(-10.45)
Log($Share\_turnover_{t-1}$)	0.0349**	-0.697***	-0.0112***	-0.175***	-0.189***
	(2.197)	(-20.85)	(-8.486)	(-6.159)	(-7.926)
Log($Volatility_{t-1}$)	0.522***	0.392***	0.00396**	0.583***	0.423***
	(9.146)	(4.393)	(2.064)	(13.51)	(12.93)
Log($Analyst_{t-1}$)	0.00944	-0.159***	-0.00224	-0.0750	-0.0682*
	(0.531)	(-3.056)	(-1.119)	(-1.630)	(-1.893)
Log($Inst\_holding_{t-1}$)	-0.195**	-0.326	-0.00975	-0.423*	-0.337*
	(-2.659)	(-1.491)	(-1.194)	(-1.886)	(-1.873)
Constant	-1.287***	-3.197***	0.0982***	-2.147***	2.221***
	(-6.174)	(-6.828)	(6.277)	(-6.464)	(7.708)
Observations	1,318	1,318	1,318	1,318	1,318
R-squared	0.506	0.806	0.451	0.570	0.608
Fixed effects	Year/industry	Year/industry	Year/industry	Year/industry	Year/industry
R2 adjusted	0.481	0.796	0.422	0.548	0.588
F-test Def_disagree-Def_other	0.072	0.443**	0.021***	0.427**	0.381***
F-test Def_other-Clean	-0.047	-0.166	-0.001	-0.087	-0.070

Table 2.5 continued

Panel C: Third inspection					
Def_disagree	0.177**	0.104	0.00145	0.0262	0.0604
	(2.448)	(0.521)	(0.213)	(0.0946)	(0.508)
Def_other	-0.0458	-0.0986	0.00100	-0.0251	-0.0171
	(-1.308)	(-1.018)	(0.305)	(-0.188)	(-0.297)
Clean	-0.00471	0.00248	-0.000436	0.0635	0.0108
	(-0.175)	(0.0333)	(-0.173)	(0.617)	(0.244)
Def2	-0.0197	-0.0536	0.000705	-0.0375	-0.0127
	(-0.854)	(-0.840)	(0.325)	(-0.426)	(-0.335)
Log($Size_{t-1}$)	-0.0180	-1.036***	-0.0109***	-0.389***	-0.315***
	(-1.354)	(-28.11)	(-8.733)	(-7.641)	(-14.41)
Log($Share\_turnover_{t-1}$)	-0.0138	-0.759***	-0.00967***	-0.312***	-0.252***
	(-1.159)	(-23.10)	(-8.670)	(-6.878)	(-12.90)
Log($Volatility_{t-1}$)	0.676***	0.762***	0.00507*	0.734***	0.421***
	(24.55)	(10.01)	(1.961)	(6.977)	(9.301)
Log($Analyst_{t-1}$)	0.0937***	-0.258***	0.000744	0.127	0.0197
	(4.599)	(-4.577)	(0.389)	(1.633)	(0.589)
Log($Inst\_holding_{t-1}$)	-0.0128	-0.422*	-0.0175**	-1.325***	-0.515***
	(-0.140)	(-1.666)	(-2.034)	(-3.789)	(-3.423)
Constant	-0.398	-2.140***	0.116***	-0.650	3.003***
	(-1.367)	(-2.655)	(4.250)	(-0.583)	(6.270)
Observations	996	996	996	996	996
R-squared	0.684	0.858	0.390	0.463	0.667
Fixed effects	Year/industry	Year/industry	Year/industry	Year/industry	Year/industry
R2 adjusted	0.664	0.849	0.351	0.429	0.646
F-test Def_disagree-Def_other	0.223**	0.203	0.0005	0.051	0.078
F-test Def_other-Clean	-0.041	-0.101	0.0014	-0.089	-0.028

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1
All continuous variables winsorized at the 1% and 99% level.
All variables definitions can be found in Appendix 1.

In summary, we find that stock market liquidity decreases after the publication of the first round of inspections and increases after the second round of inspections. These findings provide support for the argumentation of a learning effect in understanding the information contained in the inspection reports. Our evidence also suggests that investors appear to expect audit quality increases for deficient auditors who did not disagree with the inspection findings. Similarly, if audit firms disagree, there is no positive anticipation of future audit quality which is reflected by an insignificant change in stock market liquidity after the publication of the second round inspection reports. After the second round of inspections, most of the uncertainty appears to be resolved and future reports contain less new information that help investors in updating their views on audit quality. Collectively, these results provide some support for H3.

2.5 Empirical results

2.5.1 Initial year effect

We argue that the observed information asymmetry increase after the first round of inspections is due to difficulties in processing this new information. There is a possibility that this effect will decrease after the initial year that the PCAOB started to publish the inspection reports, as investors already have experience in processing the information. To explore this possibility, we exclude the initial year of publication, which is 2005 for the small audit firms, and rerun the regression for the first round of inspections. The results are presented in table 2.6. The coefficients on Post1 are all significantly positive except in the zero return model. Hence, the observed increase in stock market liquidity after the publication of the first round inspection reports is not only due to the initial year effect.

Table 2.6: First inspection excluding the initial year

VARIABLES	Log_Bid-ask spread	Log_Price impact	Zero return	Log_Trading cost	Liquidity factor
Post1	0.194***	0.494***	-0.00215	0.238***	0.166***
	(6.074)	(8.958)	(-1.465)	(4.302)	(4.568)
Log($Size_{t-1}$)	0.0504*	-1.182***	-0.0208***	-0.473***	-0.439***
	(1.918)	(-19.33)	(-6.271)	(-6.256)	(-7.224)
Log($Share\_turnover_{t-1}$)	0.00429	-0.819***	-0.0147***	-0.305***	-0.288***
	(0.167)	(-26.17)	(-11.12)	(-7.397)	(-10.08)
Log($Volatility_{t-1}$)	0.771***	0.770***	0.00183	0.644***	0.414***
	(21.53)	(9.815)	(0.265)	(4.595)	(3.851)
Log($Analyst_{t-1}$)	0.0656**	-0.0518	-0.00220	-0.00874	-0.0192
	(2.655)	(-1.226)	(-0.964)	(-0.148)	(-0.459)
Log($Inst\_holding_{t-1}$)	-0.185*	-0.199	-0.0121	-0.571**	-0.392**
	(-2.010)	(-0.814)	(-1.057)	(-2.321)	(-2.056)
Constant	-1.475***	-1.866**	0.215***	-1.511***	3.054***
	(-6.150)	(-2.497)	(9.744)	(-3.161)	(8.421)
Observations	1,254	1,254	1,254	1,254	1,254
R-squared	0.723	0.815	0.436	0.593	0.635
Fixed effects	Year/industry	Year/industry	Year/industry	Year/industry	Year/industry
R2 adjusted	0.710	0.806	0.409	0.573	0.618

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1
All continuous variables winsorized at the 1% and 99% level.
All variables definitions can be found in Appendix 1.

2.5.2 Constant sample

In our main analysis, the samples for the three inspections differ due to auditor switches between the inspection rounds. As a result, we are not fully able to compare the liquidity after the third inspection round to the liquidity in the period preceding the first inspection round. Therefore, we construct a constant sample with only clients that do not switch audit firms from at least one year before the publication of the first inspection report to one year after the publication of the third round inspection report to compare the liquidity change over time. To conduct our empirical tests, we first define three dummy variables as our variables of interest for three rounds of inspections: Period1, Period2 and Period3. Period1 (Period2/Period3) takes a value of one if the observation belongs to the period after the publication date of the first (second/third) round inspection reports and before the publication of the second (third/one year period after the publication of the third) round inspection reports, zero otherwise. We then combine our manually coded variables “Deficient”, “Disagree” and the period dummies to create three new variables of interests to test the impact of the content of the inspection reports

on stock market liquidity. Def1_disagree (Def2_disagree/Def3_disagree) has a value of one if the observation has a deficient auditor who disagreed with the inspection findings for the first (second/third) round of inspection and belongs to the period after the publication of the first (second/third) round inspection results and before the publication of the second (third/one year period after the publication of the third) round inspection reports, zero otherwise. Def1_other (Def2_other/Def3_other) has a value of one if the observation has a deficient auditor who did not disagree with the inspection findings for the first (second/third) round of inspections and belongs to the period after the publication of the first (second/third) round inspection results and before the publication of the second (third/one year period after the publication of the third) round inspection reports, zero otherwise. Clean1 (Clean2/Clean3) take a value of one if the observation has a clean auditor for the first (second/third) round of inspection and belongs to the period after the publication of the first (second/third) round inspection results and before the publication of the second (third/one year period after the publication of the third) round inspection reports, zero otherwise. As small audit firms are inspected every three years, the period between the inspections are quite long. We include an additional variable "Days" to count for the number of days between the publication of the current round and the next round inspection reports.

Table 2.7 describes the report type related characteristics for both the inspection reports and the client companies in the constant sample. Panel A provides an overview of characteristics of the inspection reports in the sample. The constant sample includes 80 inspection reports. Out of the 80 inspection reports, 45 (56 percent) have PCAOB identified deficiencies and among them 11 (14 percent) stated disagreement with the PCAOB for the first round inspections, while only 28 (35 percent) have deficiencies and among them 3 (4 percent) stated disagreement with the PCAOB for the second round inspections. For the third round inspections, 40 (50 percent) reports have deficiencies and among them 5 (6 percent) stated disagreement with the PCAOB. Consistent with our main analysis, there appears to be a clear indication of improvement after the second inspection round and a decrease again after the third inspection round.

Table 2.7, panel B provides the report related statistics of the 225 client companies in the sample. For the first round inspections, 127 (56 percent) of them are audited by a firm receiving a deficient report and 35 (16 percent) indicate a disagreement with the PCAOB. For the second round inspections, 102 client companies (45 percent) are audited by a firm receiving a deficient report and only 4 (2 percent) state a disagreement with the PCAOB. For the third round inspections, 136 client companies (60 percent) are audited by a firm receiving a deficient report and only 6 (3 percent) disagree with the PCAOB.

Table 2.7: PCAOB inspection for constant sample

Panel A: Inspection reports

	First-round		*Second-round*		*Third-round*	
Inspection results	N	Percentage	N	Percentage	N	Percentage
Def_disagree	11	13.75	3	3.75	5	6.25
Def_other	34	42.50	25	31.25	35	43.75
Clean	35	43.75	52	65.00	40	50.00
Total	80	100.00	80	100.00	80	100.00

Panel B: Report related characteristics of client companies

	First-round		*Second-round*		*Third-round*	
Inspection results	N	Percentage	N	Percentage	N	Percentage
Def_disagree	35	15.56	4	1.78	6	2.67
Def_other	92	40.88	98	43.55	130	57.77
Clean	98	43.56	123	54.67	89	39.56
Total	225	100.00	225	100.00	225	100.00

Table 2.8: Descriptive Statistics for constant sample small audit firms

VARIABLES	N	mean	p50	sd	min	max
Bid_ask_spread	900	0.0356	0.0317	0.0182	0.00777	0.0940
Price Impact	900	0.000942	0.000223	0.00213	1.06e-06	0.0149
Zero Return	900	0.0541	0.0479	0.0390	0.00103	0.191
Total Trading Costs	900	0.00704	0.00568	0.00527	0.000806	0.0304
Size	900	159.8	77.57	244.9	6.261	1,481
Share Turnover	900	1.760	0.764	2.716	0.0376	16.14
Volatility	900	0.0353	0.0309	0.0191	0.00923	0.111
Analyst	900	1.651	1	2.450	0	11
Inst_holding	900	0.211	0.143	0.220	0	0.890

Table 2.8 presents descriptive statistics on the variables used in the regression analysis. The mean (median) value of bid-ask spread is 0.0356 (0.0317). The mean (median) value of price impact is 0.000942 (0.000223) suggesting that, on average, a US$ 1,000 trade moves

stock prices by 0.094% (0.022%). The mean (median) value of zero return is 0.0541 (0.0479). Finally, for total trading cost, the mean (median) value is 0.00704 (0.00568).

Table 2.9 reports the OLS regression results. The models explain between 42% and 78% of the variation. In all regression models, the coefficients on Period1 are significant and positive, except for the regression with zero returns as the dependent variable. The coefficients on Period2 are also significant and positive except for the regressions with bid-ask spread and zero returns as the dependent variable. Moreover, a comparison of the coefficients of Period1 and Period2 shows that stock market liquidity is significantly lower ($p<0.05$) after the second inspection compared to the period between the first and second inspection. Combining these findings with the results of the main analysis, there appears to be a sharp decrease in liquidity after the first inspection and a relative small increase after the second inspection. Hence, it appears that the sharp decrease in liquidity after the first inspection round is not fully offset by the increase in liquidity after the second round. Given that the coefficients on Period3 are insignificant in all models, this suggests that the liquidity level after the third inspection round has reached the same level again as before the start of the first inspection round. (i.e. one year before the publication of the first round inspection reports). We emphasize that while using a constant sample has its merits, it also has important limitations. First, the time between the start of the first inspection and the end of the third inspection is very long implying that many factors could affect stock market liquidity during this period. Furthermore, the constant sample is limited in size because of clients switching auditors or leaving the market. Theoretically, we also do not have reason to believe that the disclosure and content of inspection reports would only affect the client companies in the constant sample. Therefore, we consider the sample and the results of the main analysis theoretically and empirically more appropriate.

To further analyze the impact on stock market liquidity, we distinguish between audit firms with no deficiencies, audit firms disagreeing with the observed deficiencies, and audit firms which not disagreeing with observed deficiencies. Table 2.10 presents the OLS regression results. In all the regression models, the coefficients on Def1_disagree, Def1_other and Clean1 are significant and positive, except for the one using zero returns as the dependent variable. Further, we find that the coefficients on Clean2, Def2_other and Def2_disagree are significant and positive in most of the models. Finally, we find that the coefficients on Def3_disagree, Def3_other and Clean3 are insignificant. Collectively, the findings are in line with the reported results in Table 2.9.

Table 2.9: Regression with for constant sample small audit firms

VARIABLES	Log_ Bid-askspread	Log_Price impact	Zero return	Log_Trading cost	Liquidity factor
Period1	0.293***	0.669***	0.000867	0.280***	0.253***
	(3.837)	(4.550)	(0.190)	(3.286)	(3.354)
Period2	0.141	1.123***	0.00882	0.299*	0.393***
	(1.523)	(5.197)	(1.178)	(1.847)	(3.458)
Period3	0.100	0.416	0.00449	0.149	0.178
	(0.555)	(0.985)	(0.664)	(0.571)	(0.829)
Log($Size_{t-1}$)	0.0414	-1.269***	-0.0166***	-0.252***	-0.454***
	(1.215)	(-25.67)	(-5.204)	(-6.658)	(-9.611)
Log($Share\_turnover_{t-1}$)	0.0239	-0.573***	-0.00845***	-0.0816**	-0.201***
	(1.083)	(-11.04)	(-7.489)	(-2.245)	(-7.972)
Log($Volatility_{t-1}$)	0.514***	0.282**	0.00256	0.415***	0.289***
	(21.93)	(2.681)	(0.877)	(7.146)	(5.190)
Log($Analyst_{t-1}$)	0.0160	-0.102*	0.000942	-0.0316	-0.0179
	(0.483)	(-1.943)	(0.738)	(-0.671)	(-0.544)
Log($Inst\_holding_{t-1}$)	-0.344***	-0.581***	-0.00822	-0.531*	-0.423**
	(-3.347)	(-3.098)	(-0.944)	(-1.853)	(-2.064)
Log(Days)	-0.108	-0.331**	0.000248	-0.182**	-0.134
	(-1.614)	(-2.220)	(0.0483)	(-2.379)	(-1.370)
Constant	-1.222***	-0.0961	0.141***	-1.026*	4.113***
	(-2.767)	(-0.102)	(7.142)	(-1.961)	(8.363)
Observations	900	900	900	900	900
R-squared	0.615	0.788	0.460	0.455	0.646
Fixed effects	Year/industry	Year/industry	Year/industry	Year/industry	Year/industry
R2 adjusted	0.590	0.774	0.424	0.419	0.622
F test Period2-Period1	-0.152***	0.454***	0.0079**	0.019	0.140**
F test Period3-Period2	-0.041	-0.707*	-0.0043	-0.150	-0.215

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1
All continuous variables winsorized at the 1% and 99% level.
All variables definitions can be found in Appendix 1.

Table 2.10: Regression with for constant sample small audit firms

VARIABLES	Log_ Bid-askspread	Log_Price impact	Zero return	Log_Trading cost	Liquidity factor
def1_disagree	0.187***	0.640**	-0.00110	0.333***	0.243**
	(3.346)	(2.701)	(-0.246)	(3.459)	(2.418)
def1_other	0.317***	0.701***	-0.000433	0.258***	0.238***
	(3.745)	(4.646)	(-0.0749)	(2.750)	(2.853)
clean1	0.433***	0.683***	0.000560	0.315**	0.280**
	(4.977)	(3.838)	(0.0738)	(2.683)	(2.217)
def2_disagree	0.198	1.441**	0.0492***	0.932*	1.109***
	(1.132)	(2.303)	(5.306)	(1.952)	(3.066)
def2_other	0.156	1.082***	0.0102*	0.230	0.373***
	(1.328)	(4.904)	(1.732)	(1.106)	(3.297)
clean2	0.235**	1.154***	0.00696	0.317**	0.396***
	(2.525)	(5.111)	(0.689)	(2.054)	(2.792)
def3_disagree	0.246	0.559	0.01000	0.347	0.350
	(0.973)	(0.524)	(0.661)	(0.907)	(0.897)
def3_other	0.101	0.435	0.00982	0.114	0.218
	(0.570)	(0.951)	(1.139)	(0.338)	(0.768)
clean3	0.0973	0.365	0.00461	0.0802	0.142
	(0.450)	(0.855)	(0.620)	(0.259)	(0.580)
Log($size_{t-1}$)	0.0422	-1.271***	-0.0167***	-0.258***	-0.458***
	(1.216)	(-25.89)	(-5.281)	(-7.099)	(-9.892)
Log($Share\_turnover_{t-1}$)	0.0244	-0.573***	-0.00843***	-0.0782**	-0.199***
	(1.072)	(-10.99)	(-7.837)	(-2.301)	(-8.521)
Log($Volatility_{t-1}$)	0.526***	0.286**	0.00229	0.418***	0.290***
	(20.49)	(2.563)	(0.692)	(6.645)	(4.569)
Log($Analyst_{t-1}$)	0.0166	-0.105**	0.000799	-0.0372	-0.0222
	(0.497)	(-2.027)	(0.598)	(-0.822)	(-0.685)
Log($Inst\_holding_{t-1}$)	-0.334***	-0.562***	-0.00845	-0.500*	-0.409**
	(-3.253)	(-2.843)	(-0.971)	(-1.792)	(-2.032)
Log(Days)	-0.164**	-0.344**	0.00120	-0.202*	-0.140
	(-2.516)	(-2.110)	(0.181)	(-1.902)	(-1.097)
Constant	-0.806*	0.0353	0.137***	-0.850	4.198***
	(-1.857)	(0.0325)	(5.017)	(-1.320)	(6.459)
Observations	900	900	900	900	900
R-squared	0.622	0.789	0.465	0.460	0.649

Table 2.10 continued

Fixed effects	Year/industry	Year/industry	Year/industry	Year/industry	Year/industry
R2 adjusted	0.594	0.773	0.426	0.420	0.623

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1
All continuous variables winsorized at the 1% and 99% level.
All variables definitions can be found in Appendix 1.

2.5.3 Annual inspected audit firms

In this paper, we mainly focus on the stock market liquidity effects of the disclosure of inspection reports of the small audit firms. Although investors may already know more about audit quality of large audit firms (i.e. audit firms with more than 100 issuer clients, which are inspected on an annual basis) before the inspections, stock market liquidity may still increase as audit quality has been documented to improve after the inspection (Carcello et al. 2011). To empirically test this, we construct a constant sample for the first three rounds of inspections (i.e. no auditor switches from one year before the publication of the first round inspection reports until the publication of the fourth round inspections) for the annually inspected audit firms. We define three variables of interest: Period1_annual, Period2_annual and Period3_annual. Period1_annual (2/3) equals one when the observation belongs to the period after the publication of the first (second/third) inspection report and before the publication of the second (third/fourth) inspection report, zero otherwise.

The results in Table 2.11 show that stock market liquidity significantly increases after the publication of the first inspection report, suggesting an increase in the investors' perception of future audit quality. While the coefficient of Period2_annual is significantly negative, it is not significantly different from the coefficient on Period1_annual in the liquidity factor model. This implies that after the publication of the second round inspection reports, liquidity does not improve compared to the period after the first inspection. Furthermore, we find that after the publication of the third round inspection reports, liquidity is unchanged compared to the starting level (i.e., the one year period before the first inspection). Collectively, the results suggest that investors do expect audit quality to increase for the annually inspected audit firms after the first round of inspections. However, due to the continuously deficient inspection reports coming out from the second and third round of inspections, the expected improvement in audit quality disappears.

Table 2.11: Regression with constant sample for annual inspected firms

VARIABLES	Log_ Bid-askspread	Log_Price impact	Zero return	Log_Trading cost	Liquidity factor
Period1_annual	-0.0116	-0.130**	-0.00403***	-0.113***	-0.0884***
	(-0.621)	(-2.548)	(-3.520)	(-2.849)	(-4.694)
Period2_annual	0.0254	-0.0947	-0.00264	-0.184*	-0.0752*
	(0.669)	(-1.546)	(-1.030)	(-1.966)	(-1.844)
Period3_annual	-0.0471	-0.184**	-0.000409	-0.154	-0.0608
	(-1.131)	(-2.554)	(-0.145)	(-1.481)	(-1.346)
Log($size_{t-1}$)	0.00681	-1.050***	-0.00872***	-0.347***	-0.307***
	(0.773)	(-127.7)	(-16.30)	(-17.28)	(-35.33)
Log($Share\_turnover_{t-1}$)	0.00426	-0.869***	-0.00563***	-0.197***	-0.219***
	(0.487)	(-41.34)	(-8.783)	(-8.020)	(-18.85)
Log($Return\_variability_{t-1}$)	0.808***	0.678***	-0.00481	0.587***	0.211***
	(54.19)	(25.91)	(-1.082)	(5.653)	(2.963)
$Analyst\_following_{t-1}$	-0.00169	0.000973	0.000785***	0.0149***	0.0124***
	(-1.128)	(0.618)	(10.78)	(3.273)	(9.046)
Log($Inst\_holding_{t-1}$)	0.0318	-0.451***	-0.0382***	-1.028***	-0.712***
	(0.957)	(-6.146)	(-11.04)	(-8.161)	(-11.60)
Constant	-0.934***	-3.222***	0.0849***	-2.070***	2.992***
	(-12.68)	(-28.77)	(4.881)	(-4.963)	(10.69)
Observations	13,224	13,224	13,224	13,224	13,224
R-squared	0.790	0.939	0.465	0.333	0.713
Fixed effects	Year/industry	Year/industry	Year/industry	Year/industry	Year/industry
R2 adjusted	0.788	0.938	0.462	0.329	0.711

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1
All continuous variables winsorized at the 1% and 99% level.
All variables definitions can be found in Appendix 1.

2.6 Conclusion

We investigate the capital market effects of the publication of PCAOB inspection reports over time. By performing a capital market based analysis, we aim to contribute to the ongoing debate on the effectiveness and economic consequences of independent inspections (Abernathy et al. 2013). Specifically, we investigate whether the publication of the inspection reports increases capital market liquidity or decreases information asymmetry among investors, which

would be in line with regulator intentions. We use bid-ask spread, price impact, zero returns and total trading costs as proxies for stock market liquidity. We focus on the inspection reports of the triennially inspected audit firms because they show variation in the inspection results. This allows us to investigate the impact of this variation on market liquidity, while in prior research smaller audit firms are generally treated as a homogeneous group. Moreover, they are also economically important as they play a significant role in the competitive local audit markets and significantly influence Big4 audit firms' ability to collect a fee premium (Bills and Stephens 2016). In addition, liquidity is priced in imperfect capital markets and this may be more salient for the smaller audit firm market for which there is arguably more uncertainty on audit quality (Akins et al. 2011; Armstrong et al. 2011).

The results of our study indicate that stock market liquidity decreases after the publication of the first inspection reports, suggesting that not all investors are able to fully interpret this new information. In contrast to the first inspection round, we find that after the publication of the second round inspection reports, liquidity increases. These findings imply that there is a learning process in the capital market when it comes to the interpretation of the inspection reports. However, the changes in liquidity are only significant for companies with deficient auditors who do not disagree in the response letters to the PCAOB and for companies with clean auditors. If auditors state that they disagree with the PCAOB findings, liquidity does not improve. Overall, these results imply that the first inspection reports resulted in an initial decrease in liquidity, regardless of the content in the inspection reports. After the publication of the second round inspection reports, investors are better able to interpret the information disclosed which leads to an increase in liquidity. In addition, investors may anticipate a bigger improvement in audit quality for deficient auditors without disagreement with PCAOB findings. Hence, the expected benefits of disclosing the results of audit firm inspections only seem to become visible after the disclosure of the second round inspection reports. At the same time, we find that the informational value of inspection reports appears to fade out after the third inspection round.

In an additional analysis, we report that the decrease in liquidity after the first round of inspections is not due to the initial year effects. Moreover, we also construct a constant sample for the triennially inspected audit firms. The results indicate that the liquidity level is lower after the first and second inspections compared to the year before the publication of the reports of the first inspection round and returns to the initial level after the third inspection. In combination with the results of the main analysis, while the samples are not fully comparable, these findings imply that the increase in liquidity after the second inspection round is not fully offsetting the sharp decrease in liquidity after the first inspection round. Finally, we also analyze changes in information asymmetry for the annually inspected audit firms. We find that stock market liquidity is higher after the first and second round inspection reports but liquidity does not further improve after the second round compared to the first round, and fades out after the third inspection round. After the third round, the liquidity does not differ from the level before the first inspections. These findings suggest that the expected improvement in audit quality disappears potentially due to the continual deficient inspection reports.

We contribute to the literature in several ways. First, we contribute to the literature on the effectiveness of PCAOB inspections. We provide evidence that capital market participants value the information provided by the inspection report and react to it accordingly. While our results imply that investors learn how to interpret inspection reports, ultimately the information value appears to fade out after multiple inspection rounds as most of the uncertainty is already resolved and future reports contain less new information that may help investors in updating their views on audit quality. Second, this paper examines the economic consequences of disclosures on audit firm performance from the stock market investors' perspective, which to the best of our knowledge has not been addressed in prior research. This is also important for practice since other countries are following the US example of installing independent public oversight in varying forms and stages of development, for which insights on the potential economic effects of public disclosure of the inspection results are relevant.

We are aware that our results are subject to a number of limitations. First, we do not have a control group in our study since PCAOB inspections are mandatory for all audit firms who have publicly listed clients. However, this issue is partly resolved with the unique feature of the PCAOB inspection itself as the inspection reports are published at different points in time. In addition, we are not able to investigate the market reaction to quality control deficiencies for small audit firms due to an insufficient number of observations. Future research could complement our understanding of the market consequences of inspection results by looking into other type of countries (e.g., stakeholder countries, countries with lower investor protection) or by performing a content analysis of the information disclosed in the inspection reports.

Chapter 3: PCAOB Inspections and Audit Firm Behavior: An Analysis of the First Three Inspection Rounds of Small Audit Firms

Abstract[8]

This study examines the impact of PCAOB inspections on audit firm behavior over time. More specifically, we investigate whether and how different inspection results affect audit fees. While inspections arguably result in increased costs for audit firms to comply with PCAOB standards, the impact on audit fees likely depends on audit firm reputation triggered by the inspection report. Using a sample of audit firms subject to triennial inspection, we find, on average, higher audit fees for companies without PCAOB Part I or Part II deficiencies before the inspection, suggesting that PCAOB inspection results do reflect audit effort. When classifying the inspection results based on Part I and Part II findings and considering the audit firms' response, we find, consistent with predictions, an increase in audit fees for audit firms without quality control deficiencies. This increase in fees persists across the first three inspection rounds. However, for Part I of the inspection reports, we find limited impact on audit fees. To further corroborate these results, we find evidence of an increase in the number of CPAs employed by audit firms who do not disagree with the PCAOB Part I findings and audit firms who remediated the quality control deficiencies, suggesting increased audit effort. At the same time, they are not able to charge higher fees for the additional effort, implying potential reputation damage. While audit firms without quality control deficiencies are able to increase their fees, the number of public clients decreases. If PCAOB inspection reports signal audit quality, these findings imply that in the small audit firm market, there appears to be a strong focus of public clients on negotiating for the lowest possible fee instead of searching for higher audit quality. Collectively, we provide evidence that PCAOB inspections led to significant changes in audit firm behavior and a redistribution of client companies in the small audit firm market segment.

[8] This chapter is based on a working paper together with Ann Vanstraelen.

3.1 Introduction

Since more than a decade the US Public Company Accounting Oversight Board (PCAOB) is conducting periodic independent inspections of accounting firms that perform audits of US registrants. The PCAOB is therefore considered as "a durable and significant part of the regulatory landscape" (Coates and Srinivasan 2014). The mission of the inspections is to improve audit quality and protect the interests of investors. Given the amount of resources PCAOB inspections require, investigating whether the PCAOB has been effective in achieving this mission over time as well as examining economic consequences (both intended and unintended) of PCAOB inspections are important questions for academics, regulators and society at large. A number of studies already looked into the impact of PCAOB inspections on different audit quality outcome variables, including financial reporting quality (Lamoreaux 2016; Gipper et al. 2015; Carcello et al. 2011) and auditor reporting (Defond and Lennox 2017; Gramling et al. 2011; Lamoreaux 2016). In this paper, we look into another dimension of audit quality, audit fees, which is considered to be an input factor of audit quality (e.g., DeFond and Zhang 2014). Furthermore, we investigate the impact of inspections on audit fees over time. Prior research has typically focused on the impact of inspections after the first inspection round. Hence, not much is currently known about the impact of inspections over time and whether the effects fade out over time. We focus our study on the small audit firm setting. Not much is known about these firms while they actually play a significant role in the competitive landscape of local markets (Bills and Stephens 2016). Research on the impact of PCAOB inspections for this type of audit firms is also relatively limited. Further, a focus on triennially inspected audit firms allows to investigate the impact of inspections on audit fees conditional on the outcome of the inspection report (clean or deficient). This is not possible for annually inspected firms since they receive continuously deficient inspection reports over time. Interestingly, despite these systematic deficient inspection reports, research findings suggest that audit quality of annually inspected audit firms improves. In contrast, the evidence is much less conclusive for triennially inspected audit firms. For example, while Gunny and Zhang (2013) do not find an association between inspection reports and going concern opinions (GCO) as a measure of audit quality, Gramling et al. (2011) document an increase in the likelihood of a GCO in the post-inspection period for clients from triennially inspected audit firms with PCAOB deficiencies. At the same time, Daugherty and Tervo (2010) document that small audit firms do not perceive an improvement in audit quality or public confidence in the audit profession following PCAOB inspections. Recently, Tanyi and Litt (2016) provide evidence of lower quality and audit fees in the post-inspection period for non-Big 4 audit firms subject to triennial inspection compared to non-Big 4 audit firms which are inspected on an annual basis. Furthermore, the results of Tanyi and Litt show that small and midsize audit firms inspected annually are more selective in their choice of new clients in the post-inspection period compared to the triennially inspected firms. Using textual analysis, Acito et al. (2017) find that PCAOB identified audit deficiencies lead to higher audit fees and higher turnover likelihood for clients of Big 4 auditors.

The purpose of this study is to extend this line of research by examining how smaller audit firms that are subject to triennial inspection respond to the findings of the PCAOB

inspections. More specifically, we start our analyses with examining whether audit fees are different before the inspections, conditional on the inspection outcomes. Then we continue to investigate whether inspections affect the audit fees of smaller audit firms charged to their clients, and whether this effect changes over time. We expect that the impact on audit fees is conditional on audit firm reputation triggered by the type of inspection report received and the public response of the audit firm on this inspection report. Finally, we construct our third set of analyses to investigate whether the inspections can have long-term impact.

We argue that PCAOB inspections can lead to a change in audit fees for at least two reasons. First, the cost of remaining within the public sector increases after the installment of the PCAOB inspections, especially for small audit firms (DeFond and Lennox 2011). Indeed, as explained by DeFond and Lennox (2011), audit firms with a smaller audit fee base are less able to recover the fixed cost component of complying with the stricter regulatory standards demanded by the PCAOB through higher fees and still remain competitive. Second, audit firms face regulatory sanctions and penalties if serious deficiencies are not corrected (DeFond 2010).[9] Assuming that the market in which small audit firms operate is competitive, the increased costs are likely to lead to an increase in audit fees and this effect is arguably even more pronounced for audit firms considered to be deficient by the PCAOB. On the other hand, a number of recent studies show the importance of auditor reputation for providing firms with incentives to supply high quality audits (Craswell et al. 1995; Skinner and Srinivasan 2012; Weber et al. 2008; Francis et al. 2005). For audit firms with deficient inspection reports, it has been documented that it can harm the auditor's reputation resulting in an adverse effect on clients' valuations (Dee et al. 2011) or may cause the firm to exit the audit market (DeFond and Lennox 2011). From this point of view, although faced with increased costs, deficient audit firms will have difficulties to pass on these additional costs to their clients by increasing audit fees.

At the same time, there may be reasons why a PCAOB inspection may not influence the effort level for individual engagements. That is, the extent to which deficiencies create a sufficient incentive for the auditor to adjust behavior, especially at the level of individual engagements is uncertain for at least two reasons. First, there has been criticism on the PCAOB inspectors' technical and in-depth expertise (Glover et al., 2009) and firms may disagree with the inspector's findings as they pertain to specific audits. Second, it takes an extended period of time before inspection results are published and the identity of the inspected clients remains unknown, so it is not possible to link deficiencies to audit effort for individual clients. Furthermore, in spite of a reputation for high quality, Big4 audit firms have repeatedly received deficient inspection reports in the US so it remains unclear to what extent the inspection result can cause severe damage to an audit firm's reputation. For example, Lennox and Pittman (2010) find no support for changes in audit firm market shares as a result of deficient inspection

[9] Examples of such actions include notifying the SEC, the US Justice Department, and disciplinary proceedings by the PCAOB such as censuring, suspending, and barring auditors, or revoking the registration of audit firms, all of which can be accompanied with large monetary penalties. For example, Deloitte was assessed a $1 million fine based on the inspection of the conduct of the 2003 audit of the public company Ligand Pharmaceuticals.

reports. Therefore, it is an empirical question whether audit firms are sufficiently incentivized to change their behavior after the instalment of PCAOB inspections.

Using PCAOB inspection reports on small audit firms of the first three rounds published from 2005 to 2014, we investigate whether and how the inspections affect audit fees, while considering the different types of inspection outcomes. During this period, most of the small audit firms were inspected for at least three rounds. For our first set of analyses, we use the first round to study whether audit fees are different conditional on inspection results. For our second and third set of analyses, we use all first three rounds and aim to investigate whether PCAOB inspections have a long-term impact and whether the impact is influenced by the inspection findings and audit firm's responses to the inspection findings. While the costs of complying with PCAOB quality control standards may mainly relate to the beginning period of inspections, the increase in engagement costs is likely structural since more work is needed on each engagement to meet PCAOB standards. The sample for the first set of analyses include 5,050 company-year observations relating to 1825 clients and 418 first round inspected audit firms. Our sample for the second set of analyses includes 5,020 company-year observations relating to 325 audit firms for the first inspection, 3,908 company-year observations relating to 259 audit firms for the second inspection and 3,118 company-year observations relating to 175 audit firms for the third inspection. Finally, we construct a constant sample without any auditor switches from at least one fiscal year before the publication of the first inspection to at least one year after the third inspection for our third set of analyses. This sample consists of 2597 client-year observations for 275 clients and 115 audit firms. For all the inspection reports included in our analyses, we manually coded them based on Part I and Part II PCAOB findings as well as the audit firms' responses to those findings.

An important feature of the PCAOB inspections on small audit firms is the natural staggered setting, in which the PCAOB inspects the small audit firms at different time points. This specific setting not only allows us to compare the audit fee change from pre- to post-inspection for those client companies with auditors already being inspected by the PCAOB, but also enables us to benchmark the fees in other companies whose auditor has not been inspected yet at that time. Both benchmarks help us to control for contemporaneous effects of other changes in the audit market that are unrelated to the publication of the PCAOB inspection reports. Moreover, we also include year- and industry-fixed effects to account for the unobserved time- and industry-invariant characteristics.

Our results indicate that audit fees are higher on average before the publication of the inspection reports for audit firms without any Part I or Part II deficiencies. Further, we find that audit fees increase after the PCAOB inspections but show that this increase is mainly driven by audit firms without any quality control deficiencies. To further corroborate these results, we find in an additional analysis that deficient audit firms who do not state disagreement with the engagement deficiencies and audit firms who remediated their identified quality control deficiencies experienced increases in the number of CPAs, which suggest a seeking for increased audit effort. However, combined with the main findings that audit fees do not change significantly for these two groups, our results show that PCAOB identified deficiencies limit

their ability to charge for the additional effort arguably due to reputation damage. Interestingly, we find that while audit firms without quality control deficiencies are able to increase audit fees, their number of public clients decreases. Furthermore, we show that new clients added to the client portfolio of clean audit firms after the inspections have lower financial risks compared to deficient audit firms. If a clean PCAOB inspection report is an indication of higher audit quality, this finding would suggest that in the small audit firm market, there appears to be a strong focus of clients on lowering the fees instead of seeking for higher audit quality. Consistently, for those audit firms who react negatively to the PCAOB deficiencies by disagreeing with the Part I findings or failing to address the quality control deficiencies, the inspection does not have any significantly impact. At the same time, these two groups also charge the lowest fee in the market.

Our study contributes to the growing body of literature on the economic effects of PCAOB inspections by focusing on the smaller audit firm market segment and by considering different dimensions of audit firms' behavior. Recent studies mainly document positive effects of PCAOB inspections, though most of these studies relate to annually inspected audit firms. We show that the evidence for the small audit firm market is not unequivocally positive, which appears to be driven by the lower demand for audit quality in this market segment. This would also be consistent with the recent evidence of Tanyi and Litt (2016) showing that audit quality and audit fees are lower for triennially inspected audit firms in the post-inspection period compared to annually inspected non-Big 4 audit firms. While Acito et al. (2017) shows that GAAP related deficiencies of Big 4 audit firms lead to higher audit fees due to the costs associated with remediating those deficiencies, our results point out that small audit firms are not able to do the same due to reputation loss. The remainder of the paper proceeds as follows. Section 2 describes prior literature on the effects of PCAOB inspections. Next, we develop our hypotheses in Section 3. The research design is outlined in Section 4, which is followed by a discussion of the results in Section 5. Section 6 contains additional analyses and Section 7 provides conclusions and limitations.

3.2 Background

Under the provisions of SOX, the PCAOB conducts annual inspections of firms that audit more than 100 issuers, and triennial inspections of the audit firms with fewer than 100 registrant clients (the latter referred to as "small audit firms" hereafter). Along with the evaluation of an audit firm's quality control policies and procedures, the inspection process involves a review of some audits selected based on characteristics of the client, its industry, practice office, partner, or prior inspection results (PCAOB 2009). The results of the inspection process are publicly disclosed in a report for each audit firm. While not disclosing the identity of inspected clients, Part I of the inspection report contains information about engagement-specific deficiencies and Part II contains the existence of quality control deficiencies. Details about quality control deficiencies are only made available to the public if the audit firm does not sufficiently address the PCAOB's concerns within a one-year period. At the end of the inspection report, audit firms are allowed to provide their responses to the PCAOB findings.

In the course of this paper, the term "deficient" is used for inspection reports that contain one or more engagement-specific deficiencies and the term "clean" (or non-deficient) for reports without any engagement-specific deficiencies.

Prior research addresses the relationship between PCAOB inspections and audit quality in different ways. From a conceptual point of view, researchers and practitioners have argued both for and against the effectiveness of the inspection process, i.e., whether the process is able to systematically identify meaningful audit deficiencies that can lead to an improvement in audit quality. Some argue that the PCAOB inspection process is superior to the older peer review system because it is independent and objective, has better access to auditor documentation, and has more resources available for inspectors (Gunny and Zhang 2013; Carcello et al. 2011). Others criticize the inspection process because of limited staff and expertise, inadequate transparency of procedures and inspection outcomes, and the slow timing of feedback (Glover et al. 2009; Oliverio and Newman 2009; Palmrose 2005; DeFond 2010).

This conceptual debate served as motivation for a number of studies examining the association between inspection outcomes and various proxies for audit quality. Insights obtained from these studies include that clients of audit firms with engagement deficiencies discovered during the inspection process display higher levels of abnormal accruals (Gunny and Zhang 2013). Further, it has been documented that auditor tenure and industry expertise mitigates engagement deficiencies for non-Big4 auditors (Gunny, Krishnan, & Zhang, 2007). However, there appears to be no association between PCAOB reports for triennially inspected auditors and GCOs as a measure of audit quality (Gunny and Zhang 2013).

Additional insights can be obtained by examining reactions to inspections. The most extreme reaction is that negative inspection outcomes for small audit firms have resulted in deregistration with the PCAOB (DeFond and Lennox 2011). For audit firms remaining in the market, Gramling et al. (2011) find that triennially inspected audit firms with PCAOB deficiencies were more likely to issue a GC opinion for financially distressed clients subsequent to their PCAOB inspection than prior to their inspection. Similarly, Carcello et al. (2011) find that absolute abnormal accruals decrease following inspections for Big4 clients. These findings would support the notion that PCAOB oversight and inspections are effective. On the other hand, it has been documented that small audit firms do not perceive that the inspection process improved audit quality or public confidence in the audit profession arising from the inspection process (Daugherty and Tervo 2010). Recently, Tanyi and Litt (2016) show that non-Big 4 audit firms subject to triennial inspection have lower audit quality and audit fees in the post-inspection period compared to non-Big 4 audit firms which are inspected on an annual basis. In addition, Tanyi and Litt (2016) show that small and midsize audit firms inspected annually are more selective in their choice of new clients in the post-inspection period compared to the triennially inspected firms. Furthermore, it has been shown that clients with effective audit committees or with high potential reporting quality of GAAP-deficient triennially inspected auditors are more likely to switch to audit firms without GAAP related deficiencies (Abbott et al. 2013). Finally, the capital market also appears to react to the PCAOB inspection reports. Vanstraelen et al. (2016) find that stock market liquidity decreases after the publication of the

first round inspection reports but increases after the publication of the second round inspection reports. Capital market responses to unexpected earnings also significantly increase following the introduction of the PCAOB inspection regime (Gipper et al. 2015).

3.3 Theoretical background and development of hypotheses

The audit production process comprises technology and effort as fixed and variable factors of production (Hope et al. 2012). Even though advances in audit technology have rendered auditing less labor intensive (Elliott 1998), human resource compensation is still a major part of audit fees (Knechel et al. 2013). Audit firms have flexibility in adjusting human resource inputs as a result of excess capacity, shifts of resources from non-public clients, and new employee hires. Firms can alter audit effort by assigning more or better experienced personnel to a client's team, or let the existing team members conduct more work. In either case, fees are likely to increase as extra time and more expensive staff is assigned to a client. Using fees as a proxy for effort is based on the assumption that the market for audit services is competitive (Simunic 1980; Elliott 1998; Craswell et al. 1995). This assumption is supported by prior studies that indicate that the market in which smaller audit firms compete is highly fragmented and competitive (Sirois and Simunic 2011). Competition implies that fee changes are mainly caused by changes in cost rather than profit margin, and prior evidence corroborates that fees are reflective of audit effort (Schelleman and Knechel 2010; Bell et al. 2001; Menon and Williams 2001; Simunic and Stein 1996; Davis et al. 1993).

During the fieldwork, the PCAOB inspectors dissect the audit work papers, interact frequently with the engagement team to improve their understanding of the work completed during the audit (Aobdia 2016). Audit firms receiving a deficient Part I inspection report have, in the opinion of the PCAOB inspectors, failed to "obtain sufficient competent evidential matter to support its audit opinion". In other words, deficiencies can be attributed to inadequate effort, at least in the judgment of the inspectors. Following credence theory, Causholli et al. (2010) argue that the level of effort needed to achieve a minimum standard of audit quality for the particular client may be difficult to assess by a client and external parties. Hence, insufficient audit effort may arise when clients are unable to observe the exact quality of their audit. At the same time, given the credence attributes of an audit, the auditor may not only under-audit, but can also overcharge or over-audit. Further, auditors and regulators may have differing opinions as to what constitutes sufficient evidence and documentation since auditor's decisions related to a single engagement are potentially influenced by commercial considerations when setting fees and scoping the audit work. For these reasons, independent inspections are designed to check whether the level of audit effort is in accordance with quality standards. Thus, we expect that audit fees are lower for clients with deficient auditors compared to clients with clean auditors before the first inspection, as audit effort was arguably lower for these clients.

The same reasoning applies to the clients of audit firms which have quality control deficiencies (QCDs). An audit firm's quality control system aims to provide reasonable

assurance that the firm's personnel comply with applicable profession standards and the firm's standards of quality (PCAOB 2003, QC Section 20.03). The PCAOB's evaluation of a firm's system of quality control typically includes a review of policies, procedures, and practices concerning audit performance, training, compliance with independence requirements, client acceptance and retention, and the establishment of policies and procedures (PCAOB 2012). Compared to the engagement level deficiencies, QCDs are identified at the firm level and are arguably even more likely to represent audit quality and audit effort since the quality control system can be considered as the foundation for the way audits are performed within the firm. As a result, we also expect that audit fees are lower for clients of auditors with quality control deficiencies in the pre-inspection period (i.e. before the first inspection) compared to clients of auditors without any quality control deficiencies before the first inspection. In summary, we formulate our first hypothesis as following.

H1: *Audit fees in the pre-inspection period are different conditional on the inspection outcome.*

For the triennially inspected audit firms, the cost of remaining within the public sector increases after the instalment of the PCAOB inspections. In particular, the PCAOB's strict enforcement of compliance with auditing standards drives the costs upwards of audit firms choosing to remain auditing public clients (Farrell and Shadab 2005). Stricter compliance requires auditors to invest in a variety of practice areas that are closely monitored by the PCAOB, such as procedures for client acceptance and retention, partner compensation and review, auditor independence, and staff training (DeFond and Lennox 2011). Moreover, compared to the big audit firms, the percentage of engagements being inspected is much larger for small audit firms (Lennox and Pittman 2010). As PCAOB inspections have a disruptive impact on auditors' normal activities, examining a higher proportion of their clients imposes a relatively greater cost on small auditors (DeFond and Lennox 2011). Furthermore, PCAOB inspections are expected to increase the cost of an engagement since more work is required to meet PCAOB standards (e.g., more documentation requirements). As a result, audit firms who remain in the market and audit public clients are likely faced with increased costs, which could result in higher fees. At the same time, audit fees are not only reflective of audit effort but also of reputation. We argue that the extent to which the audit firm can pass on these increased costs to the client will depend on audit firm reputation triggered by the inspection report. Clean audit firms are arguably able to pass on the increased costs to the client as a clean inspection report provides a positive signal about the audit firm's reputation. This leads to our second hypothesis:

H2a: *Clients of triennially inspected clean audit firms are associated with an increase in audit fees in the post-inspection period, compared to the pre-inspection period.*

The auditor determines the level of effort supplied and fees charged for an audit based on risk factors and reputation concerns (Stefaniak 2009; Hay et al. 2006; Nelson 2006; Lyon and Maher 2005; Larcker and Richardson 2004; Johnstone and Bedard 2003; Seetharaman et al. 2002; Reynolds and Francis 2001; Schelleman and Knechel 2010). Expected losses from inadequate audit effort can arise from regulatory penalties and the potential loss of clients due

to reputation loss. Consequently, the detection of deficiencies by PCAOB inspectors may cause a change in the auditor's assessment of expected losses from insufficient effort and provide ex-ante incentives that could lead to a change in auditor behavior.

On the other hand, inspection reports are not intended to categorize audit firms into high and low quality firms. This is partly due to the fact that the engagements and audit issues selected for review are not random. Lennox and Pittman (2010) find no evidence of changes in the market share of Big4 audit firms as a result of deficient inspection results. Thus, the extent of the threat of client switching in response to deficiencies mentioned in the inspection report may be limited. Even though clients might not switch in response to a deficient report, the PCAOB is authorized to conduct disciplinary proceedings, impose sanctions, and communicate inspection results to other regulatory agencies (Wegman 2008; Gunny and Zhang 2013; Farrell and Shadab 2005). The PCAOB has demonstrated its willingness to impose sanctions for violations of standards detected via inspections by revoking the registration of audit firms and censuring, suspending, or barring auditors (Gilbertson and Herron 2009; PCAOB 2011). Moreover, audit firms have an incentive to prevent publication of their deficiencies if they can be addressed by changes in firm practices. In general, since detected deficiencies can raise the probability that sanctions and penalties are imposed, it is likely that auditors will change their behavior when presented with potential losses or penalties.

Auditors may have a number of options for addressing the issues raised in a deficiency report. While the auditor might merely charge a fee premium to cover expected future losses from deficient audits, clients are unlikely to accept fee changes without observable adjustments to audit work. Further, such an approach is also unlikely to satisfy inspectors. The risk of regulatory penalties as a result of PCAOB inspections is less remote than the risk of litigation, given that a problem has already been detected. For that reason, the deficient inspection gives audit firms a convincing argument for fee increases when having the annual meeting with the audit committee to determine current year's audit fees, i.e., previous fees may have been artificially low and the auditor can convince the client that alternative auditors would have to charge comparable fees. However, we expect this effect to be less profound if audit firms stated in their responses to the PCAOB inspections that they disagree with the findings as it shows an unwillingness to improve.

At the same time, audit firms receiving a deficient inspection report will likely suffer from reputation loss. Indeed, since PCAOB inspection reports do not disclose the specific name of the inspected engagement for the engagement deficiencies, clients are not likely to perceive the news of the inspection reports an isolated incident to a specific client of the audit firm. As a result, it may be difficult for audit firms to pass on increased costs to their clients. For example, prior research shows that an audit firm experiences economic losses, including lower fees, after incurring damage to their reputation (Davis and Simon 1992; Boone et al. 2015). Instead of choosing to increase the audit effort and pay higher audit fees, audit committees of the clients may still be focused on negotiating for the lowest fee and make full use of the reputation damage caused by a deficient report, especially in the small audit firm market. Audit firms not contesting the deficiencies identified by the PCAOB are arguably more likely to increase audit effort to address the identified deficiencies. However, it remains unclear whether

they will be able to pass these higher costs to their clients because of reputation loss. Hence, this is an empirical question and we therefore formulate our hypothesis in the null form:

H2b: *There is no difference in audit fees for clients of triennially inspected deficient audit firms not contesting the PCAOB findings in the post-inspection period, compared to the pre-inspection period.*

The predictions for audit firms disagreeing with the PCAOB findings are likely more clear. In particular, it would seem very difficult, if not impossible, for this type of audit firms to charge higher audit fees because of loss of reputation in combination with a low likelihood that they will increase effort on individual engagements. Since these audit firms are unlikely to change behavior, we expect that this will be reflected in lower audit fees. Hence, we hypothesize that:

H2c: *Clients of triennially inspected deficient audit firms disagreeing with the PCAOB findings are associated with a decrease in audit fees in the post-inspection period, compared to the pre-inspection period.*

The same reasoning applies to audit firms which did not successfully address quality control deficiencies. As we discussed earlier, QCDs are identified at the firm level and are arguably even more likely to represent audit quality since the quality control system can be considered as the foundation for the way audits are performed within the firm. Thus, it is possible that audit fees increase for auditors who initially have QCDs identified during the inspections while not publically disclosed later, as the firm established and implemented the quality control upgrades that were agreed upon as part of its settlement with the PCAOB, and managed to pass along these higher costs to its clients. But it still remains an empirical question whether clients would accept this approach in a highly competitive market. Boone et al. (2015) find that the public disclosure of QCDs for Deloitte caused reputation damage and a decrease in Deloitte's audit fee growth rates. We argue this could also apply to small audit firms with QCDs. Indeed, the public disclosure of QCDs arguably causes reputation damage and is likely also a signal of unwillingness to improve audit quality. As a result, audit fees are expected to decrease. However, audit firms which addressed the QCDs are likely to have a convincing argument to increase audit fees. Similarly, clean audit firms are also likely facing some increased costs, though presumable to a smaller extent than firms with QCDs. Similar to our reasoning for H2a, we expect that clean audit firms are likely to be able to pass the increased costs to their clients since they received a positive signal about their reputation. This leads to the following set of hypotheses:

H3a: *Clients of triennially inspected audit firms without identified quality control deficiencies are associated with an increase in audit fees in the post-inspection period, compared to the pre-inspection period.*

H3b: *Clients of triennially inspected audit firms with identified quality control deficiencies which are addressed within one year are associated with an increase in audit fees in the post-inspection period, compared to the pre-inspection period.*

H3c: *Clients of triennially inspected audit firms with disclosed quality control deficiencies are associated with a decrease in audit fees in the post-inspection period, compared to the pre-inspection period.*

Finally, we examine the impact of inspections on audit fees over time. As discussed earlier, inspections are expected to result in increased costs. First, engagement costs are expected to increase to comply with PCAOB standards (e.g., documentation requirements). Second, audit firms will likely need to invest in their internal quality control system to meet PCAOB standards. While the increase in engagements costs is arguably structural in nature, these costs may not necessarily further increase after each inspection round unless the PCAOB becomes stricter with each inspection round resulting in higher compliance costs over time. Furthermore, the investments in the internal quality control system are not expected to further increase over time once an appropriate system is in place. Overall, this would imply that the impact of inspections on audit fees decreases over time. Hence, we hypothesize that:

H4: *The magnitude of change in audit fees from pre- to post inspection decrease over time.*

3.4 Research design

3.4.1 Sample selection

The sample selection is based on the first three rounds of inspection on the US audit firms that are inspected on a triennial basis (<100 registrant clients). We include all available inspection reports on the PCAOB website as of December 2014. The inspected audit firms are matched with their respective audit clients in Audit-Analytics and financial information is retrieved from Compustat for the years 2003 through 2015. The final sample consist of the observations contained in the intersection of these three data sources.[10]

[10] As Audit-Analytics neither contains all inspected audit firms nor the full set of an audit firm's clients, it is not possible to match the inspected audit firms with all their clients. Furthermore, information is incomplete for certain client observations due to missing data or missing identifiers for matching the different databases. Because of these reasons, a number of inspection reports are excluded from the analysis.

To test our first hypothesis, only observations before the first inspection are included. Table 3.1, Panel A provides detailed information about our sample selection procedure. We start with 761 PCAOB inspection reports relating to all the first time inspected audit firms and merge them with AuditAnalytics to get the clients sample. Next, we obtain all the client financial information from Compustat and exclude all the observations that have missing values for calculating the variables in our model. After that, we delete client observations with a financial year-end after the first inspection and the observations belonging to the financial institutions (SIC codes 6000–6700) or utilities (SIC codes 4000–4900). This gives us a sample with 5050 client-year observations for 1825 clients and 418 audit firms. Table 3.1, Panel B displays the composition of the sample for testing our second and third hypotheses. We start again with 761 inspection reports for the first round, and further identity 537 inspection reports for the second round and 373 for the third round. We exclude the audit firms that do not have data available in AuditAnalytics. This gives us a sample of 666 audit firms with 9,639 clients for the first inspection, 485 audit firms with 8,789 clients for the second inspection and 344 audit firms with 7,723 clients for the third inspection. Next, we retrieve the financial data from Compustat and exclude all observations with missing values for variables in our empirical model. This yields a sample of 505 audit firms with 3,282 clients for the first round, 400 audit firms with 3,087 clients for the second round and 288 audit firms with 2,770 clients for the third round. In addition, for each round of inspection, we exclude the client-year observations that have a financial year-end before the previous round and after the next round.[11] Moreover, we exclude observations classified as financial institutions (SIC codes 6000–6700) or utilities (SIC codes 4000–4900). To ensure proper representation of client firms in all time periods, only auditor-client combinations that have at least one financial year-end before and after the inspection are included in the samples for testing our other hypotheses. This yields a final sample of 5,020 client-year observations for 1083 clients and 325 audit firms for the first round inspection; 3,908 client-year observations for 931 clients and 259 audit firms for the second round inspection; and 3,118 client-year observations for 759 clients and 175 audit firms for the third round inspection. In addition, we constructed a constant sample with only clients that do not switch audit firm from at least one year before the publication of the first inspection report to one year after the publication of the third round inspection report to test our fourth hypothesis. This sample consists of 2,597 client-year observations for 275 clients and 115 audit firms.

For each inspection report, we manually code the type of the report as “DEF” or “CLEAN”, depending on whether any engagement specific deficiency is disclosed in Part I of the PCAOB inspection report. If the audit firms state that they disagree or they do not fully agree with the PCAOB findings, they were coded as “DISAGREE”. Alternatively, if they do not disagree, they were coded as “OTHER”. We further manually code the inspection reports as “NON-QCD” if no quality control deficiency is identified during the inspection, “QCD” if any quality control deficiency is identified, “QCD-D” if any quality control deficiency is

[11] For example, for the second inspection sample, we excluded all the observations that have a fiscal-year end before the publication of the first inspection and after the publication of the third round inspection.

identified and disclosed later, "QCD-ND" if any quality control deficiency is identified but not disclosed.[12] We also create a variable "POST" to indicate whether the observation belongs to the period before or after the publication of the inspection reports.

Table 3.1: Sample selection procedure

Panel A: Sample for H1

Number of Audit firms (number of clients)	**Pre-first inspection**
Originally from PCAOB website	761
-without data from AuditAnalytics	666 (9639)
-without data from Compustat	578 (4131)
-missing values for variables used in the model	505 (3282)
-observations with year-end after the first inspection	444 (2003)
-SIC 6000-6700 and SIC4000-4900	418 (1825)

Panel B: Samples for H2 and H3

Number of Audit firms (number of clients)	**First inspection**	**Second inspection**	**Third inspection**
Originally from PCAOB website	761	537	373
-without data from AuditAnalytics	666 (9639)	485 (8789)	344 (7723)
-without data from Compustat	578 (4131)	450 (3893)	329 (3513)
-missing values for variables used in the model	505 (3282)	400 (3087)	288 (2770)
-observations with year-end after the next inspection and before previous inspection	487 (2603)	369 (2193)	252 (1739)
-SIC 6000-6700 and SIC4000-4900	465 (2383)	358 (2045)	242 (1640)
-observations without at least one fiscal year before and one fiscal year after the inspection	325 (1083)	259 (931)	175 (759)

[12] If audit firms have quality control deficiencies identified during the inspection reports, the PCAOB will state in Part II of the inspection report "Any defects in, or criticisms of, the Firm's quality control system are discussed in the nonpublic portion of this report and will remain nonpublic unless the Firm fails to address them to the Board's satisfaction within 12 months of the date of this report". If the audit firm does not have any quality control deficiency identified, the PCAOB will state in part II of the inspection report: "The inspection team did not identify anything that it considered to be a quality control defect that warrants discussion in a Board inspection report".

3.4.2 Empirical models

We start our analyses with a benchmark model in the pre-inspection period to examine whether audit fees are different conditional on the ex-post PCAOB inspection outcomes. Following Francis et al. (2005) and Hay et al. (2006), we use the following audit fee model using ordinary least squares regression:

$$\begin{aligned} LAF_{it} = {} & \alpha_0 + \alpha_1 CLEAN/NON\text{-}QCD + \alpha_2 LOGASSETS_{it} + \alpha_3 LEVERAGE_{it} + \alpha_4 INVERE_{it} + \alpha_5 ROA_{it} \\ & + \alpha_6 LOSS_{it} + \alpha_7 FOREIGN_{it} + \alpha_8 BUSY_{it} + \alpha_9 OPINION_{it} + \alpha_{10} LOGSEG_{it} + \alpha_{11} SHORT_{it} \\ & + \alpha_{12} LOGAVG\_ASSET + \alpha_{12} LOGTOTAL\_FEE + \text{Year fixed effects} \\ & + \text{Industry fixed effects} + \delta \quad (3.1) \end{aligned}$$

Where LAF is measured as the natural logarithm of audit fees (measured in US dollars) as reported in AuditAnalytics. CLEAN/NON-QCD is our variable of interest. CLEAN/NON-QCD is an indicator variable and is equal to 1 for clients of audit firms without any deficiencies identified in Part I/Part II of the inspection reports. If audit fees were already higher before the inspection for clients of auditors without Part I/Part II deficiencies, the coefficient on CLEAN/NON-QCD will be positive. We include LOGASSETS, the natural logarithm of total assets (measured in US dollars) to control for size. To account for client risk, we include LEVERAGE, the sum of the company's current and long term debt divided by total assets, and INVERE, the sum of inventories and receivables scaled by total assets. We expect both of them to be positively related to audit fees as they indicate higher audit risk. We include client performance variables ROA, measured as net income divided by total assets, and LOSS, a dummy variable for a loss in the current year. As less profitable companies exhibit more financial risk, we expect audit fees to decrease with ROA and to increase with LOSS. Client complexity is measured by LOGSEG, the natural logarithm of the number of business segments reported and we expect it to be positively related to audit fees. Additional dummy variables include OPINION, FOREIGN, and BUSY, where OPINION equals one when a going-concern opinion is issued, FOREIGN equals one whenever foreign income is earned, and BUSY is set to one for audits where the financial year-end is in December. We expect all of them to be positively associated with audit fees. SHORTTENURE is one in the first year of the auditor-client relationship to account for possible low-balling. Finally, we also add two variables LOGAVG_ASSET and LOGTOTAL_FEE to control for audit firm size, calculated as the natural logarithm of the average client size of the audit firm and the natural logarithm of the total fee collected by the audit firm, respectively. These two variables are measured at audit firm level, while all other control variables are measured at client company level. Additionally, we also control for industry fixed effects for which we use the two digit SIC code and year fixed effects. All the variables are winsorized at the 5 and 95 percent.[13] The descriptions of all variables used in the empirical analyses are included in Appendix 2.

[13] We winsorize our data at the 5 and 95 percent to make sure that most of the continuous variables remain in the range of three standard deviations from the means.

To test hypotheses H2a, H2b and H2c, we use three variables of interest: CLEAN, OTHER and POST replacing the variable CLEAN/NON-QCD in Model 3.1. POST is an indicator variable and is equal to 1 for the fiscal years after the publication of the inspection results. CLEAN and OTHER are equal to 1 for clients with clean Part I auditors and clients with deficient auditors who do not state disagreement with the PCAOB Part I findings, respectively. For the second and third inspection rounds, we also control for the previous round Part I inspection report findings, and in particular whether the previous inspection report was deficient or not. We interact CLEAN and OTHER with POST to see the audit fee change from pre-inspection to post-inspection conditional on the Part I inspection findings.[14] To test hypotheses H3a, H3b, and H3c, we use the following three variables of interest: NON-QCD, QCD_ND and POST, which replace again the variable CLEAN/NON-QCD in Model 3.1. NON-QCD and QCD_ND are equal to 1 for clients with auditors who do not have any quality control deficiencies identified and clients with auditors who have quality control deficiencies identified but not disclosed.[15] For the second and third inspection rounds, we also control for the previous round Part II inspection report findings, and in particular whether the previous inspection report had QCDs or not. We interact these two variables with POST to analyse the fee change from pre- to post-inspection, conditional on the PCAOB Part II findings.[16] The regression models look as follows:

$$\begin{gathered}\mathrm{LAF_{it}}=\alpha_0+\alpha_1\mathrm{CLEAN}+\alpha_2\mathrm{POST}+\alpha_3\mathrm{CLEAN}*\mathrm{POST}+\alpha_4\mathrm{OTHER}\\+\alpha_5\mathrm{OTHER}*\mathrm{POST}+\alpha_6\mathrm{LOGASSETS_{it}}+\alpha_7\mathrm{LEVERAGE_{it}}+\alpha_8\mathrm{INVERE_{it}}+\alpha_9\mathrm{ROA_{it}}\\+\alpha_{10}\mathrm{LOSS_{it}}+\alpha_{11}\mathrm{FOREIGN_{it}}+\alpha_{12}\mathrm{BUSY_{it}}+\alpha_{13}\mathrm{OPINION_{it}}+\alpha_{14}\mathrm{LOGSEG_{it}}+\alpha_{15}\mathrm{SHORT_{it}}\\+\alpha_{16}\mathrm{LOGAVG\_ASSET}+\alpha_{17}\mathrm{LOGTOTAL\_FEE}+\text{Year fixed effects}\\+\text{Industry fixed effects}+\delta\quad(3.2)\end{gathered}$$

$$\begin{gathered}\mathrm{LAF_{it}}=\alpha_0+\alpha_1\mathrm{NON\_QCD}+\alpha_2\mathrm{POST}+\alpha_3\mathrm{NON\_QCD}*\mathrm{POST}+\alpha_4\mathrm{QCD\_ND}\\+\alpha_5\mathrm{QCD\_ND}*\mathrm{POST}+\alpha_6\mathrm{LOGASSETS_{it}}+\alpha_7\mathrm{LEVERAGE_{it}}+\alpha_8\mathrm{INVERE_{it}}+\alpha_9\mathrm{ROA_{it}}\\+\alpha_{10}\mathrm{LOSS_{it}}+\alpha_{11}\mathrm{FOREIGN_{it}}+\alpha_{12}\mathrm{BUSY_{it}}+\alpha_{13}\mathrm{OPINION_{it}}+\alpha_{14}\mathrm{LOGSEG_{it}}+\alpha_{15}\mathrm{SHORT_{it}}\\+\alpha_{16}\mathrm{LOGAVG\_ASSET}+\alpha_{17}\mathrm{LOGTOTAL\_FEE}+\text{Year fixed effects}\\+\text{Industry fixed effects}+\delta\quad(3.3)\end{gathered}$$

In order to compare the change of audit fees across the three inspection rounds, we construct a constant sample with only clients that do not switch audit firm from at least one year before the publication of the first inspection report to one year after the publication of the third round inspection report to test our fourth hypothesis. To conduct our empirical tests, we

[14] Clients with audit firms disagreeing the PCAOB Part I findings are used as control group.

[15] The PCAOB (2003) stated that "Deficiencies in individual audit, attest, review, and compilation engagements do not, in and of themselves, indicate that the firm's system of quality control is insufficient to provide it with reasonable assurance that its personnel comply with applicable professional standards." However, we find that quality control deficiency and engagement level deficiency are highly correlated in our sample. As a result, we do not include quality control deficiencies as control variables in our analysis on engagement deficiencies and vice versa.

[16] Clients of auditors with disclosed quality control deficiencies are used as control group.

first define three dummy variables as our variables of interest for three inspection rounds: Period1, Period2 and Period3. Period1 (Period2/Period3) takes a value of one if the observation belongs to the period after the publication date of the first (second/third) round inspection reports and before the publication of the second round inspection reports (third/after the publication of the third round inspection reports), zero otherwise. We also excluded the auditor-client combinations that do not have at least one observation in each period of time. Then we rerun our analysis using Model 3.1 replacing the variable CLEAN/NON-QCD with Period1, Period2 and Period3. The empirical model looks as follows:

$$\begin{gathered}\mathrm{LAF_{it}}=\alpha_0+\alpha_1\mathrm{Period1}+\alpha_2\mathrm{Period2}+\alpha_3\mathrm{Period3}+\alpha_4\mathrm{LOGASSETS_{it}}+\alpha_5\mathrm{LEVERAGE_{it}}\\+\alpha_6\mathrm{INVERE_{it}}+\alpha_7\mathrm{ROA_{it}}+\alpha_8\mathrm{LOSS_{it}}+\alpha_9\mathrm{FOREIGN_{it}}+\alpha_{10}\mathrm{BUSY_{it}}+\alpha_{11}\mathrm{OPINION_{it}}\\+\alpha_{12}\mathrm{LOGSEG_{it}}+\alpha_{13}\mathrm{SHORT_{it}}+\alpha_{14}\mathrm{LOGAVG\_ASSET}+\alpha_{15}\mathrm{LOGTOTAL\_FEE}+\mathrm{Year\ fixed\ effects}\\+\mathrm{Industry\ fixed\ effects}+\delta \quad (3.4)\end{gathered}$$

3.5 Empirical results

3.5.1 Descriptive statistics

Table 3.2, Panel A describes the report type related characteristics for both the inspection reports and the client companies in the pre-inspection sample used for testing our first hypothesis. Out of the 418 audit firms, 269 (64 percent) have Part I deficiencies and 324 (78 percent) have Part II deficiencies. For the 1,825 clients included in the sample, 1429 (78 percent) and 1517 (83 percent) have Part I and Part II deficiencies, respectively.

The remaining panels in Table 3.2 give the same type of information for the samples used to testing our second and third hypotheses. Panel B and Panel C provide an overview of Part I and Part II inspection results for the audit firms, respectively. The total sample includes 325 first round inspection reports, 259 second round inspection reports and 175 third round inspection reports. Out of the 325 first round reports, 208 (64 percent) have PCAOB identified deficiencies and among them 49 (15 percent) stated disagreement with the PCAOB, while out of the 259 second round reports, only 115 (44 percent) have deficiencies and among them 24 stated disagreement with the PCAOB. For the third inspection round, 93 (53 percent) out of the 175 inspection reports have deficiencies and among them 13 (7 percent) stated disagreement with the PCAOB. Hence, there appears to be a clear indication of improvement after the second inspection round, as only 36 percent of the reports are clean in the first round while the proportion increases to 56 percent in the second. However, this rate drops again to 47 percent after the third round. Turning to the Part II inspection findings, 47 (14 percent) of the first round inspected firms, 28 (11 percent) of the second round inspected firms and 18 (10 percent) of the third round inspected firms have disclosed quality control deficiencies (QCD). The number of audit firms with QCD identified but not disclosed because the PCAOB considers that they were satisfactorily addressed within a one year period is 200 (62 percent), 123 (48 percent) and 102 (58 percent) for the first three rounds of inspections, respectively.

Table 3.2, Panel D and Panel E provide the report related statistics of the client companies in the sample. For the first inspection round, there are in total 1,143 client companies included. 239 (21 percent) of them are audited by audit firms receiving a deficiency report and indicating a disagreement with the PCAOB, while 579 (51 percent) are audited by audit firms receiving a deficiency report without indicated disagreement. 115 (10 percent) client companies have audit firms with disclosed QCDs, while 847 (74 percent) are audited by firms with QCDs identified but not disclosed. Out of the 968 client companies for the second inspection round, 114 of them (12 percent) are audited by audit firms receiving a deficiency report and stating a disagreement with the PCAOB and 376 (39 percent) are audited by audit firms receiving a deficiency report without indicated disagreement. Regarding the Part II findings, 86 (9 percent) have auditors with disclosed QCDs and 552 (57 percent) have auditors with remediated QCDs. Turning to the third inspection round, the sample has 771 clients included, of which 72 (9 percent) are audited by audit firms receiving a deficiency report and stating a disagreement with the PCAOB, and 430 (56 percent) are audited by audit firms receiving a deficiency report without indicated disagreement. The number of clients with disclosed QCDs is 67 (9 percent) and the number of clients with no QCDs identified is 171 (22 percent). A comparison of the first and the second inspection round indicates a significant improvement in the Part I inspection results, as in the first round only 28 percent of the companies are audited by clean audit firms while this percentage increased to 49 percent for the second inspection round. However, the percentage of clients audited by clean firms falls to 35 percent again for the third inspection round.

Table 3.2: Report related statistics

Panel A: Auditor and client characteristics for H1

	Auditor characteristics		Client characteristics	
	N	Percentage	N	Percentage
DISAGREE	269	64.35	1429	78.30
CLEAN	149	35.65	396	21.70
Total	418	100	1825	100
QCD	324	77.51	1517	83.12
NON-QCD	94	22.49	308	16.88
Total	418	100	1825	100

Panel B: Auditor characteristics with Part I findings for H2 and H3

	First-round		*Second-round*		*Third-round*	
	N	Percentage	N	Percentage	N	Percentage
DISAGREE	49	15.08	24	9.27	13	7.43
OTHER	159	48.92	91	35.13	80	45.71
CLEAN	117	36	144	55.6	82	46.86
Total	325	100	259	100	175	100

Table 3.2 continued

Panel C: Auditor characteristics with Part II findings for H2 and H3

	First-round		*Second-round*		*Third-round*	
	N	Percentage	N	Percentage	N	Percentage
QCD_D	47	14.46	28	10.81	18	10.29
QCD_ND	200	61.54	123	47.5	102	58.29
NON-QCD	78	24	108	41.69	55	31.42
Total	325	100	259	100	175	100

Panel D: Client characteristics with Part I findings for H2 and H3

	First-round		*Second-round*		*Third-round*	
	N	Percentage	N	Percentage	N	Percentage
DISAGREE	239	20.91	114	11.78	72	9.34
OTHER	579	50.66	376	38.84	430	55.77
CLEAN	325	28.43	478	49.38	269	34.89
Total	1143	100	968	100	771	100

Table 3.2 continued

Panel E: Clientcharacteristics with Part II findings for H2 and H3

	First-round		*Second-round*		*Third-round*	
	N	Percentage	N	Percentage	N	Percentage
QCD_D	115	10.06	86	8.88	67	8.69
QCD_ND	847	74.1	552	57.02	533	69.13
NON-QCD	181	15.84	330	34.1	171	22.18
Total	1143	100	968	100	771	100

Table 3.3 presents descriptive statistics for our samples. For illustration and brevity reasons, we only describe the descriptives included in Panel A relating to pre-inspection sample used for testing H1. Audit fees paid by the clients range from $10,000 to $415,048 with a mean of $101,562. The average client in the period has total assets of around $28.5 million with inventory and receivables representing 26 percent of that amount. Average leverage is 2.162 and the mean return on assets is -1.700. The average client reports 1.5 business segments. Overall, 67 percent of the observations are loss-making, 36 percent receive going-concern opinions and 9 percent report foreign income. Also, 64 percent of the audits are conducted during busy season and 21 percent are first year new clients.

Table 3.3: Descriptive statistics

Panel A: Pre-inspection sample for H1

Variables	N	Mean	Median	SD	Min	Max
AUDITFEE	5,050	101,562	65,000	101,482	10,000	415,048
ASSETS	5,050	28,480,000	8,615,000	47,910,000	57,000	212,6000,000
LEVERAGE	5,050	2.162	0.527	4.670	0.0517	20.30
INVERE	5,050	0.255	0.195	0.238	0	0.728
ROA	5,050	-1.700	-0.166	3.875	-15.88	0.236
LOSS	5,050	0.665	1.00	0.472	0.00	1.00
OPINION	5,050	0.361	0.00	0.480	0.00	1.00
FOREIGN	5,050	0.085	0.00	0.279	0.00	1.00
BUSY	5,050	0.641	1.00	0.480	0.00	1.00
SEGMENT	5,050	1.531	1.00	1.123	0.00	11.00
SHORT	5,050	0.210	0.00	0.410	0.00	1.00
TOTAL_FEE	5,050	2,772,000	1,194,000	3,565,000	91,900	13,970,000
AVG_ASSET	5,050	70,800,000	20,890,000	129,200,000	1,019,000	558,5000,000

Panel B: First round inspection sample for H2 and H3

Variables	N	Mean	Median	SD	Min	Max
AUDITFEE	5,020	122,562	81,810	110,816	10,000	415,048
ASSETS	5,020	36,730,000	12,750,000	54,980,000	57,000	212,600,000
LEVERAGE	5,020	1.775	0.432	4.199	0.0517	20.30
INVERE	5,020	0.253	0.194	0.232	0.00	0.728
ROA	5,020	-1.289	-0.0992	3.370	-15.88	0.236
LOSS	5,020	0.624	1.00	0.484	0.00	1.00
OPINION	5,020	0.309	0.00	0.462	0.00	1.00
FOREIGN	5,020	0.116	0.00	0.320	0.00	1.00
BUSY	5,020	0.642	1.00	0.480	0.00	1.00
SEGMENT	5,020	1.607	1.00	1.300	0.00	11.00
SHORT	5,020	0.133	0.00	0.339	0.00	1.00
TOTAL_FEE	5,020	3,212,000	1,503,000	3,864,000	91,751	13,970,000
AVG_ASSET	5,020	90,220,000	31,530,000	142,400,000	1,019,000	558,500,000

Table 3.3 Continued

Panel C: Second round inspection sample for H2 and H3						
AUDITFEE	3,908	142,070	103,629	118,893	10,000	426,000
ASSETS	3,908	43,650,000	16,220,000	61,590,000	62,000	216,800,000
LEVERAGE	3,908	1.977	0.416	4.535	0.0511	19.40
INVERE	3,908	0.250	0.187	0.230	0.00	0.728
ROA	3,908	-1.424	-0.103	3.543	-15.11	0.235
LOSS	3,908	0.623	1.00	0.485	0.00	1.00
OPINION	3,908	0.301	0.00	0.459	0.00	1.00
FOREIGN	3,908	0.144	0.00	0.351	0.00	1.00
BUSY	3,908	0.622	1.00	0.485	0.00	1.00
SEGMENT	3,908	1.600	1.00	1.271	0.00	10.00
SHORT	3,908	0.0693	0.00	0.254	0.00	1.00
TOTAL_FEE	3,908	3,465,000	1,771,000	3,921,000	100,622	14,320,000
AVG_ASSET	3,908	114,300,000	47,840,000	162,600,000	1,012,000	584,200,000
Panel D: Third round inspection sample for H2 and H3						
AUDITFEE	3,118	150,547	117,473	118,465	11,000	432,136
ASSETS	3,118	45,210,000	17,050,000	63,710,000	69,000	219,900,000
LEVERAGE	3,118	1.861	0.41	4.235	0.0493	18.49
INVERE	3,118	0.247	0.187	0.23	0.00	0.719
ROA	3,118	-1.378	-0.125	3.342	-14.5	0.238
LOSS	3,118	0.639	1.00	0.48	0.00	1.00
OPINION	3,118	0.296	0.00	0.456	0.00	1.00
FOREIGN	3,118	0.158	0.00	0.365	0.00	1.00
BUSY	3,118	0.637	1.00	0.481	0.00	1.00
SEGMENT	3,118	1.581	1.00	1.28	0.00	10.00
SHORT	3,118	0.0712	0.00	0.257	0.00	1.00
TOTAL_FEE	3,118	4,411,000	2,038,000	4,597,000	114,056	14,490,000
AVG_ASSET	3,118	138,100,000	66,540,000	178,900,000	1,229,000	600,900,000
Panel E: Constant sample for H4						
AUDITFEE	2,597	161,334	112,000	137,461	22,950	521,000
ASSETS	2,597	60,800,000	22,470,000	89,900,000	270,000	341,600,000
LEVERAGE	2,597	1.069	0.345	2.169	0.0502	9.339
INVERE	2,597	0.263	0.209	0.227	0	0.718
ROA	2,597	-0.557	-0.0105	1.467	-6.316	0.238
LOSS	2,597	0.517	1.000	0.500	0.000	1.000

Table 3.3 continued

OPINION	2,597	0.194	0.000	0.396	0.000	1.000
FOREIGN	2,597	0.186	0.000	0.389	0.000	1.000
BUSY	2,597	0.603	1.000	0.489	0.000	1.000
SEGMENT	2,597	1.615	1.000	1.286	0.000	10.000
TOTAL_FEE	2,597	4,345,000	2,061,000	4,665,000	105,310	14,840,000
AVG_ASSET	2,597	153,700,000	69,980,000	207,900,000	2,461,000	721,600,000

All continuous variables have been winsorized at the 5th and 95th percentile.
All variables definitions can be found in Appendix 2.

3.5.2 Univariate results

Table 3.4 provides the univariate analyses for our dependent variables for all the samples based on t-tests. The results in Panel A suggest that the average fees are higher for clients of audit firms without any Part I/ Part II deficiencies, providing some initial evidence to support our H1. From Panel B it appears that audit fees increase significantly after the first inspection, irrespective of the inspection findings and the audit firms' responses to those findings. However, after the second inspection, audit fees do not significantly increase anymore for clients of auditors without clean Part I findings and clients of auditors who have disclosed quality control deficiencies. After the third inspection round, the only group of clients with significant audit fee increases are those without any quality control deficiencies. Overall, these findings partly confirm our expectations. Panel C shows the results for the constant sample for testing our last hypothesis. The results indicate that audit fee increases are significant after the first and second inspection but are not significant anymore after the third inspection, consistent with our H4. In the next section, we use multivariate analyses to test our hypotheses by also incorporating the control variables that influence audit fees.

Table 3.4: Univariate analysis

Panel A: Pre-inspection sample for H1

Log_audit_fee	DEF	CLEAN	Diff	QCD	NON-QCD	Diff
	11.000	11.321	0.321***	11.064	11.179	0.115***

Panel B: Pre-inspection sample for H2 and H3

	First inspection			Second inspection			Third inspection		
Log_audit_fee	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff
DISAGREE	11.065	11.371	0.306***	11.069	11.137	0.068	11.255	11.390	0.135
OTHER	11.147	11.369	0.222***	11.331	11.388	0.057	11.636	11.657	0.201
CLEAN	11.414	11.583	0.168***	11.575	11.672	0.097***	11.498	11.551	0.053
QCD-D	10.521	10.698	0.177**	10.502	10.617	0.115	11.484	11.311	-0.173
QCD-ND	11.273	11.493	0.220***	11.500	11.580	0.080**	11.582	11.625	0.043
NON-QCD	11.253	11.600	0.374***	11.501	11.610	0.109***	11.486	11.572	0.086*

Panel C: Constant sample for H4 testing

Log_audit_fee	Pre-inspection(1)	Period1(2)	Period2(3)	Period3(4)	(2)- (1)	(3)- (2)	(4)- (3)
	11.369	11.670	11.806	11.748	0.301***	0.136***	-0.058

* p<.1, ** p<0.05, *** p<0.01, based on two tailed test.
All continuous variables have been winsorized at the 5th and 95th percentile.
All variables definitions can be found in Appendix 2.

3.5.3 Multivariate results

In Table 3.5, the first column shows the regression results of the benchmark model to test our first hypothesis regarding the Part I inspection findings. The regressions contain 5,050 observations and yield an R2 of 58 percent. CLEAN has a positive coefficient (0.172, p<0.01) indicating that the average fees are higher for companies with clean auditors before the first inspection compared to companies with deficient Part I findings. Similarly, the second column reports the regression results based on the Part II inspection findings and the coefficient on NON-QCD is also significant positive (0.151, p<0.01), suggesting that audit fees are also higher for companies without any quality control deficiencies. These findings provide support for our first hypothesis.

Table 3.5: Pre-inspection audit fee analysis

Log_audit_fee	Part I findings	Part II findings
CLEAN	0.172***	
	(7.673)	
NON-QCD		0.151***
		(5.017)
LOGASSETS	0.328***	0.328***
	(44.25)	(43.60)
LEVERAGE	0.0145***	0.0145***
	(4.471)	(4.244)
INVERE	0.248***	0.257***
	(5.706)	(5.699)
ROA	-0.0303***	-0.0303***
	(-7.455)	(-7.055)
LOSS	0.203***	0.206***
	(9.118)	(8.936)
FOREIGN	0.197***	0.203***
	(5.629)	(5.449)
BUSY	0.113***	0.112***
	(5.835)	(5.738)
OPINION	0.157***	0.157***
	(6.962)	(6.343)
LOGSEG	0.0460***	0.0449***
	(5.838)	(5.961)
SHORT	-0.0154	-0.0105
	(-0.689)	(-0.453)
LOGAVG_ASSET	0.0622***	0.0715***
	(7.771)	(8.863)
LOGTOTAL_FEE	0.0977***	0.0929***
	(13.12)	(12.23)
Constant	3.110***	3.017***
	(15.06)	(15.50)
Observations	5,050	5,050
R-squared	0.580	0.577
Fixed effects	Year/industry	Year/industry
R2 adjusted	0.573	0.571

* p<.1, ** p<0.05, *** p<0.01, based on two tailed test.

Table 3.6 presents the results of the regression analysis used to test hypotheses H2a, H2b, and H2c. The coefficients on POST are all positive but only significant for the second round inspection (0.096, p<0.10), providing no support for H2c.[17] The coefficient on CLEAN is positive for the first round inspections, which provides additional support to our first hypothesis. However, the coefficients on the interaction terms between POST and CLEAN are all insignificant. Moreover, the F-test on the total effect of CLEAN (i.e. Total effect CLEAN) shows that the change in audit fees from pre- to post- inspection for clean auditors does not change significantly which rejects H2a. For testing H2b, interestingly, the coefficients on OTHER are significantly positive for the first and second inspection round, suggesting that audit fees are higher for clients of audit firms who do not contest the identified Part I deficiencies compared to clients of audit firms who disagree with the Part I findings before the inspections. However, the coefficients on the interaction term between POST and OTHER are all insignificant. We further use the F-test to examine the total effect of OTHER (i.e. Total effect OTHER) on the audit fees from pre- and post- inspection, which is also not significant. All the control variables have the expected signs. In summary, we conclude that the impact of the publication of Part I findings on the change of audit fees is very limited. A possible explanation is that Part I deficiencies are viewed as individual engagement related and they have limited impact on the average fees for all clients. Since the PCAOB does not disclose the names of the inspected engagements, we are not able to observe what effect the inspection can have on these deficient engagements.

Table 3.6: Regression results with Part I findings

Log_audit_fee	First inspection	Second inspection	Third inspection
POST	0.056	0.096*	0.020
	(1.532)	(1.659)	(0.324)
CLEAN	0.190***	0.277***	-0.036
	(5.968)	(7.060)	(-0.811)
POST*CLEAN	-0.004	-0.061	0.018
	(-0.077)	(-1.011)	(0.279)
OTHER	0.149***	0.092**	-0.067
	(5.442)	(2.229)	(-1.559)
POST*OTHER	-0.024	-0.091	0.024

[17] The coefficients on POST here present the changes in audit fees from pre- to post-inspections for clients of auditors who disagree with the PCAOB Part I findings.

Table 3.6 continued

	(-0.586)	(-1.431)	(0.379)
FIRST_DEF		-0.124***	
		(-6.282)	
SECOND_DEF			-0.146***
			(-7.605)
LOGASSETS	0.348***	0.362***	0.346***
	(48.039)	(45.086)	(42.168)
LEVERAGE	0.026***	0.029***	0.023***
	(6.783)	(7.606)	(5.376)
INVERE	0.221***	0.250***	0.296***
	(5.213)	(5.515)	(6.221)
ROA	-0.025***	-0.024***	-0.023***
	(-5.080)	(-4.767)	(-3.721)
LOSS	0.167***	0.136***	0.064***
	(8.574)	(6.560)	(2.914)
FOREIGN	0.256***	0.238***	0.204***
	(9.297)	(8.782)	(7.804)
BUSY	0.085***	0.036*	0.026
	(4.831)	(1.914)	(1.310)
OPINION	0.173***	0.180***	0.134***
	(7.006)	(6.951)	(5.063)
LOGSEG	0.031***	0.029***	0.007
	(4.670)	(3.608)	(1.068)
SHORT	-0.095***	-0.117***	-0.203***
	(-3.625)	(-2.981)	(-4.661)
LOGAVG_ASSET	0.061***	0.067***	0.042***
	(8.249)	(8.039)	(4.997)
LOGTOTAL_FEE	0.085***	0.096***	0.112***
	(12.686)	(12.601)	(13.501)
Constant	2.798***	2.420***	3.173***
	(12.925)	(11.583)	(7.352)
Observations	5,020	3,908	3,118
R-squared	0.648	0.705	0.735
Fixed effects	Year/industry	Year/industry	Year/industry
R2 adjusted	0.642	0.699	0.729

Table 3.6 continued			
F test Total effect CLEAN	**0.051**	**0.005**	**0.038**
F test Total effect OTHER	**0.032**	**0.005**	**0.044**

* p<.1, ** p<0.05, *** p<0.01, based on two tailed test.
All continuous variables have been winsorized at the 5th and 95th percentile.
All variables definitions can be found in Appendix 2.

Table 3.7 provides the regression results for our hypotheses H3a, H3b, and H3c. The coefficients on POST are insignificant for all three inspection rounds.[18] In other words, audit fees do not change significantly for clients of audit firms with disclosed quality control deficiencies and it does not support our H3c. The coefficients on NON-QCD and QCD-ND are both significantly positive for the first inspection round, suggesting that audit fees are higher before the first/second inspection for clients of audit firms without QCDs and clients of audit firms who remediated the QCDs than for clients of audit firms with disclosed QCDs. These findings further support our first hypothesis that audit fees are different before the inspection, conditional on the inspection outcomes. We continue to use an F-test to test the significance of the total effect by adding up the coefficients on NON-QCD/QCD-ND with the coefficients on the interaction terms. The results (Total effect NON-QCD) suggest that the total effect of NON-QCD on audit fees is significantly positive for both the second and third inspection round. In other words, for clients of audit firms with a clean Part II inspection report, audit fees increase after the publication of the inspection report. Economically, the coefficient is 0.069/0.100 for the second/third inspection, which means that on average audit fees are 7%/11% higher after the second/third inspection for clients of audit firms with a clean Part II inspection report.[19] These findings support our H3a. Similarly, we use an F-test to analyze the total effect of QCD-ND to test our H3b. The results (Total effect QCD_ND) suggest that audit fees only increase after the third inspection round for clients of audit firms who remediated their QCDs, providing limited support for H3b. Economically, the coefficient is 0.049 suggesting that audit fees increase by 5% for clients of audit firms who remediated their QCDs. Collectively, we conclude that PCAOB inspections provide an opportunity for small audit firms to signal their audit quality, especially when no quality control deficiencies are identified.

[18] The coefficients on POST here present the changes in audit fees from pre- to post-inspections for clients of auditors who have disclosed quality control deficiencies.

[19] We calculate the percentages shift in audit fees in the regression model following Simon and Francis (1988) as e^(-0.069)-1 and e^(-0.010)-1. The same methodology is used to calculate the percentage of fee increase in this chapter.

Table 3.7: Regression results with Part II findings

Log_audit_fee	First inspection	Second inspection	Third inspection
POST	-0.045	0.072	0.043
	(-0.796)	(0.878)	(0.584)
NON-QCD	0.220***	0.412***	-0.061
	(4.438)	(7.483)	(-1.325)
POST*NON-QCD	0.116*	-0.003	0.057
	(1.721)	(-0.037)	(0.723)
QCD-ND	0.171***	0.337***	-0.028
	(4.194)	(6.257)	(-0.715)
POST*QCD-ND	0.074	-0.028	0.006
	(1.284)	(-0.339)	(0.086)
FIRST_QCD		-0.101***	
		(-4.054)	
SECOND_QCD			-0.080***
			(-4.166)
LOGASSETS	0.346***	0.360***	0.346***
	(47.608)	(44.875)	(42.021)
LEVERAGE	0.024***	0.029***	0.023***
	(6.320)	(7.613)	(5.429)
INVERE	0.242***	0.250***	0.312***
	(5.740)	(5.458)	(6.518)
ROA	-0.026***	-0.022***	-0.022***
	(-5.324)	(-4.352)	(-3.674)
LOSS	0.173***	0.145***	0.067***
	(8.892)	(7.032)	(3.009)
FOREIGN	0.253***	0.255***	0.202***
	(9.159)	(9.341)	(7.640)
BUSY	0.086***	0.029	0.018
	(4.894)	(1.575)	(0.891)
OPINION	0.176***	0.177***	0.129***
	(7.152)	(6.770)	(4.857)
LOGSEG	0.030***	0.026***	0.005
	(4.521)	(3.307)	(0.734)
SHORT	-0.092***	-0.125***	-0.197***
	(-3.483)	(-3.200)	(-4.534)

Table 3.7 continued

LOGAVG_ASSET	0.060***	0.064***	0.039***
	(8.312)	(7.881)	(4.661)
LOGTOTAL_FEE	0.075***	0.087***	0.113***
	(10.845)	(10.867)	(14.156)
Constant	2.893***	2.465***	3.178***
	(13.496)	(11.646)	(7.295)
Observations	5,020	3,908	3,118
R-squared	0.648	0.703	0.731
Fixed effects	Year/industry	Year/industry	Year/industry
R2 adjusted	0.643	0.697	0.725
F test Total effect NON-QCD	**0.071**	**0.069****	**0.100****
F test Total effect QCD-ND	**0.029**	**0.044**	**0.049***

* p<.1, ** p<0.05, *** p<0.01, based on two tailed test.
All variables definitions can be found in Appendix 2.
All continuous variables have been winsorized at the 5th and 95th percentile.

Table 3.8 presents the OLS regression results for testing H4. The model explains 76 percent of the variance. All the control variables have the expected sign. The coefficients on Period1, Period2 and Period3 are all significantly positive, consistent with our previous findings that audit fees increase after the PCAOB inspections. However, the t-test indicates that there is no significant difference between the coefficient on Period2 and Period3. Overall, the results suggest that for the companies that do not switch auditors, audit fees increase after the first and second inspection round. However, after the third inspection, audit fees do not change significantly compared to the period after the second inspection, suggesting that there is a saturation point after which there is no further incremental increase in audit fees for audit firms which have been subject to multiple inspection rounds. This would be in line with hypothesis 4. Economically, the coefficients suggest that audit fees are 27% (23%/24%) percent higher after the first (second/third) inspection compared to the period before the first round inspection.

Table 3.8: OLS regression with constant sample

Log_audit_fee	
Period1	0.0875*
	(1.862)
Period2	0.209***
	(3.265)
Period3	0.218**
	(2.707)
LOGASSETS	0.373***
	(27.89)
LEVERAGE	0.0303**
	(2.664)
INVERE	0.310***
	(4.592)
ROA	-0.0602**
	(-2.262)
LOSS	0.112**
	(2.528)
FOREIGN	0.296***
	(4.800)
BUSY	0.0221
	(0.528)
OPINION	0.117**
	(2.039)
LOGSEG	0.00642
	(0.591)
LOGAVG_ASSET	0.0152
	(0.761)
LOGTOTAL_FEE	0.0970***
	(3.679)
Constant	3.018***
	(12.10)
Observations	2,597
R-squared	0.766
Fixed effects	Year/industry
R2 adjusted	0.761

* p<.1, ** p<0.05, *** p<0.01, based on two tailed test.

3.6 Additional analyses

3.6.1 Personnel adjustments

To further examine whether the expected change in audit fees is associated with a change in audit effort, we investigate personnel adjustments of audit firms. Specifically, we argue that an observed fee increase of an audit firm is likely to reflect an increase in effort when we also observe an increase in human resources for that audit firm. At the same time, it is less likely that a firm with a deficient inspection hires additional staff due to growth in its revenue (Lennox and Pittman 2010), which is also reflected in our previous results that deficient audit firms have problems in raising their audit fees. In line with this reasoning, we expect that deficient firms are less likely to increase the number of professionals employed by the firm. We examine changes in human resources (the number of CPAs) using the Form2 Data published on the PCAOB website. All PCAOB registered audit firms are required to publish this form which covers a 12-month period from April 1 to March 31 starting in 2010. These reports contain information on the number of CPAs working for the firms. We regress the natural logarithm of the number of CPAs on the indicator variables based on the Part I inspection results and two audit firm level control variables:

$$\text{LOGCPAS}=\alpha_0+\alpha_1\text{CLEAN\#POST}+\alpha_2\text{OTHER\#POST}+\alpha_3\text{LOGTOTAL\_FEE}+\alpha_4\text{LOGAVG\_ASSET}+\text{e} \qquad (3.5)$$

Next, following our previous analysis, we use two variables of interest relating to the Part II inspection findings: NON-QCD and QCD_ND replacing the two variables CLEAN and OTHER in Model 3.5.

Table 3.9 and Table 3.10 present the results for the effect that Part I and Part II inspection findings have on the number of CPAs of the audit firms, respectively. Table 3.9 shows that the number of CPAs does not change significantly after any of the inspection rounds for deficient audit firms who state a disagreement with the PCAOB findings. For deficient audit firms without public disagreement with the PCAOB findings, the number of CPAs only experiences a weak increase after the second round of inspection. At the same time, it appears that the number of CPAs significantly decreases for clean audit firms after the third round of inspections. This provides some evidence that audit firms who do not disagree with the PCAOB Part I findings put more effort to improve by turning to more expensive labor, irrespective of their inability to charge clients for it.

Table 3.10 shows the regression results for how QCDs are associated with the number of CPAs. The findings suggest that the number of CPAs increased after the second inspection round for audit firms which successfully remediated their QCDs. For audit firms who have disclosed QCDs and audit firms without any QCDs, the number of CPAs does not change significantly. Collectively, we find some support to the notion that audit firms who remediated the QCDs increase their effort after the publication of the inspection reports, at least through

personnel adjustment. In combination with our previous findings that audit fee increases are driven by audit firms without QCDs, we conclude that there is evidence of both a reputation and an effort effect after the inspections.

Table 3.9: Regression results with Part I findings

Log(NCPAS)	First inspection	Second inspection	Third inspection
POST	0.108	0.372	-0.105
	(0.463)	(1.423)	(-0.350)
CLEAN	1.360***	0.677***	0.432***
	(5.099)	(3.030)	(2.613)
CLEAN*POST	-0.123	-0.220	-0.118
	(-0.356)	(-0.806)	(-0.395)
OTHER	0.643**	0.324	-0.269
	(2.567)	(1.462)	(-1.619)
OTHER*POST	-0.0309	0.00205	0.0660
	(-0.104)	(0.00738)	(0.212)
LOGSUMFEE	0.339***	0.461***	0.512***
	(5.473)	(13.39)	(17.00)
LOGAVGASSET	0.236***	0.230***	0.158***
	(8.099)	(12.37)	(8.151)
Constant	-6.845***	-7.460***	-6.463***
	(-7.563)	(-14.15)	(-14.12)
Observations	220	862	917
R-squared	0.478	0.418	0.421
Fixed effects	Year	Year	Year
R2 adjusted	0.448	0.410	0.413
F test Total effect CLEAN	**-0.015**	**0.152**	**-0.223***
F test Total effect OTHER	**0.077**	**0.374****	**-0.039**

* p<.1, ** p<0.05, *** p<0.01, based on two tailed test.
All continuous variables have been winsorized at the 5th and 95th percentile.
All variables definitions can be found in Appendix 2.

Table 3.10: Regression results with Part II findings

Log(NCPAS)	First inspection	Second inspection	Third inspection
POST	0.382	0.346	0.043
	(1.057)	(1.456)	(0.160)
NON-QCD	1.488***	0.959***	1.156***
	(4.525)	(4.803)	(6.818)
POST*NON-QCD	-0.561	-0.384	-0.223
	(-1.047)	(-1.478)	(-0.797)
QCD-ND	0.589**	0.683***	0.790***
	(2.342)	(3.661)	(5.076)
POST*QCD-ND	-0.283	-0.0299	-0.035
	(-0.746)	(-0.118)	(-0.130)
LOGSUMFEE	0.339***	0.449***	0.490***
	(4.440)	(12.98)	(16.77)
LOGAVGASSET	0.212***	0.213***	0.147***
	(6.495)	(10.84)	(7.730)
Constant	-6.263***	-7.246***	-6.678***
	(-6.525)	(-14.29)	(-14.72)
Observations	220	862	917
R-squared	0.433	0.426	0.421
Fixed effects	Year	Year	Year
R2 adjusted	0.400	0.418	0.413
F test Total effect NON-QCD	-0.179	-0.038	-0.180
F test Total effect QCD-ND	0.099	0.316*	0.008

* p<.1, ** p<0.05, *** p<0.01, based on two tailed test.
All continuous variables have been winsorized at the 5th and 95th percentile.
All variables definitions can be found in Appendix 2.

3.6.2 Changes in the number of clients

In addition to audit fee changes, we also investigate the clients' reaction from another side, which is the number of clients of the audit firms. Besides the number of CPAs, audit firms also report the number of public clients in the annually published Form 2. We extract the data and use the natural logarithm of the number of public clients as dependent variable instead of the natural logarithm of the number of CPAs and rerun Model 3.5 for Part I and Part II inspection findings. Table 3.11 and 3.12 show the regression results. Table 3.11 shows that the number of clients increases after the first inspection and then decreases after the second inspection for deficient audit firms who disagree with the PCAOB findings. At the same time, there is a weak decrease in the number of clients for audit firms who do not contest the Part I deficiencies after the second inspection round and the number of clients does not change significantly for clean audit firms after any of the three inspections. Turning to Table 3.12, we only find a weak decrease for audit firms without any QCDs. Interestingly, in combination with the previous results in Table 3.9 and 3.10, we find that the number of CPAs is higher and the number of clients is lower for audit firms without any deficiencies identified in Part I or Part II of the inspection reports. In summary, the pattern in our results shows that the increase in audit fees is accompanied by a drop in the number of clients. As a result, certain clients in the small audit firm market seem to prefer lower audit fees rather than better audit quality.

3.6.3 Total audit fee change

As our results suggest that the audit firms without quality control deficiencies lose clients while having an increase in audit fees for the remaining clients, we investigate how the total audit fee collected by audit firms from their public clients change after the publication of the inspection report, conditional on the Part II inspection findings. Table 3.13 displays our results. Using the data from AuditAnalytics, we calculate the natural logarithm of the total audit fees collected by each audit firm per year. We use t-tests to compare the total fees from pre- to post-inspection based on the outcome of the inspection report. The results suggest that total audit fees increase significantly for both auditors with remediated QCDs and auditors without quality control deficiencies after the first round of inspection, while audit fees do not change significantly for auditors with disclosed QCDs. After the second inspection, total audit fees drop significantly for audit firms with disclosed QCD, while total audit fees do not change significantly for both audit firms with remediated QCDs and audit firms without QCDs. After the third inspection, total audit fees do not change significantly for auditors without QCDs and drop significantly for deficient audit firms who do not state disagreement with the deficiencies while there is no significant change for the two other types of audit firms. In summary, the results give some indication that audit firms without QCDs are better off compared to the other two groups of audit firms. This would imply that there is a net benefit of the increase in audit fees despite the loss of public clients.

Table 3.11: Regression results with Part I findings

Log(NCLIENTS)	First inspection	Second inspection	Third inspection
POST	0.456**	-0.308**	0.091
	(2.239)	(-2.092)	(0.779)
CLEAN	-0.438**	-0.350***	-0.067
	(-2.041)	(-2.620)	(-0.968)
CLEAN*POST	-0.317	0.175	-0.182
	(-1.171)	(1.123)	(-1.531)
OTHER	-0.259	-0.130	0.079
	(-1.330)	(-1.003)	(1.191)
OTHER*POST	-0.431*	0.158	-0.134
	(-1.783)	(1.017)	(-1.111)
LOGSUMFEE	0.820***	0.768***	0.777***
	(18.86)	(40.45)	(47.36)
LOGAVGASSET	-0.247***	-0.149***	-0.135***
	(-11.68)	(-13.74)	(-11.62)
Constant	-4.046***	-5.181***	-5.851***
	(-6.976)	(-17.71)	(-23.05)
Observations	220	862	917
R-squared	0.706	0.688	0.737
Fixed effects	Year	Year	Year
R2 adjusted	0.689	0.683	0.734
F test Total effect CLEAN	0.139	-0.133	-0.091
F test Total effect OTHER	0.025	-0.438*	-0.043

* p<.1, ** p<0.05, *** p<0.01, based on two tailed test.
All continuous variables have been winsorized at the 5th and 95th percentile.
All variables definitions can be found in Appendix 2.

Table 3.12: Regression results with Part II findings

Log(NCLIENTS)	First inspection	Second inspection	Third inspection
POST	-0.0170	-0.108	-0.018
	(-0.0609)	(-0.734)	(-0.121)
NON-QCD	-0.550**	-0.582***	-0.410***
	(-2.054)	(-4.071)	(-4.016)
POST*NON-QCD	0.0990	0.0970	-0.132
	(0.278)	(0.594)	(-0.815)
QCD-ND	-0.319	-0.227*	-0.343***
	(-1.354)	(-1.688)	(-3.835)
POST*QCD-ND	0.272	-0.032	0.008
	(0.957)	(-0.204)	(0.0518)
LOGSUMFEE	0.821***	0.765***	0.781***
	(18.40)	(38.68)	(47.34)
LOGAVGASSET	-0.231***	-0.132***	-0.126***
	(-10.09)	(-11.88)	(-11.09)
Constant	-4.305***	-5.329***	-5.747***
	(-7.541)	(-18.62)	(-22.61)
Observations	220	862	917
R-squared	0.685	0.697	0.744
Fixed effects	Year	Year	Year
R2 adjusted	0.667	0.693	0.740
F test Total effect NON-QCD	0.082	-0.011	-0.150*
F test Total effect QCD-ND	0.255	-0.140	-0.010

* p<.1, ** p<0.05, *** p<0.01, based on two tailed test.
All continuous variables have been winsorized at the 5th and 95th percentile.
All variables definitions can be found in Appendix 2.

Table 3.13: Change in total audit fees

Log(sumfee)	Pre	Post	Diff	p-value
Panel A: First inspection				
QCD-D	12.18	12.34	0.16	0.126
QCD-ND	12.82	13.04	0.22	0.003
NON-QCD	12.47	12.77	0.30	0.002
Panel B: Second inspection				
QCD-D	12.54	12.09	-0.45	0.013
QCD-ND	13.49	13.33	-0.16	0.102
NON-QCD	12.86	12.85	-0.01	0.476
Panel C: Third inspection				
QCD-D	12.71	12.29	-0.42	0.098
QCD-ND	13.48	13.09	-0.39	0.003
NON-QCD	12.94	12.90	-0.04	0.412

* p<.1, ** p<0.05, *** p<0.01, based on two tailed test.
All continuous variables have been winsorized at the 5th and 95th percentile.
All variables definitions can be found in Appendix 2.

3.6.4 Financial risk of new clients after the inspections

In our main analysis, we restrict our sample to clients that do not switch audit firms after the publication of the inspection report. To further corroborate our findings on how disclosure of inspection outcomes affects audit firm's behavior, we investigate the financial risks of the new clients after each round of inspection. We identify the new clients from AuditAnalytics and match them with the financial information from Compustat. Using t-tests, we compare whether ROA, Loss and Leverage[20] for the new clients are different across the audit firms with different inspection outcomes. The results are presented in Table 3.14. In general, the results show that the financial risks are lower for new clients of audit firms who do not have QCDs, implying that these audit firms became more selective in their client acceptance decisions, which is a key feature of a well-designed internal quality control system.

[20] Following our main analysis, we winsorize our continuous variables at the 5 percent and 95 percent.

Table 3.14: Financial risks for the new clients after the inspections

Panel A: First inspection						
	QCD_D(1)	QCD_ND(2)	NON-QCD(3)	Diff(1)-(2)	Diff(1)-(3)	Diff(2)-(3)
ROA	-5.199	-3.054	-1.830	-2.145***	-3.368***	-1.224***
LEVERAGE	6.418	3.518	2.498	2.900***	3.920 ***	1.020***
LOSS	0.736	0.721	0.515	0.015	0.221***	0.206***
Panel B: Second inspection						
ROA	-6.211	-3.232	-3.469	-2.979***	2.742***	-0.237
LEVERAGE	8.942	3.245	3.984	5.697***	4.958***	-0.739*
LOSS	0.804	0.722	0.731	0.082**	0.073*	0.009
Panel C: Third inspection						
ROA	-5.664	-3.132	-2.519	-2.532***	-3.145****	-0.613
LEVERAGE	4.933	2.546	2.244	2.387***	2.689***	0.302
LOSS	0.810	0.800	0.775	0.100	0.025	0.035

* p<.1, ** p<0.05, *** p<0.01, based on two tailed test.
All continuous variables have been winsorized at the 5th and 95th percentile.
All variables definitions can be found in Appendix 2.

3.6.5 Other additional tests

To rule out the possibility that very small client companies' might have different pricing decisions, we exclude clients with assets less than one million US dollars. The untabulated results show that our main results hold when excluding these small client companies. Furthermore, the number of engagements being inspected by the PCAOB is larger for audit firms with more clients. Therefore, these larger audit firms are more likely to get a deficient Part I finding even though they do not supply lower quality audits. In an untabulated analysis, we investigate whether the audit fee change depends on the percentage of deficient engagements (number of deficient engagements divided by the total number of inspected engagements). The results show that the percentage of deficient engagements is not significant, implying that this is not driving our main findings.

Finally, we rerun our regression analysis by dropping the sample restriction used in the main analysis to only include the audit-client combinations that have at least one fiscal year end before and after the publication of the inspection report. The results remain unchanged using the full panel without this restriction.

3.7 Conclusion

In view of recent regulatory changes that established independent inspections of US audit firms, we examine the impact of PCAOB inspections on audit firm behavior of triennially inspected firms over time. We start by investigating whether audit fees are different before the inspection conditional on the inspection outcomes, and find that PCAOB inspection findings appear to be representative of audit effort. Next, we examine whether the inspection results caused changes in audit fees. The findings of our study reveal that audit fees increase after the PCAOB inspections, but that this increase is driven by audit firms without disclosed quality control deficiencies. At the same time, the publication of Part I inspection findings appears to have limited impact on audit fees. Furthermore, we observe an increase in the number of CPAs employed by audit firms who do not contest with the PCAOB Part I findings and audit firms who remediated the quality control deficiencies. However, the reputation damage caused by the deficiencies limit their abilities to charge clients for the increased effort. Finally, we find that, instead of attracting more clients, audit firms without QCDs experience a decrease in the number of public clients while they do charge higher fees. This would suggest that in the small audit firm market, clients seem to care more about obtaining a lower fee instead of higher quality, which a clean inspection report is expected to reflect. Collectively, our evidence suggests that PCAOB inspections led to important changes in audit firm behavior.

Our study is subject to several data limitations. First, it would be desirable to have a fully balanced sample of audit clients across the period of investigation. Given limited data availability, a reasonable sample size is only achievable by including all clients with not less than one year of available data in each of the estimation, pre-, and post-inspection periods. Secondly, the Form 2 data we used for analyzing the change in the number of CPAs and the number of public clients is only available after 2010. So the analysis based on these data is especially an issue for the first inspection round.

This study contributes to the literature on the effects of PCAOB inspections by focusing on a number of potential changes in audit firm behavior. More generally, we add to the literature on independent inspections of audit firms at a time when public oversight systems are being discussed, established, and refined across the world. While prior studies have either looked at client-level fees prior to inspections (Gunny et al. 2007), at fees at a single audit firm level (Boone et al. 2015) or at fees for Big 4 audit firms (Acito et al. 2017), this study contributes to the literature by showing that the established US inspection system changes small audit firms' behavior. While recent studies mainly relating to annually inspected audit firms report a number of positive economic effects of PCAOB inspections, we conclude that for the small audit firm market, the effects are not unequivocal positive. This seems to be driven by a lower demand for high quality in this audit market segment. This paper therefore also extends the literature on the potentially adverse effects of high fee pressure caused by competition and client-specific demand characteristics. The insights can be useful to regulators and oversight bodies throughout the world in setting guidelines regarding the detailed implementation and future development of audit firm inspections.

Chapter 4: Market Reactions to Public Oversight: Evidence from the Netherlands

Abstract

This paper investigates the capital market reactions to the publication of AFM inspection reports and AFM fine announcements against Big 4 in the Netherlands, using cumulative average abnormal returns (CAARs). First, by using event studies, I find that CAARs are insignificant from zero for the first inspection and four announcements of decisions on fines, suggesting that these information does not change investors' perception of audit quality. For the second inspection, on average, CAARs are significantly negative, providing limited support to the notion that auditor suffer from reputation damage after the disclosure. Second, I use a cross-section analysis to investigate whether CARs are different across clients audited by different audit firms. In general, the results suggest that the market reaction is not significantly different.

4.1 Introduction

In response to the wave of high-profile accounting scandals in the early 2000s, the US introduced independent public oversight of the auditing profession to replace the previous self-regulation system. Public oversight is considered to be one of the most profound changes in auditing profession in decades. According to SOX, all audit firms with public listed clients in the US need to be inspected by the Public Company Accounting Oversight Board (referred to as PCAOB) at least every three years. Following the SOX in the US, the revised 8th EU Directive (EU 2006) ended self-regulation of the auditing profession in all EU member states, and member states were given two years (up to June 2008) to implement the new Directive. Similar to the PCAOB in the US, public oversight authorities in Europe now have ultimate responsibility for approval and registration of audit firms, quality control of audit firms and auditors, continuous education of auditors and investigative and disciplinary action against audit firms (Van Opijnen 2016).

Since the aim of public oversight is to improve audit quality and protect investors, the introduction of it has been of great interest to setters of auditing standards, audit firms and researchers. There is an emerging literature investigating the impact of public oversight including on financial reporting quality (Carcello et al. 2011; Gipper et al. 2015; Gunny and Zhang 2013; Lamoreaux 2016; Carson, Simnett, Thürheimer and Vanstraelen 2017) and auditor reporting behavior (DeFond and Lennox 2017; Gramling et al. 2011; Lamoreaux 2016). Furthermore, studies show that the publication of the PCAOB inspection results, especially the disclosure of quality control deficiencies, can negatively impact an audit firm's reputation, leading to lower audit fees and fewer clients (Boone, Khurana and Raman 2015; Vanstraelen and Zou 2017).

Besides the aim to improve audit quality, an important role for public oversight is to provide information to capital market investors (DeFond 2010). As the only visible products of the PCAOB inspections, the publicly disclosed inspection reports provide a new source of information on audit quality. Offermanns and Peek (2011) find that investors respond to PCAOB inspection reports and at least part of the response to the publication of the inspection results can be attributed to revisions in investors' beliefs about accounting information quality. While Offermans and Peek (2011) focuses on the US setting, this paper explores capital market reactions to public oversight in a non-US setting, which has not been addressed in prior literature. More specifically, the paper investigates whether the publication of the inspection results and decisions to fine the Big 4 audit firms when serious deficiencies are identified provide meaningful information for capital market investors, using the setting of the Netherlands.

As a member state of the EU and one of the founding countries of the International Forum of Independent Audit Regulators (IFIAR), the Netherlands introduced public oversight in 2006, regulated by the Audit Firm Supervision Act (referred to as AFS Act 2006 hereafter). According to the Act, all audit firms performing statutory audits need to be inspected by the Autoriteit Financiële Markten (AFM). Inspections of audit firms in the Netherlands have been

carried out twice since the introduction of the Act, with the first inspection results published in 2010 and the second inspection results in 2014.

There are several differences between the PCAOB and the AFM. Compared to the PCAOB inspections in the US, in which only public company audit clients are inspected, a major difference in the AFM inspection in the Netherlands is that private clients as well as public clients are covered. While the PCAOB publishes an individual inspection report for each audit firm, the AFM published its first round inspection outcomes on Big 4 audit firms in the Netherlands using a single report. A unique feature of the AFM inspection is that the first inspection report only disclosed the collective audit firm performance, while the second inspection report published individual audit firm performances for the Big 4 firms. This unique feature provides an opportunity to explore whether capital markets react differently to different disclosure regimes. Quality control deficiencies are also directly disclosed in the AFM inspection reports, but are only disclosed in the PCAOB inspection reports if the audit firm does not remediate them within 12 months. Besides the periodical inspections, the AFM also has the authority to impose fines and disciplinary actions on the audit firms if serious deficiencies are identified. Between 2006 and 2015, the AFM published four decisions to fine Big 4 firms, with two fines against EY, one against Deloitte, and one against KPMG. This paper also explores whether these disclosures provide valuable information about audit quality to capital market participants.

There are two ways that the publication of the inspection results and decisions on fines can lead to capital market reactions. Firstly, since all the inspections point out that audit firms did not collect adequate evidence to support their audit opinion and all the announcements of fines document that audit firms have problems with their quality control systems, auditor reputation can be damaged. The decreased reputation can lead to loss of confidence in the audited financial statements, which can result in negative market reactions (Dee et al. 2011). Secondly, negative inspection reports can increase investors' perceptions of potential penalties towards the Big 4 firms, which can result in a decreased valuation of the insurance based on the audit firms' "deep pockets" and lead to negative market reaction. As a result, I hypothesize that capital market will react negatively to the publications of AFM inspection findings and decisions on fines. Nevertheless, both arguments are based on the assumption that the AFM inspections are considered by investors to be effective and to generate reliable information.

Event studies are used to examine the cumulative average abnormal returns (CAARs) for all client companies of the audit firms over a three-day event window around the disclosures of AFM inspection findings and AFM's decisions on fines, beginning at the day before the announcements through to the day after. The analyses cover all public clients listed in AEX of Big 4 firms. The results of the event study indicate CAARs are not significantly different from zero for the first AFM inspection and four announcements of fines, suggesting that these reports are not informative to investors in the capital market in general. For the second AFM inspection report, on average, CAARs are significantly negative, providing some support to the hypothesis that the perceived audit quality decreased and the auditor suffered reputation damage after the disclosure. Cross-section regressions are used to examine whether cumulative abnormal returns (CARs) are different across the clients audited by different auditors in the Big 4 firms. In

general, the results suggest that the market reaction is not significantly different. A possible reason is that market structure is different in the Netherlands compared to the US. With the very small and concentrated public audit market in the Netherlands, the lack of competition and alternative auditors may lead to investors not valuing the information about audit quality. Another possible reason is that the AFM inspection covers both public and private companies. However, no further detailed information is provided in the inspection reports about the percentage of the public clients inspected with deficiencies. Due to the lack of relevant information, capital market investors do not react accordingly.

The Big 4 audit firms in the Netherlands are also inspected by the PCAOB as they have public clients in the US. Although the PCAOB only inspects audit clients listed in the US, it provides an opportunity to investigate whether the PCAOB inspection reports can also change investors' perception of audit quality in the Netherlands. In additional analyses, I study the market reactions to the publication of the PCAOB inspection reports and find no significant results in general, suggesting that there is no information spillover effect.

Finally, the impact of the publication of the AFM and PCAOB inspection results on the cost of debt for public companies is investigated. The results show that cost of debt decreases after the publication of the first and second AFM inspections, suggesting an increase in perceived audit quality, while the cost of debt increases after the publication of the PCAOB inspection results, suggesting damage to auditor reputation. In summary, this suggests the audit quality perceived by debt market investors changes after the publication of the audit inspection results.

This paper contributes to the literature in several ways. Firstly, it provides empirical evidence that the publication of the AFM inspection reports and announcements of fines against the Big 4 firms do not change perceived audit quality in the capital market in the Netherlands, while prior research suggests that the PCAOB inspection reports and decisions on fines are valued in the US market. To the best of my knowledge, this is the first paper to explore the capital market reaction to public oversight of the auditing profession in a non-US setting. Secondly, the paper also examines the debt market reaction to the audit inspections, which is important for practice since debt plays an important role in companies' financing activities (Pittman and Fortin 2004).

The remainder of the paper is organised as follows. Section 2 provides background information about the AFM inspections and announcements of fines in the Netherlands. Section 3 reviews the prior literature and develops the hypotheses. Section 4 presents the methodology to test the hypotheses. Section 5 describes the data and sample and discusses the empirical results. Section 6 includes the additional analysis. Section 7 concludes and outlines the implications and limitations of the study.

4.2 Background

According to the AFS Act 2006, all audit firms performing statutory audits in the Netherlands need to be inspected by the Autoriteit Financiële Markten (AFM). The Netherlands AFM aims to promote fairness and transparency within financial markets, promoting investor confidence in these markets (AFM 2010; AFM 2014). Similar to PCAOB inspections in the US, the independent AFM inspectors not only examine the audit engagements performed by the audit firms, but also inspect the quality control systems of the audit firms periodically. The AFM inspectors also use a risk-based approach in selecting specific aspects of quality control systems and audit engagements for review. After the inspection, an inspection report is publicly disclosed on the AFM website, indicating whether any material mistakes were identified in the engagements selected for inspection and the quality control systems in the audit firms based on the 'International Standard on Quality Control 1' (IAASB 2009b). Where material mistakes are identified, AFM may also decide to impose penalties and disciplinary action.

While there are many similarities between AFM inspections and PCAOB inspections, they differ in the following areas. Firstly, while the PCAOB inspection only inspects public client engagements, the AFM inspection covers both public and private companies. Secondly, according to SOX, the Big 4 audit firms are inspected annually as they have more than 100 public clients. However, in the Netherlands, the Big 4 audit firms are only inspected every four years recently. AFM and PCAOB also differ in publishing the inspection results. PCAOB publishes a separate inspection report for each inspected audit firm, while AFM releases one integrated inspection report after all Big 4 audit firms are inspected. When quality control deficiencies are identified during the inspection, PCAOB gives the audit firm 12 months to remediate the deficiencies before disclosing them publicly. However, AFM releases the inspection findings on the engagement deficiencies and quality control deficiencies at the same time.

The first AFM inspection on Big 4 audit firms was conducted in 2009 and the first half of 2010 and the inspection report was published on 1 September 2010. AFM reviewed 46 audits conducted by the Big 4 firms in 2008 and 29 of the 46 had deficiencies (AFM 2010). However, the inspection report did not provide any further information on the performance of individual audit firms. Between April 2013 and the end of July 2014, AFM carried out a second inspection on the Big 4 firms. In the second inspection, AFM selected 10 audits at each of the Big 4 firms and evaluated whether the audit firms collected sufficient audit evidence for any material part to justify their audit opinions. The inspection result was published on the AFM website on 25 September 2014. In contrast to the first inspection report, the second inspection report disclosed the results for each of the Big 4 firms separately: 4 out of 10 audits by Deloitte were regarded as inadequate, 3 out of 10 audits by EY, 7 out of 10 audits by KPMG and 4 out of 10 audits by PWC. Unlike the first inspection report, from which no information can be drawn on the differences among the Big 4 firms, the second inspection report indicates that KPMG is clearly worse than the other three Big 4 firms, with 70% of its audits inadequate.

In addition to performing regular inspections on Big 4 audit firms and publishing the inspection findings, AFM also has the authority to impose fines and disciplinary action on audit

firms if serious deficiencies are identified. After the first AFM inspections, AFM announced four decisions on fines against Big 4 firms up to 2015. On 26 January 2012, AFM published its first fine decision against EY due to its non-compliance with the duty of care in its engagements performed in 2007 and 2008. On 2 October 2012, AFM announced another fine against EY for its lack of compliance officer from 2009 to 2010. Deloitte was also fined for its non-compliance with the duty of care, which was publicly disclosed on 23 February 2012. On 3 June 2013, AFM revealed its fine decision against KPMG for its insufficient quality control system. There are no disclosed fine decisions against PWC from 2006 to 2015.

4.3 Prior literature and hypotheses development

Research on the audit profession inspection has primarily focused on PCAOB inspection in the US, with mixed results on the impact. Some studies suggest that PCAOB may not be able to improve audit quality. For example, Glover, Prawitt and Taylor (2009) state that the PCAOB decision to discard the strengths of the existing peer review process and use only PCAOB staff in its inspections leads to inadequate expertise to effectively conduct "risk-based" inspections. Based on interviews with auditors, Glover, Prawitt and Taylor (2009) find that PCAOB inspectors often fail to look at the riskiest areas of an audit because the technical complexity of such areas is beyond the inspection team's expertise. At the same time, auditors often respond to the PCAOB inspection deficiencies on documentation, which may not necessarily affect the auditor's opinion after remediation (Defond and Lennox 2017; Dowling, Knechel and Moroney 2015). As PCAOB uses a risk-based approach to select the engagements to be inspected, the inspection results are not representative of overall audit quality. As a result, even if the deficiencies are remediated, the remediation might not improve overall audit quality (Dowling, Knechel and Moroney 2015). On the other hand, some studies do find empirical support that the introduction of PCAOB inspection improves audit quality for both Big 4 and non-Big 4 audit firms, with audit quality proxied by abnormal accruals and going concern opinions (Carcello et al. 2011; Gramling et al. 2011). DeFond and Lennox (2011) also provide evidence that PCAOB inspection improves audit quality by providing incentives for audit firms with low audit quality to exit the market.

In contrast to the studies on PCAOB inspections in the US, there is very limited research about the impact of public oversight in non-US settings. De Fuentes et al. (2015) show that auditors sanctioned by the Spanish Institute of Accounting and Auditing exhibit lower average audit quality than non-sanctioned auditors. Van Opijnen (2016) finds no support that AFM inspection in the Netherlands improves audit quality.

Despite the debate on whether public oversight is an effective mechanism to improve actual audit quality, an important role for public oversight of the auditing profession is to provide information to capital market investors (DeFond 2010). Thus, it is important to investigate how the capital market reacts to the inspections. The informational value of public oversight is realised after the inspection reports are published. Prior to the introduction of public oversight, the auditing profession self-regulated through peer observation. Compared to

the peer observation results, the PCAOB inspection results provide an informative, low cost and more reliable signal about audit quality because of the independence of PCAOB (Vanstraelen et al. 2017). Prior literature provides evidence that the publication of PCAOB inspection reports and the subsequent sanctions change investors' perceived audit quality. Offermanns and Peek (2011) find evidence that investors react to the publication of PCAOB inspection report immediately and at least part of the reaction can be attributed to the change in perceived audit quality. Vanstraelen, Vorst and Zou (2017) find that stock market liquidity decreases after the publication of the first round inspection reports but increases after the publication of the second round inspection reports in US. Meanwhile, Gipper et al. (2015) find that capital market responses to unexpected earnings also significantly increase following the introduction of the PCAOB inspection regime. Dee et al. (2011) find that investors reacted negatively to the news of the PCAOB sanctions against Deloitte.

This paper investigates whether the publication of audit inspection results and some subsequent fine decisions can impact investors' perception of audit quality, or auditor reputation, in a non-US setting of the Netherlands. While Van Opijnen (2016) fails to find support that AFM inspections improve actual audit quality in the Netherlands, it does not necessarily mean that the capital market does not react to the publication of the inspection findings due to possible changes in perceived audit quality. The ultimate purpose of auditing is to provide insurance on the financial information on which investors base their investment decisions. As audit quality is not directly observable by investors, auditor reputation is used as an important proxy for audit quality and financial reporting credibility (DeAngelo 1981). Another source of insurance that auditors provide is that auditors are generally considered to have "deep pockets" as investors are able to sue the auditor to partially recover their loss in the case of auditor failure (Dee et al. 2011; Palmrose 2005; DeAngelo 1981). It is also well documented empirically in prior literature that auditor reputation is valued in the capital market. For example, Knechel, Naiker and Pacheco (2007) find that firms switching between Big 4 auditors experience significant positive abnormal returns when the successor auditor is an industry specialist, and they experience significant negative abnormal returns when the successor auditor is not a specialist. Krishnamurthy et al. (2006) find that the market reacted negatively to Andersen clients after the news about Andersen's indictment was released.

As discussed above, it is well documented that the publication of PCAOB inspection reports and the following sanction decisions changed investors' perceived audit quality in the US. After two rounds of AFM inspections, all Big 4 audit firms in the Netherlands are revealed to be inadequate in collecting enough evidence to support their audit opinion. On one hand, such information could lead investors to update their belief about audit quality and question the reliability of the financial statements. This loss of confidence in the audited financial statements can lead investors to revise their valuation of the audit firms' clients, which could lead to negative market reaction (Dee et al. 2011). At the same time, according to the fine decisions, the audit firms were punished due to either lack of compliance with the duty of care or insufficient quality control systems. Thus, the same effect may be applied to the AFM fine decisions. On the other hand, the negative inspection reports can increase investors'

perceptions of potential penalties towards the Big 4 firms, which will result in a decreased valuation of the insurance based on the audit firms' "deep pockets".

However, there are some reasons that investors might not value the information provided by AFM inspection reports and fine decisions. Firstly, while AFM inspects both public and private companies, its inspection reports do not provide detailed information on the percentage of deficient engagements for public and private companies separately. As a result, investors of public companies may perceive the information to be less relevant. Secondly, the audit market in the US is still very competitive, especially at the local market level (Sirois and Simunic 2011; Bills and Stephens 2016), while the public audit market is relatively small and highly concentrated in the Netherlands (European Commission 2017). The potential lack of competition leads to limited choice of alternative auditors even if perceived audit quality is low for the current auditor. In this case, the publication of inspection reports and fine decisions may have limited capital market reactions as audit quality is not highly valued in general. Thirdly, the "deep pockets" value of auditing is much weaker in the Netherlands compared to the US due to the different legal environments. As a result, the perceived and actual fines may not impact investor' valuation of audit quality. Last but not least, it is possible that investors consider the inspection reports and decisions on fines to be outdated by the time they become public. All in all, whether the audit inspection reports and fine decisions help investors to update their belief in audit quality remains an empirical question. Therefore, the paper hypothesises that capital market reaction to the publication of both rounds of AFM inspections and decisions on fines is significantly different from zero.

H1: *Client firms' market reaction after the publication of the AFM inspection reports and decisions on fines is significantly different from zero.*

A unique feature of AFM inspections is that AFM did not disclose individual audit firm performance in its first inspection report. As a result, it is not possible for investors to differentiate audit quality among the Big 4 firms. However, after the second inspection, inspection findings were published for each Big 4 audit firm, providing additional information for investors about the quality of individual audit firms. The most significant information in the report is that 70% of KPMG's audits were inadequate, significantly higher than all other three audit firms. If the inspection reports provide information for investors, the market reaction should be more negative for clients audited by KPMG. This high percentage may also increase investors' anticipation of regulatory penalties towards KPMG by a larger extent, compared to other Big 4 audit firms. As a result, the second hypothesis is formulated as follows:

H2a: *The clients' magnitude of market reaction to the publication of the first AFM inspection report is not different among the Big 4 audit firms.*

H2b: *The clients' magnitude of market reaction to the publication of the second AFM inspection report is different among the Big 4 audit firms.*

4.4 Research design

In this paper, I calculate capital market reactions following Brown and Warner (1985) and DeFond et al. (2005) in computing cumulative abnormal returns (CARs) for the client companies over a three-day event window, beginning the day before the announcement through the day after.

Following Chaney and Philipich (2002), the market model is used to measure abnormal returns to control for the effects of market wide fluctuations:

$R_{it} = \alpha_i + \beta_i R_{mt} + u_{it}$

where:

R_{it} = return for client i on day t

α_i = intercept

β_i = beta for firm i

R_{mt} = AEX market index on day t

u_{it} = error term

The abnormal return on day t is the difference between the actual return and the expected return derived from the market model, or formally:

$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt})$

Based on the abnormal return, the three-day cumulative abnormal return (CAR) is computed as follows:

$$CAR_{it} = \sum_{t=-1}^{1} AR_{it}$$

The estimation period I use for calculating the expected return starts from 142 trading days before the events dates and ends 21 trading days before those dates. I drop the observations which have less than 120 trading days in the estimation period.

To test my first hypothesis, I use cumulative average abnormal returns (CAAR), the average CAR across all the client companies of the audit firms, which is calculated as follows:

$$CAAR = \frac{1}{n}\sum_{i=1}^{n} CAR_{it}$$

Where n equals to the numbers of clients of the audit firm(s) influenced by the six events.

Following Kothari and Wasley (1989), I compute the t-statistics for CAAR as follows:

$$\frac{CAAR}{S(CAAR)/\sqrt{n}}$$

Where:

$$S(CAAR) = \sqrt{\sum_{i=1}^{n}(CAR_{it} - CAAR)^2/(n-1)}$$

To test my second hypothesis, I use a cross-sectional regression analysis to explore whether the cumulative abnormal returns are different across the client companies audited by different audit firms. Specifically, the following model is used:

$$CAR_{it} = \alpha + \beta 1DT_{it} + \beta 2EY_{it} + \beta 3PWC_{it} + \beta 4SIZE_{it} + \beta 5LEV_{it} + \beta 6GROWTH_{it} + \delta \quad (3.1)$$

I use three variables to test my hypotheses: DT, EY and PWC. DT (EY/PWC) takes a value of 1 if the client company is audited by DT (EY/PWC) and 0 otherwise. For the first AFM inspection, as there is no information regarding individual audit firm's performance in the inspection report, I expect that the coefficients are insignificant for all three proxies. For the second AFM inspection, as the percentage of inadequate audits is significantly higher for KPMG compared to other three Big 4 auditors, I expect that the coefficients on all three proxies are positive.

I also include a number of client firm variables to control for other factors that may influence the market's reaction to the publication of the inspection reports. Klock (1994) argues that the greater the availability of information about a firm, the less likely incremental information is contained in an event. Following Knechel, Naiker and Pacheco (2007) and Defond et al. (2005), I include SIZE as a client firm control variable, which is calculated as the natural log of total assets in the year prior to the events. Given that firm size is commonly used as a proxy for information availability (Collins and Kothari 1989), an inverse relationship is expected between firm size and abnormal returns (Freeman 1987). I also include LEV and GROWTH as client firm control variables, capturing either greater need for a reputable auditor or increased risk of auditor litigation. LEV is the company's leverage ratio in the year before the events, calculated as the total debt divided by total assets. GROWTH measures the growth in revenues in the year prior to the events. Drawing on prior literature (DeFond et.al 2005; Dee et.al 2011), greater need for a reputable auditor and increased litigation risks are associated with more negative reactions to bad news related to audit quality.

4.5 Data, sample and results

To explore investors' assessments of AFM inspection reports, I examine the cumulative average abnormal returns around the publication of the inspection reports. The first inspection report is published on 1 September 2010 and the second inspection report is published on 25 September 2014. If the inspection findings do impact auditor reputation, it should apply to all clients of the audit firms. Other than the inspection findings, AFM also disclosed four decisions on fines: two against EY on 26 January 2012 and 2 October 2012, one against Deloitte on 23 February 2012 and one against KPMG on 3 June 2013. These announcements should only influence the punished audit firms' clients. Table 4.1 provides a summary of the six events.

Table 4.1: Events dates and summaries

Event date	Event summary
1st September 2010	AFM disclosed its first inspection reports
26th January 2012	AFM disclosed its fine against EY
23th February 2012	AFM disclosed its fine against DT
2nd October 2012	AFM disclosed another fine against EY
3rd June 2013	AFM disclosed its fine against KPMG
25th September 2014	AFM disclosed its second inspection reports

To calculate abnormal returns around these six events, I first get all AEX listed companies' daily returns and the AEX index from DataStream. Then I collect the auditor information from Orbis from 2009 to 2015. All the financial information used as control variables in my cross-sectional analysis are also collected from DataStream.

Table 4.2 presents the sample composition for these six events. The final samples include 85 clients for the first AFM inspection and 71 clients for the second AFM inspection. For the first inspection, 14 clients are audited by Deloitte, 21 are audited by EY, 33 are audited by KPMG and 17 are audited by PWC. For the second inspection, 16 clients are audited by Deloitte and EY separately, 22 are audited by KPMG and 17 are audited by PWC. For the fines against EY, the number of clients influenced is 14/15 for the first/second fine. DT has 16 clients being influenced for its fine and KPMG has 21.

Table 4.2: Sample composition

Events	Total	DT	EY	KPMG	PWC
First inspection	85	16	21	31	17
Second inspection	71	17	18	18	18
Fine 26th Jan 2012	--	--	14	--	--
Fine 23th Feb 2012	--	16	--	--	--
Fine 2nd Oct2012	--	--	15	--	--
Fine 3rd Jun 2013	--	--	--	21	--

Table 4.3 reports the results for my first hypothesis. Panel A shows the average abnormal returns at the event day and CAARs around the publication of the first AFM inspection report. At the event day, the average abnormal returns are all negative but insignificant for all client companies, regardless of their auditors. For the whole sample, CAAR is negative and insignificant on average. When I partitioned the sample based to audit firms, the results suggest that clients of KPMG react negatively to the publication of the inspection report, significant at the 10% level. However, the market reaction for the clients of all other three audit firms are insignificant. In general, the results provide no support to my first hypothesis. Panel B of Table 4.3 reports the statistic results for the publication of the second AFM inspection report. The average abnormal returns are all positive at the event day but insignificant for clients of Deloitte and EY while significant for clients of KPMG and PWC. The average abnormal returns for the whole sample at that date is also positive and significant. On the contrary, CAAR is significantly negative for the whole sample on average. However, when the whole sample is divided into four sub-samples based on audit firms, the results suggest CAARs are all not significant anymore, regardless of audit firms. In summary, the results provide some but limited support to my first hypothesis.

Table 4.3: CAARs for AFM inspections

Panel A: First AFM inspection					
Window	Total	DT	EY	KPMG	PWC
Event day	-0.0027	-0.0039	-0.0025	-0.0031	-0.0011
[t-stat]	-1.18	-0.94	-0.51	-0.89	-0.17
CAAR	-0.0055	0.0049	-0.0098	-0.0088*	-0.0039
[t-stat]	-1.26	0.45	-1.33	-1.97	-0.26
Panel B: Second AFM inspection					
Window	Total	DT	EY	KPMG	PWC
Event day	0.0057***	0.0040	0.0061	0.0038*	0.0088*
[t-stat]	2.85	1.40	1.03	1.85	2.11
CAAR	-0.0061	-0.0047	-0.0051	-0.0044	-0.0010
[t-stat]	-1.73*	-0.72	-0.59	-0.93	-1.25

Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 4.4 presents the market reactions to the AFM's announcement of fine decisions. For the first fine announcement, in which AFM imposed a fine against EY, both the abnormal market return on the event day and the cumulative abnormal returns over the three-day period are insignificant. The results suggest that the market participant did not adjust their perceived audit quality after the disclosure. The second fine imposed by AFM is against DT. The market reacts negatively to the announcement on the event day. However, the insignificant CAAR suggests the lack of evidence that investors downgrade their valuation of DT. On 2nd Oct 2012,

AFM imposed a second fine on EY. Consistent with the reaction to the first fine on EY, the reaction after this fine is insignificant, confirming that there is no reputation change for EY after the announcements. The last fine that AFM imposed after the instalment of the inspection and before the end of 2015 is against KPMG. The abnormal return at the event day and the CAAR are all insignificant. In general, the results suggest that the market does not react to the AFM's announcements of fine decisions against the audit firms. In other word, the valuation of auditing by the investors in the capital market does not change after the announcements. Overall, the results provide no support for my first hypothesis.

Table 4.4: CAARs for AFM fines

Events	Event day	[t-stat]	CAAR	[t-stat]
26th Jan 2012 against EY	-0.0043	-0.39	0.0178	1.52
23th Feb 2012 against DT	-0.0150***	-2.99	-0.0034	-0.33
2nd Oct2012 against EY	-0.0082	-1.69	-0.0449	-1.46
3rd Jun 2013 against KPMG	-0.0010	-0.25	-0.0048	-0.73

Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 4.5, Panel A provides the descriptive statistics for the first inspection sample for testing my second hypothesis. For the first inspection, 83 clients are included in the analysis.[21] Total assets of the companies range from 7.29 million US dollars to 1,154,000 million US dollars with a mean of 22,100 million US dollars. Average leverage is 0.243 and median leverage is 0.234. Overall, the companies have a decline in revenues for 0.27 percent on average while half of the companies experience a decline for at least 5.26 percent in 2009. For my dependent variable, the companies had a negative cumulative abnormal return of 0.27 percent on average.

Table 4.5, Panel B presents the descriptive statistics for the second AFM inspection sample for testing my second hypothesis. For the second inspection, 69 clients are included in the analysis.[22] Total assets of the companies range from 0.04 million US dollars to 44,620 million US dollars with a mean of 4,548 million US dollars. Average leverage is 0.226 and median leverage is 0.210. Overall, the companies have a decline in revenues for 17.5 percent on average while half of the companies experienced a decline for 2.98 percent at the minimum in 2013. And the companies had a negative mean cumulative abnormal return of 0.49 percent.

[21] One observation is dropped out of the sample compared to the sample for testing the first hypothesis due to data availability for GROWTH in 2009.

[22] One observation is dropped out of the sample compared to the sample for testing the first hypothesis due to data availability for total assets in 2013.

Table 4.5: Descriptive statistics for cross-section analysis

Panel A: First AFM inspection						
VARIABLES	N	mean	p50	sd	min	max
SIZE	84	2.210e+07	924,598	1.298e+08	7,296	1.154e+09
LEV	84	0.243	0.234	0.158	0	0.854
GROWTH	84	-0.277	-5.26	52.1	-56.2	423.7
CAR	84	-0.00272	-0.00352	0.0313	-0.103	0.0982
Panel B: Second AFM inspection						
SIZE	69	4.548e+06	1.006e+06	8.708e+06	40	4.462e+07
LEV	69	0.226	0.210	0.156	0	0.597
GROWTH	69	-17.5	-2.98	90.9	-741.9	26.1
CAR	69	-0.00491	-0.00277	0.0281	-0.116	0.0703

SIZE is calculated as the natural log of total assets in the year prior to the events. *LEV* is the company's leverage ratio in the year before the events, calculated as the total debt divided by total assets. *GROWTH* measures the growth in revenues in the year prior to the events. *CAR* is the cumulative abnormal returns over a three-day event window, beginning the day before the announcement through the day after.

Table 4.6 reports the cross-sectional regression results for testing my second hypothesis. For the first inspection, the coefficients are insignificant for DT and EY while significantly positive for PWC. It suggests that CAR is significantly larger for clients of PWC compared to clients of DT, EY and KPMG, providing no support for H2. The results in the second column are all insignificant, suggesting that CAR is not different across the client companies of different audit firms around the publication of the second AFM inspection report. Taken together, these results are quite consistent with the event study results, suggesting that the capital market participants do not take the information provided in AFM's inspection reports and announcements of fine decisions into consideration while value the auditors.

Table 4.6: Regression results for H2

VARIABLES	First inspection	Second inspection
DT	0.013	0.003
	(1.054)	(0.366)
EY	-0.001	-0.002
	(-0.134)	(-0.198)
PWC	0.018**	-0.007
	(2.447)	(-0.723)
Log(SIZE)	-0.000	0.000
	(-0.207)	(0.026)
LEV	0.026	-0.027
	(1.093)	(-0.808)
GROWTH	0.002	-0.001
	(0.381)	(-0.688)
Constant	-0.010	0.002
	(-0.534)	(0.113)
Observations	84	69
R-squared	0.092	0.041
R2 adjusted	0.0208	-0.0520

Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1
DT equals to 1 for companies audited by DT, 0 otherwise. EY equals to 1 for companies audited by EY, 0 otherwise. PWC equals 1 for companies audited by PWC, 0 otherwise. *SIZE* is calculated as the natural log of total assets in the year prior to the events. *LEV* is the company's leverage ratio in the year before the events, calculated as the total debt divided by total assets. *GROWTH* measures the growth in revenues in the year prior to the events. The dependent variable *CAR* is the cumulative abnormal returns over a three-day event window, beginning the day before the announcement through the day after for each client company.

4.6 Additional analyses

4.6.1 Market reactions to PCAOB inspection reports

Except for conducting inspections on local audit firms with listed clients in the US, PCAOB also aims to perform oversight on international audit firms whose clients listed in the US. However, while not every country agrees to corporate with PCAOB, the Netherlands is one of the countries who accept the inspections. As a result, the Dutch Big 4 audit firms are not only inspected by AFM in the Netherlands, they are also inspected by PCAOB as they have public clients listed in the US. In this section, I further investigate whether the PCAOB inspection reports provide valuable information about audit quality to the capital market investors in the Netherlands, using this unique setting.

Table 4.7 provides information about the publication of the PCAOB inspection reports of the Big 4 audit firms in the Netherlands. The publication dates are 10 November 2014, 1 May 2014, 1 August 2013 and 1 July 2013 for DT, EY, KPMG and PWC separately. As the time of disclosure in the inspection reports are local time at District of Columbia, United States, the event days are identified as one day later at Amsterdam time. I employed the same procedure as in my main analyses to identify the auditor clients from Orbis and get the return data for calculating abnormal returns from DataStream. The number of clients are 16, 17, 22 and 18 for DT, EY, KPMG and PWC. Except for PWC, all other three audit firms have GAAS related deficiencies disclosed in their inspection reports. At the same time, all four audit firms have quality control deficiencies identified during the inspections. These quality control deficiencies are all remediated in a 12-month period after the publication of the inspection results and not publicly disclosed later on.

Table 4.7: PCAOB inspection information

Events	Publication date US	Event date	Number of clients	GAAS	QCI
DT	10th Nov 2014	11th Nov 2014	16	1	1
EY	1st May 2014	2nd May 2014	17	1	1
KPMG	1st Aug 2013	2nd Aug 2013	22	1	1
PWC	1st Jul 2013	2nd Jul 2013	18	0	1

Table 4.8 presents the market reactions to the publication of the PCAOB inspection findings. For DT, EY and PWC, the average abnormal returns are negative but not significant from zero at the event day. And CAARs are also not significant from zero for clients of DT, EY and PWC. However, the market reacts positively to KPMG's inspection results, based on both the average abnormal return on the event day and CAARs. To summarize, the results provide limited support to the notion that PCAOB inspection reports on Big 4 audit firms in the Netherlands impact

Table 4.8: CAAR for PCAOB inspections

Auditor	Event day	[t-stat]	CAAR	[t-stat]
DT	-0.0010	-0.33	0.0083	1.24
EY	-0.0026	-0.35	-0.0016	-0.19
KPMG	0.0145**	2.26	0.0158***	2.92
PWC	-0.0033	-0.50	0.0086	1.40

Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

4.6.2 Cost of debt analyses

While audit plays a vital role in decreasing information asymmetry in the equity market, it is also highly valued in the debt market. Extant literature has found extensive evidence that cost of debt capital is lower for companies choosing a highly reputable auditor (Gul et al. 2013; Minnis 2011; Pittman and Fortin 2004). As one important difference between AFM and PCAOB inspections is that AFM also inspect audit firms' private clients, I further investigate whether the publication of the AFM and the PCAOB inspection reports are valued in the debt market, employing cost of debt as a proxy in this section. Following Minnis (2011), I employ the following model to test whether cost of debt for client companies of the audit firms changes after the publication of the inspection reports:

$$\text{Cost of debt}_{i.t+1}=\beta_0+\beta_1*\text{Post}_{i,t+1}+\beta_2*\text{InterestCoverage}_{i,t}+\beta_3*\text{CurrentRatio}_{i,t}+\beta_4*\text{PPE}_{i,t}+$$

$$\beta_5*\text{LEV}_{i,t}+\beta_6*\text{Ln(ASSETS)}_{i.t}+\beta_7*\text{GROWTH}_{i,t+1}+\beta_8*\text{NegEquity}_{i,t}$$

$$+\text{Year fixed effects}+\text{Industry fixed effects}+\delta \quad (3.2)$$

Where:

Cost of $\text{debt}_{i,t+1}$=2*interest paidt+1 / (Total debtt+1+Total debtt)

$\text{Post}_{i,t+1}$=1 for financial year ends after the publication of inspection results,0 otherwise

$\text{InterestCoverage}_{i,t}$= EBITDA/interest paid in year t

$\text{CurrentRatio}_{i,t}$= current assets/current liabilities in year t

$\text{PPE}_{i,t}$= property, plant and equipment/total assets in year t

$\text{LEV}_{i,t}$= total debts/total assets in year t

$\text{ASSET}_{i,t}$=total assets in year t

$\text{GROWTH}_{i,t+1}$= sales growth in year t

Neg-$\text{equity}_{i,t}$=1 if total liability is larger than total assets in year t

The sample used to test the effect after the first AFM inspection includes all public listed companies in AEX with available data from 2006 to 2013. The sample used to test the effect after the second AFM inspection starts from 2010, which is the year that AFM published its first inspection report, to 2015. For both samples, I only include those companies that have at least one observation before and one observation after the first/second inspection. All the continuous variables used are winsorized at the first and last 5 percent. As AFM only publish one inspection report for all audit firms after each inspection round, I do not have a control group to control for other common factors that influence cost of debt.

In contrast to the publications of AFM inspection finding, the variation in the publication dates of PCAOB inspection results creates a natural diff-in-diff design to compare the change in cost of debt. The sample period to test the effect of PCAOB inspections starts from 2006 to 2015. And I only included those companies that have at least one observation before and one observation after the publication of the inspection findings in the samples. All the continuous variables are winsorized at the first and last 5 percent.

Table 4.9 reports the OLS regression results for the AFM inspections. The coefficients on Post are all significantly negative for the first and second AFM inspection analyses, indicating that cost of debt capital decreases after the publication of the inspection results. In other words, perceived audit quality of borrowers increases after the inspections. A possible explanation is that the borrowers believe that audit quality should increases after the inspections, consistent with the AFM's mission to improve capital market participants' confidence. However, as I mentioned above, there is a lack of a control group for these analyses. Except for the publications of AFM inspection findings, other important changes in the audit market also happened during this period, including the disclosure of the audit firms' transparency reports, the anticipated audit firm rotation etc. Without a control group, I am not able to distinguish whether the change in perceived audit quality is only caused by inspections. In summary, although the results suggest some positive effect of the publications of the inspection reports, they should be interpreted with conscious.

Table 4.10 presents the empirical analysis result for the PCAOB inspections. The coefficient on Post is positive and significant at the 10 percent level, suggesting that the publication of PCAOB inspection reports do have spillover effect in the Netherlands' debt market. The deficient reports lead to reputation loss for Big 4 audit firms among the borrowers. Compared to the results from AFM inspections, it suggests that PCAOB inspection reports serve as an information role rather than supervision role which lead to increased perceived audit quality. Moreover, the natural diff-in-diff design lends more credibility to interpret the empirical results.

Table 4.9: Cost of Debt analysis AFM inspections

VARIABLES	First inspection	Second inspection
Post	-0.0143**	-0.0129*
	(-2.177)	(-1.861)
Interest coverage	0.000146	-0.000249
	(0.814)	(-1.238)
Current ratio	-0.00267	-0.0117**
	(-0.487)	(-2.256)
PPE	-0.0472***	0.0235
	(-2.841)	(1.232)
LEV	-0.0650**	-0.170***
	(-2.015)	(-5.389)
Log(ASSET)	-0.00474***	-0.00153
	(-2.704)	(-0.975)
GROWTH	0.0364*	-0.00834
	(1.904)	(-0.437)
Neg-equity	0.0759***	0.0458***
	(3.434)	(2.896)
Constant	0.170***	0.136***
	(7.562)	(4.704)
Observations	324	285
R-squared	0.325	0.312
Fixed effects	Year/industry	Year/industry
R2 adjusted	0.281	0.259

Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1
Cost of debt in year t+1 equals to the interest paid in year t+1 divided by the average total debt in year t and year t+1; *Post* equals 1 for financial year ends after the publication of inspection results,0 otherwise; *Interest coverage* is calculated as the earnings before tax, depreciation and amortization divided by interest paid. *Current ratio* equals to current asset divided by current liabilities; *PPE* is the percentage of property, plant and equipment out of total assets; *Growth* is the increases in sales. *Neg-equity* equals to 1 if total liability is larger than total assets, 0 otherwise.

Table 4.10: Cost of Debt analysis PCAOB inspections

VARIABLES	PCAOB inspection
Post	0.0130*
	(1.657)
Interest coverage	-0.000279**
	(-2.023)
Current ratio	-0.00476
	(-1.122)
PPE	-0.0199*
	(-1.690)
LEV	-0.0956***
	(-4.166)
Log(ASSET)	-0.00134
	(-1.149)
GROWTH	0.00709
	(0.502)
Neg-equity	0.0383***
	(3.856)
Constant	0.128***
	(5.981)
Observations	396
R-squared	0.239
Fixed effects	Year/industry
R2 adjusted	0.191

Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1
Cost of debt in year t+1 equals to the interest paid in year t+1 divided by the average total debt in year t and year t+1; *Post* equals 1 for financial year ends after the publication of inspection results,0 otherwise; *Interest coverage* is calculated as the earnings before tax, depreciation and amortization divided by interest paid. *Current ratio* equals to current asset divided by current liabilities; *PPE* is the percentage of property, plant and equipment out of total assets; *Growth* is the increases in sales. *Neg-equity* equals to 1 if total liability is larger than total assets, 0 otherwise.

4.7 Conclusion

In this paper, I investigate the capital market reactions to the publication of AFM inspection reports and AFM fine announcements against Big 4 in the Netherlands. By studying the market reactions, I aim to contribute to the emerging literature on the effectiveness of auditing profession oversight under a non-US setting. Specially, I examine the cumulative abnormal returns over a three-day event window, beginning at the day before the announcements through the day after.

The results of my event study indicate that CAARs are insignificant from zero for the first inspection and four announcements of decisions on fines, suggesting that these information does not change investors' perception of audit quality. For the second inspection, on average, CAARs is significantly negative, providing limited support to my hypothesis that auditor suffer from reputation damage after the disclosure. As the second AFM inspection report point out that the percentage of inadequate engagements is the highest for KPMG compared to other audit firms, I use a cross-section analysis to investigate whether CARs is different across clients audited by different audit firms. In general, the results suggest that the market reaction is not significantly different. A possible explanation for the lack of reactions to the publications of the reports is that the market structure is different in the Netherlands compared to the US. The audit market in the Netherlands is highly concentrated with more than 90% of the public companies audited by Big4. Unlike the US, in which the audit market is still very competitive at the local level (Bill and Stephens, 2016), the Netherlands have a rather small audit firm market. The concentration may lead to the lack of competition and client audit firm choices. As a result, investors do not value Big 4 audit firms differently even after the disclosure of the deficient inspection findings and the announcements of fines decisions. Another possible reason is that the information may considered to be less relevant for investors as AFM do not provide detailed information about the percentage of deficient engagements for public and private companies. Moreover, the smaller litigation risks for audit firms together with the potential outdated information may also lead to the lack of reaction.

Big 4 audit firms are also under inspection by the PCAOB as they have public clients listed in the US. In additional analyses, I report the market reactions to the publications of the PCAOB inspection reports. The results suggest that investors do not react significantly to the disclosures, except for KPMG. In combination with the results of my main analysis, the market participants do not adjust their valuation of auditing around all the events related to public oversight. In another additional analysis, I continue to investigate how the borrowers in the debt market react to the publications of AFM and the PCAOB inspection findings by employing the cost of debt as a proxy. The results show that cost of debt decreases after the publications of the first and second AFM inspection, suggesting an increase in perceived audit quality. However, these results should be interpreted carefully as other important changes happened in the audit market during that period, including disclosure of audit firms' transparency reports and anticipated audit firm rotation. The lack of a control group makes it impossible to distinguish the cause of the increased perceived audit quality. In contrast, the analysis on the PCAOB inspection shows that the cost of debt increases, suggesting auditor

reputation damages. The natural diff-in-diff design in this analysis provides more credibility for interpreting the results.

I contribute to the literature in several ways. Firstly, most prior research investigating the effect of public oversight in auditing profession focuses on the US setting. In this paper, I provide empirical evidence that AFM inspections in the Netherlands do not seem to have much capital market impact. Secondly, I also look at the debt market reactions to the inspections, which to the best of my knowledge has not been address in extant literature. This provides some guidance for practice since debt serves an ultimate important role in companies' financing activities (Pittman and Fortin 2004).

I am aware that my results are subject to a number of limitations. First, my analysis focuses on the Netherlands. So the findings may not be generalizable to other countries with different audit market structures and regulation environments. Secondly, I do not have a control group in my cost of debt study on the AFM inspections, and my cost of debt analyses are relatively indirect tests. Thirdly, I only study cost of capital for public listed companies in this paper. Future research could complement my research by looking at the private companies.

Chapter 5: Conclusion

5.1 Summary

Being one of the most profound changes in the history of the auditing profession, public oversight receives considerable attention from academics, regulators, stakeholders and society at large. Prior literature has focused on investigating the impact of public oversight on accounting quality and auditor reporting behavior of big audit firms in the US In this dissertation, I extend this stream of literature by examining various effects of public oversight in the US, both from the investor perspective and the audit firm perspective. Additionally, using the public oversight setting in the Netherlands, I study how the publication of inspection reports affects investors' perceived audit quality in a non-US setting.

The results of my first study, described in chapter 2, provide some indication that inspection reports issued by the PCAOB are value relevant for capital market investors. More specifically, I find that stock market liquidity decreases after the publication of the first inspection reports, regardless of the inspection results. This suggest that the effect of the changed perceived audit quality is dominating after the first inspection. After the second inspection, liquidity increases and the increase is driven by clients with deficient auditors who do not contest the PCAOB inspection findings. In other words, the expected benefits of disclosing the results of audit firm inspections only seem to become visible after the disclosure of the second round inspection reports. Combined with the finding that liquidity first decreases, the results suggest that there is a learning effect in incorporating the information conveyed in the inspection reports and it helps to close the information gap after the first inspection. However, the results show that liquidity does not significantly change after the third inspection, suggesting that the informational value of inspection reports appears to fade out after the third inspection round.

While my first study investigates how investors value PCAOB inspection reports, my second study, described in chapter 3, focuses on whether publicly disclosed inspection findings can shape auditor behavior. The intended goal of PCAOB inspections to improve audit quality can only be achieved if inspection outcomes can provide sufficient incentives for audit firms to adjust their behavior. Hence, I examine whether inspections affect audit fees of smaller audit firms, which is viewed as a proxy for the input factor of audit quality, conditioning on the content of the inspection reports.

The results of my second study indicate that audit fees increase on average after all first three rounds of inspection. I conjecture that incentives stemming from litigation risks and reputation damage affecting perceived competence following public disclosure of inspection findings can shape the magnitude of audit fees changes. For audit firms with deficient inspection findings, litigation risks and the possibility to get regulatory sanctions are arguably higher than those with clean inspection reports, which leads to more incentives for deficient audit firms to improve audit effort. In a competitive market, increased audit effort should be reflected in audit fees. At the same time, deficient audit firms' ability to raise their fees are largely constrained by reputation loss if clients value the information provided in inspection reports. I further show that the increase in audit fees is driven by audit firms without engagement or disclosed quality control deficiencies. In contrast, audit firms with disclosed

quality control deficiencies experience decreases in audit fees, suggesting that clients perceive Part II of PCAOB inspection reports to be better indicators of audit quality.

In addition, in my second study, I provide insights regarding the impact of inspections on audit firms by investigating the change in personnel decisions and number of public clients. The results show that deficient audit firms experienced a decrease in the number of CPAs, which may suggest a seeking for lower labor cost. On the contrary, for clean audit firms, I document an increase in the number of CPAs, which would be consistent with higher audit effort. However, the number of public clients decreases for clean audit firms. Collectively, my second study suggests that there appears to be a strong focus of public clients on negotiating for the lowest possible audit fee instead of searching for higher audit quality, based on the assumption that PCAOB inspection reports signal audit quality accurately. However, while my first and second study suggest that PCAOB inspections lead to important changes in stock market liquidity as well as audit firm behavior, it does not provide direct evidence that the benefits outweigh the cost of public oversight.

As indicated in the introduction of the dissertation, more and more countries are implementing public oversight in the footsteps of the PCAOB. Even though my first study presented in chapter 2 finds that investors value the information provided in PCAOB inspection reports, it remains an empirical question to what extent these findings can be generalized to other countries with different formats of inspections and different institutional environments. Hence, in my third study, presented in chapter 4, I use the public oversight setting in the Netherlands, which shares some similarities and presents some important distinctions with the PCAOB inspections, to shed some light on this question.

The similarities between the AFM inspections in the Netherlands and the PCAOB inspections in the US include their fully independent nature and their inspection processes. The differences pertain to aspects including inspection coverage, disclosure formats and institutional environment such as litigation risks. I argue that these differences may affect the impact of inspection findings on investors' perceived audit quality. In my third study, I find that the capital market does not react significantly to the publication of AFM inspection reports regardless of their findings, even if these inspection reports disclose quality control deficiencies in the audit firms and thus potentially convey even more information than PCAOB inspection reports.

5.2 Contributions and future research

While the contribution of each study is discussed in the chapters describing the respective studies, the combined findings of the three studies in my dissertation have important implications for audit firms, regulators and researchers. Firstly, the results in my first and second study do suggest that the way audit firms respond to PCAOB inspection findings have an important impact on both investors and audit firms themselves. While the magnitude of change in audit fees is not significant for audit firms stating that they disagree with PCAOB findings, the contesting is considered to be a signal of unwillingness to improve audit quality,

which is documented by negative market reactions in the first study. This group of audit firms are also not hiring more CPAs while other audit firms are doing so. Hence, regulators should draw more attention to these auditors and attempt to incentivize them to improve audit quality in order to increase investor confidence.

Secondly, the results of the first two studies can be useful to regulators in the US in setting guidelines regarding the future development of public oversight. For example, while the first and second round inspection reports are valued by investors, the third round inspection reports do no longer appear to be relevant. Combined with the findings in the second study that clients regard quality control deficiencies as audit quality indicators, it is worth considering for regulators to further improve the informativeness of the inspection reports by disclosing additional information, especially information related to the quality control systems of audit firms.

Thirdly, the combined results of this dissertation can be useful for oversight bodies worldwide in developing and establishing auditor inspection systems.. In particular, regulators need to be aware of their own specific institutional environment in order to improve the efficiency of public oversight and strengthening its role in providing valuable information regarding audit quality, especially given the fact that public oversight is costly.

There are several possible ways that future research can extend the studies presented in this dissertation. First, while my studies provide insights on the economic consequences of public oversight, they do not provide direct evidence on the cost benefit trade-off. Future research may consider to engage in more direct cost benefit analyses. Second, most current research on public oversight relates to the PCAOB while insights on the economic consequences of public oversight in an international setting are limited. Hence, future studies can extend the investigation of the economic consequences of public oversight in other countries around the world and compare the main features that can improve the informativeness and effectiveness of public oversight in different institutional settings. Finally, I have focused in this dissertation on the impact of public oversight for the capital markets. However, public oversight can also be relevant for other stakeholders. For example, public oversight in the Netherlands covers both public and private companies, but also US inspection findings can arguably provide useful information to other stakeholders as well. Future research can extend my research by studying the impact on other stakeholders, such as private investors, tax authorities, the public sector and the public interest in general.

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Appendix 1: Variable definitions for Chapter2

Deficient	equal to 1 for audit firms receiving PCAOB inspection reports with GAAS-related or GAAP-related deficiencies.
Disagree	equal to1 for audit firms who state that they disagree or do not fully agree with the PCAOB findings.
Bid-ask spread	the yearly median quoted spread (i.e., difference between the bid and ask price divided by the midpoint and measured at the end of each trading day).
Price impact	the yearly median of the Amihud (2002) illiquidity measure (i.e., daily absolute stock return divided by US$ trading volume).
Zero Returns	the proportion of trading days with zero daily stock returns out of all potential trading days in a given year.
Total trading costs	a yearly estimate of total round-trip transaction costs (i.e., bid–ask spreads, commissions, as well as implicit costs such as short-sale constraints or taxes) inferred from the series of daily security and aggregate market returns, as developed by Lesmond, Ogden, and Trzcinka (1999).
Post1(2/3)	equal to 1 for observations belongs to the one year period after the publication of the first (second/third) round of inspection reports.
Def_disagree	equal to 1 if the observation has a deficient auditor who disagreed with the inspection findings after the publication of the inspection report, zero otherwise.
Def_other	equal to 1 if the observation has a deficient auditor who did not disagree with the inspection findings after the publication of the inspection report, zero otherwise.
Clean	equal to 1 if the observation has a clean auditor after the publication of each round's inspection report, zero otherwise.
Size	the yearly average of daily stock price times the number of shares outstanding (in US$ millions).
ShareTurnover	the annual US$ trading volume divided by market value of outstanding equity.
Volatility	the annual standard deviation of daily stock returns.
Analyst	the number of analyst following the company in a given year.
Inst_holding	the yearly average of number of shares hold by the institutional investors divided by the number of shares outstanding.
Def1	equal to 1 for audit firms receiving PCAOB inspection reports with GAAS-related or GAAP-related deficiency in the first inspection round.

Def2	equal to 1 for audit firms receiving PCAOB inspection reports with GAAS-related or GAAP-related deficiency in the second inspection round.
Period1(2/3)	equal to 1 if the observation belongs to the period after the publication date of the first (second/third) round inspection reports and before the publication of the second (third/one year period after the publication of the third) round inspection reports, zero otherwise.
Def1(2/3)_disagree	equal to 1 if the observation has a deficient auditor who disagreed with the inspection findings for the first (second/third) round of inspection and belongs to the period after the publication of the first (second/third) round inspection results and before the publication of the second (third/one year period after the publication of the third round of inspection reports) round of inspection reports, zero otherwise.
Def1(2/3)_other	equal to 1 if the observation has a deficient auditor who did not disagree with the inspection findings for the first (second/third) round of inspections and belongs to the period after the publication of the first (second/third) round inspection results and before the publication of the second (third/one year period after the publication of the third round of inspection reports) round of inspection reports, zero otherwise.
Clean1/2/3	equal to 1 if the observation has a clean auditor for the first (second/third) round of inspection and belongs to the period after the publication of the first (second/third) round inspection results and before the publication of the second (third/one year period after the publication of the third round of inspection reports) round of inspection reports, zero otherwise.
Days	the number of days between the publication of the current round and the next round inspection reports.
Period1(2/3) annual	equal to1 if the observation belongs to the period after the publication of the first (second/third) inspection report and before the publication of the second (third/fourth) inspection report, zero otherwise.

Appendix 2: Variable definitions for Chapter3

AUDITFEE	Amount of audit fees paid by the client for the audit in the particular financial year, measured in US dollars.
ASSETS	Total assets of the client firm, measured in US dollars.
INVERE	Sum of inventory and receivables of the client divided by total assets.
ROA	Net income divided by total assets.
LOSS	Indicator equal to one when net income is below zero.
OPINION	Indicator equal to one when a going concern opinion was issued.
BUSY	Indicator equal to one when the financial year-end is in December.
FOREIGN	Indicator equal to one when the client reports foreign income.
SEGMENT	Number of business segments of the company.
SHORT	Indicator equals to one for first year engagement as anew client.
TOTAL_FEE	Total audit fee collected by the auditor in a year.
AVG_ASSET	Average client total assets of the audit firm.
DISAGREE	Indicator equal to 1 for deficient auditors who state disagreement with the PCAOB findings.
OTHER	Indicator equal to 1 for deficient auditors who do not state disagreement with the PCAOB findings.
CLEAN	Indicator equal to 1 for clean auditors.
QCD_D	Indicator equal to 1 for auditors with disclosed QCDs.
QCD_ND	Indicator equal to 1 for auditors with identified but not disclosed QCDs.
NON-QCD	Indicator equal to 1 for auditors without any QCDs identified.
POST	Indicator equal to 1 if the fiscal year ended after the publication of the inspection reports.
FIRST_DEF	Indicator equal to 1 for auditors with deficient first inspection results.
SECOND_DEF	Indicator equal to 1 for auditors with deficient second inspection results.

FIRST-QCD	Indicator equal to 1 for auditors with quality control deficiencies in first inspection reports.
SECOND-QCD	Indicator equal to 1 for auditors with d quality control deficiencies in second inspection reports.
LOGNCPAS	Natural logarithm of the number of CPAs of the audit firm.
LOGNCLIENTS	Natural logarithm of the number of public clients of the audit firm.
Period1	Indicator equal to 1 if the observation belongs to the period after the publication date of the first and before the publication of the second round inspection reports.
Period2	Indicator equal to 1 if the observation belongs to the period after the publication date of the second and before the publication of the third round inspection reports.
Period3	Indicator equal to 1 if the observation belongs to the period after the publication date of the third round inspection reports.

Appendix 3: Variable definitions for Chapter4

R_{it}	Return for client i on day t.
R_{mt}	AEX market index on day t.
AR_{it}	Abnormal return for client i on day t.
CAR_{it}	Cumulative abnormal return for client i on day t.
$CAAR_i$	Cumulative average abnormal return for on day t for all clients.
DT	Indicator equal to one if the client is audited by DT.
EY	Indicator equal to one if the client is audited by EY.
PWC	Indicator equal to one if the client is audited by PWC.
LEV_{it}	The client company's leverage ratio in the year before the events, calculated as the total debt divided by total assets.
$GROWTH_{it}$	The growth in revenues in the year prior to the events.
$Cost\ of\ debt_{i,t+1}$	The interest paid in year t+1 divided by the average total debt in year t+1 and year t.
$POST_{i,t+1}$	Equals 1 for financial year ends after the publication of inspection results,0 otherwise.
$InterestCoverage_{it}$	Calculated as earnings before interest, tax and depreciation and amortization (EBITDA) in year t divided by interest paid in year t.
$CurrentRatio_{i,t}$	Calculated as current asset in year t divided by current liabilities in year t.
$PPE_{i,t}$	Calculated as property, plant and equipment in year t divided by total assets in year t.
$LEV_{i,t}$	Calculated as total debts in year t divided by total assets in year t.
$ASSET_{i,t}$	Total assets in year t.
$GROWTH_{i,t+1}$	Calculated as sales growth from year t to year t+1.
$Neg\text{-}equity_{i,t}$	Indicator equal to 1 if total liability is larger than total asset in year t.

Appendix 4: Valorization-addendum

With rising importance of global capital markets, mechanisms designed to secure their proper functioning become increasingly important. External financing is based on the concept that firms can credibly communicate their true economic performance by means of audited financial statements. If investors lose confidence in the reliability of audited financial information, market participation and the availability of capital decrease, harming financial stability.

Public oversight of the auditing profession represents a mechanism intended to ensure high audit quality and was installed in response to investor loss of confidence resulting from high-profile financial reporting scandals in which auditors were also blamed. It is considered as one of the most profound changes in the history of audit regulation. The US set the tone in 2002 by creating the Public Company Accounting Oversight Board (PCAOB) putting an end to self-regulation of the auditing profession, which was the dominant model for many decades. Subsequently, many other countries (including all EU member states) followed the US example of installing independent public oversight in varying forms and stages of development. The central aim of independent audit regulators is to ensure trust in the financial markets and enhance the protection of investors and the public interest through audit oversight, enforcement and improving audit quality.

Since the creation of the PCAOB, the value of stock trading and audit fees have only further increased, which makes the relevance of independent public oversight on the auditing profession even more important for regulators, audit firms as well as investors. For example, from 2002 to 2015, the total value of stock traded in the US increased from US$ 17 trillion to US$ 42 trillion (World Federation of Exchanges 2016). Similarly, total audit fees paid by public listed companies have increased from US$ 2,902 million in 2002 to US$ 8,146 million in 2015 (AuditAnalytics 2016).

Motivated by the debate on the effectiveness of public oversight, which is not uncontested, and the paucity of empirical evidence, my dissertation investigates economic consequences of public oversight and specifically the impact of disclosure of inspection outcomes on information asymmetry and the cost of capital in the equity and debt market, and auditor behavior. The findings from this dissertation can inform capital market participants in their decision-making and provide insights to public oversight bodies on their impact on the capital and audit market.

Specifically, the findings in Chapter 2 suggest that stock market liquidity in the small audit firm market segment decreases on average after the publication of the first PCAOB inspection reports regardless of the inspection outcome, implying an increased cost of capital, which would be opposite to the regulatory intention of improving investor confidence. However, liquidity increases after the publication of the second round inspection reports for clients audited by clean auditors and deficient auditors who do not disagree with the PCAOB's findings, while there appears to be no change in liquidity after the third inspection. By means of comparison, it is shown that stock market liquidity increases after the publication of the first

inspection reports for the large audit firms. Overall, these findings suggest that PCAOB inspection reports change investors' perceptions of future audit quality and that there is a learning process in the capital market when it comes to the interpretation of inspection reports. These findings have implications for regulators in terms of considering providing more guidance for investors to understand the inspection process as well as the findings, and being aware that investors appear to react differently to inspection results of large versus smaller audit firms.

The findings in Chapter 3, which investigates the behavior of smaller audit firms after the publication of the PCAOB inspection findings, are relevant for both investors and regulatory bodies. For investors, the results suggest that the audit firms' reactions to the quality control findings (i.e. Part II inspection outcomes) provide more useful information on future audit quality compared to the engagement related findings (i.e. Part I inspection outcomes). By utilizing this information effectively, investors may make better decisions. For regulators, the findings of the study suggest that there is an important group of client companies in the smaller audit firm market segment that appear to have a stronger interest in demanding lower audit fees rather than audit quality. As regulators are using a "one size fits all" approach in implementing public oversight, they should consider treating large and small audit firms differently to achieve better performance. Furthermore, by knowing that Part II of the inspection reports are more informative for companies in choosing their auditors, regulators may want to pay particular attention to consider disclosing more, and potentially also more timely, information on the audit firm quality control system, after having carefully evaluating the costs and benefits.

Finally, Chapter 4 examines how investors react to the publication of the Dutch AFM inspection findings and penalty announcements. In contrast to the findings in Chapter 2 relating to the US setting, it appears that the information is much less valued in the Netherlands. Hence, regulators need to be aware of the institutional factors affecting investor perception of public oversight.

Overall, the findings of this dissertation can help improve public oversight on the auditing profession, with the ultimate goal to improve audit quality. In particular, the dissertation provides innovative insights that regulators need to pay more attention to the inherent differences between large and small public accounting firms in designing the public oversight system, and the impact of institutional differences. Although the dissertation suggests that there is room for further improvement of public oversight, this does not come without costs. Specifically, it is questionable whether the costs of public oversight can be offset by the potential benefits of increased audit quality, especially in the presence of a low audit quality demand for certain type of companies in the market. Future research on this matter is warranted.

Curriculum Vitae

Lei Zou was born on May 3rd, 1988 in Hunan Province, China. From 2006 – 2010 she studied to obtain her undergraduate degree in Accounting at the School of Business and Economics, Central South University (China). She obtained her MSc. in Business Research (with a specialization in Accounting) from Maastricht University in August 2013. In September 2013 she became a Ph.D. candidate at Maastricht University at the Accounting and Information Management department, focusing on auditing research. During her doctoral studies she has been a visiting scholar at the University of Florida (U.S.). She has presented her work at various accounting conferences such as the midyear Meeting of the Auditing Section of the American Accounting Association (AAA), the International Symposium on Auditing Research, and the European Auditing Research Network Symposium, and workshops at the ESSEC Business School, the University of Amsterdam, the University of Melbourne, and the University of Queensland. Since June 2017 she works as a Lecturer at the School of Accounting at University of New South Wales (UNSW) Australia.