ESSAYS ON THE ECONOMICS OF MARKET AND REGULATORY ENFORCEMENT IN AUDITING

by

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Abstract

Within the framework of classical auditing theory (Simunic, 1980), an auditor is motivated to exert more effort in the presence of greater litigation risk imposed by courts or regulators. A key element underexplored by literature based on the auditing theory is how the detection of audit failure or non-compliance of auditing standards. This dissertation uses two natural experiments to illustrate the importance of auditor misconduct detection. The first essay exploits mergers of brokerage houses in order to examine whether an exogenous loss in analyst coverage affects audit effort. Security analysts, who are considered to be sophisticated users of financial statements, scrutinize auditor-verified financial statements. I predict that a change in perceived analyst scrutiny will cause auditors to change the effort that they expend in achieving high auditing standards. Using the audit fee as the proxy for audit effort, I find that firms which lose an analyst experience a reduction in audit fees, compared to similar firms that do not lose an analyst. Moreover, this effect is stronger for smaller firms. Overall, the results support the hypothesis that analysts contribute to auditor discipline.

The second essay of this thesis makes use of an announcement by the PCAOB on May 18, 2010, which indicates that the PCAOB oversight of foreign auditors has been restricted, as an exogenous shock, in order to identify the perceived effectiveness of cross-border enforcement of audit oversight. Analyzing a comprehensive sample of foreign companies registered with and reporting to the SEC, I document that 1) the "inability" announcement had a spillover effect: the stock market reacted negatively not only for companies mentioned in the "inability" list, but also for other U.S. listed foreign companies; 2) the market reactions to the announcement varied with companies' home country institutional strength and firm-level characteristics; 3) US-listed

foreign companies' bid-ask spreads increased following the announcement and the changes in bid-ask spreads also varied with companies' home country institutional features. The evidence supports a prediction of the theory developed herein: that the value creation of adherence to a stringent auditing regime should be more pronounced for companies from countries with weaker institutional strength.

Preface

This dissertation is original, unpublished, independent work by the author, Ti Gu.

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Dedication

To my parents

Chapter 1: Introduction

Within the framework of classical auditing theory (Simunic, 1980), an auditor is motivated to exert more audit effort in the presence of greater litigation risk. Applied to auditing practice, mechanisms that detect audit failure to identify material misstatement or non-compliance with auditing standards are a key component in this framework. Litigation or sanctions cannot occur without the discovery of audit failure when such failure occurs. Thus mechanisms that facilitate such discovery are essential to ensure audit effort and quality, and can therefore affect the value of auditing.

The two essays of this dissertation illustrate the importance of market and regulatory mechanisms that detect audit failure by using three unique settings. Specifically, the first essay investigates whether security analysts contribute to auditor discipline. The second essay studies how cross-border regulatory oversight of auditors affects client valuation by examining a sample of foreign companies listed in the U.S. In addition, I also propose a study for future research by providing economic analysis on whether U.S. cross-border audit oversight on audits of U.S.-listed foreign companies exerts an externality on audit quality and the audit fee of foreign auditors' clients not subject to the U.S. regulatory regime.

The empirical challenge in testing how market and regulatory monitoring affects audit quality and client valuation is that the two constructs are endogenous. For example, analysts are more likely to cover firms with better quality auditors, so that the analysts have better information to reply on (McNichols and O'Brien, 1997; Hayes, 1998). It is therefore difficult to attribute the full extent of any observed association between third party audit discipline and audit production properties solely to the discipline role of third parties rather than to the other factors.

To solve this identification problem, the first essay (Chapter 2) makes use of mergers of brokerage houses as an exogenous source of loss in analyst coverage. Security analysts, who are generally considered to be sophisticated financial statement users, scrutinize auditor verified financial statements. I predict that the exogenous change in analyst scrutiny will cause auditors to change their effort level ex ante. The identification strategy follows Hong and Kacperczyk (2010). Suppose that two brokerage houses merge and that prior to the merger each had a single analyst covering a particular firm. Post-merger, the combined brokerage will assign only one of the analysts to follow the firm. Consequently, broker mergers provide variation in analyst coverage exogenous to firm characteristics. I exploit this exogeneity in restricting the sample of firms to those covered by both of the brokerage houses before the merger, and then covered by the merged brokerage.

My identification strategy yields 6 brokerage house merger events from 2005 to 2008.[1] Associated with these mergers are 320 unique non-financial firm-years (with all the necessary data) that were covered by both houses in the years prior to the merger and by the combined broker after the merger. After identifying the stocks exposed to exogenous analyst coverage termination (i.e. treatment sample), I further use an extensive set of matching techniques to construct control samples along with a large set of observable characteristics that are likely to be associated with treatment assignment (i.e. the merger event) and outcome (i.e. the change in audit fees). Relying on the matched samples, I use a difference-in-differences (DID) approach that estimates the treatment effect by adjusting the change in audit fees of the treatment group with the change in audit fee of the control group.

[1] See Section 2.3.2 for details of the identification.

My empirical strategy yields two main results: 1) an exogenous decrease in analyst coverage leads to a smaller increase in audit fees for the treatment group (i.e., firms whose analyst coverage goes down due to brokerage mergers) compared to that for the control group, 2) the difference in difference estimator is larger in both magnitude and significance level for smaller firms. The results are robust to the introduction of matching techniques with regression adjustments. I find that the exogenous analyst coverage termination's effect on audit fees remains after I control for the change of a wide range of firm characteristics. The firm characteristics included cover the classical audit fee determinants in the prior literature and variables likely to be associated with the merger event and change in audit fees such as institutional ownership, return on assets, average monthly stock return, stock return volatility and stock turnover. Overall, the results suggest that analysts have a disciplining role on auditors.

Knowledge of how the market disciplines auditors is an important input to decisions on regulatory audit oversight. Unlike voluntary choices of audit firms by public companies and voluntary decisions of hiring external audit firms by private companies, which are made by management to maximize firm value, regulatory audit oversight does not necessarily create value for audit clients. If audit regulation creates too much burden on audit firms, a regulation can negatively impact firm value with such burden transferred to audit clients. Chapter 3 of this dissertation investigates whether U.S. cross-border audit oversight affects value of foreign companies listed in the U.S., and whether the value added varies with home country institutional strength. A long-lasting question in the international finance area is whether U.S. accounting and auditing requirements create value for cross border listings. The leading theory of international cross-listings, "bonding theory" as advocated by Coffee (1999) and Stulz (1999), argues that SEC's stringent disclosure requirements and increased legal exposure associated with U.S.

listing upgrade U.S.-listed foreign companies' corporate governance, and thus foreign firms experience significant positive returns after listing in the U.S. However, prior research has failed to provide direct evidence for the valuation benefits of U.S. listing accounting requirements, since it is particularly difficult to disentangle the confounding effects associated with cross-listing, such as the effects caused by changes in liquidity associated with the U.S. capital market, risk sharing, investor base, and investment banking relations.

In Chapter 3, I use the unexpected news release by the U.S. Public Company Accounting Oversight Board (PCAOB) on May 18, 2010 to identify changes in investor confidence in cross-border audit oversight. On May 18, 2010, the PCAOB for the first time published the names of all foreign companies audited by audit firms from countries blocking the PCAOB access to local audit information. A salient fact reflected by the sudden announcement is that certain foreign jurisdictions have successfully denied an important way in which the PCAOB enforces the U.S. auditing and accounting standards, without affecting the associated foreign companies' U.S. listing status. This announcement was a surprise because the PCAOB had never published the names of cross-listed companies associated with inspection problems prior to May 18, 2010. Previously, the board had merely disclosed that some scheduled inspections were delayed and provided names of audit firms experiencing inspection delays, without explicitly explaining the reasons for the delays. Market reactions to this announcement shed light on the value of cross-border audit oversight since both the PCAOB announcement decision and the blocking decision of foreign regulators are reasonably external to foreign companies' fundamentals. Because of this exogeneity, stock market reactions to the announcement can be assumed to reflect the oversight value rather than individual firms' fundamentals. Significant negative reactions should indicate that the PCAOB oversight overseas creates value for cross-listed firms.

Analyzing the sample of foreign companies registered and reporting with the SEC, I document 1) this "inability" announcement has a spillover effect: the stock market reacts negatively not only for companies mentioned in the "inability" list, but also for other U.S. listed foreign companies; 2) the negative reactions exist in both cross-listed companies (i.e., those with both home country listing and US listing) and companies without home listings; 3) market reactions vary with the companies' home country institutional strength and firm-level characteristics; 4) US-listed foreign companies' bid-ask spreads increased following the announcement and the change in bid-ask spreads also varies with companies' home country institutional features. Overall, the evidence indicates that the value creation of bonding to a stringent auditing regime is more pronounced for companies from countries with weaker institutional strength, which is exactly the pattern that one should expect: the value added of a bond with a stringent auditing regime is higher the weaker the forces, apart from the regime, in disciplining auditors.

While the PCAOB cross-border audit oversight was designed to ensure audit quality of U.S.-listed audit clients in an effort protect investors in the U.S. capital markets, it can affect investors in other capital markets, to the extent that audit quality of clients listed in the U.S. and other clients is economically connected through the underlying quality control system. Chapter 4 provides analysis for such a connection. Specifically, I analyze whether the audit quality of foreign auditors' clients *not* listed in the U.S. changed following registration, initial inspection and settlement of disciplinary orders. In addition, I further analyze the connection by analyzing change in audit fees of clients not listed in the U.S. for foreign audit firms.

By definition, quality control refers to policies and procedures designed to provide assurance that an audit firm's personnel comply with applicable professional standards and the

firm's standards of quality. Due to knowledge, technology and experience constraints, the quality control system (i.e. rules and auditing procedures adopted to avoid audit failure) adopted by foreign audit firms may not be the optimal one. PCAOB cross-border audit inspection provides a unique opportunity for foreign audit firms to learn how to efficiently design and enforce quality control system from senior practitioners in the auditing profession from the U.S. As such, inspection provides a direct way to identify defects in quality control system. For a profit maximizing audit firm, the occurrence of *de facto* remediation in the quality control system for U.S.-listed clients hinges on whether the remediation increases the net profit of the audit firm. If fixing quality control problems can lead the firm to efficiently allocate audit effort, constrain engagement partner self-serving activities or avoid junior staff slackness, then the audit firm will improve the quality control system. The audit firm will then apply this system to auditing practice of both U.S.-listed clients and clients listed in the home country. In addition, the spillover effect will also occur when it is economically more efficient to apply the same quality control system to U.S.-listed clients and other clients For example, when the audit firm creates an internal training program on auditing procedure, the firm would enroll personnel not engaging in audits of U.S.-listed client in the program as well, as the marginal cost of adding more personnel is small given the existence of such program. In this sense, PCAOB cross-border audit oversight exhibits a positive externality on audit clients not subject to its regulation regime.

On the other hand, remediation in quality control system may occur only for the group of U.S.-listed clients if applying the same quality control system to U.S. listed clients and other clients causes profit impairment. Standards for client acceptance and retention is an example. Due to stringent legal protection for investors in the U.S., litigation risk of accepting U.S.-listed clients is much higher than non-U.S. listed clients given client quality (Choi et al. 2009).Thus,

the standard adopted to accept U.S.-listed clients is not necessary the profit maximization client acceptance standard for non-U.S.-listed clients. In this case, audit firms will not adopt the same client acceptance standard for the two groups even if they take steps to remedy the rules for accepting U.S.-listed clients. In addition, possibility of negative externality exists to the extent that foreign audit firms may improve audit quality of U.S.-listed clients by allocating most training resources and high quality personnel to U.S. audit services at the expense of non-U.S. audit services. Chapter 4 sets out a methodology to examine the spillover effects.

The remainder of the dissertation is structured as follows. Chapter 2 examines whether financial analysts contribute to auditor discipline. Chapter 3 studies whether PCAOB cross-border audit oversight adds to or reduces the value of cross-listings, and how the value-added varies with home country regulation. Chapter 4 introduces the background of the PCAOB cross-border inspection programs and lays out economic analysis for the connection between audit production of foreign auditors' U.S.-listed clients and other clients. Chapter 5 summarizes the findings and concludes.

Chapter 2: Do analysts contribute to auditor discipline? Evidence from a natural experiment

2.1. Introduction

External auditors and financial analysts are two central information intermediaries in well-functioning capital markets. Both groups are "information producers", but they play quite different roles. The job of analysts is to evaluate a firm based on available information, while the role of external auditors concerns the verification of management-prepared periodic financial statements. Very little is currently known about the relationship between the work of analysts and auditors. I attempt to shed some light on the relationship by examining whether analysts discipline auditors. Specifically, I examine whether analyst monitoring affects audit effort. Knowledge about how an important third party affects auditors can inform regulators on the amount and the focus of auditing regulation.

A by-product of analysts' evaluation of companies is monitoring and detection of financial misstatements. Dyck et al. (2010) documents how analysts blew the whistle on corporate fraud occurring at many firms including Amazon, Charter Communications, Compaq Computer, CVS, Gateway, Global Crossing, Motorola, PeopleSoft, and Qwest Communications.[2] Analyst's role as an external monitor potentially has two distinct effects, one on management and the other on auditors. The empirical work by Yu (2008), Irani and Oesch (2013) and Chen et al. (2013) exploit exogenous variation in analyst coverage and find that the monitoring from analysts causes management to decrease accrual-based earnings management.

[2] Dyck et al. (2010) provide a summary of the cases on their website. For the summary, please search: http://www-2.rotman.utoronto.ca/dyck/.

The effect on auditors is less clean. On the one hand, analyst coverage reduces auditors' litigation risk and their effort since analysts reduce the probability or magnitude of misstatements in the financial statements before the audit is conducted. On the other hand, analysts are capable of uncovering misstatements that are not detected by auditors, thereby increasing litigation risk and audit effort. Therefore, it is an empirical question whether the monitoring role of analysts increases or decreases audit effort.

The empirical challenge in examining the discipline role of analysts on auditors is two-fold. First, the determinants of analysts' coverage (a proxy for the monitoring intensity of analysts) are commonly associated with other factors that affect auditors' risk assessment (omitted variable problem), such as the firm's fundamental economic condition and future prospects. Further, audit effort may also affect analysts' coverage decision (reverse causality problem). Thus, it is hard to attribute the full extent of any observed association between analyst coverage and audit effort solely to the disciplining role of analysts rather than to the other factors.

I sidestep the above problems by exploiting exogenous reductions in analyst coverage resulting from brokerage house mergers. The identification strategy follows Hong and Kacperczyk (2010). Suppose two brokerage houses merge and each has an analyst covering a particular firm. When one brokerage acquires or merges with the other, the combined brokerage after the merger will only assign one of the analysts to follow the firm. Consequently, broker mergers provide variation in analyst coverage exogenous to firm characteristics if I restrict the firms to be covered by both of the brokerage houses before the merger, and continue to be covered by the merged brokerage.

My identification strategy yields 6 brokerage house merger events from 2005 to 2008.[3] Associated with these mergers are 320 unique non-financial firm-years (with all the necessary data) that were covered by both houses in the years prior to the merger and by the combined broker after the merger. After I identify the stocks exposed to exogenous analyst coverage termination (i.e. treatment sample), I further use an extensive set of matching techniques to construct control samples along with a large set of observable characteristics that are likely to be associated with treatment assignment (i.e. the merger event) and outcome (i.e. the change in audit fees). Relying on the matched samples, I use a difference-in-differences (DID) approach that estimates the treatment effect by adjusting the change in audit fees of the treatment group with the change in audit fee of the control group.

To identify the sample, I use the diagnostic techniques suggested by Rosenbaum and Rubin (1985), Rubin (2001), and Stuart (2010) to evaluate the quality of various matching results. Specifically, the optimally matched control sample yields the smallest standardized difference of means across the largest number of firm characteristics between the control sample and the treatment sample, minimizes the standardized difference of means of the particularly important firm characteristics (firm size, analyst coverage and audit fees) and results in the fewest number of "large" standardized difference of means (greater than 0.25 as suggested by Rubin, 2001).

Using the optimally matched control sample, I first successfully replicate the main results of Irani and Oesch (2013): an exogenous decrease in analyst coverage leads to an increase in accruals management. Then, I examine the effect of decrease in analyst coverage on audit effort.

[3] See Section 2.3.2 for details of the identification.

However, audit effort is unobservable, so I use audit fee as its proxy, following prior findings that audit fee increases in the face of higher litigation risk are almost exclusively caused by higher levels of audit effort (i.e. more audit hours) (e.g., Davis et al., 1993; Simunic and Stein, 1996; Bell et al. , 2001).[4] My empirical strategy yields two main results: 1) an exogenous decrease in analyst coverage leads to a smaller increase in audit fees for the treatment group (i.e., firms whose analyst coverage goes down due to brokerage mergers) compared to that for the control group, 2) the difference in difference estimator is larger in both magnitude and significance level for smaller firms.

To address the concern that the observed change in audit fees in response to analyst coverage reduction can be caused by the effect of coverage reduction on other firm characteristics, I perform two tests. I first estimate the difference-in-differences estimators for a set of variables that have the potential to affect audit fees. The variables includes the percentage of institutional ownership, daily stock return volatility, average monthly stock turnover, average monthly stock return, return on asset, cash flow volatility and the classical audit fee predictors. The difference-in-differences estimator suggests that exogenous reduction in analyst coverage increases institutional ownership. This result is consistent with the theoretical prediction and empirical finding by Kelly and Ljungqvist (2012), which shows that exogenous analyst coverage termination increases the institutional investors' relative information advantage over retail investors and thus increases institutional investors' demand.

[4] Examples of other studies using audit fee as the proxy for audit effort include Bentley et al. (2012), Black et al. (2011), Hribar et al. (2010) and Lobo and Zhao (2013). See Section 2.3.1 for the literature supporting the validity of using audit fee as the proxy for audit effort.

After that, I regress the change in audit fees on the treatment indicator (equal to 1 if the firm experienced an exogenous drop in analyst coverage, and 0 otherwise) and the change of the above variables using the matched full sample. The regression results suggest that after controlling for the change of other variables affecting audit fees, the treatment effect is still very significant (p=0.001). Note that regressing on the changes using the matched sample in essence combines matching with modelling adjustments (linear regression in my setting), where the regression adjustment is used to "clean up" small residual covariate imbalance between treatment group and the matched control group (Abadie and Imbens, 2006; Stuart, 2010).

To test whether the observed difference in audit fee change between the treatment group and the control group are caused by the identified treatment, I perform placebo (the term "placebo" here is used in contrast to the "actual" timing of the merger event) difference-in-differences test which falsely shifts the merger year one (or two) year before (or after) the actual event (i.e., mergers of brokerage houses) year. I find that falsely shifting the event year yields insignificant difference in difference estimators, and its magnitude is much smaller than the actual ones. The finding increases the confidence that the difference in the change between the treatment group and the control group is more likely due to the treatment, as opposed to some alternative force.

Overall, this study adds to the literature on the interplay between financial intermediaries. Fong et al. (2013) investigate whether analysts have a disciplining role on credit rating agencies. Their basic argument is that analysts' ability to reveal the real condition about the firm makes it costly for credit rating agencies to inflate ratings. They find that a drop of exogenous analyst coverage increases the rating of a firm, consistent with their conjecture that analysts have a

disciplining role on credit rating agencies. My study complements their study by finding that analysts also play a disciplining role on auditors by increasing audit effort.

Additionally, this study complements prior literature investigating the components of auditors' litigation risk. This risk has three key components: (1) misstatement probability —that the audited financial statements contain a material error, (2) revelation probability—that the failure of audit to detect the material error will be discovered, and (3) factors affecting the law suit process and outcome. While the prior literature mainly finds that misstatement probability (e.g., Simunic, 1980; Bell et al., 2001) and ease of law suits (e.g., Choi et al. 2008, 2009; Seetharaman et al., 2002; Venkataraman et al., 2008; Badertscher, et al., 2013) affect litigation risk and audit fees, a neglected yet important area is whether misstatement revelation mechanisms affect auditors' perceived litigation risk and audit fees. This paper bridges such a gap in the prior literature by looking at the effect of a market enforcement mechanism's (i.e., analysts) on auditors. From a social planner's perspective, understanding how a market enforcement mechanism affects auditors sheds lights on the focus of regulation. For example, the finding that auditors work less hard when its clients are less governed by analysts suggests that the auditing regulation needs to highlight companies neglected by other external monitors.

The finding that a drop in exogenous analyst coverage reduces audit fees provides a first step to understanding the association between other misstatement detection mechanisms and auditors' perceived litigation risk. One example of a misstatement detection program is the "SEC Whistle Blower Enforcement Program." Similar to analysts, a whistle blower program can increase the revelation probability of material misstatements. To this end, knowledge of the

association between analysts and auditors can inform the whistle blower program's economic consequence and is useful for future policy design.

To my knowledge, the only other paper that investigates the association between analyst coverage and audit fees is Yu et al. (2012). They argue that analysts increase the revelation probability of material misstatement and thus increase management's risk to manage earnings, consequently decreasing the possibility that a misstatement exists in pre-audited financial statements. Based on this argument, they hypothesize that analyst monitoring decreases auditors' perceived litigation risk. However, a neglected factor in their study is that if analysts increase the revelation probability of misstatements, then they increase auditors' litigation risk simply because they bring auditor failure to light.

Empirically, using analyst coverage and audit fee information from China, they report a negative association between analyst coverage and audit fees. The difference in their findings versus mine could be due to the institutional differences between China and the United States. For example, the legal regime in the U.S. is tougher than that in China. Without a legal system imposing tough legal liability for audit failure, the discipline effect of analysts on auditors can be minimal. Perhaps more importantly, the opposite result between their paper and mine may be caused by different research designs. To investigate whether analysts discipline auditors, it is essential to find exogenous variation in analyst coverage that is correlated with analysts' monitoring intensity but not correlated with other firm characteristics such as the firm's future prospects and firm type. Otherwise, any observed association between analyst coverage and audit fees are subject to alternative explanations. Yu et al. (2012) do not exploit exogenous variation in analyst coverage. In contrast, this paper relies on the merger of brokerage houses to identify

exogenous analyst coverage termination. Therefore, the results provided by this paper are more reliable.

Cassell et al. (2011) is another related paper. They conjecture that short interest serves as a signal for auditors about the potential for material misstatements in the pre-audited financial statements and hypothesize a positive association between audit fees and short interest. Security analysts and short sellers are similar in the sense that both are sophisticated financial statement users. However, different from Cassell et al. (2011), this paper does not intend to examine whether auditors extract information from security analysts.[5] In contrast, the purpose of this paper is to investigate whether the role of analysts affect audit effort, and my empirical design allows me to focus on the monitoring role (as opposed to the information role) of analysts on auditors.

The remainder of the paper is organized as follows. Section 2.2 reviews related literature and develops testable hypotheses. Section 2.3 presents the matching methods and empirical design. Section 2.4 presents data source, sample selection, and the benchmark OLS regression results. Section 2.5 discusses the matching quality and results for the two hypotheses. Section 2.6 provides sensitivity test for the validity of the difference-in-differences methodology. Section 2.7 performs "double robustness" check for the two hypotheses and investigates whether analysts affect audit effort through changes in other firm characteristics. Section 2.8 concludes.

[5] It is a different and separate question whether auditors learn from the information generated by analysts (e.g., down-grading or up-grading) or analysts' coverage condition per se. Such a question is probably a very difficult one using archival research method (as opposed to experimental research method), since one has no means of identifying whether auditors share the same set of information as analysts or learn from analysts.

2.2. Prior literature and hypothesis development

This paper builds on two lines of research: 1) the literature linking auditor litigation risk and auditor fees 2) the literature on the monitoring role of analysts. Below, I briefly review these studies and develop the hypotheses on how the monitoring role of analysts affects audit effort.

2. 2.1. Literature linking litigation risk and auditor fees

The auditing theory by Simunic (1980) suggests that audit fees for financial statements cover the costs of performing audit work and the auditor's expected loss from legal liability, plus a normal profit. In application, auditors minimize their total cost by trading-off the resource costs of audit production and their expected loss from legal liability. The intuition of this theory suggests that auditors react to higher audit litigation risk by raising fees, either to cover the cost of increased audit production effort to reduce the likelihood of material misstatement or by adding a risk premium to help cover possible future litigation costs (Palmrose, 1986; Simon and Francis, 1988; Pratt and Stice, 1994; Simunic and Stein, 1996). Simunic and Stein (1996) find that audit fees are indeed positively associated with litigation risk, and upward adjustments in fees are "made almost exclusively through higher levels of audit effort, rather than through a pure price premium" (page 120). Following this theory, a considerable number of studies find a positive association between litigation risk and audit fees. The prior related literature can be classified into two categories based on the factors contributing to litigation risk.

The first category deals with litigation risk arising from the clients' characteristics affecting the probability that a material misstatement exists in management prepared financial statements. A lot of early research on audit production belongs to this category. For example,

Simunic (1980) conducted a survey in 1977 to investigate the determinants of audit fees. Using the information contained in the returned 397 questionnaires, he finds that auditors charge higher fees when their clients are larger, more complex and have higher business risk. Pratt and Stice (1994) conduct a field experiment to investigate auditors' assessment of litigation risk. They ask 243 audit partners and managers of four "Big 6" firms from offices throughout the U.S. to review a single case describing a prospective audit client, and to assess certain elements of litigation risk associated with the engagement, the required amount of audit evidence, and client fees. They find that auditors rely on clients' financial condition and asset structure (proportion of receivables and inventory to total assets) to assess litigation risk, and that audit fees reflect both the amount of audit evidence collected and an additional premium to cover litigation risk.

The second category focuses on factors affecting the litigation process and outcome. The factors include the toughness of legal regimes and the market condition affecting client's ability to prove loss. For example, Seetharaman et al. (2002) find that U.K. auditors charge higher fees for their services when their clients access U.S. capital markets, but they do not charge higher fees when clients access non-us capital markets, consistent with a stronger legal regime imposing higher risk on auditors. Choi et al. (2009) extend their research to 14 countries and find that auditors charge higher fees for firms that are cross-listed in countries with stronger regimes than they do for non-cross-listed firms, and that the audit fee premium increases with the amount by which the strength of legal regimes in the cross-listed foreign country exceeds that in the home country. Similarly, Choi et al. (2008) find that the Big4 audit fee premium decreases monotonically with the strength of a country's legal liability regime. Choi et al. (2008) interpret their results as supporting their theory that increased legal liability associated with audit failures motivates low quality auditors to expend more effort in their audit process.

Venkataraman et al. (2008) explore variation of legal regime strength within a country. They find that audit fees and audit quality tend to be higher during a client's initial public offering (IPO) period than in the post-IPO period in the United States. They interpret the finding as being consistent with auditors of IPO firms being subject to a tougher legal regime (SEC 1933 Act) as compared to non-IPO firms (SEC 1934 Act).

O'Keefe et al. (1994) find that auditors charge their public clients higher fees and work for more hours than their private clients. This is consistent with private firms being widely considered as having lower litigation risk (e.g., Johnstone and Bedard 2003, 2004; Bell et al. 2002; Lys and Watts 1994; Palmrose 1986). Legal regime differences between private firms (state law) and public firms (federal law and state law) provides one explanation for the audit fee difference. Badertscher et al. (2013) further the comparison by examining audit fees of privately held firms with public debt and publically held firms with public debt and find that the latter charge higher fees. They claim that in their setting both the publicly owned firms and privately owned firms are subject to the same regulation (SEC 1934 Act) and the main difference between the two is a public stock market for public firms. Badertscher et al. (2013) argue that the specific factors of firms with public equity, such as readily available stock price decline to measure the damage from accounting failure, impose higher de facto litigation risk on their auditors and thus cause their auditors to charge higher fees than they charge their private clients.

These prior studies are common in that they all investigate how the components of litigation risk affects audit fees. However, they neglect an important component of litigation risk: audit failure discovery. After all, auditors can be punished for audit failures only if these failures are brought to light. Therefore, it is natural to hypothesize that misstatement detection

mechanisms can affect audit fees and audit effort. This paper tests this hypothesis by investigating how auditors are affected by analysts, who are considered to be an important group of whistle blowers (Dyck et al., 2010). Examining how misstatement detection enforcement affects auditors' incentives and decision making within a legal regime (rather than across regimes) can provide a new perspective to regulators and researchers. To provide the intuition for how analysts affect auditors' exposure to litigation risk, I briefly review in the following section the literature on the monitoring role of analysts.

2.2.2. The monitoring role of analysts

The primary job of analysts is to assess the value of a firm by analyzing financial statements and other available information. As a by-product of their normal work, they collect a considerable amount of value relevant information about the firm, through private information exploration and public information interpretation (Chen et al., 2010). The relevant information puts analysts in a much better position than other parties such as regulators to detect corporate fraud and misstatement (Dyck et al. 2010). Consistent with analysts' information advantage in fraud discovery, Cotter and Young (2007) find that analysts anticipate fraud and drop coverage earlier in the period preceding the public announcement of the Accounting and Auditing Enforcement Release (AAER) by the SEC.

More directly, Dyck et al. (2010) report that analysts as a group are one of the major whistle blowers of corporate fraud. They analyze a sample of corporate fraud perpetrated in companies with more than $750 million in assets in the United States between 1996 and 2004, and the results demonstrate that analysts are important fraud detectors. Among the frauds detected by external governance mechanisms (142 cases), 16.9% were discovered by financial

analysts.[6] This percentage is relatively high, second only to employees (18.3%). The other external fraud detectors include media (15.5%), auditors (11.3%), industry regulators, government agencies or self-regulatory organizations (14.1%), the SEC (7%), equity holders (3.5%), law firms (3.5%) and short sellers (3.5%).[7]

Consistent with analysts' ability to detect material financial misstatements, Yu (2008), Irani and Oesch (2013) and Chen et al. (2013) find that analysts deter accrual-based earnings management. Using an instrumental variable approach, Yu (2008) report a negative association between analyst coverage and (i) discretionary accruals and (ii) the likelihood of successfully meeting or beating analyst forecasts.[8] Similarly, Irani and Oesch (2013) and Chen, et al. (2013) find an exogenous analyst coverage termination leads to an increase in earnings management as proxied by discretionary accruals. They conclude that analysts serve as an external monitor for the firm.

Taken together, the prior literature on analysts indicates that analysts are capable of discovering material financial misstatements and can potentially deter accrual-based earnings management. The auditing literature suggests that audit fees are in essence a function of the

[6] Among the 216 cases investigated, 74(34.3%) are detected through internal governance mechanisms and 142(65.7%) are revealed by external governance mechanisms.
[7] The percentage is calculated using raw data, which clearly identify who reveal the fraud. Analysts are ranked as the third most productive fraud detector (13.8%) with employee being the first (17.1%) and short sellers being the second (14.5%), when Dyck et al. (2010) recode the fraud detector as a short seller when short selling activity prior to revelation is more than three standard deviations above the prior 3-month average. They also provide fraud detector distribution information using value-weighted information.
[8] Note that such evidence does not suggest that analysts decrease managers' incentives to meet or beat analyst forecasts. In instead, they may switch to non-accounting based methods to meet or beat analyst forecasts. For example, Yu (2008) find that management is more likely to "walk down" analyst forecasts to meet or beat analyst forecast when there are more analysts following the firm. Also, He and Tian (2013, internet appendix) report a negative association between analyst coverage and R&D expenditure. However, these activities are not related to auditors' litigation risk or audit effort.

components of litigation risk. The prior literature provides basis for my hypothesis. In the following section, I develop hypothesis on how analysts affect auditors' litigation risk and effort.

2.2.3 Hypothesis development

2.2.3.1. Hypothesis 1: The effect of analysts on auditor discipline

Generally accepted auditing standards (GAAS) require auditors to apply auditing procedures to obtain sufficient appropriate evidence to express an opinion on the fairness of the financial statements and whether they conform to GAAP in all material respects (SEC 2002). A crucial aspect of the auditors' environment is state and federal laws allowing third parties such as investors and creditors to sue auditors in an effort to recover damages. Under the U.S. legal system, when auditors fail to detect material misstatement, they can be sued by clients, investors and creditors based on federal law (Section 10(b)-5 of the Securities Exchange Act of 1934 for securities traded in the secondary markets or Section 11 of the Securities Act of 1933 for new issues of securities), contract law, and tort law.[9] Under Section 11 of the 1933 Act, auditors are liable for ordinary negligence if security holders prove that audit failure caused their financial loss. To avoid liability, auditors need to prove that they have acted with due diligence (Talley 2006, 1657–1658). Under Rule 10(b)-5of SEC 1934 Act, auditors are liable for gross negligence, which is usually tantamount to fraud (Kaplan and Williams, 2012). Contract law and tort law are state laws allowing clients and third parties to sue auditors.

[9] Under which law one can sue auditors depends on one's legal relationship with auditors. For example, the firm can sue auditors under contract law since they are auditors' clients. Investors can also sue auditors under the contract law if the investors are classified as primary third party beneficiary of auditor-client contract according to the Ultramares v. Touche (1931 U.S.) case. For the more general case, investors of public companies can sue auditors under the federal law (either the 1933 Act or 1934 Act depending on whether the purchased securities are new issues).

Litigation can impose significant direct economic loss to auditors. For example, the legal costs of the Big 6 auditing firms were $477 million, representing 9% of their domestic auditing revenues in 1991 (Cook et al. 1992; Kaplan and Williams, 2012). Auditors may suffer from severe reputation loss even if plaintiffs fail to prove that auditors are liable. For example, Arthur Andersen, Enron's auditor, was found guilty in the Enron scandal by a United States District Court. Even though the ruling was later overturned at the U.S. Supreme Court, the firm lost the majority of its customers and shut down. To avoid the legal liability and reputation cost associated with the discovery of auditor failure, auditors are motivated to exert effort to decrease misstatement probability and to increase defensibility during law suits (Bell et al., 2001).

Turning to the institutional background of analysts, the accounting and finance literatures have long deemed them as important external monitors of management (Jensen and Meckling, 1976; Healy and Palepu, 2001). Different from short sellers and regulators, who intentionally search for material misstatements, analysts are passive (as opposed to active) external monitors of the financial statements. After all, their main job is to evaluate the firm. However, they consistently follow specific firms and gather a lot of relevant private information and public information (Chen et al., 2009; Yu, 2008 and Dyck et al., 2010). The accumulated information puts them at an advantage at uncovering material misstatements. For example, in the case of NorthWestern Corporation, analysts were the whistle blowers (Dyck et al., 2010). After looking at the company's 2001 annual report, Charles Fishman, a utility analyst with A.G. Edwards in St. Louis, says "We've never seen anything like this before. We do not believe this accounting methodology paints a good picture of reality. The complex accounting masks NorthWestern's losses." Jim Bellessa, a senior analyst with D.A. Divison & Co. of Great Falls, says he has been studying NorthWestern for 18 months and cannot keep track of all the moving parts. Shortly

after analysts showed their concern about NorthWestern's accounting, the SEC started investigating and found that NorthWestern's senior management manipulated the books to avoid recording losses and to artificially inflate earnings.[10]

Given analysts' ability to detect accounting irregularities, they face the trade-off between the risk and benefit of uncovering it. As agents of investors, it is in their interest to warn investors about material financial misstatements should they suspect it. There are potentially reputational and career benefits to uncovering fraud. However, this incentive can be diluted by the potential conflict of interest between their research and their firms' investment banking services (Brown et al., 1985; Stickel, 1990; Abarbanell, 1991; Dreman and Berry, 1995). Hong and Kacperczyk (2010) find that the disincentive to reveal bad news about the firm is mitigated when there are more analysts covering the firm. They apply the theory of competition and reporting bias to explain the observation. The theory indicates that competition from other information suppliers makes it more costly for the information supplier to suppress information because the first deviator benefits the most from reporting the truth (Besley and Prat, 2006; Gentzkow and Shapiro, 2006).

Built on the literature on analysts' monitoring role and auditors' decision function, two competing predictions emerge. On the one hand, analysts decrease auditors' litigation risk and audit effort in the sense that analysts help auditors to monitor management thereby reducing earnings management ex ante. On the other hand, analysts' ability to ferret out material

[10] See Appendix B for the details of the case. I thank Dyck et al. (2010) for providing the summary of the cases.

misstatements increases auditors' litigation risk by bringing the audit failure to light ex post. Given these opposing effects, the hypothesis is non-directional.

To form a testable hypothesis, I use audit fees to proxy for audit effort. The prior literature investigating the association between audit fee and audit labor input using confidential data supports the use of this proxy. Using survey data from a large accounting firm, Davis et al. (1993) find that audit fee is a strong linear function of audit effort. In a similar vein, using proprietary data of 249 audits performed mostly in 1989 by a Big 6 firm, Simunic and Stein (1996) show that auditors increase audit fees for clients involving higher liability exposure and the fee adjustments are made almost exclusively through higher levels of audit effort (i.e. through increasing audit hours). Bell et al. (2001) examine the relation between perceived litigation risk and audit fees by using confidential survey data collected from a large international accounting firm. They find that higher perceived litigation risk increases the number of audit hours, but not the fees per hour. Bell et al. (2001) conclude that the behavior of increasing audit hours is auditors' strategy to enhance their "defensibility." This evidence suggests that it is reasonable to use audit fees as a proxy for audit effort. In addition, my study is not the first one to use audit fees as a proxy for audit effort. Examples include Bentley et al. (2012) and Black et al. (2011). Given the competing effects of analysts on auditors, I state my first testable hypothesis in a non-directional from as follows:

H1. *Exogenous reduction in analyst coverage is followed by changes in audit fees.*

The basic question underlying the above hypothesis is whether analysts discipline or substitute for auditors. If I find that increased monitoring from analysts leads to audit fees

increases, then it can be inferred the disciplining effect dominates. If the opposite relationship is observed then it can be inferred that the substitution effect dominates.

2.2.3.2. Hypothesis 2: cross-sectional differences in analysts' role of monitoring

The strength of analysts' disciplining or substitution role on auditors depends on the extent to which analysts serve as an external monitor. More specifically, it depends on two factors: 1) the monitoring intensity of other external monitors; and 2) the size of entity monitored. Conceptually, one could predict that the greater the monitoring intensity of other external monitors, the smaller analysts' marginal monitoring effect. However, it is not directly measurable how the monitoring intensity of other external monitors affects analysts' disciplining or substitution role on auditors since it is difficult for a researcher to directly measure the total amount of monitoring from all the external monitors given that a firm's external monitoring environment is composed of media, regulators, credit rating agencies, etc. A proxy for a firm's external monitoring environment is firm size. Smaller firms in general face less external monitoring such as media (Solomon and Soltes, 2012) and equity holders, thus the marginal monitoring effect of analysts is predicted to be stronger for smaller firms. Based on the above logic, I state my second hypothesis as follows:

> ***H2.*** *The marginal effect of a decrease in analyst coverage on auditor fees is stronger for smaller firms.*

2.3. Identification issues and empirical strategy

I discuss the identification issues and empirical strategy for hypothesis testing in this section. Section 2.3.1 presents a benchmark ordinary least square (OLS) regression. Section 2.3.2

discusses the identification issues and provides the identification strategy that exploits exogenous variation in analyst coverage. Section 2.3.3 presents the matching techniques used to construct the sample for hypothesis testing.

2.3.1. A benchmark OLS regression

While my main identification strategy relies on the quasi-natural experiment of exogenous analyst coverage termination, to provide a benchmark I start with an OLS regression that expresses audit fees as a function of analyst coverage and a set of other controls. The OLS regression model follows the standard audit fee model developed by Simunic (1980) and implemented by a large number of later studies. Note that the coefficient on analyst coverage in the OLS regression can be biased since analyst coverage is likely to be correlated with other unobservable firm characteristics such as time varying technology break through (the details of the identification problem is discussed in details in section 2.3.2). The purpose of providing the OLS regression is for comparison with the main identification strategy.

The classical determinants of audit fees are client size, client complexity, and client business risk. Following prior studies (e.g., Francis, 1984; Francis and Simon 1987; DeFond et al., 2000), I use the natural logarithm of total assets (LNASSET) as the proxy from client size. The log transformation of the total assets captures the decreasing marginal cost of auditing as firm size increases, as documented by Simunic (1980). Client complexity is proxied by inventory and accounts receivables scaled by total assets (INVREC), number of business segments (SEGMENTS) and number of foreign segments (FSEGMENTS). I include Loss (LOSS), leverage (LEVERAGE) and going concern opinion (GOCERN) to capture client litigation risk. A big 4 indicator variable (BIG4) is included to capture the big 4 audit fee premium (e.g.,

DeFond et al. 2000; Francis and Simon 1987). The detailed variable definitions for all variables in this paper are provided in Appendix A.

On the basis of the classical audit fee determinants model, I add lagged analyst coverage as the proxy for the monitoring intensity from analysts. Analyst coverage is measured as the mean of the 12 monthly numbers of annual earnings forecasts from the I/B/E/S summary file for the fiscal year. The prior literature documents that analyst coverage is associated with a number of firm characteristics (e.g., Bhushan, 1989; Brennan and Hughes, 1991; O'Brien and Bhushan, 1990; Brennan and Hughes, 1991; Lang and Lundholm, 1996; Kasznik, 1999). Following Yu (2008), I add additional controls to alleviate the concern that analyst coverage captures information about these firm characteristics. The controls include the volatility of business (STD_CFO, measured as the standard deviation of the cash flow from operations deflated by average total assets from years t-5 to t-1), past performance (ROA), growth (MB, measured as the firm's market to book ratio), firms' external financing activities (EXT_FIN, the measurement follows Bradshaw et al. (2006) which uses the sum of net proceeds from equity financing and debt financing scaled by total assets). I also include institutional ownership (INSOWNER) to address the likelihood that institutional ownership influences analyst coverage decisions. Firm fixed effects and year fixed effects are also included as controls for other unobservables that do not change within the firm and across time.

Hypothesis 2 indicates that given the number of analysts, the marginal effect of monitoring will be greater for smaller firms. To shed light on this hypothesis, I re-estimate the OLS regression separately for firms smaller than median size and firms larger than median size. I expect to observe heterogeneity of the coefficients on analyst coverage for the small firms and

large firms, even though the OLS regression is predicted to be biased. Such investigation also further addresses the correlation between analyst coverage and size.[11] In other words, it is a further control for size.

2.3.2. Identification strategy

My main identification strategy is straightforward. I rely on mergers of brokerage houses to identify exogenous changes in analysts' monitoring intensity. My analysis focuses on termination of analyst coverage that results from mergers between brokerage houses. This approach avoids identification problems resulting from the endogenous relation between the level of analyst coverage and audit effort.

The empirical work of McNichols and O'Brien (1997) and the theoretical model by Hayes (1998) suggest that analyst coverage decision is endogenous. Coverage terminations, in particular, are often viewed as implicit sell recommendations (Scherbina 2008). If coverage termination is caused by the firms' deteriorating financial conditions or poor future prospects, then an increase in audit fees in response to coverage termination does not mean that auditor work substitutes for analyst monitoring. Meanwhile, if analysts are more likely to terminate coverage when auditors exert less effort in their audit work, then a positive association would result. Behn et al. (2008) find that analysts' earnings forecast accuracy is higher and the forecast dispersion is smaller for firms audited by a Big 5 auditor. If analysts want to produce more accurate forecasts, then they will prefer to cover firms with higher quality auditors. To the extent

[11] In unreported tables, I also re-estimate the OLS regression separately for each size deciles, size quintiles and size terciles. As I will discuss in the results part, the results follows a similar pattern as the reported results. Basically, the coefficient on analyst coverage is significantly positive for small firms, and become less positive when firm size becomes larger, and finally turns to be negative when firm size is the largest.

that audit effort potentially affects analysts' coverage decisions, any observed positive association between analyst coverage and audit fees is not reliable evidence that analyst coverage disciplines auditors.

I address the above concerns by exploiting the mergers of brokerage houses, rather than analysts' selective terminations. The merger event per se is unlikely to be caused by individual firm's audit effort or litigation risk. If a stock is covered by both firms before the merger, they will remove at least one of the analysts, usually the target analyst (Wu and Zang, 2009). I first retain firms that are covered by both the target and the acquirer before the merger, and then delete firms that are dropped by the combined brokerage. Deleting firms that are dropped by the combined brokerage ensure that the coverage termination is purely caused by the merger event rather than the firm's economic factors.

To make my analysis consistent with previous studies, I extract the list of brokerage mergers from Hong and Kacperczyk (2010) and Kelly and Ljungqvist (2012).[12] To conduct my study, I require audit fee data to be available two years before the pre-merger year (the two years are required for the difference-in-differences methodology).[13] In the merger lists provided by Hong and Kacperczyk (2010) and Kelly and Ljungqvist (2012), the merger event satisfying this requirement starts in year 2005 and their last merger event ends in 2008. Most of my merger events are from Kelly and Ljungqvist (2012) since Hong and Kacperczyk (2010)'s sample period ends in year 2005. Kelly and Ljungqvist (2012) provide target brokers' names and the merger

[12] I thank the authors of the above two articles for making the data on brokerage mergers publically available.
[13] For example, if the merger year is 2005 and the pre-merger fiscal year is 2004, then I require audit fee data to be available in year 2003 and 2002. The Securities and Exchange Commission (SEC) requires public companies to disclose audit fees and nonaudit fees in their proxy statement filed on or after February 5, 2001 (SEC, 2000) and audit fee data is first available for fiscal year 2000. My first event year should be year 2003.

dates information. Using this information, I search the acquirer names from SDC Mergers and Acquisition database.

Since the merger of brokerage houses usually spans a long time (usually several months), it is difficult to pin down a precise disappearance date for the events in my sample. Following prior studies that encounter a similar problem, I define the "event period" as the six months period around the identified merger effective dates (Derrien and Kecskes, 2012; He and Tian, 2013). Therefore, the event start date is three months before the identified merger effective dates and the event end date is three months after the identified merger effective dates. I then measure change in analyst coverage as the analyst coverage difference between the month before event start date and the month after event end date. For other control variables (e.g., financial statement variables and audit fee variable), the fiscal year for the pre-event period (t-1) is the fiscal year ending three months before the identified event date and the fiscal year for the post-event period (t+1) is fiscal year following the pre-event fiscal year.[14]

After getting both the targets' and acquirers' names and defining the event periods, I manually match brokers' name with the broker identifier (BACODE) in I/B/E/S. Sometimes, one broker name will find multiple BACODE matches, this is because I/B/E/S changes brokers' BACODEs over time even though a specific broker has only one BACODE at a point in time. To determine the BACODE for the broker during the pre-event period, I search the coverage activity corresponding with the entire candidate BACODEs for the broker one year before the event start date. The chosen BACODE is the one with non-zero coverage during the pre-event period (add

[14] For example, suppose a firm with a brokerage merger date of September 30, 2006 and for which the fiscal year ends on December 31. The audit fee variable and Compustat variables for year t-1 and year t+1 are from fiscal years ending on December 31, 2005 and December 31, 2006, respectively.

examples in the footnote). This procedure yields me 6 merger events with available broker code and analyst coverage information, with 2 other merger events described in Kelly and Ljungqvist (2012) not being able to find the acquirer broker's analyst coverage information. The missing acquirer is Merrill Lynch & Co Inc for the two events. As notified by Thompson-Reuters, Merrill Lynch is no longer being distributed in the I/B/E/S database. They have removed all the data from this company.[15] Thus, my final sample contains 6 merger events.

After obtaining the broker code for both the target and acquirer, I proceed to construct a sample of treatment firms that were covered by both the target and the acquirer before the merger and continue to be covered by the combined brokerage houses after the merger. I first identify firms covered by both the target and the acquirer in the I/B/E/S detail file during the one year before the event start date (i.e. year t-1). Then I only retain firms that are not stopped in the I/B/E/S stop file before the event start date. This step deletes firms whose coverage termination is likely due to endogenous reasons. After this step, I retain firms that are still covered by the combined brokerage houses in the I/B/E/S detail file during the one year after the event end date (i.e. year t+1). The above procedure yields 494 firm-years experiencing an exogenous analyst coverage termination.

2.3.3. Test of Hypothesis 1

To evaluate how the coverage termination affects audit fees (the test for Hypothesis 1), conceptually I would compare the actual audit fees to the same firm's hypothetical audit fees had the firm not been exposed to the drop in analyst coverage. Because the counterfactual is not

[15] Thomson informs that it is "around December 2010 when the Merrill Lynch forecast were no longer included in the historical feed to WRDS", even though they "are unable to trace an exact date".

observed, I must find an empirical proxy for the hypothetical audit fee. I use a standard approach that constructs a control group with pre-termination characteristics similar to those of the treatment group. The control firms' audit fee change serves as the proxy for the hypothetical audit fee change for the treatment firms had they not been exposed to analyst coverage termination. The treatment effect can be expressed as:

$$DID = (LNFEE_{2,T} - LNFEE_{1,T}) - (LNFEE_{2,C} - LNFEE_{1,C}) \quad (1)$$

In equation (1), the subscripts "1" and "2" present the pre-treatment period and post-treatment period respectively, and "T" and "C" represent treatment firm and control firm respectively. In equation (1), "$LNFEE_{2,T} - LNFEE_{1,T}$" is the change in audit fee of the treatment firm. "$LNFEE_{2,C} - LNFEE_{1,C}$" in equation (1) serves as the proxy for the hypothetical audit fee change for the treatment firm. The difference-in-differences estimate is the mean of individual difference-in-differences (DID) as described in equation (1). If the proxy for the hypothetical audit fee change is successfully chosen, the difference-in-differences estimate measures the average effect caused by the treatment.

For good estimation of the average treatment effect, the control group and the treatment group should be similar in observable or unobservable characteristics related to both treatment assignment (the merger event) and outcome (change in audit fees) so that the observed difference in audit fee changes is caused by the treatment per se rather than these characteristics.[16] To better satisfy this assumption, I use several matching techniques to construct control groups by matching on a wide range of observables that are likely to affect the treatment assignment and

[16] This requirement is called the "ignorability assumption" in statistics for randomized experiments. See Rosenbaum and Rubin (1983b) and Imben (2004) for more details about this assumption.

the outcome (For explanations why matching on such observables better satisfies the assumption, see Rubin and Thomas (1996), Heckman, Ichimura and Todd (1998), Glazerman, Levy and Myers (2003), Hill, Reiter and Zanutoo (2004), Stuart (2010). The basic intuition is that matching on observables also matches on unobservables in so much as they are correlated with those that are observed).

I adopt four types of matching: (1) matching directly dimension-by-dimension along a set of firm characteristics; (2) pure propensity score matching using industry fixed effects and year fixed effects in the propensity score model; (3) appending the propensity score matching in (2) by further requiring the matches for every individual have the same fiscal year; (4) appending the propensity score matching in (2) by further requiring the matches for every individual have the same fiscal year and share the same two digit SIC code.[17] After matching, I follow the advice by Stuart (2010) to diagnose the quality of matching and provide different versions of DID estimators using the various control samples. I choose the optimally matched control sample to test Hypothesis 2 and for further robustness test that combines matching and regression. To diagnose the matching quality, I compute the standardized difference of means for all the variables predicted to be associated with treatment assignment and treatment outcome. I use the following ways to choose the optimal method: (1) the method that yields the smallest standardized difference of means across the largest number of covariates, (2) the method that minimizes the standardized difference of means of a few particularly important firm

[17]I implement several versions of the above four types of matching by either changing the covariates or by using different criteria to choose matches in the propensity score matching. For example, I implement other versions of direct matching by matching on various subsets of variables used in the main direct matching presented in the paper. In addition to the nearest neighbour propensity score matching, I conduct matching by requiring the treatment group's and the control group's estimated propensity scores to be within a distance (caliper) of 0.005. In untabulated tables, the results are robust to the various matching methods, even though the untabulated matching methods generate lower quality matching.

characteristics such as pre-treatment firm size, analyst coverage and audit fees, and (3) the method that results in the fewest number of "large" standardized mean difference of means (great than 0.25) (Stuart, 2010).[18]

Specifically, I first adopt a matching technique in a way similar to Hong and Kacperczyk (2010). I construct a control group by requiring the treatment firms and control firms to be in the same size quintile, stock return quintile, market to book ratio quintile, and stock return volatility quintile using annual sorts. Firm size is measured as the natural logarithm of total assets, market to book ratio is the firm's market cap divided by book value, stock return is the average monthly stock return, and stock return volatility is the standard deviation of a firm's daily stock returns. Further I require the treatment firms and control firms to be from the same fiscal year and having the same two digit SIC industry code. From the available matches, I retain 5 firm-years with the closest analyst coverage to the treatment firm-year. This procedure creates a benchmark portfolio for every treatment firm-year (given there are matches available). To make the benchmark portfolio comparable to the treatment firm, I use the portfolio means of the variables for the firm characteristics.

To address the concern that directly matching on multiple covariates yields limited number of matches (Chapin, 1947), I follow Rasenbaum and Rubin (1983b) to implement the propensity score matching, which facilitates the construction of matched sets with similar distributions of covariates, without requiring close or exact matches on all of the individual variables. The propensity score matching method includes two steps. First, a probit regression

[18] Robin (2001) suggests that for further regression adjustment to be trustworthy, the absolute standardized differences of means should be less than 0.25.

predicts the likelihood of experiencing the exogenous analyst coverage termination on a set of firm characteristics. The sample for the probit model includes firm-year observations that span the lagged treatment periods.[19] The binary dependent variable equals 1 if the firm-year experiences the exogenous analyst coverage termination and 0 otherwise. Since there is little cost to including variables that are actually unassociated with treatment assignment, but it will be very costly excluding a potentially important confounder (Stuart, 2010), I include a rich set of variables that may be associated with treatment assignment and the outcomes in the probit model.[20] The variables include all the independent variables that appear in the benchmark OLS regression as well as average monthly stock return (RET), daily stock return volatility (SIGMA), average monthly stock turnover (TURNOVER), industry fixed effect and year fixed effect in the propensity score estimation model.[21] The reason for including all the variables from the OLS regression is that those variables are classical determinants of audit fees (the outcome variable). The inclusion of monthly stock return, daily stock return volatility and average monthly follows Hong and Kacperczyk (2010) and Kelly and Ljungqvist (2012), who utilize a similar experiment.

After estimating the probit model, I use the estimated propensity scores to perform a nearest-neighbor matching with replacement to form the control group.[22] In addition to the pure propensity score matching, I provide two other versions of matching by appending the propensity score matching with further requiring an exact match of fiscal year and industry. I choose to find

[19] For example, if the firms are scatteredly treated from fiscal year 2005 to 2008, then the sample period is from 2004 to 2007. The sample includes all the firms with available matching variables.
[20] As indicated by Stuart (2010), irrelevant variables will be of little influence in the propensity score model. The cost of including irrelevant variables is just slight increases in variances. Excluding relevant variables can be very costly in terms of increased bias.
[21] The results are robust to several alternative specifications of the probit model.
[22] The result is robust to matching without replacement and matching by requiring the treatment group's and the control group's estimated propensity scores to be within a distance (caliper) of 0.005.

only one control for each treatment to minimize bias in estimates. To the extent that choosing only one match generates relatively large variance, my design is the most conservative one.[23]

2.4. Data, sample, and results for the benchmark regression

2.4.1. Data sources and sample

Before forming the sample for the difference-in-differences estimation, I first obtain the sample for the benchmark OLS regression. The benchmark OLS regression spans from fiscal year 2004 to fiscal year 2009. I start with fiscal year 2004 rather than the first year that audit fee information is available (fiscal year 2000)[24] because the auditing industry experienced substantial structural change from year 2001 to year 2003 due to the high profile accounting scandals (e.g., Enron and WorldCom), the bankruptcy of the big 5 accounting firm Arthur Andersen (year 2002) and the legislation of the Sarbanes-Oxley Act (enacted July 30, 2002, with the final rules regarding auditor independence released in March 26, 2003, becoming effective in May, 2003.).[25] The effects of these factors on auditor fees cannot be characterized by year fixed effect since the effects are not fixed across firms and are expected to affect the association between analyst scrutiny and audit fees. For the cleanness of the benchmark analysis, fiscal year 2004 is chosen as the first sample year. The sample period ends in fiscal year 2009 since the Dodd Frank Act was enacted on July 21, 2010, which potentially affects auditor litigation risk

[23] However, my results are robust to any number of matches between 1 and 5. When I increase the number of matches, the t-statistics increase.
[24] The auditor fee database in Audit Analytics contains all fee data disclosed by SEC registrants in electronic filings since January 1, 2001.
[25] Before the final rules regarding auditor independence become effective, several non-audit services that are regarded as impairing audit independence by the final rules are allowed. The final rule forbids any non-audit services that will impair audit independence. For more details about the regulation, see SEC Final Rule 33-8183, with an effective date of May 6, 2003 (http://www.sec.gov/rules/final/33-8183.htm and http://www.sec.gov/rules/final/33-8183a.htm). For its predecessor rule, see SEC final rule 33-7919.

function in several aspects.[26] Analyst coverage information is from the Institutional Brokers Estimate System (I/B/E/S) database and I obtain audit fees information from Audit Analytics and accounting variables from Compustat. The sample selection process requires firms to have available information for all the variables in the benchmark OLS regression. In the audit fee database (Audit Analytics), some firms change their auditors during the fiscal year for various reasons. Among those cases, most of the firms pay both auditors. For the cleanness of data, I delete observations with multiple audit fee entries for the same fiscal year.[27] For the OLS regression, I match the audit fee data with Compustat using CIK identifier, which is the key identifier in Audit Analytics. The sample exclude financial firms (firms with four-digit SIC codes from 6000 to 6999), because the audit fee function for financial firms is likely to be different from nonfinancial firms.[28]

To obtain data on analyst coverage, accounting variables, and audit fee information for the treatment sample, I first match I/B/E/S data with Compustat data, and then use the CIK in Compustat to match with Audit Analytics. I extract institutional ownership information from CDA/Spectrum Institutional 13(f) filings and stock return data from CRSP. The above sample

[26] For example, the Act establishes monetary awards for whistleblowers in any SEC or Commodity Futures Trading Commission ("CFTC") enforcement action resulting in a sanction of over $1,000,000, with award amounts determined as a percentage of the recovery. It also creates a private right of action for whistleblowers against employers that retaliate, subjecting employers to lawsuits for reinstatement, back pay and litigation costs and attorneys' fees. The whistleblowing mechanism could affect audit litigation risk by increasing the detection probability of financial misstatement. Also, the executive compensation reforms could potentially change firms' corporate governance structure and consequently affect the risk born by auditors.

[27] The OLS results are statistically and quantitatively similar if I add up the audit fees paid to all the auditors for the same fiscal year. For the whole audit fee database in Audit Analytics, 4.01% firm-years paid multiple auditors (can be more than two) for audit service fees. Manual pilot check in the original filings suggests that the reasons can be mergers during the fiscal year, restatement for the fiscal year in the sample, or paying the prior year's auditor for current year audit fee, etc.

[28] In the standard audit fee regression model (Simunic, 1980), client size is measured by the natural log of total assets and is one of the main explainers for the total audit fees. For financial institutions, total assets is not a good measure for size.

selection process yields 17711 firm-years (4347 unique firms) for the OLS regression. All continuous variables are winsorized at the extreme 1% to remove the influence of outliers for the OLS regression.

After the OLS regression sample is constructed, I proceed to form the difference-in-differences estimation sample. The sample for the DID estimation contains treatment firms and control firms. To construct the treatment group, I identify 429 firm-years exposed to an exogenous drop in analyst coverage as discussed in Section 2.3.2. After identifying the 429 observations, I match I/B/E/S data with Compustat data, and then use the CIK to match with Audit Analytics. Since not all the Compustat observations have CIK identifiers, for treatment firms that do not have CIK identifiers in Compustat, I manually find their CIK for the treatment year from their original fillings at the SEC website and then use the manually found CIK to get audit fee information from Audit Analytics. After I delete the financial firms and retain the firm-years with all the needed accounting, audit fee and stock market information, the treatment sample has 320 firm-years. The control group is obtained by matching the treatment group with the OLS regression sample using the matching criteria described in Section 2.3.3.

2.4.2. Results for the OLS regression

Table 2.2 presents descriptive statistics for the variables used in the baseline regression. The mean and median analyst coverage in the sample firm is 8.46 and 7.00. The mean and median total assets are $4626 million and $657 million, and therefore total assets have a positively skewed distribution. By using the natural logarithm of total assets as the proxy for size (LNASSET), I normalize the positively skewed distribution. Size (LNASSET) has a mean and median of 6.57 and 6.49 respectively. Similarly, the raw audit fee has a positively skewed

distribution, with a mean value of $2,361,019 and a median value of $1,093,520. About 85 percent firms in the whole sample are audited by Big 4 auditors. The magnitudes of these variables are comparable to that of other studies (e.g., Carcello et al., 2002; Yu, 2008; He and Tian, 2013).

Table 2.3 reports results of the benchmark OLS regression that regresses audit fees on analyst coverage. To address the econometric concern that residuals from the panel data regression are not independent, I adjust the OLS standard errors using two-way clustering based the firm clusters and year cluster as advised by Petersen (2009) as Gelbach and Miller (2011).Column (1) provides the results for whole sample. The full sample regression shows that the coefficient on the analyst coverage variable (LAG_LNCOVERAGE) is slightly positive but insignificant (estimate=0.0009, t-statistic=0.08).[29] Column (2) further controls stock return (MRET), stock return volatility (SIGMA) and stock turnover (TURNOVER) to address that analyst coverage is correlated with firms' stock market performance. Adding these control variables slightly increases the magnitude and the significance level of the coefficient on analyst coverage (estimate=0.0036, t-statistic=0.25). Since analyst coverage captures time varying unobservable firm characteristics (e.g. analysts intend to cover firms with better prospects) (Hayes, 1998), the OLS estimate is predicted to be downward biased. It is inconclusive from the OLS regression whether analysts discipline or substitute auditors.

[29] The coefficients of all the other variables are quantitatively and statistically similar to the prior audit fee literature (e.g., DeFond et al., 2000; Carcello et al., 2002). For example, in the full sample regression (Table 3 column (1)) the coefficient on firm size is 0.4873 with a t statistics of 47.60. The coefficient on the loss dummy is 0.2063 and is significant at 1% level. The coefficient on the big 4 dummy is significant at 1% level with a value of 0.2523.

Column (3) and column (4) provides OLS regression results for firms with size less than median and larger than median, respectively. Interestingly, the sign of coefficient on analyst coverage is significantly positive (estimate=0.0323, t-statistic=2.08) in column (3) (firms with size less than median), and is significantly negative (estimate=-0.0408, t-statistic=-2.34) in column (4) (firms with size larger than median).[30] While the OLS regression is subject to various alternative explanations, the heterogeneity of the coefficients on analyst coverage across different size of firms suggests that the discipline role (if it exists) of analysts on auditors is stronger for smaller firms. To provide more reliable inference, Section 2.5, 2.6, 2.7 provide the results from the difference-in-differences (DID) method and compares the DID results with the OLS regression results.

2.5. Results for difference-in-differences method

2.5.1. Matching quality: compare the balance of the treatment sample and control sample

Table 2.4 provides the distribution of the treatment sample by industry, using Fama and French's 12 industry classification.[31] The treatment firms span 11 of the 12 industries, with the 11th industry (finance) missing by construction. Overall, the treatment firms and Compustat universe have a similar distribution. In untabulated table, I find that treatment firms cover 31 of the 48 industries as defined by Fama and French (1997). This observation suggests that it is unlikely that the treatment assignment (i.e. merger event) concentrates in certain industries.

[30] In unreported tables, when I run the OLS regressions by quintiles, the coefficient on analyst coverage is significantly positive in the first quintile, and becomes insignificant in the second and third quintiles, and then turns to be significantly negative in the last quintile.
[31] See details of the Fama and French 12 industry definitions at the website: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_12_ind_port.html.

As discussed in section 2.3.3, a key for efficient causal inference and good estimation of the treatment effect is that the treatment group and control group are similar enough in variables correlated with the treatment assignment and outcome. While there are no means knowing exactly what firm characteristics are correlated with the merger event, the classical audit fee determinants model provides variables affecting the audit fees. Table 2.5 compares the treatment group and Compustat universe using the mean values of variables used in the benchmark OLS audit fee regression model and a set of additional variables. The most salient observation is that almost all of the variables (except for RET, MB and BUSY) have significant difference. Firms exposed to analyst coverage termination are in general larger in size, having more analysts following and more profitable. The evidence indicates that it is not appropriate to use the Compstuat universe as the control sample, substantiating the necessity to construct control samples matching on firm characteristics.

Table 2.6 Panel A-Panel D present the variable attributes of the matched samples. Panel A presents the comparison between the two groups when matched directly based on size, stock return, market to book, and stock return volatility. Panel B provides the comparison when the two groups are matched based on the propensity score (using nearest neighbour matching). Panel C chooses the control firm as the one that has the closest estimated propensity score with the same fiscal year. Panel D chooses the control firm having the nearest estimated propensity score from firm-years with the same two digit SIC code and the same fiscal year as the treatment firm.

To diagnose how well the control firms match the treatment firms, I test the equality of the means, medians as well as the distributions (using the Kolmogorov-Smirnov test) of the matching variables and the audit fee variable for both groups of firms. I follow Stuart's (2010)

suggestion to examine the standardized difference of means for a wide range of variables. At the bottom of the table, the sum of standardized difference in means across all variables is provided. Regarding the number of matches found, one can observe that direct matching on covariates (Panel A) yields the smallest number of matches (number=118). Comparing the sums of standardized difference across the panels, I find that Panel C (propensity score matching requiring exact fiscal year match) yields the smallest sum of standardized difference in means across all variables (sum=0.8627). Also, Panel C provides the smallest sum of standardized difference in means between groups for the three key variables, analyst coverage (COVERAGE), audit fees (LNFEE) and firm size (LNASSET) (sum=0.0641). The evidence also suggests in Panel C the empirical distribution of the treatment sample and control sample are similar according to the p values of the Kolmogorov-Smirnov test. Overall, Panel C yields the best matching of control and treatment groups. Therefore, my test of hypothesis 2 and the robustness test combining matching and regression will rely on the matching provided by Panel C.

2.5.2. Test of Hypothesis 1: difference-in-differences estimator

I use the difference-in-differences method to test hypothesis 1. Specifically, after obtaining a closely matched sample of control firms, I find the change in audit fees between the pre-treatment period (year t-1) and the post treatment (year t+1) and compute the difference between the treatment and control firms. This approach ensures that the estimated average treatment effect is not contaminated by time trends in audit fees.

Table 2.7 presents the DID estimators under the above four matching methods. As shown from Panel A to Panel D in Table 2.7, all of the DID estimators are essentially significant. The DID estimator of the best matching (Panel C, propensity score match constraining exact fiscal

year match) is -0.0550 with the p-value equal to 0.0418. The evidence is consistent with the conjecture in Section 2.4.2 that the OLS regression results are downward biased (estimate=0.0009), and is biased to the opposite sign for the large size group (Table 2.3, Column (3)). Not that 87% of observations in the DID sample are within the large size group of the OLS regression sample.

In addition, Panel E shows that the DID estimator for discretionary accruals (ABSDA) is 0.0219 with the p-value equal to 0.0208. The results are consistent with the findings by Irani and Oesch (2013) and Chen et al. (2013). Note that the presented significance levels of the DID estimators are the most conservative ones since the DID estimators from Panel A to Panel D are estimated using 1:1 matching (as discussed in Section 2.3.3, only retaining the first closest match in general generates the estimator with the smallest bias but relatively large variance due to limited sample size). In untabulated tables, when I add the number of matches (from 2 to 5), the DID estimators are trending to a much smaller p-values and the estimators are quantitatively similar in magnitude. Overall, the results suggest that analysts have a discipline role on auditors.

2.5.3. Test of Hypothesis 2: difference-in-differences estimators conditional on firm size

The basic logic of hypothesis 2 is that the strength of analysts' disciplining role on auditors depends on the incremental monitoring power analysts exert on auditors given other external monitors. I predict that the incremental monitoring power from analysts depends on the firms' overall monitoring environment as proxied by size (LNASSET). To test hypothesis 2, I provide the DID estimator conditional on firm size in table 2.8. In Panel A, the DID estimator is estimated by requiring the size of the firms to be smaller than or equal to the median size (i.e., LNASSET<=median). In Panel B, firm size is great than median size.

As shown from Table 2.8, Panel A to Panel C, when the size is smaller than or equal to the median size, the DID estimator is -0.0993 (p=0.0191). The magnitude is larger than the full sample DID estimator (estimator=-0.0550) and is more significant (p=0.0191 versus p=0.0418). When the size is larger the median, the difference in difference estimate is very small (DID estimator=0.0049) and is insignificant (p=0.8827). The evidence suggests that the loss of analyst coverage has more effect on small firms (as compared to large firms).

2.6. Testing the validity of the DID methodology

By construction, the consistency of the DID estimator depends on the assumption that in the absence of the treatment, the average change in the audit fees would have been the same for both the treatment and control groups (also called the "parallel trend assumption", Roberts and Whited, 2012). While the parallel trend assumption is not directly testable (since the counterfactual is not observable), I use two tests to check the validity of the DID estimator. I first plot the audit fees of the treatment group and control group during the pre- and post-treatment periods. Figure 1 plots the audit fees for the three years before the treatment and for the three years after the treatment. As Figure 1 shows, before the treatment (year t-1, year t-2 and year t-3), the audit fees of the treatment firms and the control firms are quite similar and follow parallel time trend. There is a kink in the audit fees of the treatment group occurring in the year after the coverage termination (year t+1). After year t+1, the audit fees of treatment firms and control firms follow a parallel trend again (from year t+1 to year t+2 and from year t+2 to year t+3). Figure 2 shows the difference in treatment firm audit fees and the control firms' audit fee. As can be observed, there is a sharp decrease in the adjusted audit fees from the year before treatment (year t-1) to the year immediately after treatment (year t+1).

In addition to the figures above, I also perform a placebo difference-in-differences test. Specifically, I hypothetically assume that the merger occurs one year (and two years) before it actually does and re-do the difference-in-differences estimation for audit fees. The placebo DID estimator should be statistically indistinguishable from zero if the previously observed DID estimator is due to the treatment. Table 2.9 Panel A and Panel B present the placebo DID estimator. When I assume the merger occur one year before the actual year, the DID estimator is 0.0126 with a p-value of 0.7035. When I assume the merger occurs two years before the actual year, the DID estimator is also insignificant. Similarly, when I assume the merger happens one year (and two years) after the actual year, the DID estimators are 0.0229 and 0.0199, and are insignificant. The placebo DID estimators are in sharp contrast with the actual DID estimator (estimator=-0.0550, p=0.0418). These results provide me confidence in the validity of the DID estimator.

2.7. Double robustness check: are the changes in audit fees caused by change in firm characteristics other than analyst coverage

In this section, I address two concerns: (1) whether the observed exogenous coverage termination's effect is a mechanical observation caused by coverage termination's effect on other audit fee determinants; (2) whether the DID estimators are robust to regression adjustment based on the matched sample. As suggested by Stuart (2010), matching methods should not be seen in conflict with regression adjustment and the two methods are complementary and best in combination. To check the "double robustness", I combine matching and linear regression in this section.

I take two steps to address the above concerns. First, I estimate the DID estimators for all the matching variables (except for the two digit SIC code and the fiscal year variable) used in the propensity score model; second, using the treatment group and control group as the full sample I regress the change in audit fees on the treatment indicator variable (TREAT) and the changes of all the matching variables (except for analyst coverage). The first step investigate whether analyst coverage termination has casual effects on the matching variables. The basic logic is that if coverage termination affects audit fees by affecting those variables, then the researcher can observe significant changes in these variables. The second step serves two purposes. On the one hand, the regression adjustment "cleans up" small residual covariate imbalance between treatment group and the matched control group (Abadie and Imbens, 2006; Stuart, 2010); on the other hand, we can observe whether the treatment effect remains after controlling for treatment's correlation with the changes in these variables. If the treatment effect still remains, the results indicate that the exogenous analyst coverage termination has an independent effect on auditors.

Table 2.10 provides the DID estimators for the matching variables. The inference from Table 2.10 is that exogenous analyst coverage termination causes an increase in institutional ownership (DID estimator=0.02, p=0.09). This evidence is consistent with the finding in Kelly and Ljungqvist (2012). They provide a theoretical model that exogenous analyst coverage termination increases the information asymmetry between retail investors and institutional investors, and thus increase institutional investors' stock demand. They also provide empirical evidence consistent with this theoretical prediction. Thus, we need to consider the possible impact of the change in institutional ownership on audit fees.

I further provide the regression results in Table 2.11 Column (1) to Column (4). Column (1) use heteroskedasticity robust standard error to calculate the inference. In Column (2) to Column (4), I adjust the OLS standard errors using two-way clustering based the firm clusters and year cluster as advised by Petersen (2009) as Gelbach and Miller (2011). Column (3) reports regression results for the subsample of small firms (less than or equal to median size). Column (4) provides regression results for the large firm sample (larger than median size). Except for Column (1), the models used in Column (2)-(4) include year fixed effect. The adjusted R-squared in column (1) is 0.0799, and the adjusted R-squared is greater than 0.13 in Columns (2), (3) and (4), suggesting that year fixed effect provides substantial explanatory power for the change regression. Note that including firm- or industry- fixed effect in a change regression model is different from including it in a level regression model. Adding firm- , industry or merger (event) – fixed effects in a change regression allows these effects to be non-fixed in level analysis. In untabulated tables, the regression results are statistically and quantitatively similar including firm or industry fixed effects.

As shown in Column (2), the coefficient on the TREAT indicator variable is -0.0593 (t=-3.59, p=0.0002). The results suggest that after the regression adjustment the treatment effect is even stronger in both magnitude and significance level, as compared to the DID estimator (estimator=-0.0550, t=-2.04, p=0.0418) shown in Table 2.7 Panel C. The evidence confirms the robustness of the DID estimators. Comparing Column (3) and Column (4), the most obvious observation is that the coefficient on TREAT in the small firm regression is significant and large in magnitude (coefficient=-0.0764, t=-1.92, p= 0.0559) but the coefficient from large firm regression is insignificant and small in magnitude (coefficient=-0.0342, t=-0.87). The results are consistent with Hypothesis 2, suggesting that the monitoring effect is stronger for small firms.

2.8. Conclusion

In this paper, I investigate how a market mechanism of financial misstatement detection, financial analysts, affects audit effort. On the surface, given that a misstatement detection mechanism by parties outside the firm can potentially deter management's misreporting behavior, one can expect that the existence of such a mechanism can substitute for audit effort. However, as an approach of detecting financial misstatement, auditors are quite different from other mandatory approaches such as the regulators from SEC and nonfinancial market regulators in the sense that auditors will suffer from either legal liability cost or reputation damage as long as they are found failing to eliminate material misstatement in the publically issued financial statement. When other parties brought the audit failure to light, auditors are subject to either reputation damage or legal liability. To this end, the existence of other misstatement detectors creates competition pressure on auditors. Auditors have incentives to be the first one to detect the misstatement and to produce clean financial statement. Consistent with the conjecture, I find that audit fees (the proxy for audit effort) decrease in response to an exogenous drop in analyst coverage.

While this paper analyzes how analysts affect auditors' incentives, the underlying purpose is to understand how a market enforcement mechanism (analysts) affects the regulatory mechanism (auditors). For regulators, understanding such effect will be helpful for policy making. For researchers, the finding furthers our understanding of the audit production economics.

Finally, one caveat needs to be noted when interpreting the results of the paper. In this paper, I argue that analysts' ability to uncover material misstatement creates competition

pressure on auditors. Using data from the United States, I find evidence consistent with the conjecture. However, in a more general setting, the strength of the pressure generated by a fraud detection program is affected by the strength of the country's overall legal system. For example, if the legal system puts quite limited obligation on auditors, then increasing the revelation probability of misstatement will have limited effects on auditors' litigation risk. Therefore, one should be careful when he/she tries to generalize the finding into other countries with different legal environments.

Chapter 3: How does value creation of audit oversight vary with institutional strength? Evidence from a regulatory breakdown in cross-border audit oversight

3.1. Introduction

It has been long recognized that independent auditing is a particularly important "bonding device" to reduce agency costs and the cost of capital (e.g., Jensen and Meckling, 1976; Watts and Zimmerman, 1983). Extant archival evidence on the value creation of auditing is conducted in single-country settings (e.g., Chaney and Philipich, 2002; Krishnamurthy et al., 2006; Minnis 2011; Nelson et al., 2008). Very little is empirically known about how the value creation of high quality auditing varies with client countries' institutional characteristics, and more specifically, how these characteristics affect the magnitude of the value-added, even though the international finance literature has highlighted its importance for some time (Coffee, 2002; Karolyi, 2012). To address this issue, I examine whether and to what extent U.S. cross-border audit oversight creates value for foreign companies registered and reporting with the U.S. Securities and Exchange Commission (hereafter, SEC). Using the Public Company Accounting Oversight Board (hereafter, PCAOB) announcements of its inability to examine certain foreign companies' auditors as exogenous shocks to the perceived effectiveness of U.S. cross-border audit oversight, I find evidence suggesting that the stock market values audit oversight more where there are fewer alternative monitoring mechanisms. The evidence adds new insight into how audit shapes global capital formation.

Unlike U.S.-operated companies, foreign companies mostly hire local auditors rather than U.S. auditors. As such, foreign companies' operation and audit attributes are subject to their home country institutional environments. By listing on U.S. exchanges, they bond themselves to

the U.S. accounting and auditing requirements. It is unclear whether such requirements add value to these U.S.-listed foreign companies even though cross-border listing is a voluntary choice, as benefits associated with U.S. listing, such as broader investor base, greater liquidity and higher visibility, would trigger cross-border listing decision even if the auditing requirements reduce firm value. On the one hand, surveys of CEOs and corporate treasurers universally cite the additional disclosure requirements – particularly for non-U.S. listings in the U.S. – as the greatest hurdle to overseas listing (Karolyi, 1998). The extra audit oversight from the PCAOB creates a burden on foreign audit firms, thereby creating costs for their U.S.-traded clients. On the other hand, the PCAOB oversight serves as a useful device to improve audit quality, which can reduce agency costs. If the benefits outweigh the costs, then the additional oversight will increase firm value. For a given level of U.S. regulatory oversight, variation in home country institutional strength, such as the efficiency of home country's legal system and the quality of the home country auditing profession, will lead to variation in the net value-added. In this paper, I empirically test whether the oversight adds value to cross-border listings, and how the value added varies in the cross section.

The PCAOB announcement of its "inability" to enforce cross-border audit oversight provides a natural experimental setting to measure the value of U.S. audit oversight for foreign companies. On May 18, 2010, the PCAOB for the first time published the names of SEC-filing U.S. listed foreign companies whose external auditors are from countries blocking the PCAOB access to local audit information (I label this announcement as Announcement 1 hereafter). Prior to May 18, 2010, the PCAOB merely disclosed that some scheduled inspections were delayed and provided names of audit firms experiencing inspection delays. Specifically, on August 12, 2009, the PCAOB published a list of 18 foreign audit firms whose inspections were still delayed

at that time, without explicitly providing the reason for the delay (I label this announcement as Announcement 2 hereafter). The 18 audit firms were from 9 jurisdictions, including China, Israel and certain European Union (EU) countries. On February 03, 2010, the PCAOB updated the delay-list to 70 audit firms from 25 jurisdictions, including China, Hong Kong, Turkey, Venezuela, Czech Republic, and 20 European jurisdictions (I label this announcement as Announcement 3 hereafter). The PCAOB mentioned that "Discussions are continuing with the relevant authorities in those jurisdictions in an effort to resolve their objections to PCAOB inspections."[32]

Among the three announcements, the May 18, 2010 one is important for two reasons. First, it was the first time that the enforcement problem was directly acknowledged. Both the August 12, 2009 and the February 03, 2010 announcements are titled as "Progress on PCAOB International Inspections", and are bundled with other information, including "List of jurisdictions that the PCAOB has conducted inspection" and "List of jurisdictions that the PCAOB planned to conduct inspection". In contrast, the title of the May 18, 2010 announcement is as salient as "PCAOB publishes list of issuer audit clients of non-U.S. registered firms in jurisdictions where the PCAOB is denied access to conduct inspections." Therefore, the May 18, 2010 announcement is a clean one in terms of information content. Second, the May 18, 2010 announcement is the first time that the published information went to the audit client level. The news release published the 419 companies whose audit firms were located in the 21 jurisdictions denying the PCAOB audit inspection. In contrast, the other two announcements only provided names of audit firms that experienced inspection delays.

[32] See Appendix D and E for the detailed timeline of the events, and see Section 3.2.1 for the background introduction for the events.

I predict that the sequence of announcements creates cross-sectionally varied shocks to the U.S. listed clients of the mentioned auditors in the published list. If investors value PCAOB cross-border audit oversight positively, and infer from the PCAOB announcements that the inspection delay is a jurisdiction authority problem, then not only clients of auditors experiencing inspection delays will have negative stock market reactions, clients of auditors *not* experiencing delays but from the same country as the mentioned auditors will also have negative stock market reactions. If the unexpected announcement of enforcement failure (i.e., Announcement 3) negatively impacts investors' confidence in the *overall* effectiveness of the PCAOB's cross-border audit oversight then the stock market reactions would not be confined to companies mentioned but would spread to other international listings. Note that in Announcement 1 and 2, the PCAOB promised that it would continue work to achieve cooperation with foreign counter parties. The investor confidence loss would be triggered either by the PCAOB's inability to achieve cooperation with certain foreign regulators, or by the underscoring reality fact that cross-border enforcement is sensitive to foreign regulators' attitude. Therefore, the announcements provide an opportunity to test the value effect of U.S. cross-border auditor discipline over a wide range of countries. To investigate the overall effect of the announcements, I examine stock market reactions to both international listings directly linked with the published list and other foreign companies registered and reporting with the SEC.

The sample includes all foreign companies audited by foreign auditors from April 1, 2007 to January 10, 2011 as identified in Audit Analytics. During this period, a total of 1,898 companies files audit opinions by foreign auditors; the number reduces to 712 after deleting companies that are headquartered in the United States, or do not have stock price information in DataStream, or have a stock price less than one dollar, or do not have enough days with non-zero

trading volume.[33] The 712 companies comprise those listed on the major U.S. exchanges (NASDAQ, New York Stock Exchange) in direct form and as American Depositary Receipts (ADRs), as well as those trading on over-the-counter (OTC) markets. The sample includes foreign companies having both home listing and U.S. listing, those only have U.S. listings, those have U.S. listings and other foreign listings but no home listing, and those have home listing, U.S. listing and other foreign listings. The external audit firms of the 712 companies are domiciled in 43 countries.

Results for Announcement 1 show that companies from China experienced negative market reactions, and the negative market reactions exist in not only clients of auditors referred in the delay-list, but also other companies operating in China. For Announcement 2, I find that the stock market reacted negatively to both clients of mentioned auditors from China and EU countries and to clients of other auditors from these countries, but not companies from other countries. This result suggests that investors had inferred that the delay was not a simple procedural delay but a jurisdiction authority problem. Otherwise, the market would only react to clients of mentioned auditors. For announcement 3, the stock market reacted negatively in a statistically meaningful way to the key May 18, 2010 announcement not only for mentioned companies with auditors from China (and Hong Kong area to the extent that audit clients have operations in mainland China) but also for other international listings that are not mentioned, even for the subgroup of companies from Canada. The results are robust to various benchmark models in estimating expected returns. The evidence indicates that the significant May 18, 2010

[33] The reduction from 1898 to 712 is largely caused by deleting penny stocks. Without deleting penny stocks and companies headquartered in the U.S., the sample size is 1192. Those penny stocks are mainly listed on OTC markets. They frequently miss trading volume and are very illiquid. To make the expected return model reliable, I drop all the penny stocks. Nevertheless, the stock market reaction is much more significant in the presence of these penny stocks. I choose to present the conservative results by dropping the penny stocks.

announcement has a spillover effect. The market reactions were also negative, albeit insignificant, for companies in other countries, i.e. those from Norway, Switzerland, and 17 European Union member countries.

Cross-sectionally, Announcement 3 induced market reactions that varied predictably. I find that the negative market reaction is smaller for companies that are bigger, hiring big4 auditors, and are domiciled in countries tougher judicial system, better quality audit profession and better legal protection for investors. In addition, I find that the sample that experienced negative market reactions also has an increase in bid-ask spreads after the May 18, 2010 announcement. The increases in bid ask spread are more pronounced for companies that are smaller, hiring non-big4 auditors, and with weaker institutional strength. The results are robust to the inclusion or exclusion of Chinese companies in the sample for the cross-sectional analysis, and to various measures of institutional quality, including the control of corruption, audit profession quality, anti-self-dealing index, per capita GDP, legal origin, and home country disclosure requirements. Last, results show that the negative stock market reaction occurred for companies without home listings, with dual listings, and with multiple listings. Taken together, the evidence suggests that the U.S. cross-border audit oversight creates value for a broad sample of international listings.

Overall, this study adds to the literature on the value of audits per se. Even though a substantial amount of studies have investigated the value of auditor (Big 4 vs. non-Big 4 and specialized vs. non-specialized) choice, evidence on the value of audits per se is limited to a few studies examining whether voluntary auditing decreases cost of debt. For example, studying a large sample of privately held Korean companies that are not required to obtain an external auditing, Kim et al. (2010) find that companies with voluntary external auditing pay a

significantly lower interest rate on their debt than do private companies without an audit. In a similar vein, Minnis (2010) finds that audited private firms have a significantly lower cost of debt than those without external audits, by exploiting a large proprietary database of privately held U.S. firms. Much less studied is the effect of regulatory discipline of auditors on firm value. Different from the voluntary choice of auditors, a mandatory requirement regulatory audit oversight does not necessarily create value for audit clients. Both too much and too little oversight can be value destroying for audit clients. This paper shows that under the current regulatory regime, US cross-border audit oversight creates value for companies from a broad group of countries, and that the value varies with home countries' institutional strength.

Additionally, this paper addresses a long lasting question in the bonding literature. It is a well-documented phenomenon that foreign firms experience significant positive returns after listing in the U.S. (e.g., Foerster and Karolyi, 1999; Miller, 1999). The leading theory of international cross-listings, the "bonding theory" as advocated by Coffee (1999) and Stulz (1999), argues that the SEC's stringent disclosure requirements and increased legal exposure associated with U.S. listing are sources of cross-listing benefits.[34] However, prior research has been unable to provide direct evidence on the valuation benefits of accounting/auditing requirements in international-listings, since it is particularly difficult to disentangle other confounding effects associated with cross-listing, such as the effects caused by changes in investor base and investment banking relations. As suggested by Leuz (2003), "In order to fully

[34] The traditional bonding theory is applied to the setting of cross listing, i.e., a company lists its equity shares on one or more foreign stock exchange in addition to its domestic exchange. Currently in the US stock market, the *de facto* foreign companies includes three groups: 1) cross-listed companies, 2) the group of companies with US and other foreign listings, but no domestic listing; and 3) the group of companies only with US listing. Therefore, I do not constrain my sample to cross-listings. Nevertheless, when I constrain my sample to group "1)", the main stock market reaction results remain.

understand the cross-listing phenomenon, it is important to differentiate between the different explanations and to delve deeper [sic] into the sources of the cross-listing effects, such as improved risk sharing, increased disclosure, greater legal exposure and/or stronger SEC enforcement." In this spirit, the study uses after-listing regulatory breakdown to show that enforcing US auditing and accounting requirements create value for cross-listings.

Furthermore, the evidence in this paper has important policy implications. First, the finding that investors value cross-border audit oversight encourages regulatory bodies to improve cooperation with foreign regulators. Second, the evidence that the PCAOB's announcements had spill-over effects on foreign listings not mentioned by the published list informs regulators that it is important to take potential spill-over effects into account when predicting the economic consequences of future announcements. Third, the finding that the market reacted differently to the sequence of announcements suggests that the content of announcements by a regulatory body affect investor perception. Thus, regulators should carefully consider these aspects in future activities.

The only other paper that investigates a similar setting is the working paper by Carcello et al. (2011). For the key May 18, 2010 announcement, Carcello et al. (2011) study a truncated sample which only includes188 companies mentioned in the published list but not mentioned in prior announcements and 122 ADRs from international listings that are not mentioned by the May 18, 2010 list.[35] With the truncated sample, Carcello et al. neither investigates spillover effects, nor examines how the abnormal returns vary with home country institutional strength. In

[35] . As identified by Audit Analytics, without deleting penny stock the whole sample size is 1165 for the Announcement 3, among which 821 are international listings not mentioned in the list published by the PCAOB. After deleting penny stock, the sample of international listings not mentioned in Announcement 3 includes 821 stocks, among which, 164 are ADRs.

fact, recognizing their sampling and empirical strategy problem, Carcello et al. (2011: 30) state "Our sample sizes are modest …. Future research that replicates and, hopefully, extends our findings would be helpful …."

The rest of the paper is organized as follows. Section 3.2 describes the events, reviews the literature and develops the hypotheses. Section 3.3 discusses the sample and presents descriptive statistics. Section 3.4 lays out the empirical strategy. Section 3.5 presents and discusses the results for the market reaction analysis. Section 3.6 reports the results for cross-sectional analysis. Section 3.7 provides additional analysis. Section 3.8 concludes.

3.2. Background, prior literature and predictions

3.2.1. Background of the PCAOB cross-border oversight

In an effort to increase investor protection, the Sarbanes-Oxley Act of 2002 (SOX) created the Public Company Accounting Oversight Board (PCAOB). To carry out this charge, the Act gives the board significant powers, including registering and regularly inspecting public accounting firms that prepare or participate in the preparation of audit reports for companies that audit SEC-registered public companies without regard to whether the audit firm is located in the U.S. or in a foreign country. Section 104 of SOX requires and authorizes the PCAOB to inspect registered foreign audit firms, and PCAOB Rule 4003 specifies inspection at least once every three years.[36]

[36] Under the rule of SOX (Section 104) and the corresponding PCAOB rule (Rule 4003), the PCAOB is required to inspect registered audit firms at least once every year if the audit firm issued audit reports for more than 100 public companies that file periodic financial statements with the SEC in the previous calendar year. If the number is less than 100, then the inspection needs to be conducted at least once every three years, beginning with the calendar year the audit firm is registered with the PCAOB and issues an audit opinion for SEC registered companies. Since no foreign auditor has more than 100 U.S. listed clients, the required inspection frequency for foreign companies is at least once every three years.

A critical challenge to cross-border audit inspection is that access to foreign audit firms' documents located in their home jurisdictions requires permission from the home regulators.[37] This jurisdiction authority challenge became increasingly significant for the PCAOB at the end of 2007 when the first inspection deadlines for several foreign audit firms approached.[38] The PCAOB faced the choice of whether and how to inform investors about such challenge. On December 4, 2008, the PCAOB adopted a rule amendment that allowed the PCAOB to postpone deadlines. On April 7, 2009, the PCAOB published a list of jurisdictions in which the PCAOB has conducted inspections, and a list of jurisdictions in which the PCAOB planned to conduct inspections. On June 25, 2009, the PCAOB adopted additional rule amendments that further postponed the deadlines. On August 12, 2009 (Announcement 1), the PCAOB provided a list of jurisdictions in which there are audit firms that the PCAOB has conducted inspections, and a list of 18 audit firms from 9 jurisdictions that had not been inspected by the PCAOB even though the original deadlines had passed. On February 3, 2010 (Announcement 2), the PCAOB provided an updated list of 70 audit firms from 25 jurisdictions experiencing inspection delays. For the first time, the PCAOB mentioned that China and some EU countries denied the PCAOB access to local audit documents.

Following the February 3, 2010 announcement came the unexpected news release on May 18, 2010, entitled "PCAOB publishes list of issuer audit clients of non-U.S. registered firms in jurisdictions where the PCAOB is denied access to conduct inspections." This list identified

[37] Recognizing the political tension that handing over audit documents to U.S. regulators would be considered by foreign jurisdictions as a breach of their national sovereignty and conflict with local laws, the PCAOB had started to seek cooperation with foreign regulators since 2003 (March 31, 2003, PCAOB round table). However, investors were not informed about the progress of the continuing communication.

[38] With the requirement of registering with the PCAOB taking effect on July 19, 2004 for foreign audit firms, the deadlines for the first inspections arrived in 2007.

the 419 companies whose audit firms were located in the 21 jurisdictions denying the PCAOB access to local information. In contrast to the prior announcements guided and triggered by the PCAOB transparency rules (PCAOB Release No. 2008-007 and PCAOB Release No. 2009-003), this announcement was not required by any pre-set rules, and thus was quite unexpected. On January 10, 2011, the PCAOB announced that it entered into a cooperative agreement with the United Kingdom audit regulator. The achievement of this agreement was facilitated by the permission of the Dodd-Frank Act (July 21, 2010) for the PCAOB to share confidential information with its non-U.S. counterparts. Since one of the major reasons that foreign regulators denied sharing local information with the PCAOB is its objection to sharing its own regulatory information, this announcement is expected to boost investors' confidence in the PCAOB's ability to achieve cross-border cooperation in audit oversight. Quickly after the signing of the January 10, 2011 agreement with the U.K., the PCAOB reached agreements with several other countries, such as Switzerland, Japan, and Israel, with the key term being the sharing of audit related information with each other.

As the events evolved, companies in countries not granting the PCAOB access to audit work papers showed deep concerns. For example, Financial Executives International (FEI), the Business Roundtable, National Retail Federation, U.S. Chamber of Commerce, and the U.S.-China Business Council submitted a joint letter stating members were "deeply concerned" that "A failure to reach agreements on these issues may severely harm businesses and their investors in both the U.S. and China. ….Their capital markets and businesses–issuers and users of financial reports–must have a strong system of transparency and internal controls to raise the capital needed to grow and operate."(Financial Executives International, May 22, 2013). The perceived importance of cross-border audit oversight and the variation in the progress of

enforcement offer an opportunity for assessing the value implication of auditor discipline for cross-listings.

3.2.2. Prior literature

It is generally accepted that external auditing helps to reduce agency costs for creditors, outside shareholders, and managers (Jensen and Meckling, 1978; Watts and Zimmerman, 1983). Voluntary and costly independent auditing was pervasive even before the development of the modern corporation (Watts and Zimmerman, 1983). The pervasiveness of voluntary auditing indicates that it enhances firm value for those who choose to use it. Under the theoretical framework of agency costs and external monitoring, there is an extensive set of studies that examine the value of auditor (i.e. Big 4 vs. non-Big 4 and specialized vs. non-specialized) choice, and the following discussion touches on a small subset of these.

The theoretical work by Titman and Trueman (1986) and Datar, Feltham, and Hughes (1991) suggests that an entrepreneur with favourable information about his firm's value chooses a higher-quality auditor. The theory supports a positive association between audit quality and client value. Consistent with this theoretical prediction, using the setting of initial public offerings (IPOs), Beatty (1989), Balvers et al. (1988), Willenborg (1999), and Weber and Willenborg (2003) find that IPOs associated with larger auditors have less underpricing and more correlation between the audit opinion and post-IPO stock performance. Mansi et al. (2004) and Pittman and Fortin (2004) focus on the effect of auditors on cost of debt, and find that the cost of debt is lower for firms with larger auditors.

Despite the richness of empirical research in auditor choice, the number of literature on the value of audit per se is limited, and they mainly examine how voluntary auditing affects cost

of debt. For example, Kim et al. (2010) documented that companies with voluntary external auditing pay a significantly lower interest rate on their debt than do private companies without an audit, by using data of Korean private firms. Exploiting a large proprietary database of privately held U.S. firms, Minnis (2010) finds that audited private firms have a significantly lower cost of debt than those without external audits. The limitation with empirical research in voluntary audit choice is the pervasive problem with endogeneity, studying the effect of regulatory forces on auditing is more promising. The present study examines the value of U.S. regulatory discipline in the cross-listing setting as auditors by a regulatory body is not a decision made by firms. Therefore, it is unclear whether such regulation increases or decreases firm value in net. The bonding theory in the international cross-listing literature suggests that the stringent U.S. accounting requirements and the greater litigation risk associated with U.S. listing creates value for firms who choose to cross-list (Coffee, 1999, 2002; Stulz, 1999). However, there is no direct empirical evidence demonstrating that U.S. accounting requirements are the sources of cross-listing valuation benefits. I use a breakdown in enforcing compliance of U.S. accounting requirements to examine whether U.S. cross-border oversight of auditors creates value for foreign firm listed in the U.S.

3.2.3. Hypothesis development

The central intention of the PCAOB cross-border inspection is to ensure that foreign auditors comply with U.S. Generally Accepted Auditing Standards (GAAS) to obtain sufficient assurance that the audited financial statements are in accordance with applicable accounting standards—that is, U.S. Generally Accepted Accounting Principles (U.S. GAAP) or International Financial Reporting Standards (IFRS). In cases where auditors are required to perform additional procedures to support an audit opinion, the auditors may discover material misstatements that

they had not otherwise detected based on their home country auditing standards.[39] Violation of the SEC or PCAOB rules found in the inspection could trigger further investigations. When investigations lead to alleged violations, the PCAOB can impose sanctions including suspension or revocation of the accounting firm's registration, suspension or barring an individual from associating with a registered public accounting firm, and monetary penalties.

Given the PCAOB's ability to trigger restatement and to impose penalties, the benefits of inspections are an increased likelihood that a misstatement is discovered if a misstatement exists (Srinivasan et al., 2012) and better financial reporting quality (Lamoreaux, 2013). The cost of oversight is higher audit bills as compensation for additional time spent by auditors. As documented by prior studies, the cost of compliance with U.S. accounting requirements can be sizeable. For example, Seetharaman et al., (2002) and Choi et al. (2009) find that auditors charge higher fees for firms that cross-list in countries with stronger regimes than for non-cross-listed firms. Mittoo (1992) surveyed Canadian companies listing in the U.S. and U.K. and found more than 60% identified SEC reporting and compliance requirements as the greatest impediment. On balance, I expect that the benefits of additional oversight by the PCAOB is value increasing on average. Applied to this setting, the stock market is predicted to react negatively for companies whose auditors appear in the PCAOB enforcement failure list. Since the sequence vary in timing and content, market reactions are also predicted to vary in levels and significance.

Among all the news releases described in section 3.2.1, the May 18, 2010 announcement is an important one, since it for the first time discloses the enforcement problem in detail, and unlike the prior announcements, this one was not triggered by pre-set PCAOB rules. This news

[39] See the PCAOB publication "Information for Audit Committees About the PCAOB Inspection Process" (Aug. 1, 2012)

release has two effects other than informing investors that China and EU countries denying the PCAOB inspection, which investors may have already inferred from earlier announcements on the inspection timing problem. First, it highlights the PCAOB's continuous failure to achieve cooperation with certain countries. Second, it stresses that foreign regulators have disincentives to cooperate with the PCAOB. If these two effects cause investors to lose confidence in the overall efficiency of the PCAOB cross-border audit oversight, then the negative market reaction would spread to other foreign companies which were not mentioned in the PCAOB news release. Therefore, I predict that the May 18, 2010 announcement would dampen investor confidence in foreign companies listed in the U.S. and not identified in the announcement. Therefore, I state my first hypothesis as follows:

H1a: Mentioned companies will experience negative market reactions following Announcement 3.

H1b: Non-mentioned international listings will experience negative market reactions following Announcement 3.

After examining the stock market reactions, I investigate two cross-sectional predictions, which, if supported, would confirm the inferences from the initial stock market reaction tests. First, I test whether the market reactions vary with the strength of home country institutions and firm level corporate governance variables. The prior bonding literature suggests that a greater revaluation at the time of cross-listing for those firms that come from countries with weaker regulations (Coffee, 1999; Stulz, 1999). I expect this effect to extend to auditor discipline —the weaker the legal environment in the home country, the greater the benefit from PCAOB oversight. Second, I expect that companies with better firm level corporate governance are less

likely to be affected. Therefore, I also examine whether market reactions vary with firm size, the hiring of big4 auditors and ownership structure. The second hypothesis is as follows:

H2a: Market reactions will be stronger in companies from countries with weaker legal environment.

H2b: Market reactions will be stronger in companies with weak firm level corporate governance.

3.3. Sample construction and summary statistics

My sample comprises all foreign companies that were audited by non-U.S. auditors and file audited periodic financial statements with the SEC from April 1, 2007 to January 1, 2011. I classify a company as foreign if it is headquartered in a non-U.S. country, regardless of the place of incorporation, using the variable CIQ_LOC from Capital IQ.[40]For companies whose country of headquarters are not the same as the country of the audit firm, I use country of audit firm to define the company's home country. For companies hiring Hong Kong audit firms, I define China as their home country since almost all of them operate in China, as suggested by the PCAOB.[41]

The sample construction starts with companies with foreign auditors in the Audit Opinion file of Audit Analytics having filing dates between April 1, 2007 and January 1, 2011. The Audit

[40] Such criteria may delete companies operated in foreign countries, but headquartered in the U.S. For example, the documented headquarter country of Solar EnerTech Corp. is Mountain View, California (United States). However, its actual operations are in Shanghai, China. Similarly, Synutra International, Inc. mainly operates in China, but is headquartered in Rockville, Maryland (United States). Both companies hire audit firms from China. I was able to replicate the main results of the paper only keeping the requirement that the company needs to be audited by foreign auditors without requiring companies to be headquartered in foreign countries.

[41] Companies hiring Hong Kong auditors but operating in mainland China were listed on Announcement 3.

Opinion database in Audit Analytics covers all SEC registrants, tracks all auditor reports on financial statements disclosed since 2000, and provides auditors' location information. Thus, the database provides a comprehensive list of all foreign companies that are subject to SEC periodic financial statement reporting requirements. The initial screening returns 1,898 unique companies. After that, I obtain the Capital IQ identifiers for each company using Capital IQ excel plug in.

Since it is unclear whether the sample for mentioned companies in the May 18, 2010 announcement fully overlaps with the companies in the Audit Analytics whose auditors are from the 21 jurisdictions on the May 18, 2010 list, I utilize the website "Wayback Machine - Internet Archive" to obtain the original May 18, 2010 list which is not currently available at the PCAOB website.[42] After obtaining the May 18, 2010 list, I use the Capital IQ Identifier Convertor to generate the identifiers from company names, and manually check the matching for each company name to correct mismatching.[43] Comparing companies on the May 18, 2010 list and companies in Audit Analytics filing audit reports from April 15, 2009 to April 15, 2010[44] and hiring auditors from the 21 mentioned jurisdictions, I found 35 companies appearing in Audit Analytics but not on the May 18, 2010 list. Further investigation suggests that among the 35 firms, 19 do not have U.S. listing information, and the remaining 16 have U.S. listing

[42] Since the PCAOB updates the name list (under the same web page) annually or when a cooperative agreement is signed with the country blocking the PCAOB access to information, the original list is not currently available. The PCAOB website does not archive this file. "Wayback Machine - Internet Archive" regularly takes snapshot of the web pages to preserve information, thereby providing historical information of websites. The "Archive" website allows me to find a list as of June 4, 2010, which is a version with corrections of the original list. Google searching the name of this pdf file "issuer_audit_clients_of_certain_non-US_firms_by_jurisdiction", I found the original May 18, 2010 pdf file. Comparison between the two lists suggests that they were not substantially different. The June 4, 2010 list corrected typos and deleted duplicate companies only.

[43] Note that the CIQ_IDs generated by the Capital IQ Identifier Convertor often mismatches with company names, therefore manual checking is needed.

[44] The May 18, 2010 news release indicates that the list includes companies filing audited financial statement with SEC from Mid-April 2009 to Mid-April 2010. Therefore, I use this time period to search for comparable companies in Audit Analytics.

information and show up in a 2011 list that updates the May 18, 2010 announcement. The evidence suggests that the 16 companies were actually missed by the May 18, 2010 announcement. In my test of stock market reaction analysis, I find that the inclusion or exclusion of the 16 companies does not affect the results. The results presented exclude the 16 companies.

To match the sample with DataStream, I first use company names to manually search the unique security identifier (DSCODE) in DataStream. For securities that are traded on both major U.S. exchanges and OTC markets, I keep the one for the former. For those traded as both ADR and ordinary shares, I keep the ADR code. To address the concern that manual name search may miss stocks, for companies that I cannot find matches in DataStream, I search in Capital IQ (using the unique company level Capital IQ identifier) for ISINs, and then use the ISINs to search for matches in DataStream. As a result, I find 1523 matches in DataStream.

To construct subsamples for analysis of each event, I use a rolling window to screen the sample.[45] I require companies in the subsample to have filed audit opinions within 15 months before the news release date. In this way, I ensure that the company hires a foreign auditor and is subject to SEC period filing requirements before the PCAOB announcement date. For example, to be included in the sample for the August 12, 2009 news release, the company needs to have a filing date between May 12, 2008 and August 11, 2009 and had engaged a foreign auditor. Such screening is necessary since companies may change their audit firms from a non-U.S. audit firm to a U.S. one, or vice versa, during the two years in which the series of events happened. For

[45] Rolling is an important sampling strategy. The subsamples are not exactly the same across each announcement. A company subjecting to SEC periodic filing requirement in one year does not necessarily face the same requirements in the following year. For example, if a company meets the definition of "foreign private issuer" as defined by SEC, then it needs to provide audited financial statements to SEC not matter it is traded on the OTC market or major exchanges. Whether a company is classified as foreign private issuer depends on a lot of time varying factors such as the percentage of U.S. shareholders.

example, Tat Technologies is a company based in Israel trading on NASDAQ. It had US auditors for fiscal years before 2008 (including fiscal year 2008). After that, it hired Israeli auditors. To be included in each subsample, I further require the stock price to be at least one dollar in the expected return model estimation period and abnormal return analysis period, and the company is not headquartered in the United States.[46] These requirements reduce the sample size to 712. To avoid extreme cases and potential data errors, I trim stock return data at the 1% and 99% levels.

Financial statement data are from Capital IQ. I choose Capital IQ as the source for two reasons. First, it covers more than 62,000 public companies and provides "auditable" data for financial statement items.[47] Second, it is not practical to pull items from different databases since global databases, such as Capital IQ, WorldScope and Compustat standardize financial statement items differently from each other and thus are not perfectly comparable.[48] Ownership concentration for each company is manually calculated using Capital IQ.[49] Capital IQ provides detailed and timely public company ownership data, which includes the shares owned by institutions, insiders, individuals etc. Ownership concentration is defined as the percentage of shares held by block holders with more than 5% of the company's shares. I use an excel template

[46] Future studies that replicate this study can delete companies headquartered in the U.S. at earlier steps since it saves the effort needed to manually search for identifiers in different databases. I choose to do it in the final step because I want to see if I can replicate my results without the headquarter constraints.
[47] For every financial statement item, Capital IQ provides the details for the calculation of the item, and show how the number is derived.
[48] Even though Compustat belongs to the company S&P Capital IQ, it standardizes data differently from the Capital IQ platform. To compare the databases, I retrieve data needed to calculate market to book ratio from all of the three databases for my sample. For my sample, the coverage of Compustat is two-thirds of the coverage of either Capital IQ or WorldScope. I compare the market to book ratio calculated using the three databases, and find that for observations with data available in all the three databases, the statistics are similar across the three. For those without data in Compustat, there are more extreme values as found in the other two databases. I trimmed these extreme observations.
[49] WorldScope also provides ownership concentration data. However, there are a lot of missing values and it does not provide the details of ownership information. To get high quality ownership data, I choose to manually retrieve the detailed data from Capital IQ.

to retrieve detailed ownership data for every owner of a particular company as of March 31, 2010 and to calculate the concentration for every company.[50] Companies' non-U.S. listing information is manually identified from Capital IQ. I first use the excel plug-in to pull out all security-level identifiers for a firm, and then only keep those with the first trading date earlier than January 10, 2011 and the last trading date later than December 31, 2009. Such requirement provides companies' listing status for the May 18, 2010 and January 10, 2011 announcements. After that, using the security level identifiers, I manually search the Capital IQ website for exchange names these security level identifiers.[51] In the cross-sectional analysis, firms in the financial industry (SIC code ranging between 6000 and 6999) are dropped since the meaning of control variables (e.g., total asset and sales growth) for this industry is different from those for other industries. To reduce the effect of extreme cases or data errors, all continuous variables are winsorized at the 1% and 99% levels.[52]

Table 3.1 provides the summary statistics for the final 712 unique companies. These 712 companies were incorporated in 50 jurisdictions, and had audit firms from 43 countries. The sample covers 43 of the 48 industries as defined by Fama and French (1997). This observation suggests that the sample has a broad coverage of countries and industries. Examples for the details of the news releases are provided in Appendix D, E, and F.

[50] Note that Capital IQ excel plug in provides a data type called owners holding more than 5% of shares, which provides details holding information for these owners. However, one should rely on this data type to calculate ownership concentration, since the owners with more than 5% of shares under this data type are defined as those whose current holdings are more than 5%. Historically, their holdings may be less than 5%.
[51] For securities that have stopped trading, Capital IQ excel plug-in only provides their trading item Ids, which do not directly contain exchange information. Therefore, I search on the website for exchange information.
[52] The winsorization does not involve stock returns since they were trimmed at 1% and 99% levels already.

3.4. Empirical strategy

3. 4.1 Expected return estimation model

I aim to isolate the effect of the shocks on cross-listed firms after filtering out systematic factors. However, there is no norm about how to tease out the systematic factors for cross-listed firms. Karolyi (2012) suggested that event study results for cross-listed firms are particularly sensitive to the selection of expected return models. Thus, I adopt three expected return models to estimate abnormal returns, which includes the Fama and French (1993) three factor model, and two market models with different market indexes as benchmarks:

$$R_{i,t}=\alpha_i+\beta_i R_{m,t}+s_i SMB_t+h_i HML_t+\varepsilon_i \quad (1)$$

$$R_{i,t}=\alpha_i+\beta_i R_{m,t}+\varepsilon_i \quad (2)$$

$$R_{i,t}=\alpha_i+\beta_i R_{s\&p500,t}+\varepsilon_i \quad (3)$$

where, on day t, $R_{i,t}$ is the return to firm i; $R_{m,t}$ is the return on the CRSP value-weighted market index; SMB_t and HML_t, are the returns to the small-minus-big (SMB) and high-minus-low (HML) portfolios meant to capture size and book-to-market;[53] and $R_{s\&p500,t}$ is the return to the Standard & Poor's 500 Index. Model (1) deals with the probability that the returns of the sample are systemically affected by size and book to market. In Model (3), the advantage of using the return on S&P 500 Index as the benchmark is that it does not include foreign stocks, and thus it is not impacted by the event.[54] For each firm in the sample, I estimate the parameters in the

[53] The daily factor returns for the SMB and HML portfolios are generously provided by Kenneth French on his website.

[54] Prior research also uses different types of world index, such as Morgan Stanley Capital International (MSCI) All-Capital World Index (Gagnon and Karolyi, 2012), as the benchmark. However, it is not appropriate to use world

models over a 240-day pre-event period (Day –270 to Day –31). Daily abnormal returns during the event period are calculated by subtracting the expected return implied by the expected return models from the firm's realized return.

Because firms in my analysis have the same event periods in calendar time, some degree of cross-sectional correlation in abnormal returns across firms is expected, and conventional test-statistics will be biased. I therefore test for statistical significance using the test statistic proposed by Kolari and Pynnonen (2010), which is a modified version of the widely used t-statistic of Boehmer, Musumeci, and Poulsen (BMP, 1991). Kolari and Pynnonen show that contemporaneous correlation in abnormal returns will be accounted for by multiplying the BMP variance by a term that increases the variance when the correlation is positive. Such modification produces a closer-to-zero statistic since cross-sectional correlation is usually positive, which is also the case in my sample. This new statistic takes event-induced variance into account while adjusting for cross-sectional correlation, and thus is particularly applicable to my setting.

I examine market reactions for all foreign companies with equity traded in the US and registered and filing audited financial statements with the SEC. Specifically, I examine stock market reactions within various groups for each announcement: 1) all companies from China, 2) all companies from EU countries, 3) mentioned companies from China, 4) other international listings from China, 5) mentioned companies from EU countries, 6) other international listings

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index as a benchmark in my setting, since the lack of information sharing between the PCAOB and foreign regulators may cause investors to lose confidence in foreign countries' audit quality if they previously perceive that information sharing between foreign regulators and the PCAOB improves audit quality of foreign countries. Nevertheless, in untabulated tables I also estimate the abnormal return using the Morgan Stanley Capital International (MSCI) All-Capital World Index excluding the U.S. index as the benchmark. Interestingly, while all the results remain, the days on which daily stock return is significant shift from day -1 and day +1 to day 0 and day +2 when the MSCI ex. U.S. index is used for the May 18, 2010 event study analysis.

from EU countries; and 7) other international listings from countries other than China and EU countries. After that, I compare the inferences between groups and across events.

3.4.2. Institutional characteristics and abnormal stock returns

After estimating the abnormal returns, I seek to understand how the net benefits of the cross-border audit oversight varies with country- and firm-level corporate governance variables. Firms operating in countries with stringent rules or enforcement policies are predicted to have better corporate governance and audit quality in the absence of the US cross-border audit oversight. I use six proxies to measure the overall institutional strength of home country, strength of legal system, audit profession quality, and strength of security laws. The proxy for the overall institutional strength is the natural logarithm of the home country's per capita GDP (LNGDP) as retrieved from World Bank.[55] The overall strength of legal system has three proxies. The rule of laws index (RULE_OF_LAW) is the World Bank governance index (Kaufmann et al., 2010), which reflects perceptions of the extent to which agents have confidence in and abide by the rules of society. The judicial efficiency index (JUDICIAL) as provided by Laeven and Majnoni (2005) measures the efficiency of a country's legal system. The legal origin indicator (FRENCH_OR) equals 1 if the country has a French legal origin, and 0 otherwise. The audit profession quality (AUDIT) index is constructed by Preiato et al. (2013), using factors including "whether auditors must be licensed," "whether the oversight body can apply sanctions," "whether audit (firm or partner) rotation is required," etc. The proxies for the strength of security laws is disclosure in periodic filings index (DISCLOSURE) as constructed by Djankov et al.

[55] GDP information for Taiwan (China) is retrieved from the International Monetary Fund website.

(2008). DISCLOSURE measures the extent to which disclosure requirements in annual reports and periodic filings facilitate the scrutiny of related-party transactions by outside shareholders.

Note that among all the proxies, the first five proxies are more relevant to the sample in this paper as compared to DISCLOSURE, since not all US-listed foreign companies have home listings. For example 51JOB, a provider of integrated human resource services in China, is listed as ADRs in NASDAQ and Frankfurt Stock Exchange, but is not publically traded in China. Therefore, the requirements of stock exchanges in China does not directly affect this company's financial reporting. Nevertheless, for the subgroup that have U.S. listings in addition to home-listings, home country disclosure requirements would affect the value-added of US reporting requirements. For the comprehensiveness of the empirical test, I include this disclsoure variable. The above measures of institutional strength is predicted to be positively associated with the abnormal return, except FRENCH_OR, the prediction for which is the reverse.

Firm level corporate governance proxies include firm size, ownership structure, and whether the firm hires a Big 4 auditor. Firm size is measured as the natural logarithm of total assets. Following prior studies, a five percent cut-off level is used to identify shareholders with concentrated holdings (e.g., Hertzel and Smith, 1993). Ownership concentration (OWNERCON) is measured as the total percentage of shares owned by owners with more than five percent of total shares outstanding. To control for the non-linearity of ownership concentration on firm value (see Morck et al. (1988)), I also include squared concentration (OWNERCON2). BIG4 is an indicator variable equal to 1 if the company hires a Big 4 auditor, and 0 otherwise.

In addition to the above governance variables, further controls include sales growth (SALEGRW) and Tobin's q valuation ratio (MB) as controls for growth opportunity, long-term

debt leverage ratio (LEVERAGE) as control for financial risk, and operating cash flow relative to total assets (CFO) as the control for operating performance. Capital expenditures relative to total assets, firm age (AGE) and percentage of foreign sales (FOREIGN_SALE) measures operational risk. To investigate how the listing status of companies affects stock market reactions, I use two indicator variables to measure listings status. CROSS is an indicator variable equal to 1 if the company has domestic listing in addition to its US listing, and 0 otherwise. SINGLE is 1 if the company only has US listing, without either domestic listing or other foreign listings. Detailed variable definition and data source are available in Appendix C.

3.5. Market reactions around the key dates

3.5.1. Summary statistics of overall market reactions

To provide an overall view of the effects of the announcements, this section presents and discusses the summary statistics for mean three-day cumulative abnormal returns of all cross-listed companies hiring non-U.S. auditors. As shown in Table 3.2, only Announcement 3 (May 18, 2010) has a market wide impact. The average share price reaction for the cross-listed companies is -226 basis points for the three days surrounding May 18, 2010. The interquartile range of reactions across the firms is -488 to +35 basis points. The distribution is negatively skewed. The date with the second most negative average market reaction is Announcement 2, with an average reaction of -136 basis points. The interquartile range is -378 to +63 basis points. The distribution is less negatively skewed than for Announcement 3. For the two dates (December 4, 2008 and June 25, 2009) that the PCAOB announced postponing deadline of cross-border inspection, the average reaction distributions are symmetric, and the stock market of foreign firms was not impacted in a statistically meaningful way. On January 10, 2011, when the

PCAOB announced that it entered into cooperative agreements with UK audit regulator, the average market reaction is +93 basis points. The interquartile range of reactions is -99 to +248 basis points, thus is slightly positively skewed. Overall, the initial statistics indicate that only Announcement 3 (May 18, 2010) had statistically meaningful negative market reactions at the whole sample level. Section 3.5.2 and Section 3.5.3 provided detailed abnormal return analysis in the subsamples.

3.5.2 Test of investor response to the Announcement 3

This section presents market reactions to Announcement 3. (May 18, 2010). Since it is unclear the exact day on which market participants learned of the information, I calculate the 5 daily abnormal returns (from day -1 to day +3) surrounding the announcement date. Table 3.3 presents abnormal returns across the three expected return models. Unexpectedly, the average market reaction is not significant for mentioned companies, but significantly negative for the group of other international listings, as shown in Panel B and Panel C. Panel C shows that the average abnormal return for non-mentioned international listings using the S&P 500 index benchmark is -257 basis points for the three days surrounding the announcement date (t = -2.487).[56] To investigate the reason for lack of statistically significant reactions to mentioned companies, I split the mentioned sample into a China group and EU group. As indicated by Panels D and E, the lack of statistically significant market reaction is caused by the lack of reactions to the EU group. For the 134 cross-listed EU firms, the average market reaction is -84 basis points (z = -

[56]Unless otherwise stated, all statements of statistical significance refer to the 5% level or better in two-tailed tests. All discussed results correspond to the expected return model using S&P 500 index as the benchmark.

0.478). In contrast, for the 122 companies from China, the mean three day cumulative abnormal return is -280 basis points (t = -1.944, percentage of negative returns = 75%).

Panel F and Panel G present market reactions to the non-mentioned (by the announcement) international listings from Canada and other countries, respectively. The results suggest that the 169 companies from Canada suffered a significantly negative average cumulative abnormal return of -311 basis points, with the z-statistic equal to -2.39 with 80.47% of sampled firms experiencing negative returns. The high degree of negative is likely to be caused by the fact that a lot of small companies from Canada are listed in the U.S. exchanges, since small firms are more sensitive to negative news.[57] Similarly, the left 227 stocks from other countries went through a mean cumulative abnormal return (-1, +1) of -216 basis points (t-statistic = -2.173). The initial evidence suggests that the Announcement 3 has a spillover effect on international listings not referred on the PCAOB list.

3.5.3 Stock market reactions to other announcements

If investors learned from the prior announcements that EU countries and China have laws that conflict with sharing local audit information with the PCAOB, then the stock market response to the May 18, 2010 for companies in China and EU countries would be mitigated. Therefore, I further examine market reactions to the Announcement 1 (August 12, 2009) and Announcement 2 (February 3, 2010). [58]

[57] In the cross-sectional analysis, I analyze how size affects the cross-sectional variation in abnormal returns.
[58] In addition to the Announcement 1 and Announcement 2, I also examine market reactions to earlier key announcements as indicated in Table 2. However, none of sub-groups experienced significant market reactions, and the average abnormal returns were even not negative for the earlier announcements indicating inspection timing problem. The evidence suggests that the market did not learn from earlier announcements about the severity of the problem. Therefore, I only present the results for the Announcement 1 and Announcement 2 here. Results for early announcements are available on request. Summary statistics for market reactions to earlier announcements are provided in Table 2.

Table 3.4 and Table 3.5 present market reactions to the Announcement 1 and Announcement 2. An obvious similarity between Table 3.4 (Panel A) and Table 3.5 (Panel E) is that firms audited by non-mentioned auditors from countries other than China and EU countries did not experience significantly negative abnormal return, suggesting that investor confidence in the oversight of audit firms in these countries were not negatively impacted by these two announcements. In addition, as reported in Table 3.4 Panels A and B, while the average market reaction to firms audited by mentioned audit firms in the Announcement 1 is not significant, investors reacted significantly and negatively to firms from China, regardless of whether their auditors were on the published list or not. Clients of mentioned audit firms from China experienced an average cumulative abnormal return (from day +1 to day +3) of -506 basis points, with z-statistic equal to -2.162. Similarly, clients of non-mentioned audit firms from China suffered a three-day average cumulative market reaction of -337 basis points (t-statistic=-1.736). In addition, market reactions to clients of mentioned China audit firms and clients of non-mentioned China audit firms experienced similar negative market reactions. The results suggest that at least some investors realized that the PCAOB encountered cross-border oversight problems with China, since if investors read it as a mere inspection timing problem then the stock reactions would be limited to companies associated with mentioned auditors. In contrast, the evidence in Panel B for EU auditors, that market reactions to mentioned group and the non-mentioned group are both statistically insignificant suggests that the jurisdiction authority issue in EU countries was not an important concern to investors.

In Table 3.5, Panel A and Panel B report market reactions to the Announcement 2. A salient observation is that market reactions are negative and significant for firms from China and from EU countries, regardless of whether their audit firms were mentioned or not. The

magnitude of reactions are large for both the China group and EU group, irrespective of whether they were mentioned by the PCAOB announcement or not. The non-mentioned China group experienced an average reaction of -368 basis points (t-statistic=-3.112) accumulated from day +1 to day +3 and the non-mentioned EU group undergoing an average reaction of -233 basis points (t-statistic=-2.028). Collectively, the evidence suggests that investors learned from the Announcement 2 that the inspection authority of the PCAOB was challenged by the legal authority of China and EU countries. The lack of statistically meaningful reactions to EU countries on Announcement 2 is likely to be caused by investor learning about the problem before the Announcement 2.

Table 3.6 shows market reactions to the January 10, 2011 announcement, which informed investors that the PCAOB and the UK accounting regulators entered into cooperative agreement in cross-border audit oversight. As shown, the market did not react in a statistically meaningful way to either firms from UK or firms from other countries. However, on average, the market experienced positive market reactions following the cooperative announcement between the PCAOB and UK audit regulators, with the average cumulative abnormal returns being 113 basis points for firms from UK and 77 basis points for those from other countries, accumulating from the day one to the two days following the announcement.

3.6. Cross-sectional analysis for abnormal returns

Having examined average stock market reactions, I now perform cross-sectional analysis of the firms' abnormal returns for Announcement 3. I conduct cross-sectional analysis for this announcement rather than using the announcements prior to the Announcement 3 (May 18, 2010), because Announcement 1 and 2 are not transparent and are bundled with confounding

information.[59] Compared with the Announcements 1 and 2, Announcement 3 is more transparent. Since market reactions to Announcement 3 were concentrated in firms from non-EU countries, I only include firms from non-EU countries in the regression.

If the negative stock market reaction for the group of companies not on the PCAOB list is a reflection of the valuation of the PCAOB cross-border oversight, then the abnormal return should vary with country- and firm- level corporate governance factors. As shown in Table 3.7, the key proxies for institutional strength (e.g., RULE_OF_LAW and JUDICAL) exhibits considerable variation, and thus are ideal for cross-sectional analysis. RULE_OF_LAW arranges from -0.22 at the 25th percentage to 1.81at the 75 percentile. The mean for CROSS and SINGLE is 0.61 and 0.07 respectively, indicating that 61% companies in the sample are listed in domestic exchanges in addition to the US one, 7% are listed only in the US, the remaining 32% are listed in multiple foreign exchanges, without domestic listing.

Table 3.8 presents results of the cross-sectional analysis for Announcement 3. The reported estimates of coefficients are standardized, so, the intercepts are not reported. As reported in Panel A: Models (1) to (6), the standardized coefficients for all the country level institutional factors are significant, and FRENCH_OR having the opposite sign as predicted. For example, the coefficient for RULE_OF_LAW is 0.1290 (t=4.40).This results indicate that the U.S. cross-border audit oversight is less valuable for companies from countries with stronger institutions (i.e. the firms had less negative returns). The evidence is consistent with the prediction that firms

[59] On August 12, 2009, together with the name list of audit firms that the PCAOB delayed inspection is a list of jurisdictions the PCAOB has conducted inspections. The two lists have overlap in jurisdictions, such as Israel and Norway. Similarly, the bundled lists for the February 3, 2010 list of audit firms experiencing inspection delays are a list of jurisdictions in which the PCAOB has conducted inspections and a list of jurisdictions the PCAOB intend to conduct inspections in 2010. The three lists have overlap in jurisdictions, such as United Kingdom and Norway. Therefore, I do not make any inference from the cross-sectional analysis of the Announcement 1 and 2.

from countries with strong institutional environment are less likely to be affected, suggesting that investors view strong home country institutional environment as a mechanism to enhance corporate governance. For the firm-level factors, the coefficients on LNASSET and BIG4 are both significantly positive across all the six models. The evidence suggests that companies with more external monitoring (for big firms) with better quality auditors (for big 4 clients) are less impacted by the negative news of US cross-border audit oversight. The coefficients on the ownership concentration (OWNERCON) are significantly positive after controlling for country-level variables, and the coefficients on squared ownership concentration (OWNERCON2) are negative.

Since China is special in that it blocked the PCAOB access to audit information, I estimate the regression both in the inclusion and exclusion of companies from China to see the effect of China in the cross-sectional analysis. When I include Companies from China in the sample, I include a dummy variable (CHINA) equal to 1 if the company is from China and 0 otherwise. Table 3.8 provides the version of results from the sample including Chinese companies. In unreported results, the main results are robust to the exclusion of China companies from the sample. [60]

Panel B reports the results of regressions that investigate how listing status affects the abnormal stock return. Models (1) to (3) only have companies listing status as explanatory variable in the regression.[61] In Models (1) to (3), the coefficients on both CROSS and SINGLE are insignificant and the adjusted R-squared is negative, suggesting that listing structure alone

[60] The results are available on request.
[61] To gauge how listing status alone affects the abnormal stock return, I report the raw OLS regression results without standardization of the coefficients so that the intercept is observable.

does not affect the abnormal returns. After adding other controls in Model (4) to Model (6), results still show that listing status does not explain abnormal stock returns, and the coefficients on the proxies of home country legal strength and audit quality remains.

3.7. Additional analysis

3.7.1. Analysis of change in perceived information asymmetry

Evidence in section 3.6 suggests that the incidence of negative market reaction in companies not included on the PCAOB's May 18, 2010 announcement is caused by loss of investor confidence in the overall efficiency of the cross-border audit oversight. To further confirm this conjecture, I examine the change in perceived information asymmetry as proxied by bid-ask spreads (e.g., Stoll, 1978; Venkatesh and Chiang, 1986; Glosten and Harris, 1988) The classical theoretical literature on information and trading suggests that adverse selection reduces liquidity via price protection mechanisms, such as bid-ask spreads, as uninformed investors become less willing to trade (see Kyle 1985; Glosten and Milgrom 1985;Diamond and Verrecchia 1991; Leuz and Wysocki 2008). Loss of confidence in information quality (as caused by the PCAOB enforcement problem) increases the perceived information asymmetry for uninformed investors, thereby increasing bid-ask spreads. Therefore, if there is spillover for the cross-border listings not on the PCAOB, then there would be an increase in bid-ask spreads following the announcement.

Table 3.10 provides the results for analysis of change in bid-ask spread. Bid-ask spreads (SPREAD) is calculated as the difference between the closing ask and bid prices as scaled by the average of the two. For individual stocks, pre-event SPREAD is the daily mean spread in the three months between February 7, 2010 and May 7, 2010, and post-event spread is calculated

over the three months from June 1, 2010 to September 1, 2010. Panel A provides the mean daily bid-ask spreads during the pre- and post-announcement period. As shown in Panel A, the sample experienced an increase in bid-ask spreads following Announcement 3.

Panel B provides results for the cross-sectional analysis. In the regression, the dependent variable is the SPREAD, key explanatory variables are the indicator variable POST, and the interactions between POST and measures of country level institutional strength. Other controls include interactions between POST and LNASSET, BIG4, ownership concentration (OWNERCON), and controls from the stock market, as well as firm fixed effect. The reported estimates of coefficients are standardized. The first salient observation is that the POST indicator variable has a significantly positive coefficient (e.g., estimator=0.4248, z=5.53 in Model (1)), suggesting an increase bid-ask spreads following the event. Consistent with the abnormal return analysis consistent with the abnormal return analysis, the coefficient for the interaction between POST and home country intuitional strength measure is significant at least at the 10% level (e.g., estimator of coefficient for RULE_OF_LAW -0.0462, z=-1.75) in Model (1) – Model (5). The loadings on the other two key firm-level corporate governance variables are also consistent with the abnormal return analysis, with the estimator of coefficient for POST×LNASSET equal to -0.1561 (t=-2.98) and estimator of POST×BIG4 equal to -0.1469(t=-3.57) in model (1) for example. Collectively, the evidence suggests that information asymmetry is more severely impacted for companies from countries with weak institutional strength, smaller size and non-big4 auditors.

3.7.2. Dollar amounts of abnormal stock returns

To quantify the economic consequences of U.S. cross-border oversight enforcement challenges, I translate into dollar amounts the abnormal stock return caused by the announcements. I compute the abnormal dollar returns by multiplying the cumulative abnormal returns with the market value (in U.S. dollar amounts) of the firm as of the day before the return accumulation day. Market value data is from DataStream calculated as the share price multiplied by the number of ordinary shares in issue. Table 3.10 presents the market value loss and increase caused by the announcements. To more precisely reflect the effect of enforcement challenges, abnormal dollar return calculation is limited to the groups of firms impacted by the announcements.

The first observation from Table 3.10 is that companies from China and EU countries experienced a much larger loss than those from other countries, aggregating over all the countries. As shown in Panel A, the 122 firms from China experienced a loss of $21 billion on August 12, 2009, with the average loss for every firm as large as $170 million. Even more dramatically, on February 3, 2010, the 262 firms from China and EU countries suffered a total loss of $96 billion, with an average loss of $364 million. On May 18, 2010, foreign firms from non-EU countries underwent a total loss of $39 billion, just because of loss in investor confidence in enforcement of cross-border audit oversight. The large amount of dollar loss following the sequences of announcements suggests that the enforcement of cross-border audit oversight creates economically significant value to cross-listed firms.

As a comparison, the abnormal dollar returns of cross-listed firms are also calculated for the January 10, 2011 announcement. As the first cooperative agreement following the Dodd-Frank Act, this announcement is expected to boost investor confidence, and therefore increasing

the value of cross-listed firms. All cross-listed firms satisfying the sampling method are included in the calculation. As reported in Panel A, cross-listed firms went through a total value increase of $92.85148 billion in the three days following the announcement, with an average value increase of $139,836,562 for individual firms. Such evidence is consistent with the results from announcements of regulatory breakdown, suggesting that the value of the PCAOB cross-border audit oversight is economically large.

To further specify the valuation implication of the PCAOB cross-border audit oversight on cross-listed firms, Panel B – Panel E provide the names of the top 5 highly impacted firms. The impact is substantial for these individual firms. For example, as documented by Panel B (Announcement 1), China Mobile Ltd experienced a loss as large as $9.5 billion. Comparison between Panel C (Announcement 2) and Panel E (January 10, 2011 regulatory recovery) reveals that firms most highly impacted by the announcement of regulatory breakdown have overlaps with firms most highly impacted by the announcement of regulatory recovery. For example, BP plc, a company headquartered in the United Kingdom, underwent a value loss of $4,510,540,033 following the Announcement 2 and had a value increase of $4,307,539,684 in the three days following the January 10, 2011 announcement. Such symmetric evidence strengthens the inferences from each announcement.

3.8. Conclusion

Regulators, confined to information within their own borders, can only see a portion, and often a small portion of the risks of an enterprise operating in foreign jurisdictions. Without home country regulators offering local information, U.S. accounting regulators can have difficulties detecting the misconduct of foreign companies. Thus, cross-border cooperation in oversight is

particularly important. I show that market participants value the enforcement of U.S. cross-border audit oversight in an economically substantive manner. Additionally, I find evidence that the value of enforcement is lower for firms less agency problems. Collectively, the evidence suggests that the enforcement of U.S. cross-border audit oversight is viewed as a useful governance device. Such evidence contributes to the cross-listing literature by offering direct evidence that U.S. accounting requirements create value for cross-listed companies. In addition, the variations in stock market reaction to different announcements informs regulators that the way information is disclosed indeed affects market reactions.

The capital market consequence of the PCAOB cross-border audit oversight is particularly relevant to the PCAOB's continuing effort to achieve cooperative agreements with more countries. Following the PCAOB, global regulators have increasingly achieved bilateral agreements or Memorandums of Understanding between audit oversight bodies (e.g., between Canada and Australia; Canada and Germany).[62] As the pioneer in cross-border cooperation in audit oversight, the experience of the PCAOB is also valuable to foreign regulators.

[62] The main part of these cooperative agreements is exchange of information and documents between the two regulators, such as audit working papers and inspection and investigation reports. Memorandum of Understanding is not the same as cooperative agreement, but it can be thought as a helpful step to achieve agreement.

Chapter 4: Future research --- Can US regulation change the audit quality of foreign jurisdictions? Evidence from spillover effect of PCAOB cross-border audit oversight

4.1. Introduction

A large literature in the cross-listing area has documented that a company from countries with weak legal forces for investor protection can upgrade its own corporate governance environment by cross listing in the U.S. However, little research has investigated whether cross-border listing can change the institutional environment of the firm's home country. The lack of such research is probably due to the difficulty in identifying an explicit channel through which cross-listing changes home country institutions.

A unique channel emerges after the enactment of Sarbanes Oxley Act of 2002 (hereafter, SOX). To enhance audit quality of public companies, Section 104 of SOX and PCAOB Rules require audit firms register with, and be regularly inspected by the PCAOB if the firm wants to audit public companies registered with and filing periodic financial statements to the SEC, no matter whether the audit firm is a U.S. one or a foreign one. Essential to a typical inspection is review of certain of the practices, policies, and procedures that the audit firm adopts to ensure audit quality (i.e., quality control system of the audit firm). Remedies are required to be made if inspections discover the defects in quality control system. The cross-border audit inspection provides a unique opportunity and incentive for foreign audit firms to improve its quality control system. If adopting PCAOB quality control requirements can help audit firms to more efficiently allocate audit effort and constrain self-severing behavior by engagement partners, then a profit maximizing audit firm would apply similar quality control systems to both U.S.-listed clients and

other clients that are not listed in the U.S. As such, audit quality of the two groups of clients is economically connected by the underlying quality control system. In this paper, I investigate such economic connection by empirically examine whether audit quality of foreign auditors' clients *not* listed in the U.S. changed following registration, initial inspection and settlement of disciplinary orders. In addition, I further analyze the connection by analyzing the change in audit fees following the above three steps of enforcement.

Direct benefits of compliance with the PCAOB Rules are the qualification to accept U.S.-listed local clients and signal of high quality audit. Foreign audit firms have incentives to achieve compliance. For example, in the public documents on quality control system, KPMG Bermuda, a PCAOB registered public accounting firm, states that "KPMG in Bermuda maintains a system of quality control for its audit practice that is designed to meet or exceed the requirements of Bermuda law, the rules of the Institute of Chartered Accountants of Bermuda (ICAB), International Federation of Accountants (IFAC), and the rules and standards issued by the Public Company Accounting Oversight Board (PCAOB) and the American Institute of Certified Public Accountants (AICPA)." [63] If the economic benefits make registered audit firms to enhance their quality control system for both U.S.-listed clients and other clients, then one can observe changes in audit quality in both groups of clients.

However, there are at least three reasons why my predictions may not borne out. First, if audit firms perceive enforcement of PCAOB rules to be lax, then foreign audit firms will not change their quality control system. In this case, the PCAOB cross-border audit oversight will

[63] Our System of Audit Quality Controls, KPMG, Bermuda, Webpage link: http://www.kpmg.com/bm/en/issuesandinsights/articlespublications/pages/qualitycontrols.aspx

not affect audit quality of foreign audit firms. In addition, the PCAOB inspection of quality control system by design reviews the auditing rules and procedures in place. Even if foreign audit firms change rules on auditing procedures in place to pass the inspection, audit quality will not be affected without sufficient implementation of the designed quality control rules. Second, the intensity of cross-border externalities is related to the overlap of details in quality control for U.S.-listed clients and other clients. If improvement in quality control triggered by the oversight is mostly related to aspects specific to U.S. auditing practice, then auditing procedure and audit quality of clients not listed in the U.S. will not be affected. This will occur, for example, in cases where changes in quality control are in evaluation of clients' internal control over financial reporting, which is required only by the U.S. (SOX 2002) and in assigning the appropriate personnel to work for U.S.-listed clients. Third, if foreign audit firms improve audit quality of U.S.-listed clients by allocating most training resources and high quality personnel to U.S. audit services at the expense of non-U.S. audit services, then audit quality of non-U.S. listed clients will be negatively impacted. As such, I examine whether the PCAOB cross-border inspection program changes audit quality and audit fee of foreign auditors' clients not listed in the U.S., and I also investigate when the change happens.

The main identification strategy exploits the PCAOB's first time inspection of foreign audit firms. These inspections were reasonably external to audit firm characteristics, as the PCAOB rule 4003 requires the PCAOB periodically inspect all foreign accounting firms that audit SEC-registered public companies regardless of the firms' characteristics. One major issue in identification is that after the establishment of the PCAOB, a number of foreign countries, such as the United Kingdom, Canada, and Australia, also created their own independent audit oversight bodies. In addition, for a number of countries, the first year the PCAOB started

inspection on auditors from these countries overlap with the first year the home country started to inspect (e.g. Korea). To address the concern that any improvement in audit quality may be caused by home country inspection, I only keep countries that did not have any audit oversight body before year 2011. I start the sample construction with retrieving data of public companies in the 90 countries that have audit firms registered with the PCAOB from WorldScope. Initial searching returns 54229 unique companies (52 countries), and the sample size reduced to 47952 (12 countries) after requiring that the company have auditor identity information from Capital IQ and the country have more than 200 public companies. Among the 12 countries, 6 of them have been inspected by the PCAOB, and 6 have not. Based on the selected sample, I conduct a country by country study.

Another empirical concern is that foreign auditors' non-U.S. listed clients may intentionally switch to audit firms that are not subject to the PCAOB regulatory regime so that they can more easily manipulate earnings. If this conjecture is true, then any observed change in audit quality following an inspection may be caused by change in client pool. I address this issue by requiring the audit client to be audited by the same auditor before and after the inspection for both treatment sample and control sample. I adopt a difference-in-differences research design that compares the change in audit quality of inspected audit firms with that of uninspected audit firms in the same years. To address the potential omitted variable problem that accounting firms which have plans to improve audit quality could be more likely to register with the PCAOB, for every treatment firm-year, I obtain control observations from the same year within the registered firms. As the PCAOB first-time inspections for individual accounting firms were staggered across years, I am able to obtain control audit firms for treatment firms from the same country every year.

Detailed inspection and registration information, such as registration date, inspection start and end dates, inspection report publish date, the number of days the PCAOB spent on every inspection, are manually collected from every inspection report and registration file at the PCAOB website. To match Capital IQ audit identity information with the audit identity in the PCAOB inspection reports, I manually assign standardized names of audit firms to the names of audit firms obtained from Capital IQ and PCAOB inspection reports by using the "Auditor and auditor parent ID" spreadsheet I requested from Thomson Reuters. Note that it is important to assign the standardized names to audit firms in the two data sources (i.e., Capital IQ and PCAOB), as the PCAOB only provides specific names of network members (e.g., Sibille, Argentina, which is actually a member of the KPMG) and Capital IQ only provides either network name or specific network member name. Without correct name identification and accurate linkage between the two data sources, one cannot successfully identify the treatment sample and control sample.

4.2. Institutional setting, related literature and hypothesis development

4.2.1. Institutional setting

Triggered by the sequence of high profile financial reporting scandals (e.g., Enron, Adelphia, and WorldCom), Sarbanes-Oxley Act of 2002 created the Public Company Accounting Oversight Board to oversee the audit firms that issue, or play a substantial role in the preparation of, an audit report on the SEC-filed financial statements of public companies in order to improve audit quality. Prior to the establishment of the PCAOB, the U.S. auditing profession is self-regulated since the 1970s, and non-U.S. accountants that participate in the audit of U.S. public companies are not directly overseen by the U.S. even though have long been subject to various U.S.

requirements (Samantha, 2004).[64] PCAOB Rule 2100 requires accounting firms that audit U.S. public companies register with the PCAOB, irrespective of where those firms are located. For the first time, non-U.S. public accounting firms are required to register with the Board as a condition of preparing, issuing, or playing a substantial role in the preparation or issuance of, audit reports on U.S. public companies. The registration requirement takes effect for non-U.S. audit firms on July 19, 2004.[65]

In addition to register public accounting firms, the Act also gives the PCAOB the power and obligation to regularly inspect registered audit firms, to conduct investigations, and disciplinary proceedings concerning, and to impose appropriate sanctions. Section 104 of the Act and PCAOB Rule 4003 require that public accounting firms auditing fewer than 100 U.S. public companies should be inspected at least every three years. Most non-U.S. public accounting firms audit significantly fewer than 100 U.S. public companies, therefore they are in general subject to tri-annual inspections (Ross, 2004). After an inspection, the PCAOB would send inspection results on engagement specific issues and identified defects in the audit firms' quality control system to the audit firm inspected, and the results on engagement specific issues will be published on the PCAOB web site. In cases where the audit firm fails to remedy defects in quality control within 12 months following the issuance of the inspection report, the PCAOB will make criticisms of quality control problem public. In addition, violation of the SEC or PCAOB rules found in the inspection could trigger further investigations. When investigations

[64] Samantha Ross, 2004. Testimony Concerning the Regulatory Dialogue Between the Public Company Accounting Oversight Board And the European Commission. PCAOB webpage link: http://pcaobus.org/News/Speech/Pages/05132004_RossPCAOBAndEuropeanCommission.aspx
[65] PCAOB Release No. 2004-003: Registration Deadline for Non-U.S. Accounting Firms (March 11, 2004)

lead to alleged violations, the PCAOB can impose sanctions including suspension or revocation of the accounting firm's registration, suspension, and monetary penalties.

The PCAOB cross-border oversight system directly affected foreign audit firms' exposure to the U.S. regulation and litigation risk. For example, as of July 03, 2014, the PCAOB has reached final decisions imposing sanctions on7 non-U.S. audit firms.[66] On the basis of its finding concerning Price Waterhouse's (India, hereafter, PW India) auditing of financial statements of Satyam Computer Services, the PCAOB imposed a civil money penalty in the amount of $1,500,000 on April 5, 2011. The sanction also temporarily limited the activities, functions, and operations of PW India, by prohibiting PW India from accepting SEC filers as new clients for a period of six months; and requires PW India to (1) adopt and implement certain policies and to undertake certain actions related to PW India's system of quality control; and (2) provide additional professional education and training to its associated persons.[67]

4.2.2. Related literature

The significant change in the regulation of auditing profession has triggered a series of studies investigating the effect of this change on U.S. accounting firms, and relatively smaller number of research on its effect on U.S. listed clients of foreign accounting firms registered with the PCAOB. Research on the economic consequences of PCAOB oversight for U.S. audit firms have investigated its effect on client obtaining (or retaining), audit fee, and audit quality. For example,

[66] As required by the Sarbanes-Oxley Act, contested Board disciplinary proceedings are confidential and non-public, unless and until there is a final decision imposing sanctions. See the link at:
http://pcaobus.org/International/Enforcement/Pages/SettledDisciplinaryOrders.aspx
[67] PCAOB Release No. 105-2011-002, webpage link:
http://pcaobus.org/Enforcement/Decisions/Documents/PW_India.pdf

using changes in audit firm's market share in response to engagement performance weaknesses disclosed in PCAOB reports as the measure of information content, Lennox and Pittman (2010) document that audit clients do not perceive that the PCAOB's inspection reports are valuable for signaling audit quality. Boone et al. (2014) examine the economic consequences of the 2007 PCAOB Disciplinary Order against Deloitte in the U.S., and indicate that the PCAOB censure was associated with a decrease in Deloitte's ability to retain clients and attract new clients, and a decrease in Deloitte's audit fee growth rates without decrease in accrual quality. Carcello et al. (2011) investigate change in discretionary accruals following the first and second inspections for Big 4 audit firms, and find that the absolute value of discretionary accruals decreased in the years following the inspections.

More related to this study, another stream of studies focuses on the oversight effect on foreign audit firms. Research in this area exclusively focuses on the effect on U.S.-listed clients of registered foreign audit firms. Lamoreaux (2013) reports that auditors in jurisdictions allowing PCAOB inspections are more likely to report going concern opinions and material weaknesses relative to auditors in jurisdictions barring PCAOB inspections for their U.S.-listed clients. In addition, he finds that the difference in likelihood started after the commencement of PCAOB registration requirement for foreign audit firms, but the difference does not change following initial inspections.[68]Krishnan et al. (2014) investigates whether first-time inspection of foreign audit firms changes audit quality of their U.S.-listed clients, and find that Big 4 clients

[68] The registration requirements became effective for foreign public accounting firms on July 19, 2004. See PCAOB Release No. 2004-003: Registration Deadline for Non-U.S. Accounting Firms (March 11, 2004)

experienced a decrease in abnormal accruals following initial inspection but non-Big 4 clients do not experience such decrease.

While the above evidence indicates that PCAOB oversight has effect on audit outcome (e.g., discretionary accruals and going concern opinions), regulators and researchers cannot directly infer from these evidence how the PCAOB cross-border oversight affects audits of foreign auditors' clients not listed in the U.S. First of all, due to that fact that foreign audit firms operates in an legal and culture environment different from the U.S., audit firm characteristics and PCAOB *de facto* inspection of foreign audit firms will not be the same as that of U.S. audit firms, and therefore the incentives, cost and benefits differ between foreign audit firms and U.S. audit firms associated with the oversight will be different. As such, inference from U.S. audit firms cannot be directly applied to foreign ones. Second, for the same foreign firm, quality control rules and procedures for U.S.-listed clients and clients *not* listed in the U.S. are not necessarily the same as litigation risk for the two segments does not face the same bar. Thus, empirical results for U.S. listed clients are not directly indicative of the PCAOB's effect on other clients. Empirical answer to this question adds new insight into how auditing regulation of one country affects the auditing practice of other counties, and thus provides important inputs in policy analysis for policy makers in various countries. To better understand how PCAOB cross-border audit oversight affects the auditing procedure and audit quality of foreign audit firms, I develop testable hypothesis in Section 4.2.3.

4.2.3. Hypothesis development

Within the framework of classical auditing theory (Simunic, 1980), an auditor maximizes profit by charging audit fees and selecting a level of audit effort in verifying financial statements. This

framework simplifies the real auditing world by assuming that an auditor can precisely choose and allocate effort to decrease likelihood of audit failure in his attempt to maximize his own profit.[69] In a real modern auditing corporation, the decision making function employed to maximize corporation profitability involves much more aspects, such as how to efficiently allocate audit effort, what procedures and rules to adopt to ensure that effort is exerted where needed, and how to constraints engagement partners' self-serving behavior which would potentially impair corporation benefits. Due to knowledge, technology and experience constraints, the quality control system (i.e. rules and auditing procedures adopted to avoid audit failure) adopted by foreign audit firms may not be the optimal one. PCAOB cross-border audit inspection provides a unique opportunity for foreign audit firms to learn how to efficiently design and enforce quality control system from senior practitioners in the auditing profession from the U.S. as inspectors in the international inspection program were in general senior managers of big accounting firms before they started to work for the PCAOB. For example, George Botic, the director of the PCAOB inspection program, was a senior manager with PricewaterhouseCoopers in the Washington, D.C. office. During 13 years at PwC, he conducted audits of numerous public and private companies in a variety of industries and assisted companies in going public.[70] Maria Davis, the associate director of the cross-border inspection program, was a partner of Deloitte for four years before joining the PCAOB. Kevin Borkowski,

[69] Audit failure refers to the failure to identify a misstatement when the misstatement exists.

[70] He is also involved with international, cross-border inspection efforts and the development of regulatory policy for the PCAOB. As of April 28, 2014, George Botic become Special Advisor to PCAOB Chairman James R. Doty. He advises the Chairman on all matters that come before the Board for decision. See the PCAOB news release "George Botic to Join Chairman Doty's Office as Special Advisor" at: http://pcaobus.org/News/Releases/Pages/04282014_Botic.aspx

another associated director of the international inspection program, was a partner of KPMG in Portland for 7 years.[71]

A typical periodic cross-border quality control review covers a broad range of functional areas including(1) leadership responsibilities for quality within the audit firm (i.e. "tone at the top"); (2) practices for partner evaluation, compensation, admission, assignment of responsibilities, and disciplinary actions; (3) independence implications of non-audit services; business ventures, alliances, and arrangements; personal financial interests; and commissions and contingent fees; (4) practices for client acceptance and retention; (5) practices for consultations on accounting, auditing, and SEC matters; (6) the audit firm's internal inspection program; (7) practices for establishment and communication of audit policies, procedures, and methodologies, including training; and (8) the supervision by the audit firm's engagement teams of the work performed by foreign affiliates. As such, inspection provides a direct way to identify defects in quality control system. The PCAOB motivates remediation of the defects by making criticisms on quality control public in the absence of remediation.[72]

For a profit maximizing audit firm, occurrence of *de facto* remediation in quality control system for U.S.-listed clients hinges on whether it increases the net profit of the audit firm. If fixing quality control problems can allow the firm to efficiently allocate audit effort or constrain engagement partner self-serving activities, and avoid junior staff slackness, then the audit firm will improve the quality control system and apply this system to auditing practice of both U.S.-listed clients and clients listed in home country. In addition, the spillover effect will also occur

[71] Work experience information for PCAOB staff is either from the PCAOB website or from Linkedin.
[72] See PCAOB Rule 4009 for reference.

when it is economically more efficient to apply the same quality control system to U.S.-listed clients and other clients For example, when the audit firm creates an internal training program on auditing procedure, the firm would enroll personnel not engaging in audits of U.S.-listed client in the program as well, as the marginal cost of adding more personnel is small given the existence of such program. To this end, PCAOB cross-border audit oversight exhibits positive externality on audit clients not subject to its regulation regime. In the contrary, if the remediation causes a net profit loss, then audit firm may only change their quality control policy by name without sufficient implementation given PCAOB quality control requirements.

On the other hand, remediation in quality control system may only occur for the group of U.S.-listed clients if applying the same quality control system to U.S. listed clients and clients not listed in the U.S. causes profit impairment. Standard for client acceptance and retention is an example. Due to stringent legal protection for investors in the U.S., litigation risk of accepting U.S.-listed clients is much higher than non-U.S. listed clients given client quality (Choi et al. 2009).Thus, the standard adopted to accept U.S.-listed clients is not necessary maximize the profit for the audit firm when accepting non-U.S.-listed clients. In this case, audit firms will not adopt the same client acceptance standard for the two groups even if they take steps to remedy the rules for accepting U.S.-listed clients.

Given the possibility of positive externality and no externality as described above, PCAOB cross-border audit oversight may also exhibit negative externality. If foreign audit firms choose to improve audit quality of U.S.-listed clients through allocating more resources to U.S. audit services, either through assigning the best engagement team to U.S. audit services or through allocating more training resources to the group of personnel working for U.S. services

than to personnel working for local services, then audit quality of non-U.S. clients will be negatively impacted.

Taken together, the economic connection between quality control system and the outcome audit quality of U.S.-listed clients and other clients depends on the trade-off of costs and benefits of following PCAOB quality control requirements in auditing practices of the two groups. Even though forces for positive externality, negative externality and no externality exists hypothetically, I expect that likelihood for negative externality is small as foreign audit firms would assign better engagement team to U.S.-listed clients due to higher litigation risk in the U.S. even in the absence of the PCAOB oversight. Therefore, I predict to observe improvement in audit quality of foreign auditors' clients not listed in the U.S. following an inspection as compared to clients of audit firms that are not inspected. The prediction is summarized in the following hypothesis (stated in alternative form):

> *H1: Audit quality of inspected foreign auditors' clients not listed in the U.S. increases relative to the change in audit quality of other foreign audit firms over the same period.*

As discussed above, the likelihood of having spillover effect mainly depends on whether adopting PCAOB quality control standard for non-U.S.-listed clients increases profitability. However, such conjecture is not directly testable due to the difficulty in evaluating the effect of quality control on profitability. Therefore, I explore cross-sectional variation in the spillover effect by focusing on cross-sectional variation in the proportion of U.S.-listed clients. Conceptually, one could predict that the greater the economic significance of U.S.-listed clients, the higher the likelihood that the audit firm would adopt PCAOB quality control standards. As the marginal cost of applying PCAOB quality control standards to non-U.S-listed clients will be

smaller when the firm has already applied the standards to U.S.-listed clients, I predict that the positive externality will be larger when the audit firm has a larger proportion of U.S.-listed clients. The second hypothesis is stated as follows:

H2: The marginal effect of PCAOB inspection is larger for clients not listed in the U.S. when the audit firm has a larger proportion of U.S.-listed clients.

The above analysis focuses on the effect of PCAOB oversight directly caused by inspection. Under PCAOB cross-border oversight framework, improvement in quality control would incur either following registration or before registration. To infer timing of spillover effect, I also examine the changes auditing quality during the period surrounding registration time. Anticipating PCAOB quality control requirement and stringent enforcement policy, registration or decision to register with the PCAOB would trigger audit firm management to diagnose defects in quality control system based on PCAOB quality control standards before inspection starts. If it is economically efficient to apply the same quality control system to U.S.-listed clients and other clients, then one would observe the spillover effect either before registration or following registration. Because change in quality control surrounding registration time is mainly caused by anticipation of PCAOB requirement and enforcement, I predict the change will mainly occur following registration (as opposed to before registration), when the audit firm is under the PCAOB regulatory regime. Accordingly, the change will be larger for audit firms with a larger proportion of U.S.-listed clients. To test this prediction, I state my third and fourth hypothesis as follows:

H3: Audit quality of registered foreign auditors' clients not listed in the U.S. increases relative to the change in audit quality of other foreign audit firms over the same period.

H4: The marginal effect of PCAOB registration is larger for clients not listed in the U.S. when the audit firm has a larger proportion of U.S.-listed clients.

To infer the channel through which PCAOB cross-border oversight affect quality, I conduct additional analysis on changes in audit fees. If the change in audit quality is achieved by enhanced organizational efficiency associated with the remediation of quality control defects, then audit quality can be achieved without increase in audit fees either following registration or following inspection. To provide a comprehensive analysis on the effect of PCAOB oversight on foreign audits, I examine how audit quality and audit fee changes following the five PCAOB disciplinary orders (up to April 24, 2013).

Chapter 5: Conclusion

High quality auditing is an essential component in a well-functioning capital market. Understanding the incentives and behaviors of auditors and how auditors can affect client valuation is of interest to both researchers and policy makers. Within the framework of classical auditing theory (Simunic, 1980), an auditor is motivated to exert more audit effort in the presence of greater litigation risk imposed by the court or the regulators. The classical auditing theory does not incorporate a key element that triggers final litigation or penalty for auditors. That is, the detection of audit failure or non-compliance of auditing standards. In the real world, an auditor can be punished only if his/her misconduct is brought to light. This dissertation investigates how market and regulatory mechanisms that facilitate such discovery affect audit quality and client valuation.

The first essay focuses on the discipline effect of a market enforcement player, security analysts, on auditors. As compared to other players in the capital market, financial analysts have advantages in discovering problems with the financial statements since analysts usually follow the specific company for a long time and know the company's consumers and competitors well. Given analysts' ability and advantage to detect problems with the financial statement, I predict that the existence of analysts create pressure for auditors to work harder ex ante. Evidence from the natural experiment of mergers of brokerage houses shows that analysts have a disciplining role on auditors.

Overall, the first essay makes three contributions. First, knowledge about how an important third party affects auditors informs regulators on the amount and the focus of auditing regulation. Second, for researchers, this study furthers understanding on the economics of audit

production. The finding that a drop in exogenous analyst coverage reduces audit fees provides a first step to understanding the association between other misstatement detection mechanisms and auditors' perceived litigation risk. Other detection mechanisms can also be investigated for future research. For example, one could investigate how media coverage can affect auditors' litigation risk and audit fee. Third, this study adds to the literature on the interplay between financial intermediaries.

The second essay uses a regulatory breakdown in cross-border audit oversight to assess the value added of U.S. accounting and auditing standards for foreign companies listed in the U.S. The bonding theory suggests that the stringent U.S. accounting requirements are the reason for stock price increase when foreign companies are cross-listed in the US. However, the literature has been unable to provide direct evidence on the valuation benefits of accounting/auditing requirements in international-listings, since it is particularly difficult to disentangle other confounding effects associated with cross-listing, such as the effects caused by changes in investor base and investment banking relations. I avoid the problem of alternative explanations by investigating the stock market reaction of the PCAOB's announcement of its limitation to enforce U.S. auditing requirements for auditors from certain foreign countries. Results show that such oversight creates value, and the value added of the audit oversight is more pronounced where there are fewer alternative monitoring mechanisms.

The evidence adds new insight into how audit shapes global capital formation. As a stepping stone for my future research, the third essay shows that successful auditing regulation of one country affects the auditing practice of other counties, and thus is important for policy makers of various countries. Collectively, the two essays in my dissertation provide new insights

in the auditing literature by showing that the audit monitoring by the market and by regulation can have real effects on audit quality and client valuation.

Tables

Table 2.1: Treatment group construction and details for the merger events

The table below describes the details of the merger events used to identify stocks experiencing exogenous termination in analyst coverage. I restrict the firms to be covered by both of the brokerage houses before the merger, and continue to be covered by the merged brokerage. After that, I delete financial firms and firms without available information for the main analysis. The database used for the treatment sample construction are (1) the SDC Platinum, (2) the I/B/E/S database, (3) the CRSP/COMPUSTAT database and (4) Audit Analytics. The treatment sample includes 320 firm-years.

Brokerage Houses (Target & Acqurier)	Merger Effective Date	BACODE	Stock Coverage		
			#	Overlap	Retained
Parker/Hunter Inc.	22-Mar-05	860	54	5	5
Janney Montgomery Scott LLC		142	138		
Legg Mason Wood Walker, Inc.	01-Dec-05	158	419	185	165
Citigroup Inc-Asset Management Unit		254	998		
Ryan Beck Holdings Inc	28-Feb-07	881	190	34	28
Stifel Financial Corp		260	487		
Cochran Caronia Waller	04-Sep-07	1915	57	30	30
Fox-Pitt Kelton Inc		110	168		
AG Edwards Inc	01-Oct-07	94	636	229	212
Wachovia Corp,Charlotte,North Carolina		282	668		
CIBC World Markets	14-Jan-08	211	552	69	54
Oppenheimer Holdings Inc		98	317		
Total					494
Deleting financial firms and firms without available information					320

Table 2.2: Descriptive statistics for variables in the benchmark OLS regression

Note: This table presents the summary statistics for variables in the benchmark OLS regression. LNFEE is the natural logarithm of audit fees. AUDFEE is audit fee. LNASSET is the natural logarithm of total assets. ASSET is total assets in millions. COVERAGE is the number of analyst coverage. INVREC is the sum of inventory and account receivable scaled by total assets. LOSS equals 1 when income before extraordinary items is less than zero, 0 otherwise. BIG4 equals 1 when a firm uses one of the Big 4 auditors, and 0 otherwise. SEGNUM is the total number of business segments. FSEGNUM is the total number of foreign segments. GOCERN equals 1 if the auditor opinion includes a going concern qualification, 0 otherwise. LEVERAGE is total liabilities over total assets. BUSY equals 1 if the company's current fiscal year ends in December, and 0 otherwise. STD_CFO is the standard deviation of cash flow from operations. ROA is net income over total assets. MB is the market-to-book ratio. EX_FIN is the total amount of external financing. INSOWNER is the percentage of shares owned by institutional investors. SIGMA is the volatility of raw stock return. RET is the average monthly stock return. TURNOVER is the stock's average monthly volume divided by shares outstanding corresponding to fiscal year. See Appendix A for detailed variable definitions.

Table 2.2 (cont'd)

VARIABLE	N	MEAN	STD	MIN	0.25	MEDIAN	0.75	MAX
LNFEE	17711	13.96	1.18	9.03	13.17	13.90	14.69	18.36
AUDFEE	17711	2,361,019	3,759,335	78,000	526,000	1,093,520	2,399,000	26,149,000
LNASSET	17711	6.57	1.96	1.64	5.16	6.49	7.86	11.60
ASSET	17711	4626	12937	5	173	657	2597	112733
COVERAGE	17711	8.46	6.89	1.00	3.00	7.00	12.00	45.00
INVREC	17711	0.23	0.17	0.00	0.09	0.20	0.33	0.78
LOSS	17711	0.32	0.47	0.00	0.00	0.00	1.00	1.00
BIG4	17711	0.85	0.36	0.00	1.00	1.00	1.00	1.00
SEGNUM	17711	2.21	1.67	1.00	1.00	1.00	3.00	11.00
FSEGNUM	17711	1.73	2.39	0.00	0.00	1.00	3.00	26.00
GOCERN	17711	0.03	0.18	0.00	0.00	0.00	0.00	1.00
LEVERAGE	17711	0.18	0.21	0.00	0.00	0.13	0.29	1.09
BUSY	17711	0.71	0.45	0.00	0.00	1.00	1.00	1.00
STD_CFO	17711	0.09	0.10	0.01	0.03	0.05	0.10	0.70
ROA	17711	-0.03	0.25	-2.39	-0.02	0.04	0.08	0.35
MB	17711	2.13	1.54	0.44	1.20	1.63	2.48	10.73
EX_FIN	17711	0.06	0.31	-0.37	-0.05	0.00	0.04	4.30
INSOWNER	17711	0.55	0.31	0.00	0.29	0.61	0.82	1.00
SIGMA	17417	0.03	0.02	0.00	0.02	0.03	0.04	0.46
RET	17409	0.01	0.05	-0.36	-0.02	0.01	0.03	1.18
TURNOVER	17412	0.19	0.20	0.00	0.07	0.15	0.25	4.69

Table 2.3: Benchmark ordinary linear regressions

This table reports results from benchmark OLS regressions. Models (1), (2) and (3) are based on the following models:

$$LNFEE_{i,t} = \beta_0 + \beta_1 LNCOVERAGE_{i,t-1} + \beta_2 LNASSET_{i,t} + \beta_3 INVREC_{i,t} + \beta_4 LOSS_{i,t} + \beta_5 BIG4_{i,t} + \beta_6 SEGNUM_{i,t} + \beta_7 FSEGNUM_{i,t} + \beta_8 GOCERN_{i,t} + \beta_9 LEVERAGE_{i,t} + \beta_{10} BUSY_{i,t} + \beta_{11} MB_{,t-1} + \beta_{12} ROA_{i,t-1} + \beta_{13} EXT\_FIN_{i,t} + \beta_{14} INSOWNER_{i,t-1} + FRIM\ and\ YEAR\ FIXED\ EFFECT$$

Model (1) is the whole sample regression. Model (2) and Model (3) are regressions for firms smaller than median size and larger than median size, respectively. Model (4) adds SIGMA, RET and TURNOVER as additional controls to the whole sample regression.

LNFEE is the natural logarithm of audit fees. LNASSET is the natural logarithm of total assets. COVERAGE is the number of analyst following. LAG_LNCOVERAGE is the natural logarithm of lagged analyst coverage (COVERAGE) variable. INVREC is the sum of inventory and account receivable scaled by total assets. LOSS equals 1 when income before extraordinary items is less than zero, 0 otherwise. BIG4 equals 1 when a firm uses one of the Big 4 auditors, and 0 otherwise. SEGNUM is the total number of business segments. FSEGNUM is the total number of foreign segments. GOCERN equals 1 if the auditor opinion includes a going concern qualification, 0 otherwise. LEVERAGE is total liabilities over total assets. BUSY equals 1 if the company's current fiscal year ends in December, and 0 otherwise. STD_CFO is the standard deviation of cash flow from operations. ROA is net income over total assets. MB is the market-to-book ratio. EX_FIN is the total amount of external financing. INSOWNER is the percentage of shares owned by institutional investors. LAG_INSOWNER is the lagged institutional ownership variable. SIGMA is the volatility of raw stock return. RET is the average monthly stock return. TURNOVER is the stock's average monthly volume divided by shares outstanding corresponding to fiscal year. Standard errors are clustered by firm and year two dimensions. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. See Appendix A for detailed variable definitions.

Table 2.3 (cont'd)

Independent variable is LNFEE. Dependent variables are in this column	(1) Whole Sample	(2) Less than Median	(3) Larger than Median	(4) Whole-with More Controls in the OLS
LAG_LNCOVERAGE	**0.0009**	**0.0323****	**-0.0408****	**0.0036**
	(0.08)	**(2.08)**	**(-2.34)**	**(0.25)**
LNASSET	0.4873***	0.4380***	0.5604***	0.4877***
	(47.60)	(16.60)	(40.91)	(54.79)
INVREC	0.6138***	0.4154***	0.9478***	0.6148***
	(10.39)	(5.42)	(9.82)	(10.78)
LOSS	0.2063***	0.1964***	0.1443***	0.1954***
	(8.51)	(8.40)	(4.45)	(5.88)
BIG4	0.2523***	0.2892***	0.1253**	0.2492***
	(8.39)	(7.53)	(2.04)	(7.71)
SEGUNM	0.0512***	0.0386***	0.0523***	0.0509***
	(8.89)	(4.49)	(8.17)	(8.82)
FSEGUNM	0.0596***	0.0441***	0.0702***	0.0602***
	(15.87)	(7.60)	(11.69)	(15.87)
GO_CERN	0.1548***	0.1764***	0.1369*	0.1731***
	(4.82)	(3.30)	(1.93)	(3.65)
LEVERAGE	-0.0795*	-0.0101	0.0737	-0.0899**
	(-1.84)	(-0.19)	(0.87)	(-2.03)
BUSY	0.1077	0.1036	0.0935	0.1083
	(0.93)	(0.88)	(0.83)	(0.93)
LAG_MB	0.0337***	0.0235***	0.0448***	0.0335***
	(4.44)	(3.71)	(3.48)	(4.67)
LAG_ROA	-0.3609***	-0.2145***	-0.5616***	-0.4049***
	(-5.76)	(-3.73)	(-2.80)	(-9.61)
STD_CFO	0.3064***	0.1984*	0.0436	0.3831***
	(2.86)	(1.80)	(0.14)	(3.80)
EX_FIN	-0.1635***	-0.1500***	-0.1073**	-0.1531***
	(-8.66)	(-5.65)	(-2.22)	(-9.17)
LAG_INSOWNER	0.2541***	0.3061***	0.3286***	0.2813***
	(4.36)	(5.44)	(5.03)	(5.31)
SIGMA				-0.7940
				(-0.88)
RET				-0.3611
				(-1.52)
TURNOVER				-0.1225*
				(-1.94)
Observations	17,711	8,856	8,855	17,404
Firm/Year FE	YES	YES	YES	YES
Firm/Year Cluster	YES	YES	YES	YES
Adjusted R-squared	0.8528	0.8202	0.8057	0.8654

Table 2.4: Industrial distribution of the treatment sample

This table reports the industry distribution of the 320 treatment firm-years. The last column of Table 4 reports the industry distribution of the 17,711 firm-years in the benchmark OLS regression. Fama and French 12 industry classification is used. In Fama and French's 12 industry classification, "Other" includes "Mines, Construction, BldMt, Transportation, Hotels, Business Service and Entertainment". In unreported table, the industry distribution of the treatment sample covers 31 of the 48 industries as defined by Fama and French (1997).

Fama and French 12 Industry Classifications	Industry Code	Frequency	Cumulative Frequency	Percent	Compustat Universe Percentage
Business Equipment	6	67	67	20.94	23.67
Wholesale, Retail, and Some Services (Laundries, Repair Shops)	9	65	132	20.31	10.59
Healthcare, Medical Equipment, and Drugs	10	35	167	10.94	14.54
Other	12	35	202	10.94	15.06
Energy	4	29	231	9.06	5.23
Utilities	8	26	257	8.13	3.56
Telephone and Television Transmission	7	24	281	7.50	4.96
Consumer Non-durables	1	18	299	5.63	5.63
Manufacturing	3	17	316	5.31	11.02
Chemicals and Allied Products	5	3	319	0.94	2.77
Consumer Durables	2	1	320	0.31	2.96
Total				100%	100%

Table 2.5: Descriptive statistics of the treatment sample and Compustat universe

This table reports the mean difference of the below variables between the 320 treatment observations and 17711 observations used in the benchmark OLS regression. LNFEE is the natural logarithm of audit fees. COVERAGE is the number of analyst coverage. LNASSET is the natural logarithm of total assets. RET is the average monthly stock return. MB is the market-to-book ratio. ROA is net income over total assets. SIGMA is the volatility of raw stock return. INSOWNER is the percentage of shares owned by institutional investors. TURNOVER is the stock's average monthly volume divided by shares outstanding corresponding to fiscal year. INVREC is the sum of inventory and account receivable scaled by total assets. STD_CFO is the standard deviation of cash flow from operations. LOSS equals 1 when income before extraordinary items is less than zero, 0 otherwise. BIG4 equals 1 when a firm uses one of the Big 4 auditors, and 0 otherwise. SEGNUM is the total number of business segments. FSEGNUM is the total number of foreign segments. GOCERN equals 1 if the auditor opinion includes a going concern qualification, 0 otherwise. LEVERAGE is total liabilities over total assets. EX_FIN is the total amount of external financing. BUSY equals 1 if the company's current fiscal year ends in December, and 0 otherwise.

	Treatment firms	Compustat Universe		
Variables	Mean	Mean	Difference In Mean	p-value
LNFEE	14.7528	13.9609	-0.7919***	<.0001
COVERAGE	19.8571	8.4640	-11.3931***	<.0001
LNASSET	8.4139	6.5729	-1.8410***	<.0001
RET	0.0099	0.0082	-0.0017	0.8254
MB	2.1731	2.1328	-0.0403	0.5282
ROA	0.0566	-0.0262	-0.0828***	<.0001
SIGMA	0.0188	0.0335	0.0147***	<.0001
INSOWNER	0.7111	0.5547	-0.1564***	<.0001
TURNOVER	0.2138	0.1925	-0.0213***	0.0003
INVREC	0.1882	0.2295	0.0413***	<.0001
STD_CFO	0.0511	0.0854	0.0343***	<.0001
LOSS	0.0973	0.3174	0.2201***	<.0001
BIG4	0.9818	0.8494	-0.1324***	<.0001
SEGNUM	2.4498	2.2061	-0.2437***	0.0074
FSEGNUM	1.5167	1.7302	0.2135	0.1744
GOCERN	0	0.0328	0.0328***	<.0001
LEVERAGE	0.2181	0.1826	-0.0355***	0.0002
EX_FIN	0.0237	0.0572	0.0335***	0.0063
BUSY	0.6687	0.7078	0.0391	0.2488

Table 2.6: Matching quality comparison

This table reports the statistical properties of the variables for the treatment sample and matched control sample. In the last column of every panel, standardized difference in means is calculated as the difference in means of the treatment and control firm characteristics, and scaled by the standard deviation of the treatment firm characteristics. The last two rows --- the sum of standardized differences in means and the sum of standardized differences in means for the three key variables --- quantify the overall matching quality. LNFEE is the natural logarithm of audit fees. COVERAGE is the number of analyst coverage. LNASSET is the natural logarithm of total assets. RET is the average monthly stock return. MB is the market-to-book ratio. ROA is net income over total assets. SIGMA is the volatility of raw stock return. INSOWNER is the percentage of shares owned by institutional investors. TURNOVER is the stock's average monthly volume divided by shares outstanding corresponding to fiscal year. INVREC is the sum of inventory and account receivable scaled by total assets. STD_CFO is the standard deviation of cash flow from operations. LOSS equals 1 when income before extraordinary items is less than zero, 0 otherwise. BIG4 equals 1 when a firm uses one of the Big 4 auditors, and 0 otherwise. SEGNUM is the total number of business segments. FSEGNUM is the total number of foreign segments. GOCERN equals 1 if the auditor opinion includes a going concern qualification, 0 otherwise. LEVERAGE is total liabilities over total assets. EX_FIN is the total amount of external financing scaled by total assets. BUSY equals 1 if the company's current fiscal year ends in December, and 0 otherwise.

In Panel A, treatment observations and control observations are directly matched along the dimensions of firm size (LNASSET), market to book ratio (MB), average monthly stock returns (RET), raw daily stock return volatilities (SIGMA), analyst coverage (COVERAGE), SIC two digit industry code, and fiscal year. The matching first requires that treatment and control are in the same size quintile, stock return quintile, market to book ratio quintile, and stock return volatility quintile using annual sorts. A further requirement is that the treatment and control are from the same fiscal year and having the same two digit SIC industry code. From the available matches, 5 firm-years with the closest analyst coverage to the treatment firm-year are retained. This procedure creates a benchmark portfolio for every treatment firm-year (given there are matches available). The portfolio means of the variables for the firm characteristics are used in comparison with the treatment observations. In Panel B, the nearest neighbour propensity score matching method is used. In the first step, a probit model is estimated with TREAT as the binary dependent variable, which equals 1 when the firms are exposed to exogenous analyst coverage termination, and 0 otherwise. The sample for the probit model includes firm-year observations that span the lagged treatment periods. The variables include all the independent variables that appear in the benchmark OLS regression, as well as industry fixed effect and year fixed effect. After estimating the probit model, treatment and control having the closest distance of the estimated propensity score are matched. Only one control is selected for each treatment. In Panel C, the nearest neighbour propensity score matching is appended by further requiring the matches for every individual have the same fiscal year. The matching method requires that the treatment firm-year and control firm-year are from the same fiscal year, and have the nearest distance in the estimated propensity score within the fiscal year. Only one control is selected for each treatment. In Panel D, the nearest neighbour propensity score matching is appended by further requiring the matches for every individual have the same fiscal year, as well as the same two digit SIC code. Only one control is selected for each treatment.

Table 2.6 (Con'd)

Panel A: *Size/MB/RET/Sigma/Analyst Coverage/SIC2/Fyear*

	Mean		Median		25th percentile		75th percentile		p-value of test of equality of means	p-value of test of equality of medians	p-value of test of equality of distributions	Standardized difference in means
	Treatment firms	Control firms	Treatment firms	Control firms	Treatment firms	Control firms	Treatment firms	Control firms				
LNFEE	15.04	14.90	15.05	14.80	14.24	14.11	15.69	15.68	0.33	0.19	0.38	0.1223
COVERA	18.92	13.17	19.00	12.83	12.00	7.20	25.00	16.50	0.00***	0.00***	0.00***	0.6834
LNASSET	8.87	8.63	9.05	8.88	7.51	7.55	10.18	9.64	0.25	0.20	0.17	0.1428
RET	0.01	0.01	0.01	0.01	0.00	0.00	0.02	0.02	0.83	0.90	0.99	0.0281
MB	2.03	1.88	1.57	1.57	1.18	1.25	2.21	2.09	0.36	0.75	0.87	0.0995
ROA	0.06	0.05	0.06	0.05	0.03	0.03	0.10	0.08	0.11	0.29	0.23	0.2067
SIGMA	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.70	0.55	0.68	0.0522
INSOWNE	0.70	0.59	0.75	0.64	0.59	0.47	0.86	0.78	0.00***	0.00***	0.01***	0.5083
TURNOVE	0.19	0.16	0.13	0.10	0.08	0.07	0.23	0.17	0.13	0.09*	0.23	0.1746
INVREC	0.18	0.20	0.12	0.14	0.07	0.08	0.25	0.25	0.31	0.21	0.42	0.1468
STD_CFO	0.04	0.05	0.03	0.03	0.02	0.02	0.06	0.06	0.84	0.87	0.94	0.0290
LOSS	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.34	1.00	0.0056
BIG4	0.97	0.98	1.00	1.00	1.00	1.00	1.00	1.00	0.55	0.77	1.00	0.0660
SEGNUM	2.77	2.80	2.00	2.50	1.00	1.00	4.00	4.00	0.91	0.71	0.47	0.0139
FSEGNUM	1.49	2.11	1.00	1.00	0.00	0.00	2.00	3.00	0.07	0.27	0.23	0.2920
GOCERN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	1.00	1.00	.
LEVERAG	0.23	0.23	0.24	0.25	0.13	0.11	0.34	0.33	0.88	0.89	0.85	0.0199
EX_FIN	-0.01	0.03	-0.03	-0.01	-0.07	-0.05	0.03	0.03	0.17	0.31	0.38	0.2622
BUSY	0.69	0.74	1.00	1.00	0.00	0.50	1.00	1.00	0.47	0.89	0.79	0.0902
The sum of standardized differences in means:												2.9435
The sum of standardized differences in means for three key variables (COVERAGE, LNFEE, LNASSET)												0.9485

Table 2.6 (Con'd)

Panel B: *Propensity score matching including fyear and SIC2 fixed effect*

	Mean		Median		25th percentage		75th percentage		p-value of test of equality of means	p-value of test of equality of medians	p-value of test of equality of distributions	Standardized difference in means
	Treatment	Control	Treatment	Control	Treatment	Control	Treatment	Control				
LNFEE	14.75	14.70	14.65	14.67	13.98	13.89	15.46	15.46	0.59	0.64	0.83	0.0418
COVERAGE	19.82	19.71	19.00	20.00	13.00	13.00	26.00	25.00	0.87	0.96	0.88	0.0122
LNASSET	8.41	8.31	8.42	8.17	7.23	7.22	9.64	9.37	0.43	0.37	0.22	0.0617
RET	0.01	0.01	0.01	0.01	0.00	-0.01	0.02	0.03	0.80	0.81	0.35	0.0186
MB	2.26	2.32	1.88	1.86	1.33	1.34	2.64	2.81	0.58	0.74	0.83	0.0462
ROA	0.06	0.06	0.06	0.06	0.03	0.03	0.10	0.10	0.45	0.75	0.71	0.0839
SIGMA	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.26	0.14	0.30	0.0893
INSOWNER	0.72	0.72	0.77	0.77	0.62	0.63	0.88	0.87	1.00	0.97	0.93	0.0004
TURNOVER	0.21	0.22	0.17	0.18	0.10	0.11	0.27	0.29	0.61	0.23	0.64	0.0375
INVREC	0.19	0.18	0.16	0.14	0.07	0.07	0.25	0.25	0.41	0.67	0.58	0.0616
STD_CFO	0.05	0.05	0.04	0.04	0.02	0.02	0.06	0.07	0.68	0.39	0.71	0.0329
LOSS	0.10	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.69	1.00	0.0307
BIG4	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00	0.59	0.59	1.00	0.0448
SEGNUM	2.45	2.26	1.00	1.00	1.00	1.00	4.00	3.00	0.18	0.05	0.22	0.1072
FSEGNUM	1.51	1.45	1.00	1.00	0.00	0.00	2.00	2.00	0.71	0.49	0.58	0.0267
GOCERN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	1.00	1.00	.
LEVERAGE	0.22	0.25	0.20	0.19	0.06	0.04	0.32	0.35	0.15	0.87	0.26	0.1513
EX_FIN	0.02	0.01	-0.02	-0.03	-0.08	-0.08	0.02	0.01	0.55	0.61	0.71	0.0401
BUSY	0.67	0.66	1.00	1.00	0.00	0.00	1.00	1.00	0.87	0.87	1.00	0.0130
The sum of standardized difference in means:												0.8999
The sum of standardized difference in means for three key variables (COVERAGE, LNFEE, LNASSET)												0.1157

Table 2.6 (Con'd)

Panel C: *Propensity score matching requiring exact fyear match*

	Mean		Median		25th percentile		75th percentile		p-value of test of equality of means	p-value of test of equality of medians	p-value of test of equality of distributions	Standardized difference in means
	Treatment firms	Control firms	Treatment firms	Control firms	Treatment firms	Control firms	Treatment firms	Control firms				
LNFEE	14.76	14.79	14.66	14.68	13.97	13.96	15.49	15.50	0.74	0.90	0.98	0.0266
Coverage	19.90	19.65	19.00	19.00	14.00	14.00	26.00	25.00	0.70	0.79	1.00	0.0293
LNASSET	8.45	8.44	8.44	8.28	7.29	7.42	9.64	9.69	0.92	0.85	0.56	0.0081
RET	0.01	0.01	0.01	0.01	0.00	0.00	0.02	0.02	0.65	0.68	0.76	0.0350
MB	2.25	2.34	1.88	1.95	1.33	1.39	2.64	2.96	0.35	0.16	0.33	0.0741
ROA	0.06	0.06	0.06	0.06	0.03	0.03	0.10	0.10	0.95	0.55	0.38	0.0051
SIGMA	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.45	0.53	0.44	0.0679
INSOWNER	0.71	0.70	0.77	0.75	0.61	0.60	0.88	0.88	0.53	0.56	0.95	0.0507
TURNOVER	0.21	0.23	0.17	0.18	0.09	0.10	0.27	0.29	0.35	0.39	0.69	0.0973
INVREC	0.19	0.18	0.15	0.14	0.07	0.08	0.25	0.25	0.69	0.90	0.82	0.0298
STD_CFO	0.05	0.05	0.04	0.04	0.02	0.02	0.06	0.07	0.27	0.86	0.82	0.1045
LOSS	0.10	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.68	1.00	0.0317
BIG4	0.98	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.43	0.43	1.00	0.0692
SEGNUM	2.45	2.34	2.00	1.00	1.00	1.00	4.00	3.00	0.44	0.13	0.33	0.0642
FSEGNUM	1.54	1.39	1.00	1.00	0.00	0.00	2.00	2.00	0.31	0.73	0.33	0.0720
GOCERN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	1.00	1.00	.
LEVERAGE	0.22	0.22	0.20	0.18	0.06	0.04	0.32	0.33	0.83	0.60	0.63	0.0182
EX_FIN	0.02	0.01	-0.03	-0.03	-0.08	-0.08	0.02	0.03	0.76	0.77	0.44	0.0194
BUSY	0.67	0.64	1.00	1.00	0.00	0.00	1.00	1.00	0.46	0.46	1.00	0.0595
The sum of standardized difference in means across all variables:												0.8627
The sum of standardized difference in means for three key variables (COVERAGE, LNFEE, LNASSET)												0.0641

Table 2.6 (Con'd)

Panel D: *Propensity score matching requiring exact fyear and two digit SIC match*

	Mean		Median		25th percentile		75th percentile		p-value of test of equality of means	p-value of test of equality of medians	p-value of test of equality of distributions	Standardized difference in means
	Treatment firms	Control firms	Treatment firms	Control firms	Treatment firms	Control firms	Treatment firms	Control firms				
LFEE	14.76	14.53	14.65	14.46	13.96	13.79	15.49	15.32	0.01***	0.01***	0.04**	0.2103
Coverage	19.91	17.65	19.00	17.00	14.00	12.00	26.00	23.00	0.00***	0.00***	0.03***	0.2689
LNASSET	8.44	8.12	8.43	8.03	7.28	7.14	9.64	8.99	0.01***	0.01***	0.00***	0.2060
RET	0.01	0.01	0.01	0.01	0.00	-0.01	0.02	0.02	0.71	0.74	0.49	0.0333
MB	2.25	2.19	1.88	1.82	1.33	1.36	2.64	2.48	0.53	0.52	0.33	0.0482
ROA	0.06	0.06	0.06	0.06	0.02	0.03	0.10	0.10	0.83	0.98	0.95	0.0190
SIGMA	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.19	0.12	0.17	0.1085
INSOWNER	0.71	0.76	0.77	0.80	0.61	0.67	0.88	0.90	0.01**	0.01**	0.07**	0.2022
TURNOVER	0.21	0.22	0.17	0.18	0.09	0.11	0.27	0.28	0.36	0.14	0.20	0.0719
INVREC	0.19	0.21	0.16	0.16	0.07	0.08	0.25	0.28	0.15	0.15	0.28	0.1198
STD_CFO	0.05	0.05	0.04	0.04	0.02	0.02	0.06	0.06	0.95	0.98	0.92	0.0050
LOSS	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.0000
BIG4	0.98	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.59	0.59	1.00	0.0463
SEGNUM	2.46	2.34	1.00	1.00	1.00	1.00	4.00	3.00	0.39	0.27	0.62	0.0679
FSEGNUM	1.55	1.29	1.00	0.00	0.00	0.00	2.00	2.00	0.11	0.22	0.14	0.1211
GOCERN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.	1.00	1.00	.
LEVERAGE	0.22	0.23	0.20	0.20	0.06	0.06	0.32	0.35	0.53	0.63	0.56	0.0518
EX_FIN	0.02	0.01	-0.03	-0.03	-0.08	-0.08	0.02	0.02	0.62	0.99	0.98	0.0314
BUSY	0.66	0.66	1.00	1.00	0.00	0.00	1.00	1.00	0.87	0.87	1.00	0.0133
The sum of standardized difference in means:												1.6252
The sum of standardized difference in means for three key variables (COVERAGE, LNFEE, LNASSET)												0.7185

Table 2.7: Difference-in-differences estimator under various matching criteria

In this table, Panels A-D present difference-in-differences estimators for the audit fee variable (LNFEE) under various matching criteria. In all cases, one match is found for the treatment firm. "N" denotes the number of treatment firm-years. LNFEE is the natural logarithm of audit fees. Panel E presents the difference-in-differences estimator for the absolute value of the discretionary accrual variable (ABSDA). Discretionary accruals is calculated using the modified Jones model (Dechow, 1995). Standard errors are presented in the brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: *Size/MB/RET/Sigma/Analyst/SIC/Fyear (N=118)*

	Mean Treatment Change (after-before)	Mean Control Change (after-before)	Mean diffs-in-diffs (treat-control)	p-value
LNFEE	0.0246	0.1222	-0.0976***	0.0054
(standard error)	(0.0222)	(0.0267)	(0.0347)	

Panel B: *Propensity score match including SIC and fyear fixed effects in the propensity score model (N=320)*

	Mean Treatment Change (after-before)	Mean Control Change (after-before)	Mean diffs-in-diffs (treat-control)	p-value
LNFEE	0.0834	0.1286	- 0.0452*	0.0868
(standard error)	(0.0172)	(0.0201)	(0.0263)	

Panel C: *Propensity score match including SIC and fyear fixed effects with fyear exact match (N=320)*

	Mean Treatment Change (after-before)	Mean Control Change (after-before)	Mean diffs-in-diffs (treat-control)	p-value
LNFEE	0.0834	0.1384	-0.0550**	0.0418
(standard error)	(0.0172)	(0.0208)	(0.0270)	

Panel D: *Propensity score match including SIC and fyear fixed effects with fyear and SIC exact match (N=319)*

	Mean Treatment Change (after-before)	Mean Control Change (after-before)	Mean diffs-in-diffs (treat-control)	p-value
LNFEE	0.0843	0.1514	-0.0670**	0.0266
(standard error)	(0.0172)	(0.0248)	(0.0302)	

Panel E: *Difference in Difference Estimator for Absolute Value of Discretionary Accruals*

(Propensity Score Matched with fyear exactly matched)

	Mean Treatment Difference (after-before)	Mean Control Difference (after-before)	Mean diff-in-diffs (treat-control)	p-value
ABSDA	0.0213	-0.0007	0.0219**	0.0208
(standard error)	(0.0063)	(0.0067)	(0.0095)	

Table 2.8: Difference-in-differences estimator conditional on firm size (total assets)

In this table, Panels A and B present difference-in-differences estimators for audit fee (LNFEE) when firm size is smaller than the median size and larger than median size, respectively. LNFEE is the natural logarithm of audit fees. The sample is constructed using the propensity score matching with exact fiscal year match (the optimal match as suggested in Table 6). Standard errors are presented in the brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A: *Total Assets <= median*

	Mean Treatment Change (after-before)	Mean Control Change (after-before)	Mean diffs-in-diffs (treat-control)	p-value
LNFEE	0.0886	0.1879	-0.0993**	0.0191
(standard error)	(0.0250)	(0.0331)	(0.0422)	

Panel B: *Total Assets > median*

	Mean Treatment Change (after-before)	Mean Control Change (after-before)	Mean diff-in-diffs (treat-control)	p-value
LNFEE	0.0788	0.0837	0.0049	0.8827
(standard error)	(0.0237)	(0.0233)	(0.0333)	

Table 2.9: Validity of the natural experiment: placebo difference-in-differences test

In this table, Panels A-D present the difference-in-differences estimators for the placebo tests. LNFEE is the natural logarithm of audit fees. In Panel A and Panel B, the merger is assumed to occur one year and two years before it actually does, respectively. In Panel C and Panel D, the merger is assumed to occur one year and two years after it actually does, respectively. The audit fee difference-in-differences estimators are re-estimated accordingly in Panels A-D. Standard errors are in the brackets.

Panel A: *Assume the merger occurs one year before it actually does*

	Mean Treatment Change (after-before)	Mean Control Change (after-before)	Mean diffs-in-diffs (treat-control)	p-value
LNFEE	0.2302	0.2755	-0.0453	0.1478
(standard error)	(0.0219)	(0.0223)	(0.0313)	

Panel B: *Assume the merger occurs two years before it actually does*

	Mean Treatment Change (after-before)	Mean Control Change (after-before)	Mean diffs-in-diffs (treat-control)	p-value
LNFEE	0.2975	0.2849	0.0126	0.7035
(standard error)	(0.0239)	(0.0229)	(0.0331)	

Panel C: *Assume the merger occurs one year after it actually does*

	Mean Treatment Change (after-before)	Mean Control Change (after-before)	Mean diffs-in-diffs (treat-control)	p-value
LNFEE	0.0469	0.0240	0.0229	0.2719
(standard error)	(0.0145)	(0.0149)	(0.0208)	

Panel D: *Assume the merger occurs two years after it actually does*

	Mean Treatment Change (after-before)	Mean Control Change (after-before)	Mean diffs-in-diffs (treat-control)	p-value
LNFEE	0.00577	-0.0141	0.0199	0.2645
(standard error)	(0.0116)	(0.0136)	(0.0178)	

Table 2.10: Difference-in-differences estimators for the matching variables

This table reports the difference-in-differences estimators for all the matching variables. Standard errors are presented in the brackets. LNASSET is the natural logarithm of total assets. RET is the average monthly stock return. MB is the market-to-book ratio. ROA is net income over total assets. SIGMA is the volatility of raw stock return. INSOWNER is the percentage of shares owned by institutional investors. TURNOVER is the stock's average monthly volume divided by shares outstanding corresponding to fiscal year. INVREC is the sum of inventory and account receivable scaled by total assets. STD_CFO is the standard deviation of cash flow from operations. LOSS equals 1 when income before extraordinary items is less than zero, 0 otherwise. BIG4 equals 1 when a firm uses one of the Big 4 auditors, and 0 otherwise. SEGNUM is the total number of business segments. FSEGNUM is the total number of foreign segments. GOCERN equals 1 if the auditor opinion includes a going concern qualification, 0 otherwise. LEVERAGE is total liabilities over total assets. EX_FIN is the total amount of external financing scaled by total assets. BUSY equals 1 if the company's current fiscal year ends in December, and 0 otherwise. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	Mean Treatment Change		Mean Control Change		Mean diffs-in-diffs		
	(after-before)	Standard Error	(after-before)	Standard Error	(treat-control)	Standard Error	p-value
LNASSET	0.09	(0.0139)	0.08	(0.0122)	0.02	(0.0185)	0.39
RET	-0.01	(0.0020)	-0.01	(0.0022)	0.00	(0.0030)	0.51
MB	2.18	(0.0782)	2.18	(0.0656)	0.00	(0.1021)	0.97
ROA	0.06	(0.0052)	0.06	(0.0058)	0.00	(0.0078)	0.62
SIGMA	0.00	(0.0005)	0.00	(0.0005)	0.00	(0.0007)	0.99
INSOWNER	0.02	(0.0074)	0.00	(0.0078)	0.02*	(0.0107)	0.09
TURNOVER	0.03	(0.0124)	0.01	(0.0116)	0.02	(0.0170)	0.27
INVREC	0.00	(0.0020)	0.00	(0.0023)	0.00	(0.0031)	0.87
STD_CFO	0.00	(0.0010)	0.00	(0.0007)	0.00	(0.0013)	0.17
LOSS	0.04	(0.0164)	0.03	(0.0187)	0.01	(0.0249)	0.80
BIG4	0.00	(0.0000)	0.00	(0.0031)	0.00	(0.0031)	0.32
SEGNUM	-0.03	(0.0293)	0.01	(0.0427)	-0.04	(0.0518)	0.47
FSEGNUM	0.00	(0.0412)	0.14	(0.0642)	-0.14*	(0.0763)	0.07
GOCERN	0.00	(0.0031)	0.01	(0.0044)	0.00	(0.0054)	0.56
LEVERAGE	0.01	(0.0050)	0.01	(0.0067)	0.01	(0.0084)	0.45
EX_FIN	-0.02	(0.0249)	-0.03	(0.0156)	0.00	(0.0293)	0.89
BUSY	0.01	(0.0044)	0.00	(0.0031)	0.00	(0.0054)	0.56

Table 2.11: A change regression Analysis: combining matching with regression

This table reports results for the change regression which regresses changes in audit fees (LNFEE) on changes on variables used in the matching (excluding the analyst coverage variable) and the treatment (TREAT indicator variable). The following year fixed effect model is used:

$$\Delta LNFEE_{i,t} = \beta_0 + \beta_1 TREAT_{i,t} + \beta_2 \Delta INSOWNER_{i,t} + \beta_3 \Delta SIGMA_{i,t} + \beta_4 \Delta RET_{i,t} + \beta_5 \Delta TURNOVER_{i,t} + \beta_6 \Delta LNASSET_{i,t} + \beta_7 \Delta INVREC_{i,t} + \beta_8 \Delta LOSS_{i,t} + \beta_9 \Delta BIG4_{i,t} + \beta_{10} \Delta SEGNUM_{i,t} + \beta_{11} \Delta FSEGNUM_{i,t} + \beta_{12} \Delta GOCERN_{i,t} + \beta_{13} \Delta LEVERAGE_{i,t} + \beta_{14} \Delta BUSY_{i,t} + \beta_{15} \Delta MB_{i,t} + \beta_{16} I\Delta ROA_{i,t} + \beta_{17} I\Delta STD\_CFO_{,t} + \beta_{18} I\Delta EX\_FIN_{i,t} + YEAR\ FIXED\ EFFECT,$$

Where Δ is the prefix indicating "change", the changes for all the above variables are calculated as change between the pre-treatment year and post-treatment year. TREAT equals 1 when the firms are exposed to exogenous analyst coverage termination, and 0 otherwise. INSOWNER is the percentage of shares owned by institutional investors. SIGMA is the volatility of raw stock return. RET is the average monthly stock return. TURNOVER is the stock's average monthly volume divided by shares outstanding corresponding to fiscal year. LNASSET is natural log of total assets. INVREC the sum of inventory and account receivable scaled by total assets. LOSS equals 1 when income before extraordinary items is less than zero, 0 otherwise. BIG4 equals 1 when a firm uses one of the Big 4 auditors, and 0 otherwise. SEGNUM is the total number of business segments. FSEGNUM is the total number of foreign segments. GOCERN equals 1 if the auditor opinion includes a going concern qualification, 0 otherwise. LEVERAGE is total liabilities over total assets. BUSY equals 1 if the company's current fiscal year ends in December, and 0 otherwise. MB is the market-to-book ratio. ROA is net income over total assets. STD_CFO is the standard deviation of cash flow from operations. EX_FIN is the total amount of external financing scaled by total assets. See Appendix A for detailed variable definitions.

Model (1) and Model (2) are estimated using the whole difference-in-differences sample. Model (1) does not include year fixed effect and estimates Heteroskedasticity robust standard errors. Model (2) includes year fixed effect and adjust standard errors by firm and year two dimensions. Model (3) and Model (4) are estimated using observations with size smaller than median size and larger than median size, respectively. In unreported tables, industry and firm fixed effects are added to all the Models. The results suggest that the presence or absence of industry and firm fixed effect has little effect on the adjusted R squared, and also has little effect on the inferences for variables. See Section 2.7 for discussions about the inclusion or exclusion of industry and firm fixed effects. Standard errors are adjusted by firm and year two dimensions. In Column (4), in the sample of 315 firms, there is no variation in the ΔBIG4 variable (=0), therefore, the variable is not used in the regression. The t-statistics are in the brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table 2.11 (Con'd)

Independent variable is ΔLNFEE. Dependent variables are in this column	(1) Full DID sample		(2) Full DID sample		(3) DID sample less than median size		(4) DID sample larger than median size	
TREAT	-0.0586**	(-2.25)	-0.0593***	(-3.90)	-0.0762*	(-1.96)	-0.0368	(-0.92)
ΔINS	-0.0312	(-0.38)	-0.0268	(-0.33)	-0.1913***	(-3.22)	0.0586	(0.38)
ΔSIGMA	-0.3429	(-0.22)	4.9891***	(2.62)	5.2777**	(2.31)	4.8592***	(4.61)
ΔRET	0.1242	(0.24)	0.2902	(1.27)	0.2560	(0.97)	0.1200	(0.23)
ΔTURNOVER	-0.0599	(-1.28)	-0.0796*	(-1.68)	-0.0476	(-1.35)	-0.4143	(-1.30)
ΔLNASSET	0.3293***	(4.28)	0.3262***	(6.72)	0.2520***	(5.67)	0.3293***	(4.67)
ΔINVREC	0.2312	(0.60)	0.1167	(0.26)	0.3883	(0.91)	-0.5851	(-0.88)
ΔLOSS	-0.0559	(-1.20)	-0.0475***	(-4.78)	-0.0722***	(-4.00)	0.0661	(1.18)
ΔBIG4	0.7342***	(9.53)	0.6773***	(13.40)	0.7506***	(7.45)		
ΔSEGNUM	0.0586***	(2.96)	0.0585***	(5.17)	0.0796***	(7.20)	0.0314	(1.50)
ΔFSEGNUM	-0.0214***	(-2.75)	-0.0188	(-1.60)	-0.0220	(-1.02)	-0.0175	(-1.51)
ΔGOCERN	-0.1094	(-0.85)	-0.1358	(-1.02)	0.1221	(1.11)	-0.2248*	(-1.87)
ΔLEVERAGE	0.0491	(0.39)	0.1426	(0.61)	0.0034	(0.01)	0.2566	(1.10)
ΔBUSY	0.4239*	(1.66)	0.4654*	(1.74)	1.1003***	(11.48)	0.0881	(0.93)
ΔMB	0.0223	(0.97)	0.0055	(0.13)	0.0185	(0.50)	-0.0039	(-0.10)
ΔROA	0.0087	(0.05)	-0.0075	(-0.05)	0.0354	(0.19)	0.1628	(1.48)
ΔSTD_CFO	-0.4643	(-0.61)	-0.8051	(-1.47)	-0.4523	(-1.47)	-1.9769	(-1.11)
ΔEXFIN	0.0047	(0.10)	-0.0179	(-0.40)	-0.0315	(-1.27)	0.2107	(1.58)
Observations	634		634		317		317	
Year FE	NO		YES		YES		YES	
Heteroskedasticity Robust	YES		YES		YES		YES	
Year Cluster	NO		YES		YES		YES	
Adjusted R-squared	0.0799		0.1314		0.1500		0.1326	

Table 3.1: Summary statistics on U.S. cross border listings

Panel A: By auditor country			Panel B: By country of incorporation			Panel C: By industry		
Country	N	%	Country	N	%	FF 48 Industry	N	%
Argentina	17	2.39	Antigua & Barbuda	1	0.14	Agriculture	3	0.42
Australia	7	0.98	Argentina	13	1.83	Aircraft	2	0.28
Belgium	2	0.28	Australia	6	0.84	Apparel	4	0.56
Bermuda	12	1.69	Bahamas	1	0.14	Automobiles and Trucks	10	1.40
Brazil	30	4.21	Belgium	1	0.14	Banking	40	5.62
Canada	199	27.95	Bermuda	29	4.07	Beer & Liquor	3	0.42
Chile	13	1.83	Brazil	28	3.93	Business Services	82	11.52
China	58	8.15	British Virgin	15	2.11	Business Supplies	5	0.70
Colombia	2	0.28	Canada	155	21.77	Candy & Soda	4	0.56
Denmark	2	0.28	Cayman Islands	68	9.55	Chemicals	13	1.83
Finland	1	0.14	Channel Islands	5	0.70	Coal	3	0.42
France	11	1.54	Chile	13	1.83	Communication	68	9.55
Germany	10	1.40	China	15	2.11	Computers	10	1.40
Greece	22	3.09	Colombia	2	0.28	Construction	7	0.98
Hong Kong	74	10.39	Denmark	3	0.42	Construction Materials	4	0.56
Hungary	2	0.28	Finland	1	0.14	Consumer Goods	8	1.12
India	14	1.97	France	10	1.40	Drugs	36	5.06
Indonesia	2	0.28	Germany	9	1.26	Electrical Equipment	12	1.69
Ireland	10	1.40	Greece	2	0.28	Electronic Equipment	53	7.44
Israel	61	8.57	Hong Kong	5	0.70	Entertainment	1	0.14
Italy	4	0.56	Hungary	1	0.14	Fabricated Products	1	0.14
Japan	24	3.37	India	12	1.69	Food Products	11	1.54
Luxembourg	10	1.40	Indonesia	2	0.28	Healthcare	2	0.28
Mexico	2	0.28	Ireland	9	1.26	Insurance	28	3.93
Netherlands	19	2.67	Israel	54	7.58	Machinery	9	1.26
New Zealand	11	1.54	Italy	4	0.56	Measuring and Control Equip.	3	0.42
Nicaragua	1	0.14	Japan	24	3.37	Medical Equipment	10	1.40
Norway	1	0.14	Liberia	1	0.14	Mining	39	5.48
Panama	5	0.70	Luxembourg	6	0.84	Oil	49	6.88
Papua New	2	0.28	Marshall Islands	24	3.37	Other	2	0.28
Peru	1	0.14	Mexico	19	2.67	Personal Services	6	0.84
Philippines	2	0.28	Netherlands	13	1.83	Precious Metals	37	5.20
Portugal	1	0.14	New Zealand	1	0.14	Printing and Publishing	6	0.84
Russia	1	0.14	Norway	1	0.14	Real Estate	12	1.69
Singapore	5	0.70	Panama	2	0.28	Recreation	2	0.28
South Africa	4	0.56	Papua New Guinea	1	0.14	Retail	9	1.26
South Korea	7	0.98	Peru	1	0.14	Rubber and Plastic Products	2	0.28
Spain	6	0.84	Philippines	1	0.14	Steel Works Etc	13	1.83
Sweden	2	0.28	Portugal	1	0.14	Trading	12	1.69
Switzerland	6	0.84	Russia	4	0.56	Transportation	48	6.74
Taiwan	9	1.26	Singapore	2	0.28	Transportation	7	0.98
Turkey	1	0.14	South Africa	6	0.84	Utilities	20	2.81
United Kingdom	39	5.48	South Korea	10	1.40	Wholesale	16	2.25
			Spain	5	0.70			
			Sweden	1	0.14			
			Switzerland	6	0.84			
			Taiwan	2	0.28			
			Turkey	1	0.14			
			United Kingdom	28	3.93			
			United States	88	12.36			
Total	712	100	Total	712	100	Total	712	100

Table 3.2: Cross-sectional distribution of cumulative abnormal returns for cross-listed stocks

Table 3.2 presents the summary statistics of average cumulative three-day abnormal returns for all cross-listed stocks that satisfying the sampling method. To be included in the subsamples for each event, the firm needs to have filed with the SEC financial statements audited by a foreign auditor during the 15 months before the event date, and the firm's stock price is at least 1 dollar during this period. In addition, the firm needs to be headquartered in a non-U.S. country.

Abnormal returns are calculated using the expected return estimation model as below:

$R_{i,t} = \alpha_i + \beta_i R_{s\&p500,t}$;

where, on day t, R_{it} is the return to firm i; $R_{s\&p500,t}$ is the return to the Standard & Poor 500 Index. Test statistic is a modified version of the widely used t-statistic of Boehmer, Musumeci, and Poulsen (BMP, 1991), as proposed by Kolari and Pynnonen (2010). This new statistic takes event-induced variance into account while adjusting for cross-sectional correlation.

Event	Mean	St. Dev	t-stat.	P1	P25	P50	P75	P99
December 04, 2008	0.0015	0.0854	0.166	-0.2637	-0.0362	0.0001	0.039	0.2351
April 07, 2009	0.0129	0.0669	0.587	-0.1603	-0.0184	0.0049	0.0403	0.2222
June 25, 2009	0.0022	0.0566	0.166	-0.1397	-0.0242	-0.0010	0.0223	0.1926
August 12, 2009	0.0048	0.0541	0.609	-0.1443	-0.0186	0.0026	0.0242	0.1869
February 03, 2010	-0.0136	0.0428	-1.463	-0.1286	-0.0378	-0.0124	0.0063	0.1277
May 18, 2010	-0.0226	0.0420	-2.094**	-0.1365	-0.0488	-0.0167	0.0035	0.0703
January 10, 2011	0.0093	0.0340	1.039	-0.0653	-0.0099	0.0043	0.0248	0.1031

Table 3.3: Announcement 3 (May 18, 2010), stock market reactions

Table 3.3 presents abnormal returns for the May 18, 2010 event. On May 18, 2010, the PCAOB for the first time published a name list of companies by countries denying the PCAOB access to information need for U.S. cross-border audit inspection. The mentioned countries are China, Hong Kong area (to the extent that audit clients have operations in mainland China), Norway, Switzerland, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Spain, Sweden, and United Kingdom.

Non-mentioned foreign countries in the sample are hiring auditors from Argentina, Australia, Bermuda, Brazil, Canada, Chile, Columbia, India, Indonesia, Israel, Japan, South Korea, Mexico, New Zealand, Panama, Papua New Guinea, Peru, Philippines, Russia, Singapore, South Africa, Taiwan (China), and Turkey.

Panel A- Panel G provide the mean of daily and cumulative abnormal returns calculated across the three expected return models.

$$R_{i,t}=\alpha_i+\beta_i R_{m,t}+s_i SMB_t+h_i HML_t+\varepsilon_i \quad (1)$$

$$R_{i,t}=\alpha_i+\beta_i R_{m,t}+\varepsilon_i \quad (2)$$

$$R_{i,t}=\alpha_i+\beta_i R_{s\&p500,t}+\varepsilon_i \quad (3)$$

where, on Day t, R_{it} is the return to firm i; $R_{m,t}$ is the return on the value weighted CRSP market index; and SMB_t and HML_t, are the returns to the small-minus-big (SMB) and high-minus-low (HML) portfolios meant to capture size and book-to-market; $R_{s\&p500,t}$ is the return to the U.S. S&P 500 Index. Day 0 is May 18, 2010. Panel A- Panel G provides the abnormal returns across the three expected return models for various company groups. Panel H compares the abnormal return between groups. ***, **, and * indicate significance at the 1%, 5%, and 10% level for a two-tailed test, respectively.

Panel A: *May 18, 2010, all foreign companies listed in the U.S.*

		FF factor		Market value weighed		S&P 500		
Day	N	Return	t-stat.	Return	t-stat.	Return	t-stat.	% negative
-1	649	-1.29%**	-2.547	-1.37%	-2.703**	-1.38%***	-2.629	74.88%
0	648	0.25%	0.481	0.22%	0.441	0.22%	0.430	44.91%
+1	646	-0.97%	-1.325	-0.99%	-1.300	-1.12%	-1.501	65.94%
+2	635	0.00%	0.202	0.09%	0.352	-0.01%	0.182	48.35%
+3	649	0.29%	0.388	0.45%	0.618	0.37%	0.420	47.00%
(-1,+1)	654	-1.99%	-1.893*	-2.11%	-2.004**	-2.26%**	-2.094	71.10%
(-1,+2)	654	-1.99%	-1.357	-2.02%	-1.366	-2.26%	-1.522	64.68%
(-1,+3)	654	-1.70%	-1.123	-1.58%	-1.034	-1.90%	-1.274	64.07%

Panel B: *May 18, 2010, companies with principal auditors from China and EU countries*

		FF factor		Market value weighed		S&P 500		
Day	N	Return	t-stat.	Return	t-stat.	Return	t-stat.	% negative
-1	256	-1.05%*	1.899	-1.13%**	-2.023	-1.14%**	-1.978	67.97%
0	255	0.13%	0.129	0.11%	0.112	0.10%	0.113	48.24%
+1	254	-0.57%	-0.470	-0.62%	-0.464	-0.76%	-0.675	59.84%
+2	248	0.10%	0.414	0.21%	0.511	0.10%	0.357	45.16%
+3	254	0.56%	0.652	0.75%	0.859	0.66%	0.665	43.31%
(-1,+1)	258	-1.47%	-1.105	-1.62%	-1.185	-1.78%	-1.296	66.78%
(-1,+2)	258	-1.37%	-0.600	-1.42%	-0.613	-1.68%	-0.768	58.14%
(-1,+3)	258	-0.82%	-0.290	-0.68	-0.224	-1.03%	-0.451	58.14%

Panel C: *May 18, 2010, U.S- listed foreign companies not on the PCAOB list*

		FF factor		Market value weighed		S&P 500		
Day	N	Return	t-stat.	Return	t-stat.	Return	t-stat.	% negative
-1	393	-1.45%***	-2.707	-1.52%***	-2.876	-1.54%***	-2.804	79.40%
0	393	0.32%	0.717	0.32%	0.703	0.30%	0.646	42.75%
+1	392	-1.23%*	-1.798	-1.22%*	-1.775	-1.35%**	-1.973	69.90%
+2	387	-0.06%	0.034	0.05%	0.261	-0.08%	0.027	50.38%
+3	395	0.12%	0.159	0.25%	0.374	0.18%	0.203	46.37%
(-1,+1)	396	-2.33%**	-2.269	-2.39%**	-2.374	-2.57%**	-2.487	74.24%
(-1,+2)	396	-2.39%*	-1.825	-2.34%*	-1.779	-2.64%**	-2.001	68.94%
(-1,+3)	396	-2.28%*	-1.683	-2.09%	-1.553	-2.46%*	-1.855	69.93%

Panel D: *May 18, 2010, companies with auditors located in China or Hong Kong*

		FF factor		Market value weighed		S&P 500		
Day	N	Return	t-stat.	Return	t-stat.	Return	t-stat.	% negative
-1	122	-1.74%**	-2.570	-1.79%***	-2.646	-1.81%***	-2.576	74.59%
0	121	0.49%	0.810	0.47%	0.774	0.44%	0.716	39.67%%
+1	121	-1.16%*	-1.672	-1.34%*	-1.869	-1.48%**	-2.003	72.72%
+2	116	0.01%	0.009	0.08%	0.056	-0.07%	-0.109	50.86%
+3	121	0.79%	0.844	0.96%	0.878	0.88%	0.762	42.78%
(-1,+1)	124	-2.37%*	-1.651	-2.62%*	-1.865	-2.80%*	-1.944	75.00%
(-1,+2)	124	-2.35%	-1.333	-2.54%	-1.478	-2.87%	-1.634	66.13%
(-1,+3)	124	-1.59%	-0.888	-1.60%	-0.993	-2.01%	-1.210	65.32%

Panel E: *May 18, 2010, companies with auditors from Norway, Switzerland and EU*

		FF factor		Market value weighed		S&P 500		
Day	N	Return	t-stat.	Return	t-stat.	Return	t-stat.	% negative
-1	134	-0.42%	-0.896	-0.52%	-0.995	-0.53%	-1.017	61.44%
0	134	-0.20%	-0.491	-0.21%	-0.489	-0.20%	-0.454	55.97%
+1	133	-0.03%	-0.436	0.04%	0.587	-0.11%	0.371	48.12%
+2	132	0.18%	0.625	0.34%	0.746	0.25%	0.642	40.15%
+3	133	0.35%	0.312	0.57%	0.595	0.46%	0.394	43.94%
(-1,+1)	134	-0.64%	-0.404	-0.69%	-0.340	-0.84%	-0.478	58.21%
(-1,+2)	134	-0.47%	-0.019	-0.35%	-0.113	-0.59%	-0.026	50.75%
(-1,+3)	134	-0.12%	-0.130	0.21%	0.309	-0.13%	0.116	51.49%

Panel F: *May 18, 2010, companies with auditors from Canada*

		FF factor		Market value weighed		S&P 500		
Day	N	Return	t-stat.	Return	t-stat.	Return	t-stat.	% negative
-1	166	-1.68%**	-2.519	-1.78%***	-2.684	-1.80%***	-2.663	84.94%
0	166	0.64%	1.075	0.63%	1.057	0.62%	1.029	35.54%
+1	165	-1.93%**	-2.439	-1.86%**	-2.303	-2.00%**	-2.494	80.61%
+2	162	-0.25%	-0.396	-0.04%	-0.089	-0.17%	-0.249	53.70%
+3	168	-0.05%	-0.166	0.27%	0.224	0.19%	0.088	51.19%
(-1,+1)	169	-2.90%**	-2.201	-2.94%**	-2.276	-3.11%**	-2.390	80.47%
(-1,+2)	169	-3.14%**	-1.919	-2.98%*	-1.806	-3.28%**	-1.987	73.96%
(-1,+3)	169	-3.19%*	-1.747	-2.71%	-1.517	-3.09%*	-1.733	73.96%

Panel G: *May 18, 2010, companies with auditors from non-mentioned countries other than Canada*

		FF factor		Market value weighed		S&P 500		
Day	N	Return	t-stat.	Return	t-stat.	Return	t-stat.	% negative
-1	227	-1.29%	-2.437	-1.33%***	-2.581	-1.35%**	-2.492	75.33%
0	227	0.10%	0.218	0.09%	0.207	0.07%	0.151	48.02%
+1	227	-0.72%	-1.036	-0.75%	-1.089	-0.88%	-1.308	62.11%
+2	225	0.07%	0.448	0.13%	0.559	-0.01%	-0.282	48.00%
+3	227	0.24%	0.416	0.24%	0.456	0.17%	0.277	48.02%
(-1,+1)	227	-1.91%*	-1.935	-1.99%**	-2.056	-2.16%**	-2.173	69.60%
(-1,+2)	227	-1.84%	-1.377	-1.86%	-1.401	-2.17%*	-1.653	65.20%
(-1,+3)	227	-1.59%	-1.215	-1.62%	-1.220	-2.00%	-1.584	63.44%

Table 3.4: Announcement 1 (August 12, 2009), stock market reactions

Table 3.4 presents the abnormal returns for the days surrounding August 12, 2009. On August 12, 2009, the PCAOB published a list of audit firms that were not yet inspected even though four years have passed since issuance of an audit report while registered (i.e. audit firms that experienced inspection delays). This list contains 18 audit firms and 9 jurisdictions. The 9 mentioned jurisdictions of the mentioned audit firms are China, France, Germany, Israel, Netherlands, Portugal, Sweden, and Switzerland. S&P 500 index is used as the benchmark in the expected return estimation model. The PCAOB did not mention reason for the day in this announcement. August 12, 2009 is day 0. Panel A – Panel E provide the abnormal returns by mentioned/others or by regions. ***, **, and * indicate significance at the 1%, 5%, and 10% level for a two-tailed test, respectively.

Panel A: *Aug 12, 2009, by mentioned/non-mentioned*

	Mentioned stocks (N=64)		Other stocks(N=624)		Difference in means	
Day	Return	t-stat.	Return	t-stat.	Return	t-stat.
-1	-0.71%	-0.780	-0.42%	-0.429	-0.29%	-0.80
0	0.54%	0.666	0.25%	0.410	0.29%	0.82
+1	-0.44%	-0.312	0.55%	0.814	-0.99%*	-1.91
+2	-0.44%	-0.617	-0.41%	-0.389	-0.03%	-0.08
+3	-1.55%	-1.586	-1.42%	-1.560	-0.13%	-0.34
(+1,+2)	-0.88%	-0.583	0.14%	0.352	-1.02%	-1.55
(+1,+3)	-2.41%	-1.242	-1.27%	-0.688	-1.14%	-1.38

Panel B: *Aug 12, 2009, by mentioned/not mentioned and region*

	Mentioned China (N=38)		Other China (N=86)		Mentioned EU (N=28)		Other EU (N=110)	
Day	Return	t-stat.	Return	t-stat.	Return	t-stat.	Return	t-stat.
-1	-0.75%	-0.550	-0.29%	-0.091	-0.66%	-0.752	-0.35%	-0.240
0	-0.10%	-0.079	-0.43%	-0.222	1.32%	1.305	0.12%	0.334
+1	-1.76%	-0.987	-0.39%	-0.258	1.25%	0.724	0.96%	1.222
+2	-0.74%	-0.745	-0.97%	-0.678	-0.05%	-0.147	0.03%	-0.065
+3	-2.64%*	-1.835	-2.10%**	-2.298	-0.19%	-0.374	-1.21%*	-1.959
(+1,+2)	-2.50%	-1.439	-1.34%	-0.685	1.20%	0.462	0.99%	1.005
(+1,+3)	-5.06%**	-2.162	-3.37%*	-1.736	1.00%	0.295	-0.21%	-0.137

Table 3.5: Announcement 2 (February 03, 2010), stock market reactions

Table 3.5 presents the abnormal returns for the days surrounding February 03, 2010. On February 03, 2010, the PCAOB published an updated list of audit firms that experienced inspection delays. There are 25 jurisdictions on the February 3, 2010 audit name list. The 25 jurisdictions cover the 21 jurisdictions in the May 18, 2010 list. For the first time, the PCAOB mentioned in the news release that access to local audit information is denied by certain jurisdictions. But the PCAOB did not explicitly indicate that denial of access to information is the reason for the delays. S&P 500 index is used as the benchmark in the expected return estimation model. February 03, 2010 is day 0. Panel A – Panel E provide the abnormal returns by mentioned/others or by regions. ***, **, and * indicate significance at the 1%, 5%, and 10% level for a two-tailed test, respectively.

Panel A: *Feb 03, 2010, by mentioned/non-mentioned*

	Mentioned stocks (N=262)		Other stocks (N=420)		Difference in Means	
Day	Return	t-stat.	Return	t-stat.	(1) - (2)	t-stat.
-1	0.38%	0.454	-0.36%	-0.631	0.74%***	3.22
0	0.19%	0.288	-0.20%	-0.432	0.39%*	1.95
+1	-1.42%**	-2.197	-0.81%	-0.953	-0.61%***	-2.69
+2	-0.75%*	-1.670	-0.02%	-0.262	-0.73%***	-3.28
+3	-0.32%	-0.363	0.21%	0.309	-0.53%**	-2.37
(+1,+2)	-2.16%***	-2.933	-0.82%	-0.912	-1.34%***	-5.02
(+1,+3)	-2.48%***	-2.864	-0.61%	-0.562	-1.87%***	-5.81

Panel B: *Feb 03, 2010, by mentioned/non-mentioned and by region*

	Mentioned China (N=81)		Others China (N=41)		Mentioned EU (N=69)		Others EU (N=71)	
Day	Return	t-stat.	Return	t-stat.	Return	t-stat.	Return	t-stat.
-1	0.08%	0.047	1.44%	1.246	0.28%	0.33	0.22%	0.161
0	0.60%	0.681	1.08%	1.362	-0.31%	-0.757	-0.32%	-0.682
+1	-1.75%**	-2.193	-2.45%***	-2.679	-1.08%*	-1.705	-0.76%	-0.922
+2	0.14%	-0.206	-0.61%	-0.560	-1.55%**	-2.473	-1.07%**	-2.058
+3	-0.22%	-0.217	-0.63%	-0.483	-0.04%	0.041	-0.51%	-0.632
(+1,+2)	-1.61%*	-1.861	-3.06%***	-2.902	-2.63%***	-3.188	-1.82%*	-1.860
(+1,+3)	-1.83%	-1.586	-3.68%***	-3.112	-2.67%***	-2.982	-2.33%**	-2.028

Table 3.6: January 10, 2011, stock market reactions

Table 3.6 provides the abnormal returns for the days surrounding January 10, 2011. On January 10, 2011, the PCAOB published a news release indicating that it entered into cooperative agreement with the United Kingdom audit regulators. On the same day, the cooperative agreement was published at the PCAOB website. S&P 500 index is used as the benchmark in the expected return estimation model. January 10, 2011 is day 0. Abnormal returns for firms with auditors located in UK and for firms with auditors located in other countries are provided in groups. ***, **, and * indicate significance at the 1%, 5%, and 10% level for a two-tailed test, respectively.

Table 3.6.: *By UK/other cross border listings*

	UK (N=38)		Others (N=626)		Difference in means	
Day	Return	t-stat.	Return	t-stat.	Return	t-stat.
-1	-0.02%	0.076	-0.15%	-0.407	0.13%	0.68
0	0.12%	0.273	0.08%	0.010	0.04%	0.12
1	0.25%	0.376	0.71%	1.600	-0.46%	-1.32
2	0.38%	0.554	0.17%	0.579	0.21%	0.77
3	0.52%	1.140	-0.10%	0.029	0.62%**	2.23
(+1, +2)	0.63%	0.614	0.87%	1.497	-0.24%	-0.37
(+1, +3)	1.13%	1.083	0.77%	1.114	0.36%	0.61

Table 3.7: Summary statistics and correlation for variables for cross-sectional analysis

Table 3.7 Panel A presents the summary statistics for variables in the May 18, 2010 cross-sectional analysis. LNASSET is the natural logarithm of total assets. MB is the ratio of the market value of total assets to book value of total assets; LEVERAGE is the ratio of total liabilities to total assets; SALEGRW is the net revenue growth over the past year; CFO is cash flow from operating scaled by total assets; OWNERCON is the total percentage of shares owned by owners with more than five percent of total shares outstanding; BIG4 is an indicator variable which equals to 1 if the firm hires a big 4 auditor, and 0 otherwise; AGE is the year 2010 minus the year the firm was founded; FOREIGNSUM is the total number of foreign countries the firm is listed in; LNGDP is the natural logarithm of the home country's per capita GDP expressed in current US dollars as retrieved from World Bank Development Indicators; RULE_OF_LAW is an index capturing the perceived influence and authority of laws for a country, as obtained from World Bank Governance Indicators; JUDICIAL measures the efficiency of a country's legal system; AUDIT is an index measuring the extent to which auditors are likely to comply with the auditing standard and accounting standard, as constructed by Preiato, Brown and Tarca (2013); DISCLOSURE is index of disclosures required in periodic disclosures (e.g., annual reports), with higher scores representing higher disclosure requirements, as constructed by Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008); FRENCH_OR is 1 if the home country's legal regime is based on French law, and to 0 otherwise. Firms in the financial industry are dropped (SIC between 6000 and 6999). Detailed variable definition and data source is in Appendix C.

Panel A: *Summery statistics of variables in the cross-sectional analysis*

Variable	Mean	Std Dev	P1	P25	P50	P75	P99
LNASSET	6.99	2.32	2.66	5.23	6.87	8.71	11.79
MB	1.66	0.92	0.63	1.02	1.39	1.98	5.46
LEVERAGE	0.12	0.14	0.00	0.00	0.07	0.20	0.59
SALEGRW	0.09	0.42	-0.59	-0.15	0.02	0.24	2.29
CAPEX	0.25	0.20	0.01	0.11	0.19	0.32	0.94
CFO	0.08	0.12	-0.45	0.04	0.09	0.14	0.33
R&D	0.02	0.05	0.00	0.00	0.00	0.01	0.33
OWNERCON	0.44	0.32	0.00	0.20	0.41	0.63	1.00
BIG4	0.84	0.36	0.00	1.00	1.00	1.00	1.00
AGE	32.92	29.46	4.00	12.00	22.00	44.00	130.00
CROSS	0.61	0.49	0	0	0	1	1
SINGLE	0.07	0.26	1	0	0	0	0
LNGDP	9.78	0.98	7.05	9.03	10.33	10.59	10.59
RULE_OF_LAW	0.91	0.91	-0.77	-0.22	1.30	1.81	1.81
JUDICIAL	4.11	0.97	2.33	2.98	4.58	5.00	5.00
AUDIT	24.41	7.85	4.00	21.00	26.00	32.00	32.00
DISCLOSURE	0.83	0.28	0.00	0.80	1.00	1.00	1.00
FRENCH_OR	0.26	0.44	0.00	0.00	0.00	1.00	1.00

Table 3.7 (con'd)

Panel B: *Pearson and Spearman correlation matrix of variables in the cross-sectional analysis*

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
LNASSET	(1)	1.00	-0.18	0.51	-0.02	-0.28	0.09	-0.19	0.24	0.44	0.62	0.05	0.01	0.03	-0.11	-0.25	0.08
MB	(2)	-0.25	1.00	-0.21	0.38	0.25	0.33	0.04	-0.01	-0.11	-0.00	0.02	0.07	0.03	0.09	0.08	0.09
LEVERAGE	(3)	0.36	-0.20	1.00	-0.04	-0.30	0.02	-0.07	0.10	0.23	0.31	0.03	-0.01	-0.00	-0.10	-0.14	0.07
SALEGRW	(4)	-0.07	0.33	-0.02	1.00	0.06	0.16	0.12	-0.04	0.04	0.05	-0.13	-0.07	-0.15	-0.12	-0.08	0.25
CAPEXP	(5)	-0.28	0.20	-0.22	0.04	1.00	0.07	-0.03	-0.06	-0.21	-0.11	-0.05	-0.05	-0.07	0.01	0.02	-0.03
CFO	(6)	0.17	0.21	0.04	0.06	-0.04	1.00	0.10	0.06	-0.01	0.04	-0.07	-0.03	-0.04	-0.06	-0.01	0.06
OWNERCON	(7)	-0.16	0.02	-0.01	0.08	-0.01	0.05	1.00	-0.10	-0.20	-0.22	-0.53	-0.48	-0.49	-0.49	-0.21	0.38
BIG4	(8)	0.22	0.01	0.08	-0.07	-0.07	0.01	-0.07	1.00	0.10	0.21	-0.01	-0.03	0.04	-0.04	-0.05	0.06
AGE	(9)	0.49	-0.13	0.11	0.03	-0.21	0.02	-0.16	0.11	1.00	0.38	0.13	0.05	0.09	-0.10	-0.12	-0.04
FOREIGNSUM	(10)	0.59	-0.06	0.16	0.03	-0.13	0.05	-0.14	0.16	0.30	1.00	0.16	0.11	0.09	0.01	-0.14	-0.03
LNGDP	(11)	0.01	-0.04	-0.02	-0.13	-0.00	-0.10	-0.40	-0.09	0.03	0.07	1.00	0.94	0.94	0.90	0.64	-0.74
RULE_OF_LAW	(12)	-0.01	0.03	-0.06	-0.09	-0.02	-0.08	-0.40	-0.06	0.03	0.04	0.91	1.00	0.94	0.92	0.75	-0.68
JUDICIAL	(13)	-0.05	0.01	-0.05	-0.14	-0.04	-0.07	-0.35	-0.01	0.02	-0.05	0.87	0.92	1.00	0.87	0.69	-0.70
AUDIT	(14)	-0.15	0.08	-0.15	-0.13	0.09	-0.11	-0.41	-0.08	-0.22	-0.06	0.76	0.77	0.68	1.00	0.68	-0.69
DISCLOSURE	(15)	-0.24	0.08	-0.21	-0.14	0.08	-0.08	-0.23	0.00	-0.15	-0.22	0.61	0.79	0.80	0.64	1.00	-0.66
FRENCH_OR	(16)	0.07	0.07	0.07	0.19	-0.02	0.06	0.34	0.06	0.05	-0.01	-0.85	-0.75	-0.80	-0.70	-0.61	1.00

Table 3.8: Cross-sectional analysis for Announcement 3 (May 18, 2010)

Table 3.8 presents the results of the cross-sectional regression for Announcement 3. Dependent variable is individual firms' cumulative abnormal returns of the three days surrounding May 18, 2010. RULE_OF_LAW is the World Bank governance index (Kaufmann et al., 2010), which reflects perceptions of the extent to which agents have confidence in and abide by the rules of society. JUDICIAL measures the efficiency of a country's legal system. FRENCH_OR is 1 if the home country's legal regime is based on French law, and 0 otherwise. AUDIT is an index measuring the extent to which auditors are likely to comply with the auditing standard and accounting standard, as constructed by Preiato, Brown and Tarca (2013). LNGDP is the natural logarithm of the home country's per capita GDP expressed in current US dollars as retrieved from World Bank Development Indicators. DISCLOSURE is index of disclosures required in periodic disclosures (e.g., annual reports), with higher scores representing higher disclosure requirements, as constructed by Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008). LNASSET is the natural logarithm of total assets. BIG4 is an indicator variable which equals to 1 if the firm hires a big 4 auditor, and 0 otherwise. OWNERCON is the total percentage of shares owned by owners with more than five percent of total shares outstanding. OWNERCON2 is the square of OWNERCON. USGAAP is 1 if the financial statement follows the United States General Accepted Accounting Principles, and 0 otherwise. AGE is the year 2010 minus the year the firm was founded. MB is the ratio of the market value of total assets to book value of total assets. LEVERAGE is the ratio of total liabilities to total assets. SALEGRW is the net revenue growth over the past year. CFO is cash flow from operating scaled by total assets. CAPEX is capital expenditure scaled by total assets. FOREIGN_SALE IS the percentage of the company's sales from foreign operations. CHINA is a dummy variable equal to 1 if the company hires an audit firm from China, and 0 otherwise. CROSS is a dummy variable equal to 1 if the company has both home listing and US listing, and 0 otherwise. SINGALE is an indicator variable equal to 1 if the company only has US listing, with either home listing or other foreign listings, and 0 otherwise. All financial statement data are measured as of the end of fiscal year 2009. Financial statement data are trimmed at 1% and 99%. The indexes are as of the year that is closest prior to year 2010, among all the available years. Firms in the financial industry are dropped (SIC between 6000 and 6999). Detailed data source is in Appendix C. ***, **, and * indicate significance at the 1%, 5%, and 10% level for a two-tailed test, respectively.

Panel A : *Abnormal returns and institutional characteristics*

	Dependent variable is CAR (-1, +1)					
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
RULE_OF_LAW	**0.1290*** **					
	[4.40]					
JUDICAL		**0.1268*** **				
		[6.53]				
FRENCH_OR			**-0.1105*** **			
			[-5.47]			
AUDIT				**0.0934** **		
				[2.54]		
LNGDP					**0.1464*** **	
					[4.69]	
DISCLOSURE						**0.0990*** **
						[3.79]
LNASSET	0.1623**	0.1924**	0.1538*	0.1537*	0.1593**	0.1743**
	[2.12]	[2.53]	[2.02]	[1.96]	[2.22]	[2.19]
BIG4	0.1542**	0.1188**	0.1481**	0.1415*	0.1557**	0.1291*
	[2.39]	[2.13]	[2.40]	[1.98]	[2.49]	[1.83]
OWNERCON	0.1708**	0.1797**	0.1354*	0.1548*	0.1830**	0.1342*
	[2.27]	[2.50]	[1.91]	[1.99]	[2.44]	[1.81]
OWNERCON2	-0.0499	-0.0584	-0.0285	-0.0431	-0.0593	-0.0277
	[-1.31]	[-1.65]	[-0.71]	[-1.06]	[-1.64]	[-0.67]
USGAAP	0.1305***	0.1323***	0.1091**	0.1062**	0.1141***	0.1069**
	[3.01]	[3.38]	[2.58]	[2.29]	[3.10]	[2.32]
AGE	0.1550***	0.1702***	0.1762***	0.1679***	0.1619***	0.1608***
	[3.18]	[3.18]	[3.83]	[3.42]	[3.54]	[3.18]
MB	-0.0651	-0.0832*	-0.0534	-0.0685	-0.0622	-0.0634
	[-1.59]	[-2.08]	[-1.32]	[-1.71]	[-1.51]	[-1.70]
LEVERAGE	-0.0788	-0.0953	-0.0649	-0.0809	-0.0802	-0.074
	[-1.20]	[-1.48]	[-0.96]	[-1.14]	[-1.24]	[-1.08]
SALEGRW	0.0311	0.0344	0.0401	0.0322	0.0349	0.0406
	[0.93]	[1.13]	[1.16]	[1.02]	[1.06]	[1.25]
CFO	0.0629	0.0328	0.055	0.0673	0.0651	0.0558
	[1.52]	[1.06]	[1.39]	[1.61]	[1.59]	[1.41]
CAPEX	-0.0722	-0.0776	-0.0769	-0.077	-0.0724	-0.0751
	[-1.02]	[-1.01]	[-1.10]	[-1.09]	[-1.02]	[-1.07]
FOREIGN_SALE	-0.0432	-0.0788*	-0.0509	-0.0438	-0.0357	-0.0465
	[-0.82]	[-2.07]	[-1.06]	[-0.85]	[-0.59]	[-0.93]
CHINA	0.0305	0.0269	0.0648**	0.0179	0.0541***	0.0173
	[1.11]	[0.97]	[2.11]	[0.61]	[2.86]	[0.52]
N	346	324	346	343	346	345
adj. R-sq	0.0795	0.0883	0.0756	0.0698	0.0833	0.0732

Standard errors are clustered by country

Panel B: *Abnormal returns and listing status*

	Dependent variable is CAR(-1,+1)					
Independent variable	(1)	(2)	(3)	(4)	(5)	(6)
CROSS	**-0.0028**		**-0.0025**	**-0.0052**		**-0.0043**
	[-0.63]		**[-0.54]**	**[-1.04]**		**[-0.96]**
SINGLE		**0.0037**	**0.0025**		**0.0056**	**0.0043**
		[0.43]	**[0.27]**		**[0.69]**	**[0.52]**
LNASSET				0.0034**	0.0032**	0.0034**
				[2.33]	[2.19]	[2.33]
BIG4				0.0213**	0.0212**	0.0212**
				[2.41]	[2.39]	[2.41]
RULE_OF_LAW				0.0052***	0.0051***	0.0052***
				[4.43]	[4.37]	[4.41]
OWNERCON				0.0209**	0.0217**	0.0208**
				[2.15]	[2.18]	[2.11]
OWNERCON2				-0.0028	-0.0031	-0.0027
				[-1.12]	[-1.20]	[-1.08]
USGAAP				0.0097**	0.0106**	0.0096*
				[2.09]	[2.71]	[2.04]
AGE				0.0002***	0.0002***	0.0002***
				[3.12]	[3.23]	[3.16]
MB				-0.0033	-0.0031	-0.0032
				[-1.61]	[-1.57]	[-1.60]
LEVERAGE				-0.0244	-0.0239	-0.0247
				[-1.32]	[-1.26]	[-1.35]
SALEGRW				0.0037	0.0032	0.0036
				[1.05]	[0.95]	[1.07]
CFO				0.0232	0.0252	0.0239
				[1.39]	[1.55]	[1.44]
CAPEX				-0.0154	-0.0159	-0.0154
				[-0.99]	[-1.00]	[-0.98]
FOREIGNSALE				-0.0045	-0.0045	-0.0043
				[-0.76]	[-0.75]	[-0.71]
CHINA				0.0004	0.0031	0.0009
				[0.14]	[1.15]	[0.35]
INTERCEPT	-0.0277***	-0.0280***	-0.0280***	-0.0838***	-0.0879***	-0.0852***
	[-17.78]	[-12.89]	[-12.89]	[-4.70]	[-4.93]	[-4.78]
N	425	425	425	346	346	346
adj. R-sq	-0.0013	-0.0035	-0.0035	0.0782	0.0778	0.076
Standard errors are clustered by country						

Table 3.9: Analysis of change in perceived information asymmetry

Table 3.9 presents the results of analysis for change in perceived information asymmetry as proxied by bid-ask spread. Bid-ask spread (SPREAD) is the difference between closing ask price and bid price scaled by the average of ask and bid prices. For each observations, the pre period bid-ask spread is measured as the mean of the three months daily average in the pre-announcement period, specifically, as the mean between February 7, 2010 and May 07, 2010. The post-announcement spread is calculated as the daily mean between June 1, 2010 and September 1, 2010. POST is an indicator variable equal to 1 for the pre-disclosure period, and 0 for the post-announcement period. RULE_OF_LAW is the World Bank governance index (Kaufmann et al., 2010), which reflects perceptions of the extent to which agents have confidence in and abide by the rules of society. JUDICIAL measures the efficiency of a country's legal system. FRENCH_OR is 1 if the home country's legal regime is based on French law, and 0 otherwise. AUDIT is an index measuring the extent to which auditors are likely to comply with the auditing standard and accounting standard, as constructed by Preiato, Brown and Tarca (2013). LNGDP is the natural logarithm of the home country's per capita GDP expressed in current US dollars as retrieved from World Bank Development Indicators. DISCLOSURE is index of disclosures required in periodic disclosures (e.g., annual reports), with higher scores representing higher disclosure requirements, as constructed by Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008). LNASSET is the natural logarithm of total assets. BIG4 is an indicator variable which equals to 1 if the firm hires a big 4 auditor, and 0 otherwise. OWNERCON is the total percentage of shares owned by owners with more than five percent of total shares outstanding. OWNERCON2 is the square of OWNERCON. The indexes are as of the year that is closest prior to year 2010, among all the available years. Firms in the financial industry are dropped (SIC between 6000 and 6999). RET is the average daily stock return during the corresponding period. TURNOVER is the average daily dollar trading volume during the corresponding period. Detailed data source is in Appendix C. ***, **, and * indicate significance at the 1%, 5%, and 10% level for a two-tailed test, respectively. The model specification is as follows:

$$\text{Spread} = \alpha_0 + \alpha_1 \times \text{Post} + \alpha_2 \times \text{Post} \times \text{Country-level governance variables} + \alpha_3 \times \text{Post} \times \text{Firm-level governance variables} + \sum_{i=1}^{n} \beta_i \times \text{stock market control}_i + \text{Firm fixed effect}$$

Panel A: *Change in bid-ask spreads across regions*

	Correlation between CAR (-1,+1) and mean bid-ask spread: -0.04 (p-value=0.0364)					
Region of companies	Pre		Post		Difference (Post-Pre)	t-stat.
	Mean	Median	Mean	Median		
All foreign countries	0.0558	0.0039	0.0652	0.0041	0.0094***	9.04
All excluding EU	0.0627	0.0048	0.0742	0.0051	0.0116***	9.63
China	0.0262	0.0045	0.0383	0.0056	0.0121***	8.49
EU countries	0.0203	0.0020	0.0195	0.0018	-0.0008	-0.53
Canada	0.1157	0.0114	0.1363	0.0102	0.0206***	8.02
Others	0.0278	0.0029	0.0327	0.0030	0.0049***	4.00

Panel B: *Cross-sectional analysis for bid-ask spreads*

	Dependent variable is bid-ask spreads					
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
POST	**0.4248*** [5.53]**	**0.5063*** [4.21]**	**0.3835*** [4.43]**	**0.5003*** [4.15]**	**0.6522*** [4.05]**	**0.4712*** [3.63]**
POST*RULE_OF_LAW	**-0.0462* [-1.75]**					
POST*JUDICAL		**-0.1201* [-1.82]**				
POST*FRENCH_OR			**0.0420* [1.90]**			
POST*AUDIT				**-0.1004* [-1.83]**		
POST*LNGDP					**-0.2590** [-2.15]**	
POST*DISCLOSURE						**-0.0767 [-1.33]**
POST*LNASSET	**-0.1561*** [-2.98]**	**-0.1588*** [-2.97]**	**-0.1618** [-2.81]**	**-0.1676*** [-3.22]**	**-0.1519*** [-2.91]**	**-0.1770*** [-2.89]**
POST*BIG4	**-0.1469*** [-3.57]**	**-0.1367*** [-4.18]**	**-0.1391*** [-3.61]**	**-0.1414*** [-4.30]**	**-0.1426*** [-3.98]**	**-0.1349*** [-4.15]**
POST*OWNERCON	-0.0088 [-0.18]	-0.0041 [-0.13]	-0.0024 [-0.08]	-0.0075 [-0.20]	-0.0048 [-0.18]	0.0064 [0.17]
POST*OWNERCON2	0.0055 [0.15]	0.0016 [0.10]	0.0021 [0.13]	0.003 [0.19]	0.0043 [0.28]	-0.0025 [-0.14]
POST*MB	-0.0809** [-2.48]	-0.0837 [-1.67]	-0.0880* [-1.77]	-0.0844 [-1.73]	-0.0882 [-1.72]	-0.0829* [-1.78]
RET	0.0025 [0.12]	0.0003 [0.01]	0.0009 [0.02]	0.0018 [0.04]	0.0025 [0.06]	0.0057 [0.14]
TURNOVER	0.0339 [1.07]	0.035 [1.25]	0.0350 [1.27]	0.0345 [1.26]	0.0353 [1.24]	0.0357 [1.26]
FIRM FIXED EFFECTS AS CONTROLS						
N	768	722	768	730	734	766
adj. R-sq	0.8549	0.8549	0.8549	0.8547	0.8546	0.8545
Standard errors are clustered by country						

Table 3.10: Abnormal dollar returns around announcement dates

Table 3.10 presents the abnormal return by dollar amount. Abnormal dollar return is computed by multiplying the cumulative abnormal returns with the market value (in U.S. dollar amounts) of the firm as of the day before the return accumulation day. Market value data is from DataStream calculated as the share price multiplied by the number of ordinary shares in issue. To more precisely reflect the effect of enforcement challenges, abnormal dollar return calculation is limited to the groups of firms impacted by the announcements. Panel A provides the cumulative abnormal dollar returns for impacted stocks in each event. Panel B – Panel E reports the Top 5 highly impacted firms in each subsamples.

Panel A: *cumulative abnormal dollar returns for impacted stocks in each event*

Announcement date	N	Mean	Median	Sum	stock type
August 12, 2009 (Announcement 1)	124	-$170,318,261	-$9,376,159	-$20,608,510,000	firms from China
February 3, 2010 (Announcement 2)	262	-$364,842,575	-$16,243,220	-$95,588,750,000	firms from China and EU
May 18, 2010 (Announcement 3)	520	-$74,832,231	-$8,678,707	-$38,912,760,000	Non-EU foreign firms
January 10, 2011	664	$139,836,562	$1,901,272	$92,851,480,000	All foreign firms

Panel B: *August 12, 2009, Top 5 most highly impacted firms*

Company name	Country of Auditor	Country of headquarter	Country of incorporation	Dollar amount
CHINA MOBILE LTD	Hong Kong (China)	Hong Kong (China)	Hong Kong (China)	-$9,511,344,069
CNOOC LTD	Hong Kong (China)	Hong Kong	Hong Kong	-$2,192,628,364
CHINA LIFE INSURANCE CO LTD	Hong Kong (China)	China	China	-$1,562,847,821
CHINA UNICOM (HONG KONG) LTD	Hong Kong (China)	Hong Kong (China)	Hong Kong (China)	-$1,421,640,265
PETROCHINA CO LTD	Hong Kong (China)	China	China	-$984,988,945

Panel C: *February 03, 2010, Top 5 most highly impacted firms*

Company name	Country of Auditor	Country of headquarter	Country of incorporation	Dollar amount
LLOYDS BANKING GROUP PLC	United Kingdom	United Kingdom	United Kingdom	-$7,408,772,935
BARCLAYS PLC	United Kingdom	United Kingdom	United Kingdom	-$5,614,773,316
HSBC HOLDINGS PLC	United Kingdom	United Kingdom	United Kingdom	-$4,786,718,191
ING GROEP NV	Netherlands	Netherlands	Netherlands	-$4,655,612,125
BP PLC	United Kingdom	United Kingdom	United Kingdom	-$4,510,540,033

Panel D: *May 18, 2010, Top 5 most highly impacted firms*

Company name	Country of Auditor	Country of headquarter	Country of incorporation	Dollar amount
WESTPAC BANKING CORP	Australia	Australia	United States	-$4,792,374,560
VALE S.A.	Brazil	Brazil	Brazil	-$4,707,667,370
ITAU UNIBANCO HOLDING S.A.	Brazil	Brazil	Brazil	-$2,919,939,401
BHP BILLITON LTD	Australia	Australia	Australia	-$2,409,420,174
BARRICK GOLD CORP	Canada	Canada	Canada	-$2,310,585,355

Panel E: *January 10, 2011, Top 5 most highly impacted firms*

Company name	Country of Auditor	Country of headquarter	Country of incorporation	Dollar amount
HSBC HOLDINGS PLC	United Kingdom	United Kingdom	United Kingdom	$9,957,751,344
TELEFONICA S A	Spain	Spain	Spain	$4,587,394,300
BARCLAYS BANK PLC	United Kingdom	United Kingdom	United Kingdom	$4,404,976,682
CNOOC LTD	Hong Kong	Hong Kong	Hong Kong	$4,379,348,327
BP PLC	United Kingdom	United Kingdom	United Kingdom	$4,307,539,684

Figures

Figure 2.1: Trends of audit fees in the treatment sample and control sample

Figure 2.1 discribes the trends of audit fees in the treatment sample and control sample. Year t-1 is the year before the event period. Year t+1 is the year following year t-1.

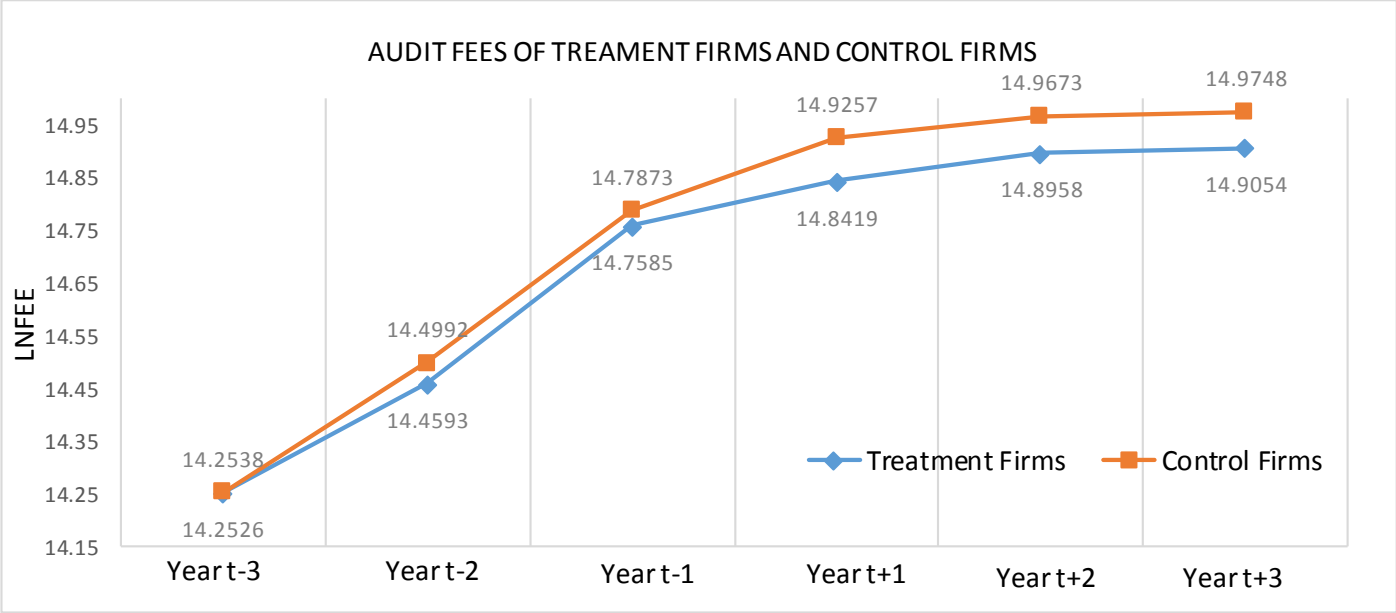
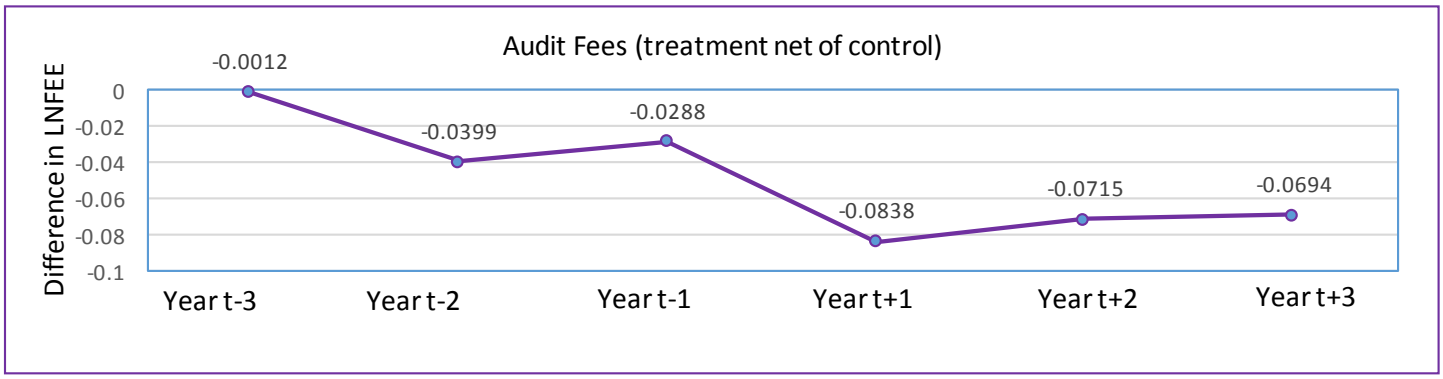


Figure 2.2: Treatment firm audit fees adjusted by control firm audit fees

Figure 2.2 shows the audit fees of treatment observations adjusted by that of control observations. LNFEE is the natural log of audit fees.



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Appendix A: Definition of variables in Chapter 2

Variable name		Definition
Dependent Variables		
AUDFEE	=	The audit fees (AUDIT_FEES) from Audit Analytics Audit Fees database;
LNFEE	=	Natural log of audit fee;
Controls		
COVERAGE	=	The mean of the 12 monthly numbers of annual earnings forecasts from the I/B/E/S summary file for the fiscal year;
LNCOVERAGE	=	The natural log of the COVERAGE variable;
ASSET	=	Total asset (AT);
LNASSET	=	Natural log of year-end total assets (AT);
INVREC	=	The sum of inventories (INVT) and receivables (RECT) divided by total assets (AT);
LOSS	=	1 when income before extraordinary Items (IB) is less than zero, 0 otherwise;
BIG4	=	1 when a firm uses one of the Big 4 auditors, and 0 otherwise;
SEGNUM	=	The total number of business segments, and is coded as 1 when this information is missing in the segment file;
FSEGNUM	=	The total number of foreign segments, and is coded as 0 when this information is missing in the segment file;
ROA	=	Net income (NI) over total assets (AT);
GOCERN	=	1 if the auditor opinion for the fiscal year includes a going concern qualification, and 0 otherwise;
LEVERAGE	=	The ratio of year-end total liabilities (DLTT) to total assets (AT);
BUSY	=	1 if the company's current fiscal year ends in December, and 0 otherwise.
STD_CFO	=	Firm-specific standard deviation of the cash flow from operations deflated by average total assets from years t-5 to t-1
MB	=	The ratio of the market value of total assets to book value of total assets (AT+CSHO*PRCC_F-CEQ- TXDB)/AT);
EX_FIN	=	The sum of net proceeds from equity financing and debt financing (SSTK-PRSTKC-DV+DLTIS-
INSOWNER	=	The mean of the quarterly institutional ownership corresponding to the fiscal year;
RET	=	The average monthly stock return corresponding to fiscal year;
TUNROVER	=	A stock's average monthly volume divided by shares outstanding corresponding to fiscal year;
SIGMA	=	The standard deviation of a firm's raw daily stock returns corresponding to the fiscal year.
TREAT	=	1 when the firms are exposed to exogenous analyst coverage termination, and 0 otherwise.
ABSDA	=	The absolute value of discretionary accruals, calculated using the modified Jones model (Dechow et al, 1995).

Appendix B: Examples of analysts' ability to detect misstatement

I provide two cases here to illustrate analysts' ability to detect misstatement. In the two cases, analysts are the fraud detector. Dyck et al. (2010) identify the actor that the documentary evidence indicates as the whistleblower. In case of an unusually high level of short seller activity, they reclassify the whistleblower as a shortseller. In the two cases below, analysts are the whistleblowers.

Case 1. NorthWestern Corporation

1) Fraud revealing and security class action:

"Analysts question the complex accounting entities used by NorthWestern as well as the company's payment of $44 million to auditor Arthur Anderson. An ensuing SEC investigation reveals that NorthWestern's senior management subverted and reallocated losses of the failing subsidiaries Blue Dot and Expanets to minority shareholders, allowing the company to keep the losses off its balance sheets and to artificially inflate earnings. NorthWestern takes an $880 million charge, ousts CEO, CFO, president and director, and files for bankruptcy in summer of 2003. Company settles shareholder suit for $41 million."

2) Documentary evidence identifying whistleblower:

"When **Charles Fishman**, a utility analyst with A.G. Edwards in St. Louis, looked at NorthWestern's latest annual report, he found the company's accounting methods curiously complex."

"We've never seen anything like this before," he says. "We do not believe this accounting methodology paints a good picture of reality."

Fishman says the *complex accounting masks NorthWestern's losses* and he's *been nervous about the company* for some time. He first downgraded NorthWestern's stock rating last May.

Li is an analyst in Allentown, Pa., for Bethlehem Steel Pension Fund. He began looking into the company as a potential investment about a year ago. *But after studying the books, he says he came away believing the accounting was suspect.*

"I felt very outraged because the investors in this company are small investors, not like the big institutions," Li says. "I think the small investors are less sophisticated."

NorthWestern's bookkeeping also puzzles **Jim Bellessa**, a senior analyst with D.A. Davidson & Co. of Great Falls. He says he's been studying NorthWestern for 18 months and can't keep track of all the moving parts."

Missoulian
April 15, 2002
Headline: Some Taking Careful Look at NorthWestern
Byline: Jan Falstad

News Website: http://missoulian.com/uncategorized/some-taking-careful-look-at-northwestern/article_d71beadf-cb37-5257-b7b0-cc3af999d3ff.html
Reference: Dyck et al. (2010), http://www-2.rotman.utoronto.ca/dyck/

Case 2: Qwest Communications International, Inc.

1) Fraud revealing and security class action:

"Morgan Stanley analysts assert that Qwest's exposure to failing Dutch venture KPNQwest, its improper pension accounting, and its capitalization of software costs will hurt future earnings for the firm. After vehemently denying the report, Qwest writes off $3.1 billion the following month. Later that the year, Morgan Stanley's accusation of overly aggressive accounting proves to be true as well. Qwests CEO sold over 4 million shares during the period. Qwest settles suit for $11 million, and in related action settles with SEC for $250 million."

2) Documentary evidence identifying whistleblower:

"Qwest Communications International on Wednesday fired back at one of Wall Street's biggest investment banks for a research report that questioned the telecommunication provider's accounting methods and estimates of future profits. 'I'm extraordinarily disappointed with what I consider irresponsible and unprofessional behavior from a major investment bank,' Qwest chief executive officer Joe Nacchio said in a conference call Wednesday. The CEO added that Qwest's financial reporting includes no improprieties.

Morgan Stanley Dean Witter & Co. analyst **Simon Flannery** on Wednesday downgraded Qwest from 'outperform' to 'neutral' and projected the company's earnings per share would grow 11 percent a year instead of 19 percent for 2002.

He asserted *the company 'quietly' wrote off $2.1 billion in assets after its $44 billion* merger last June with US West and raised concerns *Qwest had aggressively capitalized its software costs*, boosting earnings in the short term but sapping future profits.

Flannery noted that Qwest would have to write off a large amount of its interest in European joint venture KPNQwest. Qwest valued its interest in the fiber-optic network at $7.9 billion last year, but at current market values it is worth only $2 billion."

Denver Post
June 21, 2001
Headline: Qwest calls report 'irresponsible' Morgan Stanley Analyst Doubts Profit Projection
Byline: Kris Hudson and Aldo Svaldi
News Source: http://www.highbeam.com/doc/1G1-75709498.html
Reference: Dyck et al. (2010), http://www-2.rotman.utoronto.ca/dyck/

Appendix C: Variable definition in Chapter 3

Variables		Description	Source
1) Firm-characteristics			
ADR	=	1 if the security is an ADR, and 0 otherwise.	DataStream
AGE	=	Current year minus the year the firm was founded;	Capital IQ
BIG4	=	1 if the firm hires a big 4 auditor, and 0 otherwise;	Audit Analytics
LNASSET	=	The natural logarithm of total assets;	Capital IQ
CFO	=	Cash flow from operating scaled by total assets;	Capital IQ
CROSS	=	1 if the company has both home listing and US listing, and 0 otherwise;	Capital IQ
CHINA	=	1 if the company hires an audit firm from China (including Hong Kong), and 0 otherwise.	Capital IQ
CAPEX	=	Capital expenditures scaled by total assets;	Capital IQ
LEVERAGE	=	The ratio of total liabilities to total assets;	Capital IQ
MB	=	The ratio of the market value of total assets to book value of total assets;	Capital IQ
OWNERCON	=	Ownership concentration (OWNERCON) is measured as the total percentage of shares owned by owners with more than five percent of total shares outstanding;	Capital IQ
OWNERCON2	=	The squared ownership concentration;	Capital IQ
RET	=	the average daily stock return during the corresponding period;	DataStream
SALEGRW	=	Net revenue growth over the past year;	Capital IQ
SINGLE	=	1 if the company only has US listing, without either home listing or other foreign listings, and 0 otherwise	Capital IQ
SPREAD	=	The daily mean of the difference between closing ask price and bid price scaled by the average of ask and bid prices	DataStream
TURNOVER	=	the average daily dollar trading volume during the corresponding period;	DataStream
USGAPP	=	1 if the financial statement follows the United States General Accepted Accounting Principles, and 0 otherwise;	AuditAnalytics

Appendix C: Variable definition in Chapter 3 (Con'd)

2) Country-level variables			
AUDIT	=	An index of the extent to which auditors are likely to comply with the auditing standard and accounting standard. The index was constructed using factors relating to auditor skills, training, supervision, etc. The index ranges from 0 to 32, with higher scores reflecting stronger enforcement;	Preiato, Brown and Tarca (2013)
LNGDP	=	The natural logarithm of the home country's per capita GDP expressed in current US dollars;	World Bank Development Indicators, the GDP for Taiwan (of China) is retrieved from International Monetary Fund World Economic Outlook Data)
JUDICAL	=	An index that measures the efficiency of a country's legal system;	Laeven and Majnoni (2005)
FRENCH_OR	=	1 if the home country's legal regime is based on French law, and to 0 otherwise;	Reynolds and Flores (1989)
DISCLOSURE	=	Index of disclosures required in periodic disclosures (e.g., annual reports). The index ranges from 0 to 1, with higher scores representing higher disclosure requirements;	Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008)
RULE_OF_LAW	=	An index capturing the perceived influence and authority of laws for a country. The index ranges from -2.5 to 2.5, with higher scores reflecting stronger rule of law;	World Bank Governance Indicators

Appendix D: The PCAOB news releases on progress of cross-border inspections

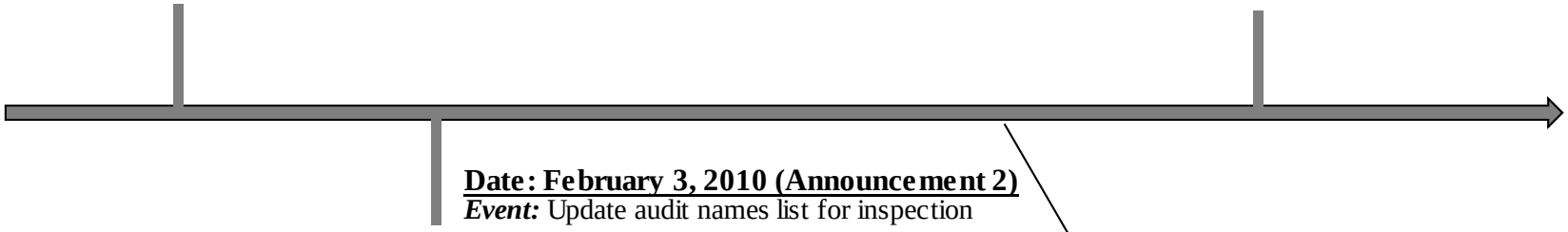
Date	News release	Details
2008-11-28	PCAOB to Consider Rule Amendments Concerning Timing of Non-U.S. Inspections, Seeking Comments	Announced that it has scheduled an Open Meeting for Thursday, Dec. 4, at 9:00 a.m.
2008-12-04	PCAOB Adopts and Proposes Rule Amendments on the Timing of Certain Non-U.S. Inspections and Seeks Comment on Related Issues	Webcast available (Indicates there is timing problem for certain countries.) Information also disclosed in Release No. 2008-007. But the disclosure is obscure.
2009-04-07	PCAOB Discloses Information Related to its International Inspections Program	Two lists are published (1) the list of non-U.S. jurisdictions in which there are registered firms that the Board intends to inspect in 2009; 2)the list of non-U.S. jurisdictions in which there are registered firms that the Board has inspected to date)
2009-06-19	PCAOB to Consider Rule Amendment Concerning the Timing of Certain Non-U.S. Inspections	Announced that it has scheduled an Open Meeting for Thursday, June 25, at 9:30 a.m.
2009-06-25	PCAOB Adopts Rule Amendment on the Timing of Certain Non-U.S. Inspections	Webcast and related documents available
2009-08-12	PCAOB Provides New and Updated Information on Inspections	Two lists are published 1)Jurisdictions in which PCAOB has conducted inspections; 2)Registered firms not yet inspected even though four years have passed since issuance of an audit report while registered.
2010-02-03	Progress on PCAOB International Inspections	Four lists are published 1)Jurisdictions in which PCAOB has conducted inspections; 2)Registered firms not yet inspected even though four years have passed since issuance of an audit report while registered 3) Jurisdictions the PCAOB intend to conduct inspections in 2010 4) Information on PCAOB international inspections.
2010-05-18	PCAOB Publishes List of Issuer Audit Clients of Non-U.S. Registered Firms In Jurisdictions where the PCAOB is Denied Access To Conduct Inspections	Publish one list: Issuer Audit Clients of Non-U.S. Registered Firms in Jurisdictions where the PCAOB is Denied Access to Conduct Inspections
2011-01-10	PCAOB Enters into Cooperative Agreement with United Kingdom Audit Regulator	Publish cooperative agreement with UK audit regulator.

Appendix E: Timeline for the key events

Date: August 12, 2009 (Announcement 1)
Event: Publish audit names list for inspection delays.
Levels of disclosure: 1) Audit names; 2) Jurisdiction names.
Reason for the delay: NO
Bundling information: List of jurisdictions that the PCAOB has conducted inspections. This list has certain overlap with the delay-list.
Title: "PCAOB Provides New and Updated Information on Inspections"

Date: May 18, 2010(Announcement 3)

Event: All companies from countries denying the PCAOB inspection were publically listed.
Levels of disclosure: 1) Audit names; 2) Jurisdiction names; 3) Client name.
Bundling information: NO
Title: "PCAOB Publishes List of Issuer Audit Clients of Non-U.S. Registered Firms In Jurisdictions where the PCAOB is Denied Access To Conduct Inspections"



Date: February 3, 2010 (Announcement 2)
Event: Update audit names list for inspection delays. More audit firms and more countries were listed.
Levels of disclosure: 1) Audit names; 2) Jurisdiction names.
Reason for the delay: YES
Bundling information: List of jurisdictions that the PCAOB has conducted inspections. List of jurisdictions that the PCAOB plans to inspect. The two lists have certain overlap with the delay-list
Title: Progress on PCAOB International Inspections.

EU countries were experiencing audit reform

Appendix F: PCAOB news release examples

Example 1: Announcement 1 (August 12, 2009)

Note by author of this paper: the below is part of the text content in the PCAOB August 12, 2009 news release. The original text font and color are kept. Attached in this news release are two lists in PDF format: (1) "Jurisdictions in which PCAOB Has Conducted Inspections of Registered Non-U.S. Firms"; and (2) "Registered Firms Not Yet Inspected Even Though Four Years Have Passed Since Issuance of an Audit Report While Registered". I attached part of the second PDF file as well.

1) Text content:

PCAOB Provides New and Updated Information on Inspections

(Note by author of this paper: this is the title of the news release.)

Washington, D.C., Aug. 12, 2009

The Public Company Accounting Oversight Board today published two lists: a list of registered firms that have not yet been inspected by the PCAOB, even though more than four years have passed since the end of the calendar year in which the firm first issued an audit report while registered with the Board; and an updated list of jurisdictions in which the Board has conducted inspections of registered non-U.S. firms. In addition, the Board today reported its progress on meeting its 2009 target for the inspection of certain non-U.S. firms eligible to be deferred, pursuant to a recent Board rule amendment. These disclosures provide transparency about aspects of the Board's inspection program, including progress with respect to international inspections.

LIST OF FIRMS

The Board previously announced its intention to publish the new list of certain firms that have not yet been inspected in two recent releases: PCAOB Release No. 2009-003, *Final Rule Concerning the Timing of Certain Inspections of Non-U.S. Firms, and Other Issues Relating to Inspections of Non-U.S. Firms* (June 25, 2009), issued in connection with the Board's adoption of PCAOB Rule 4003(g); and PCAOB Release No. 2008-007, *Rule Amendments Concerning the Timing of Certain Inspections of Non-U.S. Firms, and Other Issues Relating to Inspections of Non-U.S. Firms* (Dec. 4, 2008), issued in connection with the Board's adoption of PCAOB Rule 4003(f).

.....

2) PDF file for names of audit firms:

Name of Firm	Country
Deloitte Touche Tohmatsu CPA Ltd.	China
PricewaterhouseCoopers Zhong Tian CPAs Ltd. Co.	China
Deloitte & Associes	France
Deloitte Touche Tohmatsu	France
Ernst & Young Audit	France
KPMG SA	France
PricewaterhouseCoopers Audit	France
Ernst & Young AG WPG	Germany
Ernst & Young DATAG WPG	Germany

Example 2: Announcement 3 (May 18, 2010)

1) Text content:

PCAOB Publishes List of Issuer Audit Clients of Non-U.S. Registered Firms In Jurisdictions where the PCAOB is Denied Access To Conduct Inspections

Washington, D.C., May 18, 2010

The Public Company Accounting Oversight Board (PCAOB) today published a list of more than 400 non-U.S. companies whose securities trade in U.S. markets, but whose PCAOB-registered auditors the Board currently cannot inspect because of asserted non-U.S. legal obstacles.

….

Because investors in U.S. markets may be relying on the audit work of certain firms without realizing that those firms are presently uninspected by the PCAOB, the Board is publishing this list of issuers that have in 2009 or 2010 (through mid-April), filed financial statements with the SEC that were audited by a firm in one of these jurisdictions. The auditors of the issuers appearing on the list are located in China, Hong Kong, Switzerland and 18 European Union countries.

2) PDF file for names of U.S. listed companies:

Name of PDF file: Issuer Audit Clients of Non-U.S. Registered Firms in Jurisdictions where the PCAOB is Denied Access to Conduct Inspections

EUROPE

	Auditor	Issuers
AUSTRIA	KPMG Wirtschaftsprufungs- und Steuerberatungs GmbH	OESTERREICHISCHE KONTROLLBANK AKTIENGESELLSCHAFT
BELGIUM	Deloitte Bedrijfsrevisoren / Reviseurs d'Entreprises	DELHAIZE GROUP
	Ernst & Young Bedrijfsrevisoren - Reviseurs d'Entreprises S.C.C.	WABCO Holdings Inc.
	Klynveld Peat Marwick Goerdeler Bedrijfsrevisoren civil CVBA/SCRL	AB InBev France S.A.S. Anheuser-Busch InBev S.A.
	PKF Bedrijfsrevisoren BCVBA	REMEDENT, INC.