

# Does the PCAOB's International Inspection Program Provide Spillover Audit Quality Benefits for Investors Abroad?

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# **Does the PCAOB's International Inspection Program Provide Spillover Audit Quality Benefits for Investors Abroad?**

## **Abstract**

We examine indicators of audit quality (as measured by abnormal accruals, the likelihood of reporting a profit and the likelihood of issuing modified audit opinions) for a sample of companies from 56 countries with non-US auditors during 2002-2011. For US-listed companies with non-US auditors, we find the audit quality to be higher after the non-US auditor is PCAOB-inspected. Further, in a sample of non-US-listed foreign companies (i.e., foreign companies that are *not* US-listed), we find (a) the audit quality to be higher after the non-US auditor is PCAOB-inspected, (b) the audit quality to be higher when the non-US auditor is PCAOB-registered than otherwise, and (c) the audit quality effect to be stronger in countries that allow PCAOB inspections relative to countries that bar such inspections. Collectively, our findings suggest that the PCAOB's international program has a positive externality (provides spillover audit quality benefits) abroad, i.e., the non-US auditor's *firm*-level quality control improvements associated with the PCAOB's international program benefits not only US investors in US-listed companies but also investors abroad in non-US-listed local companies audited by PCAOB-registered/inspected auditors abroad.

**Keywords:** PCAOB international inspection program, non-US auditors, audit quality, spillover benefits

**JEL Classification codes:** M42, M48

## **Does the PCAOB's International Inspection Program Provide Spillover Audit Quality Benefits for Investors Abroad?**

### **1. Introduction**

In this paper, we examine four research questions related to the PCAOB's international inspection program: First, in a sample of US-listed companies with a non-US auditor, is the audit quality higher after the non-US auditor is PCAOB-inspected? Second, for a sample of foreign companies that are not US-listed, is audit quality higher after their non-US auditor is PCAOB-inspected? Specifically, this latter question addresses the issue of externality, i.e., whether the PCAOB's international inspection program generates a positive externality (in the form of higher audit quality) for investors abroad in non-US-listed foreign companies audited by non-US auditors who are PCAOB-inspected.<sup>1</sup> Third, for foreign companies that are not US-listed, is audit quality higher when their non-US auditor is PCAOB-*registered* rather than *not* registered with the PCAOB? Finally, for foreign companies that are not US-listed, is audit quality higher when their non-US auditor is PCAOB-registered in countries that allow PCAOB inspections relative to countries that do *not* allow such inspections?<sup>2</sup> These empirical investigations allow us to assess the effectiveness of PCAOB's international inspection program on non-US auditors, and document a new form of spillover effects in auditing, namely the spillover of the audit quality improvement through the US oversight across all clients (including their non-US clients) of the audit firm.

As background, the 2002 Sarbanes Oxley Act (SOX) represented a fundamental shift from self-regulation of US auditors to government oversight by the newly established PCAOB (Public Company Accounting Oversight Board). Consistent with its mission of protecting US investors in securities listed on US exchanges, the PCAOB requires all audit firms (US or non-US) which audit US-listed public companies to register with the Board and be subject to the Board's periodic inspections of the firm's quality controls including compliance with US securities laws and PCAOB rules and auditing standards. Naturally, the non-US audit firms abroad that are registered/inspected by the PCAOB may also audit

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<sup>1</sup> In this paper, we use the terms auditor and audit firm interchangeably.

<sup>2</sup> Note that Global Vantage provides auditor identity only for a small number of large auditors, while all other auditors are identified simply as "other" auditors. In our study, we manually collect the actual identity of the "other" non-US auditors from the Capital IQ database so as to correctly classify a client-year observation as audited by a PCAOB-registered/inspected non-US auditor or otherwise.

*other* foreign companies that are *not* US-listed, although these (non-US listed) companies are *not* required to be audited by auditors registered with the PCAOB. Basically, our objective is to examine whether the auditor's *firm*-level quality control improvements (if any) at the PCAOB registered/inspected non-US audit firms has a positive externality (in the form of higher audit quality) for investors abroad in local companies that are not US-listed. Notably, prior research (e.g., Francis and Wang 2008) suggests that quality of financial reporting is lower abroad than in the US.

Our study is of potential interest to the PCAOB as well as other similar national regulators (and investors) abroad because the PCAOB's international inspection program is subject to permission from the sovereign government of the home country in which the non-US auditor is based. To date, a number of governments (such as China) have refused – on sovereignty or other grounds – the PCAOB permission to conduct inspections of PCAOB-registered audit firms in their home countries. To the extent that there is evidence that the PCAOB's international registration/inspection program has a positive externality (i.e., provides spillover audit quality benefits) for local investors in local companies abroad audited by PCAOB-inspected local auditors, the program may be an easier sell for the PCAOB.

Theoretically, the impact of the PCAOB international program on audit quality abroad is ambiguous. As noted by DeFond (2010), to the extent that the PCAOB has a reputation for being a tough regulator, the threat of a PCAOB inspection is likely to provide audit firms an *ex-ante* incentive to increase audit quality. Specifically, the PCAOB has developed a reputation for being overly critical in second-guessing auditors' judgments, in censuring and imposing large penalties on errant auditors, in notifying the SEC of auditor transgressions, and in notifying the US Department of Justice of possible criminal violations by auditors (DeFond 2010; Farrell and Shabad 2005). Given the PCAOB's reputation for intrusive inspections and follow-up disciplinary actions against deficient auditors, for non-US auditors the very act of registering with the PCAOB may provide them an *ex-ante* incentive to increase audit quality in advance of the actual inspection itself. In addition, to the extent that audit deficiencies are discovered during the initial inspection, the firms may have an additional incentive to take appropriate

remedial action and increase audit quality to avoid any subsequent censure from the PCAOB. For these reasons, non-US auditors may increase their audit quality following their registration with the PCAOB as well as following the initial inspection by the PCAOB. Also, to the extent that non-US auditors improve their firm-level quality controls in servicing their US-listed clients, the benefits of such quality control improvements may also spillover to benefit their other non-US-listed local clients.

On the other hand, it may not be clear if the impact of PCAOB oversight on audit quality is empirically observable, because the process of PCAOB registration and inspection process (e.g. focus on compliance and documentation) may not necessarily be conducive to the improvement of audit quality (e.g. Glover et al. 2009; Lennox and Pittman 2010; Palmrose 2006). In addition, PCAOB's enforcement on non-US auditors may be constrained by geographical distance, language differences and /or cultural barriers. Further, to the extent that audit quality may vary by litigation and regulatory risk exposures, effect of PCAOB enforcement may not be effective, since the same auditor may not provide the same level of audit quality to their US-listed and other non-US-listed clients. These factors suggest that the presence of a quality spillover effect is uncertain ex-ante.

Prior research (e.g., Abbott et al. 2013; DeFond and Lennox 2011; Gunny and Zhang 2013; Grambling et al. 2011) suggests that the PCAOB inspections in the US improved audit quality among *small* auditors (i.e., those with fewer than 100 public clients) by identifying deficiencies in their audits, by encouraging clients to switch from auditors with deficient inspection reports to those with clean inspection reports, and generally by incentivizing low quality small auditors to exit the market. By contrast, for *large* auditors (i.e., those with 100 or more public clients), the evidence is less clear cut because basically all large US auditors received inspection reports identifying audit deficiencies every year.

With respect to the PCAOB's *international* inspections, Lamoreaux (2013) examines a sample of US-listed foreign companies with non-US auditors over the 2001-2010 time period. Specifically, he examines whether the home countries of these non-US auditors allowed (or barred) PCAOB inspections,

and reports that PCAOB inspection “exposure” (i.e., the mere threat of a PCAOB inspection) is associated with an increase in the likelihood of the auditor issuing a going concern opinion or reporting a material weakness in internal control. Also, Krishnan et al. (2013) report that US-listed clients of non-US auditors who were actually inspected by the PCAOB (or jointly by PCAOB and home country regulators) reported lower accruals, less income smoothing and more value relevant earnings relative to other US-listed clients whose auditors were not inspected. Consistent with these findings, Carcello et al. (2011a) report that following PCAOB disclosures in 2009 of names of foreign audit firms that could not be inspected, the stock market reacted adversely to US-listed companies audited by these non-US firms.

Our study extends the analyses to the non-US-listed foreign clients of these non-US audit firms. Pertinent to our study is the notion that the overriding objective of the PCAOB registration/inspection program is to improve audit quality. Indeed, DeFond (2010) suggests that PCAOB inspections (by having stricter standards and imposing harsh penalties) could provide auditors an ex ante incentive – similar to the threat of litigation and loss of reputation – for improving audit quality. Thus, if the inspections are successful in improving the non-US audit firm’s overall quality controls, audit approach and methodology, these improvements may also be expected to benefit the local non-US-listed clients of the non-US audit firm rather than just their US-listed clients. Hence, we investigate whether the firm-level quality control benefits (if any) associated with PCAOB inspections of non-US audit firms is passed on to the non-US-listed local clients in the auditor’s home country. We call this a positive externality because the quality control improvements following a PCAOB inspection “spillover” to benefit the audit firm’s non-US-listed local clients (who may or may not be an intended beneficiary of the PCAOB inspection).<sup>3</sup> This investigation is interesting because (1) it is an empirical question as to whether there such quality-control spillover effects exist, and if so, whether such spillover effects are significant enough to be observable, and (2) while the auditing literature debates on the existence of spillover of knowledge

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<sup>3</sup> As an analogy, the US Food and Drug Administration (FDA) inspects pharmaceutical companies abroad to ensure the safety and effectiveness of the generic drugs manufactured locally and exported to the US. To the extent that the quality control improvements in the manufacture of generics for export to the US also spillover to the manufacture of generics for local consumption, local consumers may also be expected to benefit from these FDA inspections abroad.

acquired by auditors in the non-audit services to their auditing process over the same client (e.g. Simunic 1984; Krishnan and Yu 2011), we examine quality-related spillover effects as a result of regulatory oversight to non-US-listed foreign clients of the same audit firm.

In addition to the quality spillover effects associated with PCAOB inspections, we take advantage of our international setting to empirically examine whether registering with PCAOB by itself is associated with higher audit quality, other than that induced by PCAOB inspections. This is motivated by the literature that documents a stricter scrutiny offered by the US regulators than local regulators in other jurisdictions (e.g. La Porta et al. 1998). If US regulatory scrutiny is strong enough to induce improvements in the audit quality of non-US audit firms, then the quality spillover effects may also be observed for PCAOB registration, in addition to the inspection effects.

As noted by DeFond and Zhang (2013), audit quality is a continuous construct closely connected to the quality of financial reporting, i.e., higher audit quality implies greater assurance of faithful representation of financial statements. Hence, we utilize measures of the quality of audited earnings as a proxy for audit quality, including abnormal accruals as well as the likelihood of reporting small profit. In addition, we employ an ex-post measure of audit quality, namely the likelihood of issuing a modified (or going-concern) audit opinion, which is an indication on the extent to which auditor withstands the pressure from the client.

Our empirical analyses cover ten years since the enactment of the Sarbanes Oxley Act (2002-2011), and involve two settings. We test our first research question using a US setting, comparing the audit quality for US-listed clients of non-US audit firms that are PCAOB-inspected or otherwise. Employing a difference-in-difference research design, we find that the audit quality for these clients improves significantly after their non-US auditors are inspected by PCAOB, consistent with an improvement in the firm's quality controls. We then find that such improvement benefits not only the US-listed clients of these non-US audit firms, but also their non-US-listed foreign clients. Using data for a sample of non-US-listed foreign clients from 55 foreign countries, we find results consistent with the

higher audit quality for those clients audited by PCAOB registered and inspected non-US audit firms when compared to those clients whose auditors are registered with PCAOB but not inspected. Further, we find that, in addition to the inspection effects, non-US audit firms that are registered with PCAOB are also associated with higher audit quality when compared with other non-US audit firms not registered with PCAOB. This result continues to hold after controlling for self-selection bias. We further find that the effect of PCAOB registration is stronger after the non-US audit firms are inspected by PCAOB.

In our additional analyses, we also examine the difference in the quality spillover effects for countries that allow PCAOB to inspect their auditors when compared to some other countries where PCAOB is not allowed to conduct their inspections. This is motivated by the fact that some countries (including China) do not allow PCAOB to inspect their auditors due to sovereignty concerns, and we argue and find that the spillover benefits are absent in countries where PCAOB inspections are barred. Further analyses also show, consistent with our expectations, that the spillover benefits are stronger for non-US audit firms in countries with low (vis-à-vis high) auditor liability standards. Finally, we also find that these spillover effects exist in both Big 4 auditors and also other non-US auditors.

This study offers a number of important contributions. First, recently regulators, practitioners and researchers have called for more research on the economic implications of the shifting regulatory landscape from self-regulation to independent PCAOB oversight (e.g. DeFond and Francis 2005; Palmrose 2006). Extending the work from recent studies which are primarily based on US auditors (e.g. Lennox and Pittman 2010; DeFond and Lennox 2011), this study responds to this call for research and adds to our understanding on whether and how PCAOB oversight also benefits investors abroad in non-US companies audited by PCAOB inspected by non-US auditors.

Second, findings from this study may be of potential help to the PCAOB in assessing the effectiveness of its initiatives for improving the audit quality of non-US auditors through their inspection program, given that substantial resources have been devoted to the program (e.g. \$87 million or 47.5% of the PCAOB's total 2010 Budget, an increase of 24% from 2009). This is particularly important when the



client firms audited by non-US auditors constitutes a non-trivial market capitalization in the US market ,<sup>4</sup> suggesting that the difficulties in monitoring the quality of non-US auditors may expose US investors to the substantial risk of low audit quality for these issuers, potentially leading to inefficient allocation of capital market resources.

Third, this study contributes to the auditing literature by providing evidence on the existence of audit quality spillover benefits across different clients of the same non-US auditor as a result of PCAOB oversight. In prior auditing research (e.g. Simunic 1984; Krishnan and Yu 2011), spillover effects are typically examined for the same client in the form of within-client knowledge transfers from consultancy to audit engagements. Mixed results are obtained in prior studies (e.g. Simunic 1984; Wu 2006; Krishnan and Yu 2011). One reason for the mixed findings is that the synergy effects of audit and non-audit services are examined based on the fees charged or audit hours consumed (cost savings), and under such setting the opposing forces of knowledge spillovers and economic bonding cannot be effectively teased out. By contrast, our study represents the first attempt (to our knowledge) to identify the presence of audit quality spillover benefits from US-listed to non-US-listed foreign clients of PCAOB inspected non-US auditors. Since the source of the quality improvement is an inspection by an independent regulatory agency (the PCAOB), our study is not contaminated by economic bonding issues as in prior studies.

Finally, in additional analysis we find that the PCAOB registration effect on audit quality is stronger in countries that allow rather than bar PCAOB inspections. These findings imply that mere registration in a country that allows PCAOB inspections, i.e., simply a credible threat of a subsequent PCAOB inspection, has a salutatory effect on the audit quality of a non-US auditor. Further, our findings imply that PCAOB inspections represent an opportunity for foreign regulators to improve the quality of local audits. In addition, our result is indicative to home country regulators that their decisions to prohibit

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<sup>4</sup> The market capitalization of these non-US auditors' clients in the US market are over US\$500 billion, \$75 billion and \$75 billion for EU, Switzerland and China/Hong Kong respectively. In our sample, the share of market capitalization audited by the non-US auditors in 2011 amounts to 13.8%.

PCAOB foreign inspections may sacrifice the opportunity to improve the quality of the local auditing profession.

The remainder of this paper is organized as follows. Section 2 discusses the background and develops the hypotheses. Section 3 presents the research methodology and data description, which is followed by the discussion of empirical results in Section 4. Section 5 provides concluding remarks.

## **2. Background and Hypotheses Development**

### **2.1 PCAOB and Auditor Inspection Program**

The PCAOB was established by 2002 Sarbanes-Oxley Act (SOX) with a mission to “protect the interests of investors... in the preparation of informative, accurate, and independent audit reports...”<sup>5</sup> It is distinguished from the pre-SOX period in that the regulation of the accounting profession shifts from self-regulation to oversight by an independent, statutorily established quasi-government body. The primary vehicle for PCAOB to improve audit quality is through its mandate to inspect the work of all registered audit firms (Gillan 2005; Goelzer 2006; McDonough 2005). SOX (2002) require all accounting firms that audit one or more public companies to register with the PCAOB. A registered firm is subject to PCAOB oversight, including mandatory participation in the Board’s inspection process. PCAOB inspections are conducted annually for audit firms that audit more than 100 issuers and triennially for other audit firms (PCAOB Rule 4003).

This system of PCAOB inspections replaces the previous AICPA-administered “peer review” regime.<sup>6</sup> The most notable difference that distinguishes the PCAOB inspection is that an inspection report is published and is made publicly available after each inspection, which identifies deficiencies in how the audit firms plan and perform audits. These provide guidelines and incentives to the inspected firms in

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<sup>5</sup> See <http://pcaobus.org/About/History/Pages/default.aspx>.

<sup>6</sup> The AICPA-administered peer review system was established on a voluntary basis in the 1970s, and by the late 1980s had become mandatory for accounting firms auditing public companies (Hilary and Lennox 2005; White et al. 1988).

improving their quality effectively.<sup>7</sup> The power of PCAOB to demand information from the audit firms per se could create greater incentives for the auditors to improve the quality of their work.

The inspection program covers not only the US-based auditors, but also extends to non-US auditors. Similar to US auditors, non-US auditors must register and be subject to periodic inspections by the PCAOB if they audit US-listed companies.<sup>8</sup> PCAOB inspections of non-US auditors are potentially more important than that of US auditors for a number of reasons. First, since the US regulatory system is considered as the most stringent in the world, mechanisms to monitor audit firms are likely to be weaker in non-US countries, both in terms of investor rights and protection (e.g. La Porta et al. 1998; Doidge et al. 2004), litigation exposure of accounting firms (e.g. Mueller et al. 1994) and the development of the accounting profession (e.g. Pierce 2006; Ryan 2008; McMahon and Rapoport 2011). As such, the need for active regulatory oversight or more effective inspections to ensure audit quality is more pronounced for non-US audit firms. Second, the firms audited by these non-US auditors are usually foreign companies listed in the US markets (i.e. cross-listed firms), and it is suggested that SEC actions against these companies have been rare and mostly ineffective throughout the history of the US securities laws (Siegel 2005). Investors are therefore more reliant on the assurance provided by external audits for these companies than other US companies, and as such inspections on these non-US audit firms are more

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<sup>7</sup> Based on the deficiencies identified in the inspection report, the inspected audit firm is supposed to: (1) modify the firms' audit approach, (2) modify staff training courses to reflect adjustments to the audit approach and to emphasize feedback from PCAOB inspections, and (3) modify the nature and rigor of the firm's internal work paper review procedures (Carcello et al. 2011). While the internal control quality issues in the report are not publicized, the audit firm needs to respond to it within one year, otherwise the relevant sections will be made public under SOX. Moreover, the very fact that PCAOB inspectors will inspect the audit firm again in the future provides incentives for the firm to improve their quality control and procedures. A number of other rules and procedures in the inspection process are also implemented with a view to better improving the quality of audits as compared with the previous peer-review system. For example, it has been argued that (e.g. Carcello et al. 2011) PCAOB inspectors are more likely to be independent and objective than are peer reviewers, as they are full-time employees and the inspected firm has no voice in choosing the inspectors. In addition, the PCAOB inspectors are likely to have greater inspection expertise than peer reviewers, because PCAOB inspectors devote all of their efforts to performing inspections whereas reviewers under the previous regime treat the peer review as an ancillary activity. Furthermore, the PCAOB inspection process is more extensive because the PCAOB has the resources required to conduct inspections. Besides, the PCAOB can inspect all of a firm's engagements and the scope of a PCAOB inspection is greater, including all aspects of compliance and internal management.

<sup>8</sup> See <http://pcaobus.org/International/Pages/default.aspx>. Under Section 2(a)(7) of SOX, an issuer is defined to include any issuer with debt or equity securities registered under Section 12 of the Exchange Act or required to file reports under Section 15(d) of the Exchange Act, as well as any issuer that files or has filed a registration statement that has not yet become effective under the Securities Act and that it has not withdrawn. That includes both US based firms and non-US firms cross-listed in the US markets.

economically relevant to investors. Third, there is a non-trivial number of non-US auditors actively serving the US corporate market, and the size of their clients is large and cannot be ignored (for example, we find from our sample that the client firms of these non-US auditors constitute 13.8% of the total US market capitalization in 2011). If these non-US auditors are not properly monitored/ inspected, investors of their client firms may be exposed to the substantial risk of low audit quality which might adversely affect the efficient allocation of investment resources.

While most non-US audit firms currently registered with the PCAOB are subject to inspection at least once every three years, the PCAOB has faced obstacles in conducting inspections in several jurisdictions including the United Kingdom (until 2011), Switzerland, and, most notably, China due to sovereignty reasons and/or legal issues.<sup>9</sup> In principle, PCAOB has the statutory authority to deregister these audit firms. However, this imposes costs on US-listed clients because either these clients have to switch to another PCAOB-registered auditor, or this might cause clients of the deregistered audit firm to violate SEC rules and exchange-listing standards and could result in these issuers being delisted from US exchanges, leading to non-trivial economic and political repercussions. As a result, PCAOB has chosen a more measured approach in dealing with audit firms where PCAOB has been denied the ability to conduct inspections.<sup>10</sup> Costly negotiations with foreign regulators and the justifications for those alternative treatments are subject to debates.<sup>11</sup>

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<sup>9</sup> As of the end of 2013, there are still 13 countries that do not allow the PCAOB to inspect their auditors (see <http://pcaobus.org/International/Inspections/Pages/default.aspx>).

<sup>10</sup> The PCAOB initially delayed the deadline for conducting these inspections (PCAOB 2008, 2009a). Then, in August 2009 and February 2010, the PCAOB released the names of registered accounting firms where a required inspection had not yet been performed even though more than four years had passed since the end of the calendar year when the audit firm had first issued an audit report while registered with the PCAOB (i.e., the statutory inspection time period) (PCAOB 2009b, 2010a). In May 2010, the Board released the names of issuers registered with the SEC whose audit firm was located in a country that denies the Board the ability to conduct inspections (PCAOB 2010b). Finally, in January 2011, the PCAOB disclosed that it had reached an agreement with authorities in the United Kingdom (U.K) that would permit the Board to inspect U.K.-based registered audit firms. PCAOB continues to seek international cooperation from foreign regulatory bodies to allow their inspections of the registered foreign auditors.

<sup>11</sup> See <http://pcaobus.org/Featured/Pages/International.aspx>.

## **2.2 PCAOB Inspection and Audit Quality of Non-US Audit Firms**

The objective of PCAOB inspections is to improve the performance and quality of audit firms. James Turley, Chairman and CEO of Ernst & Young, testified before a US Treasury Department committee that, “the whole profession has improved as a result of [the inspection process]” (Turley 2007). Moreover, extant research finds that the PCAOB inspection process is rigorous (Lennox and Pittman 2010), and that PCAOB inspections improve audit quality among smaller auditors (DeFond and Lennox 2011). In addition, Gunny and Zhang (2013) find that clients of auditors receiving inspection reports with serious (GAAP-based) deficiencies have a higher level of income increasing current accruals and are more likely to restate their financial statements. Abbott et al. (2013) find that companies with a higher level of agency costs and with better audit committees are more likely to switch auditors if the auditor receives an inspection report with a serious (GAAP-based) deficiency. Carcello et al. (2011b) also find a significant decline in client abnormal accruals in the year after the first two PCAOB inspections of Big 4 firms and this result is stronger for those clients reporting positive abnormal accruals before the first PCAOB inspection. Finally, Dee et al. (2011) find a significant negative stock market reaction for clients of Deloitte after the revelation of deficiencies in Deloitte’s quality controls included in part II of a PCAOB inspection report. It should be noted, however, that most of these prior studies were based primarily, if not exclusively, on US based auditors.

In principle, the impact of PCAOB inspections in improving audit quality is likely to be greater for non-US auditors because litigation exposure and therefore audit quality is potentially lower abroad (e.g. Doidge et al. 2004; La Porta et al. 1998). However, a number of factors might contribute to the weaker impact of PCAOB inspections on the audit quality improvements for non-US auditors. First, some have expressed concerns about the PCAOB inspection process in terms of the quality and expertise of the inspecting staff, effectiveness of the feedback system and timeliness of the inspection reports, as well as the usefulness of the information in the inspection reports (see Glover et al. 2009; Lennox and Pittman 2010; Palmrose 2006). Such problems could adversely affect the value of inspections for all auditors,

including non-US auditors. Second, the audit working papers and documentation of evidence for the non-US auditors may not be in English, and as such PCAOB inspectors may have difficulty in properly understanding the audit work done and identifying deficiencies. In addition to the language barrier, PCAOB inspectors might also overlook the importance of some local or regional audit practices that are deemed to be appropriate in some foreign settings which might not enhance the audit quality of the US-listed foreign client. Third, similar to the inability of SEC in regulating and enforcing rules to the foreign registrants (Siegel 2005), it is likely that PCAOB also has difficulties in implementing a proper inspection on the work done by non-US auditors, and this might adversely affect the quality of inspections and hence the ability of the inspection program to enhance audit quality for non-US auditors.

Based on the preceding discussion, it is therefore an empirical question as to whether the quality-enhancing benefits of PCAOB inspections extend to non-US auditors. Two recent studies examine this issue and yield mixed results. Krishnan et al. (2013), use a sample of US-listed clients audited by non-US auditors during 2000-2011, find that abnormal accruals (value relevance) are lower (higher) in the post-inspection period than in the pre-inspection period. However, they report mixed results for earnings smoothing measures. Stewart (2012) also focuses on US-listed foreign clients audited by non-US auditors during 2003-2009 and provides some evidence that the total current accruals were lower after the start of PCAOB inspections for his client companies. Given the non-trivial number of non-US auditors in the US market and the significant market value of the companies they audit, we test the following hypothesis:

*H1: For US-listed companies audited by non-US auditors, the audit quality improves after the auditor is inspected by PCAOB.*

### **2.3 PCAOB Inspection of non-US Audit Firms and Spillover Audit Quality Benefits for Investors in Non-US-listed Foreign Companies**

Extending the analyses based on Hypothesis H1, we examine if the audit quality for *non-US-listed* foreign clients of PCAOB-registered non-US auditors is also higher after PCAOB inspections, which we call the “quality spillover” effect. In the context of spillover effects, prior studies in auditing

research mainly focus on (1) knowledge spillovers among audit and non-audit services for the same audit client, and (2) the cost savings associated with knowledge spillovers. Simunic (1984, p.680) suggested that provision of both audit and management advisory services will result in “knowledge externalities or spillovers”, because auditors may gain audit relevant insight into client risks, internal systems and controls, and tax provisions, enabling them to make better professional judgments and reduce the total costs. However, subsequent research documents mixed results (e.g. Kinney et al. 2004; Antle et al. 2006). For example, Krishnan and Yu (2011) find a strong and significant negative relationship between audit fees and non-audit fees, consistent with knowledge spillover argument, but Wu (2006) finds no knowledge-spillover benefits on audit pricing from studies of auditor costs and hours (cost savings). One main issue with these studies is that this line of research cannot disentangle the effect of non-audit services on auditor independence losses due to economic bonding (DeAngelo 1981; Simunic 1984; Beck et al. 1988; Arruñada 1999) from knowledge spillover benefits. The mixed findings documented in prior studies may be the result of the net effect of these two counter-balancing factors.

In this study, we examine the quality-related (not cost-related) spillover effects across clients (not for the same client) of the non-US auditor, triggered by the quality improvement associated with the PCAOB inspections. Griliches (1992) defines spillovers as “working on similar things and hence benefitting much from each other’s research”, and as such spillover effects could improve the overall quality of work. Moreover, there is also evidence for positive quality-related spillover effects in the literature. For example, it is shown that workers perform better if they are in teams with more productive workers (Falk and Ichino 2006), and experimental evidence is also documented in a study on supermarket cashiers (Mas and Moretti 2009). Through the improvement in the auditing process brought by the PCAOB inspections, the non-US audit firms are likely to better structure their audit methodology and audit evidence,<sup>12</sup> and such firm-wide improvements benefit not only their US listed clients but also other

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<sup>12</sup> Anecdotal evidence suggests that PCAOB inspections identify issues that lead to improvements in audit outcomes. For example, as reported in a Wall Street Journal article, PCAOB inspection reports found a threefold increase in valuation-related audit problems, leading securities and audit regulators to alert managers and auditors that they are personally responsible for understanding the assumptions that underlie third-party value estimates. Rather than simply relying on outside services that use

clients in their home countries. We consider this a (quality-related) spillover effect because the intention of PCAOB in implementing the inspection program is to protect the US investors; the improvement in the quality of audited earnings for non-US-listed companies is not an objective of the inspection program. In this context the unintended benefits of raising the earnings quality of non-US-listed companies constitute quality spillovers of the PCAOB inspections.

Based on the above reasoning, our second hypothesis (stated in the null form) is as follows:

*H2: For non-US-listed foreign companies audited by non-US auditors, the audit quality improves after the auditor is inspected by PCAOB.*

It should be noted that in order to observe the results as predicted in H2, three conditions must be met. First, the audit quality improvement induced by PCAOB inspections needs to be sufficiently relevant to the auditing process of clients in other non-US settings. It is possible that the changes of the auditing process suggested by the inspectors are suitable to the audits in the US environments but are not applicable to non-US audits, and in such cases the audit quality of the non-US-listed clients will not be benefitted by the PCAOB inspections. Second, there exists a quality spillover effect of PCAOB inspections for the non-US auditors. Third, this quality spillover effect transferred to the other non-US-listed clients of the same auditor is large enough to be empirically observable. Given the possible difficulties encountered by PCAOB to enforce their inspections on non-US auditors, the absence of the association would not necessarily indicate the absence of the spillover effects; it could also mean that the quality effects associated with PCAOB registration is not significant enough to induce observable spillovers.

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computer modeling to appraise the firms' structured financial products, auction-rate securities and pension investments etc, both managers and auditors have to know more about those models and have better documentation to prepare for PCAOB enquiries. It is reported that auditors have to consult with their national offices on tricky valuations, and many have hired additional advisers to get a second opinion. "Auditors are going to be asking a lot more questions about how values were determined", said John Keyser, national director of assurance services at accounting firm McGladrey & Pullen LLP. "The work is exponential" (Chasen 2013). Training courses are provided to auditors to ensure proper professional judgment and to remain in compliance with the PCAOB (see, for example, <http://www.cpapracticeadvisor.com/article/11079000/complying-with-the-pcaob-the-various-options-for-independence-training>).



## 2.4 PCAOB Registration and Cross-sectional Difference in Audit Quality

Hypothesis H2 examines the quality spillover effect of PCAOB inspections, which is a specific quality-improvement initiative of PCAOB. In Hypothesis H3 we further examine empirically whether there exists a quality difference signaled by merely *registering with PCAOB*, incremental to the PCAOB inspection effects.

It is ex-ante not clear as to whether a quality spillover effect exists simply through registering with PCAOB. On the one hand, it is well documented that US regulatory system is considered to be one of the most stringent ones in the world in terms of both investor rights and protection (e.g. La Porta et al. 1998, Coffee 1999, Stulz 1999, Doidge et al. 2004), litigation exposure of accounting firms (e.g. Mueller et al., 1994) and the development of the accounting profession (e.g. Pierce, 2006; Ryan, 2008; McMahon and Rapoport, 2011). These altogether could provide significant incentives for the non-US audit firms to improve their auditing processes and audit quality assurance mechanisms upon registration with PCAOB. For example, these non-US audit firms may pro-actively adopt auditing approaches, practices or systems in the US subsequent to their registration with PCAOB. It may also be possible that they have their auditing process and systems improved in face of the stronger regulatory environment in the US,<sup>13</sup> consistent with the legal bonding theory which hypothesizes that firms have their shares cross-listed to overseas exchanges to overcome weaknesses in corporate governance through the stronger regulatory oversight, stringent reporting and disclosure requirements and investor protections of overseas (US in particular) regulators (see Karolyi 2012). Also, consistent with the signaling theory (e.g. Licht 2003), it is also possible that non-US audit firms with better internal controls and more refined auditing systems self-

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<sup>13</sup> We search the Accounting and Auditing Enforcement Releases (AAERs) concerning the SEC actions against auditors (<http://www.sec.gov/divisions/enforce/friactions.shtml>) for the period August 2002 – May 2012. We find that, out of the 172 cases where the auditor of a SEC registrant is named the defendant, 13 cases (7.6%) involve a PCAOB-registered non-US audit firm,, proportional to the portion of the market audited by these non-US audit firms during the same period (an average of 7.8% for the period 2002-2011). In addition, the sanctions or penalties against the non-US audit firms/ individual auditors in these cases range from civil money penalty, forced independent consultation and/or inspections, legal actions by SEC, to denying the concerned auditor(s) the privilege of appearing or practicing before the SEC as an accountant. These sanctions are meaningful to the non-US audit firms in both economic terms and in terms of their reputational capital, and therefore provide them some incentives to improve their audit quality upon registration with PCAOB. Details of these AAERs concerning registered non-US auditors are available upon request.

select to register with PCAOB to signal their quality when compared other audit firms in their local market. Accordingly, one might suggest that non-US audit firms that are registered with PCAOB are likely to be associated with higher audit quality compared to the counterparts in their home countries.

On the other hand, it might be argued that PCAOB registration per se should not be related to difference in audit quality of a non-US audit firm when compared with other auditors in their home countries. According to the bylaws and rules of PCAOB, registration involves only the payment of registration and annual fees, approval from the Board, and filings of annual and special reports (Form 2 and Form 3) which only require the particulars and contact information of the applicant. While PCAOB may request for more information, the applicants could withhold information from their applications for registration if they claim that submitting those information might violate non-US laws (Rule 2105). In addition, Note 1 to Rule 2100 explicitly states that “registration with the Board... will not by itself provide a basis for subjecting a foreign public accounting firm to the jurisdiction of the US federal or State courts, other than with respect to controversies between such firms and the Boards”. Further, as discussed earlier in section 2.2, PCAOB faces a number of challenges in inspecting the non-US audit firms, and such obstacles are likely to apply also to PCAOB oversight on the quality of non-US audit firms. These enforcement-related difficulties will mitigate the effects of PCAOB registration on the registered non-US audit firms, if any.

To empirically examine whether these non-US audit firms are indeed associated with higher audit quality when compared with the counterparts in their home countries, we formally test the following hypothesis on the quality of audited earnings of their non-US-listed audit clients (in null form):

*H3: For non-US-listed foreign companies audited by non-US auditors, the audit quality is not different for PCAOB-registered auditors relative to non-PCAOB-registered auditors.*

Findings of this test would be interesting not only because this provides evidence on whether registration with PCAOB per se would indicate some differences in audit quality, but also because this allows us to conduct additional analyses on the quality spillover effects that provide potentially useful

implications to policy makers. In particular, we examine the PCAOB registration effects between countries that allow PCAOB inspections and other countries that do not allow PCAOB inspections, and this is discussed in section 4.

### 3. Methodology and Data

#### 3.1 Empirical Models

We test our Hypothesis H1 (Hypotheses H2 and H3) by examining the quality of audits for a sample of US-listed (non-US-listed) client firms of the non-US audit firms registered with PCAOB. Audit quality is measured in three ways, including two measures (abnormal accruals and the probability of reporting small profits) based on the quality of financial reporting, and one measure (the probability of issuing modified audit opinions) that captures the incidences where auditors are likely to have withstand client pressure. In particular, the higher audit quality is represented by lower abnormal accrual, lower likelihood of reporting small profits and higher likelihood of issuing modified audit opinions.

To test Hypotheses H1 and H2, we use the differences-in-differences approach following Bertrand and Mullainathan (1999a, 1999b, 2003), Low (2009), and Chan et al. (2012, 2013). Specifically, we adopt the following research design:

$$\begin{aligned}
 DepVar &= \beta_0 + \beta_1 INSPECT + \beta_2 AFTERINSPECT + \alpha_k Controls \\
 &+ FixedEffects + error
 \end{aligned} \tag{1}$$

where *DepVar* is the dependent variable of interest, including abnormal accruals (*AB\_ACC*), the likelihood of reporting profit (*Prob. (PROFIT)*), and the propensity of issuing modified audit opinions (*Prob. (OPINION)*) respectively. *INSPECT* equals one if the observation is in the treatment group (i.e. non-US auditors that are PCAOB-inspected during the sample period) and equals zero if the observation is instead in the control group (non-inspected non-US auditors). *AFTERINSPECT* equals one for firm-

years in which the non-US auditor has been inspected by PCAOB, and zero otherwise.<sup>14</sup> The coefficient on *INSPECT*,  $\beta_1$ , represents the difference in the dependent variable for inspected non-US auditors and control firms in the pre-inspection period. The coefficient on *AFTERINSPECT*,  $\beta_2$ , measures the change in the dependent variable of interest across pre- and post-inspection period for the inspected auditor compared to the change over the same interval for a control firm (non-inspected auditor). We include both the client-level and country-level control variables in the regression, and both industry and year fixed effects are included to account for variation across industries or over time. We also report the results of an alternative specification, where we exclude the variable *INSPECT*, but replace industry fixed effects with firm-level fixed effects, which control for time-invariant unobservables that differ across firms that hire inspected non-US auditors and those that hire non-inspected non-US auditors. In all tests, standard errors are clustered by firm.

Hypothesis H3 cannot be tested with a difference-in-difference design because data on the date of registration with PCAOB is unavailable. We estimate a cross-sectional test based on an augmented equation (1):

$$\begin{aligned}
 DepVar &= \beta_0 + \beta_1 INSPECT + \beta_2 AFTERINSPECT + \beta_3 REGISTER \\
 &+ \alpha_k Controls + FixedEffects + error
 \end{aligned}
 \tag{2}$$

where *REGISTER* equals one if the non-US auditor is registered with PCAOB, and zero otherwise. The coefficient on *REGISTER*,  $\beta_3$ , tests if the dependent variable of interest (measures of audit quality) is different across non-US auditors that are registered with PCAOB and those that are not registered with PCAOB, after controlling for the effect of inspection. In a separate test, we remove those observations

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<sup>14</sup> The year of implementation is 2004 for all US auditors and non-US auditors. However, since not all countries allow their auditors to be subject to PCAOB inspection, the years of implementation for some non-US auditors could vary depending on the year in which the foreign regulator agreed to cooperate with PCAOB. This could partially alleviate the concern that our results are confounded by some other events in 2004 that also improve audit quality, such as the enforcement of Section 404 audits and disclosures.

from the sample that are PCAOB-inspected to better control for the possible impacts brought by inspections incremental to PCAOB registration.

### 3.2 Variables of Interest and Control Variables

We measure audit quality with three metrics. The first two measures of audit quality are based on the quality of audited earnings, because audit quality is a continuous construct closely connected to the quality of financial reporting (DeFond and Zhang 2013), and the quality of financial reporting is a joint product of both the managers and the auditors (see Gul et al. 2009). The higher audit quality therefore implies a greater assurance of faithful representation of financial statements. One widely-used measure of financial reporting quality is the level of abnormal accruals (*AB\_ACC*), which is the residual computed from the following accruals estimation model developed in prior studies (e.g., Dechow et al. 1995; Kothari et al. 2005):

$$TOT\_ACC_{i,t} = \beta_0 + \beta_1 1/ASSETS_{i,t-1} + \beta_2(\Delta SALES_{i,t} - \Delta AR_{i,t}) + \beta_3(PPE_{i,t}) + \beta_4(ROA_{i,t}) + error \quad (3)$$

where *TOT\_ACC*, is total accruals computed as net income before extraordinary items less cash flows from operations, *ASSETS* is a firm's total assets,  $\Delta SALES$  is a firm's change in sales from year t-1 to year t,  $\Delta AR$  is change in account receivables from year t-1 to year t, *PPE* is gross property, plant and equipment, and *ROA* is return on assets. *TOT\_ACC*,  $\Delta SALES$ ,  $\Delta AR$ , and *PPE* are scaled by lagged total assets. *AB\_ACC* is the residual from the estimation model (equation 3) estimated over size-based estimation sample, following Ecker et al. (2013).<sup>15</sup> Higher levels of abnormal accruals indicate lower quality of audited earnings, which implies lower audit quality.

The second measure of audit quality is the likelihood of reporting small profit, where *SMALLPROFIT* is an indicator variable that equals one for firms that report a small positive net income

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<sup>15</sup> Specifically, Ecker et al. (2013) argue that estimation samples based on similar lagged assets perform at least as well as estimation samples based on industry membership for international data, and this relaxes the restriction on the minimum number of observations required for each country-industry group. We rank lagged assets into deciles for each country in each year, and estimate the residuals for each country-year decile that contains at least 11 observations available for estimation. In untabulated sensitivity tests we also estimate *AB\_ACC* based on each year and 2-digit SIC industries and results are similar.

(where net income scaled by lagged total assets falls within the range [0.00, 0.01]) and zero otherwise. Prior studies (e.g. Burgstahler and Dichev 1997) suggest that these firms are likely the firms that have managed the earnings upward to avoid reporting losses, and are likely to be associated lower quality of financial reporting (and lower audit quality).

The third measure of audit quality is the propensity of issuing modified audit opinions. This is considered as a good and direct measure of audit quality because the audit opinion is the direct responsibility of the auditors and they have the control on this outcome. Moreover, it is expected that managers will pressure auditors not to issue modified audit opinions as this may impose costs to the clients (DeFond and Zhang 2013), so the issuance of modified audit opinions is a clear indication of auditors' ability in withstanding client pressure to act independently, which is an important element of audit quality. *OPINION* is an indicator variable that equals one if the auditor issues a modified audit opinion (a going-concern opinion in the US setting, as this is the only type of modified audit opinion available in the US), and zero otherwise.

We also include a number of client-specific control variables in the estimations, namely client's auditor quality (*BIG4*), client size (*SIZE*), cash flow from operations (*CFO*), client leverage (*LEV*), sales growth (*SALES\_GROWTH*), PPE growth (*PPE\_GROWTH*), lagged loss indicator (*LAG\_LOSS*), market to book value ratio (*MB*), and length of auditor-client relationship (*TENURE*) to control for client firm characteristics, auditor characteristics or performance-related factors that might lead to changes in the dependent variable unrelated to PCAOB inspections or registration. We also control for the lagged dependent variable in each test. To test Hypotheses H2 and H3, we also include a control that captures variations in economic environments based on a country's GDP (*LNGDP*).<sup>16</sup> All these variables are defined in the Appendix. Finally, relevant fixed effects are included in the estimations as discussed earlier.

### 3.3 Sample and Data

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<sup>16</sup> Inclusion of other country level controls, such as measures of investor protection, will reduce the size of the test sample. We include these variables in sensitivity tests and results are similar. In separate tests we include country fixed effects and results are also similar. These additional tests are discussed later in Section 4.

Panel A of Table 1 reports the sample selection process for both the sample of US-listed clients and that of non-US-listed clients. Our sample period covers 2002-2011 after the enactment of Sarbanes Oxley Act 2002 to alleviate the concern that our results are due to the effect of changes in regulatory regime. We obtain a list of non-US audit firms registered with PCAOB from PCAOB's website (<http://pcaobus.org/Registration/Firms/Pages/RegisteredFirms.aspx>). To construct the test sample for H1, we obtain US-listed clients-year observations audited by non-US audit firms from the merge of Audit Analytics and Compustat North America. We exclude all firms from financial industry and observations with missing client-level data. Out of the sample of 3,172 US-listed client-year observations audited by non-US audit firms, there are 612 (2,560) observations whose auditors are (not) inspected by PCAOB. The sample size reduces to 609 for tests of the propensity of issuing modified audit opinions, because we restrict the test for a sample of financially distressed clients (i.e. clients with negative returns on assets) following prior studies (e.g. DeFond et al. 2002).

To construct the test samples for H2 and H3, we begin with all non-US-listed client-year observations available in Compustat Global Vantage during 2002 to 2011. We include only countries that at least one local auditor was registered with PCAOB, which yields 187,395 client-year observations. Francis and Wang (2008) note that observations from Japan, South Korea, India and Pakistan may be incorrect due to the potential miscoding of the auditor identification variable. In addition, Global Vantage only provides the auditor identity for a small group of larger accounting firms<sup>17</sup> and group all the rest as "Other auditors", leading to difficulties in identifying whether the auditor of a firm is PCAOB-registered (or PCAOB-inspected) or not. We address these data issues by manually collecting the identity of the auditor from Capital IQ database<sup>18</sup> so to correctly classify whether a client-year is audited by a PCAOB-

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<sup>17</sup> The auditors identified in Global Vantage include Arthur Andersen, Ernst & Young, Deloitte & Touche, KPMG, PricewaterhouseCoopers, Arthur Young, Coopers & Lybrand, Touche Ross, Altschuler, Melvoin, and Glasser, BDO, Baird, Kurtz, and Dobson, Cherry, Bekaert, and Holland, Clarkson, Clifton Gunderson, Crowe Chizek, Grant Thornton, J H Cohn, Kenneth Leventhal, Laventhol & Horwath, McGladrey & Pullen, Moore Stephens, Moss Adams, Pannell Kerr Foster, Plante & Moran, Richard A. Eisner, and Spicer & Oppenheim. Most of the non-Big N auditors identified in the database are US-based auditors. All other non-US audit firms are coded as other auditors and the identity of these auditors is not provided.

<sup>18</sup> Capital IQ database is provided by Standard & Poor's which delivers comprehensive fundamental and quantitative research and analysis solutions to over 4,500 investment management firms, private equity funds, investment banks, advisory firms,

registered (and/ or inspected) non-US audit firm. Further, companies with negative or zero total assets, and firms in financial industry are excluded. Our final sample consists of 142,975 client-year observations (23,429 unique client firms) across 55 countries for the period 2002-2011, of which 2,346 (45,134) are audited by PCAOB-registered non-US audit firms that are inspected (not inspected), and 95,495 are audited by other non-US audit firms not registered with PCAOB. Panel B of Table 1 reports the sample distributions of client firms and non-US audit firms across countries. We show that our sample covers 79 PCAOB-registered non-US audit firms that audit 3,172 client year observations listed in the US, of which 11 (13.9%) are inspected. For the non-US countries which cover a sample of 142,975 client year observations, we find that there are 228 non-US audit firms registered with PCAOB in total, of which 57 (25%) are inspected. 11 out of the 55 countries in our sample do not allow PCAOB inspection (PCAOB 2010b).

[Insert Table 1 here]

Panel A of Table 2 presents the descriptive statistics for each variable for both the sample of US-listed clients ( $N = 3,172$ ) and the sample of non-US-listed clients ( $N = 142,975$ ). It shows that on average, abnormal accruals are 0.000 (0.000), the probability of reporting small profit is 0.039 (0.082), and the likelihood of modified audit opinions is 0.100 (0.066) for the US-listed (non-US-listed) clients. The correlations among variables used in the regression, as reported in Panel B of Table 2, show that *AB\_ACC* are negatively associated with *INSPECT* and *REGISTER*, and *SMALLPROFIT* is negatively associated with *INSPECT*, suggesting that audit quality is positively associated with *PCAOB* registration and inspection. *OPINION* is positively correlated with *INSPECT* in the sample of non-US-listed clients, but negatively correlated with *REGISTER*, before controls are included in the analysis.

[Insert Table 2 here]

#### 4. Empirical Results

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corporations, and universities worldwide. It covers 98% of the world's market capitalization, and provides unrivaled historical and point-in-time information on over 68,000 global securities, including the identity of professionals such as the auditors.



#### 4.1 PCAOB Inspections and Audit Quality for US-listed Audit Clients: Test of H1

Table 3 presents the results of testing the differences in the measures of audit quality for US-listed clients of non-US audit firms that following PCAOB inspections. 612, or 19.3% of the test sample (N = 3,172) is inspected by PCAOB. In Panel A, Columns (1), (3), (5) provide the estimation results based on the entire sample of treatment firms and control firms with year and industry fixed effects. Columns (2), (4), and (6) show the results of the alternative specification by dropping the variable *INSPECT* and replacing industry fixed effects with firm level fixed effects, in an attempt to further controlling for time-invariant unobservables that differ across treatment firms and control firms.

Column (1) of Panel A, Table 3 shows that the coefficient of *INSPECT* is not significant, indicating that there is no significant difference in abnormal accruals between treatment firms and control firms during the pre-inspection period. In contrast, the coefficient on *AFTERINSPECT* is significantly negative (-0.009,  $t=-3.36$ ), which suggests that abnormal accruals of treatment firms is significantly lower subsequent to PCAOB inspection, after controlling for the change over the same interval for control firms. Moreover, the sum of the coefficients on *INSPECT* and *AFTERINSPECT* is -0.007, suggesting that treatment firms have lower abnormal accruals (or higher audit quality) than control firms in the post-inspection period. The results in Column (2) show that the coefficient on *AFTERINSPECT* is -0.007 ( $t=-3.05$ ), consistent with that in Column (1), suggesting that our results are robust to the firm fixed effect model. The results on the control variables included in the estimations are also consistent with those documented in prior literature. For example, consistent with Francis et al. (2013), we find that *CFO* is generally negatively associated with the abnormal accruals, and *SALES\_GROWTH* and *PPE\_Growth* are generally positively associated with the abnormal accruals. The results also suggest that the quality of audited earnings is likely to be higher for clients whose non-US auditors are inspected by PCAOB, consistent with H1 and findings in prior studies that examine the effects of PCAOB inspections on US auditors (e.g. Gunny and Zhang 2013, Carcello et al. 2011b).

Columns (3) and (4) present the results based on a probit model on the likelihood of clients reporting small positive earnings (*Prob (SMALLPROFIT)*) as an alternative measure of opportunistic reporting, indicating possibly lower audit quality. Similar to the results of abnormal accruals tests, we find that the coefficients on *AFTERINSPECT* are negative and significant in both columns, suggesting that US-listed clients of non-US auditors are less likely to report small positive earnings subsequent to PCAOB inspections.

Columns (5) and (6) provide the probit estimation using the propensity of issuing going-concern opinions (*Prob (OPINION)*) as the dependent variable, which is an indication of auditor independence and hence higher audit quality. The number of observations further drop to 609 because we only include financially distressed clients in this test (see DeFond et al. 2002). We find that *AFTERINSPECT* are positive and significant in both columns, suggesting that the non-US auditors' propensity to issue a going-concern opinion is significantly stronger after they are inspected by PCAOB, using our difference-in-difference research design. This is clear indication of higher quality audit outcome and corroborating evidence in support of H1, in addition to measures relating to financial reporting quality.

PCAOB inspections are not voluntary choice for the auditors, but clients have a choice to hire auditors that are PCAOB inspected or not. To better control for the differences in various dimensions across clients that hire non-US auditors with different inspection statuses, we employ the propensity matching approach (LaLonde 1986) to identify a non-inspected control sample with closest predicted probabilities of inspection. Specifically, we estimate the inspection probability using a set of variables including firm size, leverage, market-to-book ratio, Big N indicator, lagged loss dummy, and dummy variables for each fiscal year and industry group. This matching procedure assigns to each control firm an artificial inspection year even though it has never been inspected in the sample period. We then use this matched sample (N = 2,592 for *AB\_ACC* and *Prob (SMALLPROFIT)*, and 438 for *Prob (OPINION)*) to re-estimate our tests, and the results are presented in Panel B of Table 3. The results are qualitatively similar to those reported in Panel A of Table 3. That is, clients are shown to be associated with high

quality audited earnings and auditors are more likely to withstand client pressure and issue going-concern opinions after the auditors are inspected by PCAOB.

In an untabulated additional test, we also exclude from our sample those client-years whose auditors are never inspected by PCAOB during our sample period, and include the same set of client firms whose non-US auditors are inspected at least once during our sample period. Using this actually-inspected sub-sample, we essentially test the measures of audit quality before and after PCAOB inspections for the same set of clients. The sample size naturally drops in this analysis (for example, the sample size for *AB\_ACC* tests are reduced to 1,404, with 612 (43.6%) observations that are inspected), but the results are also similar to that reported in Panel A. For sake of brevity, we do not report these findings.

[Insert Table 3 here]

#### **4.2 PCAOB Inspections and Quality Spillovers to Non-US-listed Audit Clients: Tests of H2**

Evidence in support of H1, as shown in Table 3, suggests that the quality of audit for non-US audit firms is likely to improve under the PCAOB inspection program. This provides the empirical support to motivate our investigation of the second research question i.e. whether such inspection related quality improvement on the non-US audit firm is transferred (or spillovers) to their other clients even when those clients are not subject to US regulatory oversight. This leads us to test our hypothesis H2.

To test hypothesis H2, we first confine our analyses to all the non-US-listed audit clients of PCAOB-registered non-US audit firms, and compare those that are inspected by PCAOB (N = 2,346) and those not inspected (N = 45,134) in terms of the measures of audit quality. The test sample therefore contains 47,480 client-year observations for *AB\_ACC* and *Prob (SMALLPROFIT)* tests (and 9,918 client-year observations for *Prob (OPINION)* tests, as we include only clients with negative returns on assets).

The results of the tests are reported in Table 4. Panel A shows that the coefficients on *AFTERINSPECT* are negatively associated with both *AB\_ACC* and *Prob. (SMALLPROFIT)*, but are positively associated with *Prob (OPINION)*. We also find similar results when we use the propensity

score matched sample, which are reported in Panel B of Table 4.<sup>19</sup> These results suggest that the quality improvement induced by the PCAOB inspections benefit not only the US-listed clients of those inspected non-US audit firms, but also their non-US-listed clients. Since these non-US-listed clients are in principle not related to US regulatory oversight, the findings documented in these analyses are consistent with the quality spillover effects of PCAOB inspections to non-US audit firms across clients through identification of the audit firm's deficiencies in their overall quality control mechanisms and audit methodologies, which in turn generates positive externalities to other clients of the same audit firm.

[Insert Table 4 here]

### **4.3 Cross-sectional Differences in Audit Quality Between Registered and Non-registered Non-US Audit Firms: Test of H3**

H3 tests whether registering with PCAOB *per se* indicates a difference in quality for non-US audit firms in a non-US setting, and the results are reported in Table 5. Panel A first examines the existence of a PCAOB registration effect (indicated by the coefficient on *REGISTER*) on top of the inspection effect (based on the coefficients on *INSPECT* and *AFTERINSPECT*) as documented in H2. The test sample (N = 142,975) contains both the non-US-listed clients of all non-US audit firms (1) registered with and inspected by PCAOB (N = 2,346); (2) registered with but not inspected by PCAOB (N = 45,134); and (3) not registered with PCAOB (N = 95,495) as the control group. We include both *INSPECT*, *AFTERINSPECT* and *REGISTER* in estimating equation (1) to examine the incremental effects of PCAOB registration and inspection.

Panel A results using 142,975 client-year observations (32,356 for tests based on *Prob (OPINION)*) show that, as reported in Table 4, *AFTERINSPECT* continues to be negatively associated with *AB\_ACC* and *Prob.(SMALLPROFIT)* but positively associated with *Prob.(OPINION)*, confirming the PCAOB inspection effects (or the quality spillover effect) on the audit quality for non-US-listed

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<sup>19</sup> Similar to our analyses in testing hypothesis H1, we remove from our sample the client-years whose non-US audit firms are registered with PCAOB but are never inspected. As a result, the sample (N = 6,162) contains only the client firms of the registered non-US audit firms that are inspected by PCAOB at least once during our sample period, with 2,174 (35%) clients years audited by inspected non-US audit firms. The results (untabulated for brevity) are similar to that reported in Table 4.

clients of non-US audit firms. More importantly, after controlling for *INSPECT* and *AFTERINSPECT*, we find that *REGISTER* is also negatively associated with both *AB\_ACC* and *Prob. (SMALLPROFIT)*, but positively associated with *Prob. (OPINION)*. These results show that, although the filing requirements for PCAOB registration is simple and PCAOB explicitly states that registration by itself does not subject the non-US audit firm to US regulatory regime, the registration with PCAOB *per se* indicates certain differences in terms of the audit quality for their non-US-listed clients. This may be due to the quality improvements to the non-US audit firms through the process of aligning their audit methodologies and approaches with the US system, which is considered to be one of the most advanced regimes in the world. This may also be consistent with the higher litigation and regulatory exposures associated with the PCAOB registration, which induces the non-US audit firms to exert more care on the internal firm-wide quality control mechanisms, and in turn benefit not only their US audit engagements but also their other engagements outside the US. It might also be possible that better non-US audit firms are more likely to self-select to register with PCAOB. Regardless of the sources of this registration effect, documenting the existence of such effect may provide useful inferences to regulators and clients.

We conduct additional analyses to examine the extent to which the registration effect represents only the self-selection of better non-US audit firms that are more likely to register with PCAOB. We follow the Heckman (1979) two-stage procedures and include an estimated selection variable (the inverse Mills ratio, or *INVMR*) in our tests. The inverse Mills ratio is derived by estimating a probit model in which the dependent variable is firm's auditor choice (of whether a PCAOB-registered non-US audit firm is chosen as the auditor of the firm) and the independent variables are included based on previously identified economic determinants of auditor choice (e.g. Choi and Wong, 2007).<sup>20</sup> The inverse Mills ratios

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<sup>20</sup> In the first stage, we run a probit model similar to that in Choi and Wong (2007):

$$\begin{aligned} REGISTER = & \beta_0 + \beta_1 SIZE + \beta_2 CAPINT + \beta_3 INVREC + \beta_4 LEV \\ & + \beta_5 LAG\_LOSS + \beta_6 ISSUE + \beta_7 LAW + \beta_8 LNGDP \\ & + \beta_9 FDI + \beta_{10} EQUITY + FixedEffects + error \end{aligned}$$

Where *CAPINT* is the capital intensity measured by long-term assets over total assets; *INVREC* is the inventory and receivables over total assets; *ISSUE* is the dummy variable, coded as 1 if the firm issued either equity or long-term debt for the past two years and 0 otherwise; *LAW* is natural logarithm of the legal liability index (Choi and Wong, 2007). *FDI* is net foreign direct investment (scaled by total *GDP*) for the country. *EQUITY* is the degree that each country's firms depend on equity financing, which is provided in *LLSV* (1997). Firm size, *CAPINT*, *NREC*, *LEV*, and *LAG\_LOSS* measure the scale and complexity of the

are then included in the regression models estimating equation (1) as an additional explanatory variable. Our results (untabulated) show that the references are similar after *INVMR* is included in the estimations<sup>21</sup>. While the selection issue is not a main issue in our research question, the results of this analysis suggest that the registration effect is at least not purely driven by the possibility that higher quality non-US audit firms self-select to register with PCAOB.

In Panel B of Table 5, we refine the test sample by excluding the 2,346 client-year observations where the non-US audit firms are registered with and inspected by PCAOB, reducing the sample size to 140,629 (32,027 for tests on *Prob(OPINION)*). This mitigates the concern that the variable *REGISTER* captures some inspection effects that are not captured by the variables *INSPECT* and *AFTERINSPECT*, because the sample includes only the clients of the PCAOB-registered non-US audit firms that are not inspected. This test therefore purely examines the PCAOB registration effects. The results as reported in Panel B yield similar inferences as that in Panel A, showing that both abnormal accruals and the likelihood of reporting small profit (likelihood of issuing modified audit opinions) are significantly lower (higher) for non-US-listed clients whose auditors are registered with (but not inspected by) PCAOB. This indicates that registering with PCAOB (even without inspection) yields certain benefits that spillover to the non-US audit firms' other non-US-listed clients in terms of higher audit quality.

[Insert Table 5 here]

#### 4.4 Additional Analyses

##### 4.4.1 PCAOB registration effects for non-US-listed clients: Countries allowing PCAOB inspections and countries not allowing PCAOB inspections

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audit which are likely to be associated with auditor choice (Choi and Wong, 2007). *ISSUE* represents a firm's need to raise external capital which might affect auditor choice (Copley et al., 1995). We also controlled for country-level institutional factors. *LAW* represents a country's legal environment and Choi and Wong (2007) suggested that the appointment of high quality auditor is affected by a country's legal environment. *LNGDP* is controlled because many firms in less wealthy countries may not be able to afford to hire Big N audit firms (Choi and Wong, 2007). *FDI* proxies for foreign investment, which raises the demand for non-US auditors (Choi and Wong, 2007). Finally, *EQUITY* captures the importance of equity financing in each country, which increases the need for high-quality auditors since investors in market-oriented financial systems demand more information than those in bank-oriented financial systems (Ali and Hwang, 2000).

<sup>21</sup> For example, we repeat our tests reported in Panel B of Table 5 after including the *INVMR* in the model. We find that *REGISTER* is negatively and significantly associated with *AB\_ACC* and *Prob(SMALLPROFIT)* but positively associated with *Prob(OPINION)*, which is similar to our reported findings.

Taking advantage of the fact that some foreign regulators do not allow PCAOB to inspect auditors in their countries, we examine if there exists cross-sectional variations in the registration effects for non-US audit firms from countries that allow PCAOB inspections and those that do not allow PCAOB inspections. The inability to inspect non-US audit firms is a serious threat to the ability of PCAOB to fulfill its statutory mission (Goelzer 2010; Carcello et al. 2011a), and quality control problems in those non-US audit firms are less likely to be identified and are therefore less likely to be remediated. Also, the absence of this inspection threat reduces the incentive of these auditors to improve their quality of audits. These in turn lead to a lower quality for this group of non-US audit firms and / or a smaller quality transfer from the quality improvement through PCAOB registration (if any) to their non-US-listed audit clients in their home countries. Carcello et al. (2011a) examine the market reaction to PCAOB's announcement of its inability to inspect certain non-US auditors, and they find that market reacts negatively to firms audited by non-US auditors from countries that do not allow PCAOB inspections, consistent with our argument that these auditors are likely to be associated with lower audit quality. We examine only the registration effects (but not the inspection effects) across these two groups of countries because we cannot observe the impacts of inspections in countries that do not allow PCAOB to inspect their auditors.

We partition the whole sample ( $N = 142,975$ ) into countries where PCAOB inspections are allowed ( $ALLOW = 1$ ) and those countries that do not allow PCAOB to inspect their auditors ( $ALLOW = 0$ ), which is indicated in Panel B of Table 1. This yields 123,111 client-year observations in the  $ALLOW = 1$  subsample and 19,864 in the  $ALLOW = 0$  sub-sample (28,554 and 3,716 respectively for the *Prob (OPINION)* test samples). We estimate equation (1) for each sub-sample separately and the results are reported in Table 6. We find that *REGISTER* is negatively associated with *AB\_ACC* and *Prob.(SMALLPROFIT)* but positively associated with *Prob (OPINION)* only in columns (1), (3), and (5) where PCAOB is allowed to inspect the audit firms from those countries, while the coefficients of *REGISTER* are not statistically significant for the sub-sample where PCAOB is not allowed to inspect the

auditors. These results suggest that, while registering with PCAOB matters, such impacts are likely to depend on the enforcement power of PCAOB. Since one important mechanism of PCAOB to improve the quality of auditing is through its inspections, depriving its right to inspect the auditors significantly reduces the effect of PCAOB registration on the quality of the non-US audit firms' non-US-listed clients.

[Insert Table 6 here]

#### **4.4.2 PCAOB inspection effects for non-US-listed clients: Countries with different liability standards for accountants**

We also examine whether the PCAOB inspection effects vary with different countries' liability standards for accountants. Liability standard for accountants is a measure of how easy investors can recover damages from auditors when there has been misleading disclosure in the issuance of securities (La Porta et al. 2006; Francis and Wang 2008). We expect a stronger PCAOB inspection effect in countries with lower liability standards for accountants as PCAOB inspection will act as a substitute to enhance auditors' quality.

We include in our sample the countries where data on the liability standards for accountants is available (N = 44,243).<sup>22</sup> We partition the sample of non-US-listed client firms audited by PCAOB-registered non-US audit firms into countries with high liability standards for accountants (*HIGH* = 1) and countries with low liability standards for accountants (*LOW* = 1) based on the median value of the liability standards as provided in La Porta et al. (2006). This yields 35,947 (8,296) observations and 27 (15) countries in the *HIGH* (*LOW*) sub-samples. We estimate equation (1) for each sub-sample separately, and the results are reported in Table 7. For all measures of audit quality, we find that the coefficients on *AFTERINSPECT* are significantly larger in magnitude (in the predicted directions) in columns (1), (3) and (5), suggesting that the inspection effect (quality spillover) is stronger in countries with lower liability standards for accountants than countries with higher liability standards for accountants. This shows that

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<sup>22</sup> The sample size drops because data on liability standards for accountants is not available for 15 countries in our sample, including China, Cyprus, Czech Republic, Ghana, Hungary, Iceland, Jamaica, Kazakhstan, Luxembourg, Papua New Guinea, Poland, Russia, Slovakia and Ukraine.



the benefits of PCAOB inspections are likely to be larger when the non-US audit firms are domiciled in a country with low liability standard for accountants.

[Insert Table 7 here]

#### **4.4.3 PCAOB inspection effects for non-US-listed clients: Big 4 auditors and non-Big 4 auditors**

We further examine whether the PCAOB inspection effects for non-US-listed clients exist for both international Big 4 auditors and non-US non-Big 4 auditors. On the one hand, non-US-listed clients audited by non-Big 4 audit firms are likely to benefit more from PCAOB inspections since the non-Big 4 auditors normally are associated with lower earnings quality compared to Big 4 auditors, both in US (e.g., Becker et al. 1998) and in other countries (especially countries with strong investor protection, e.g. Francis and Wang, 2008). Alternatively, it may be possible to observe a stronger spillover effect for the clients of Big 4 auditors because of their stronger global network and information sharing. As argued by Carson (2009, 356), “large audit firms have invested considerable resources in structuring their international operations as global networks of audit firms, with the intention of improving audit quality. Within such global networks, knowledge, staff, and resources are shared...” As a result, it is an open question as to whether the PCAOB inspection effects on non-US-listed clients exist for both Big 4 auditors and non-Big 4 auditors.

We partition the sample of client years audited by PCAOB registered non-US audit firms (N = 47,480) into Big 4 and non-Big 4 group, which contain 34,389 and 13,091 observations respectively. We re-estimate Table 4 results and examine the coefficient of *AFTERINSPECT* on measures of audit quality for the two sub-samples separately. The results show that the quality spillover effects of PCAOB inspections on non-US-listed clients exist for both Big 4 auditors and non-Big 4 auditors. In particular, we find that *AFTERINSPECT* are negatively associated with *AB\_ACC* and *Prob (SMALLPROFIT)*, but positively associated with *Prob (OPINION)* for both Big 4 sub-sample and non-Big 4 sub-sample. For example, in *Prob (SMALLPROFIT)* regressions, the coefficient on *AFTERINSPECT* for Big 4 sub-sample is -0.591 (z-value = -2.27), and that for non-Big 4 sub-sample is -0.183 (z-value = -4.01). Results on other

tests are similar and we do not tabulate them for brevity. Overall, we observe that the spillover effects are stronger for clients audited by Big 4 auditors, possibly due to the strong international network of large auditors which strengthens the quality spillover effects, but we also observe significant spillover effects on non-US-listed clients audited by non-US non-Big 4 auditors.

#### **4.4.4 Alternative specification on difference-and-difference design**

Since the propensity score matching procedure assigns to each control firm an "artificial" inspection year (even though it has never been inspected by PCAOB), an alternative specification of the difference-in-difference research design is to include both *INSPECT*, *AFTER* and *AFTERINSPECT* in the empirical model, where *AFTER* takes the value of one for years in which the client's non-US auditor has been inspected by PCAOB (for the treatment firms), or for years after the "artificial" inspection year (for the control firms), and zero otherwise (see, for example, Table 2 of Chan et al. 2012). Employing this alternative model specification, we repeat our tests of H1 and H2 based on the propensity score matched samples and find results with similar inferences. In particular, on tests of H1, we find that *AFTERINSPECT* are negatively associated with *AB\_ACC* (coef = -0.008, t-stat = -2.07) and *Prob (SMALLPROFIT)* (coef = -0.909, z-stat = -2.14), but positively associated with *Prob (OPINION)* (coef = 1.661, z-stat = 1.82). Similarly, on tests of H2, we find that *AFTERINSPECT* are negatively associated with *AB\_ACC* (coef = -0.007, t-stat = -2.07), *Prob (SMALLPROFIT)* (coef = -0.433, z-stat = -2.15), but positively associated with *Prob (OPINION)* (coef = 1.159, z-stat = 1.84).

#### **4.5 Other Sensitivity Tests**

We exclude each country in the sample one at a time in our tests to check whether the findings are driven by the observations from any given country. The inferences of the results (untabulated) are similar to our main findings. In addition, in our tests of H2 and H3, we include *LNGDP* as the only country-level control variables but include country fixed effects to capture other unobserved differences due to the institutional differences for each country in our sample. In a sensitivity test (untabulated), we replace the country fixed effects with measures that capture commonly used legal and institutional

differences across countries, such as investor protection, rule of law, financial development (see Francis et al. 2013 and Fung et al. 2014). Our inferences on the variables of interest do not change with these changes in model specification and choice of variables. Also, we report t-statistics that are computed based on robust standard errors clustered at the firm level in the tables. Inferences do not change when we use other dimensions of clustering (e.g. industry and year cluster, country level cluster etc).

## **5. Concluding Remarks**

In this study, we examine the impact of the PCAOB's international registration/inspection program on the audit quality for companies with non-US auditors. Specifically, for a sample of US-listed companies audited by non-US auditors, we find that the audit quality of these companies improves following PCAOB inspections, using a difference-in-difference research design. In addition, we document that PCAOB inspections (and registration) of non-US auditors has a positive externality, i.e., is associated with spillover benefits in the form of higher audit quality for non-US-listed local companies audited by a PCOAB-inspected home country auditor. Further, these spillover benefits appear to be stronger for non-US auditors who are located in countries with low auditor liability.

Our findings also suggest that PCAOB-registered non-US auditors are associated with higher audit quality for their non-US-listed foreign clients. Moreover, this differential earnings quality impact appears to be stronger in countries that allow PCAOB inspections relative to countries that bar such inspections, which suggests that the mere threat of PCAOB inspections has a favorable effect on the audit quality of companies audited by PCAOB-registered non-US auditors. Collectively, our findings are of potential interest to the PCAOB as well as other national regulators abroad. In particular, our finding that the PCAOB international inspection program has a positive externality suggests that the program benefits not only US investors but also investors abroad in local non-US-listed companies audited by PCAOB-inspected local auditors.

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## Appendix Variable Definitions

Variable	Definition
Dependent Variables:	
<i>AB_ACC</i>	= abnormal accruals, measured as the residual of the following accruals estimation model: $TOT\_ACC_{i,t} = \beta_0 + \beta_1 (1/ASSETS_{i,t-1}) + \beta_2 (\Delta SALES_{i,t} - \Delta AR_{i,t}) + \beta_3(PPE_{i,t}) + \beta_4(ROA_{i,t}) + Fixed\ Effects + error$ , where <i>TOT_ACC</i> is total accruals (net income before extraordinary items less cash flows from operations in year t), <i>ASSETS</i> is a firm's total assets, $\Delta SALES$ is change in sales from year t-1 to year t, $\Delta AR$ is change in accounts receivable from year t-1 to year t, <i>PPE</i> is gross property, plant and equipment, and <i>ROA</i> is return on assets. <i>TOT_ACC</i> , $\Delta SALES$ , $\Delta AR$ , and <i>PPE</i> are scaled by lagged total assets. <i>AB_ACC</i> is the residual from this regression calculated over size-based estimation sample, following Ecker et al. (2013).
<i>SMALLPROFIT</i>	= an indicator variable equal to 1 if the client's positive earnings fall within the range of one percent of lagged total assets, 0 otherwise.
<i>OPINION</i>	= an indicator variable equal to 1 if the US client (non-US client) receives a going-concern (qualified) opinion, 0 otherwise.
Test Variables:	
<i>INSPECT</i>	= an indicator variable equal to 1 if the client's non-US auditor was inspected by PCAOB during the sample period (as treatment group), 0 otherwise (as control group).
<i>AFTERINSPECT</i>	= an indicator variable equal to 1 for client-years in which the client's non-US auditor has been inspected by PCAOB, and 0 otherwise.
<i>AFTER</i>	= an indicator variable equal to 1 for years in which the client's non-US auditor has been inspected by PCAOB. Each matched control firm is assigned an artificial inspection year even though it has never been inspected by PCAOB.
<i>REGISTER</i>	= an indicator variable equal to 1 if the client's non-US auditor has registered with PCAOB, 0 otherwise.
Control Variables:	
<i>BIG4</i>	= an indicator variable that equals 1 if a client is audited by a Big 4 auditor, and 0 otherwise.
<i>SIZE</i>	= the natural log of sales in year t.
<i>CFO</i>	= a client's cash flows from operations in year t, scaled by lagged total assets.
<i>LEV</i>	= total liabilities scaled by total assets in year t.
<i>SALES_GROWTH</i>	= a client's growth in sales from year t-1 to year t.
<i>PPE_GROWTH</i>	= a client's growth in gross property, plant and equipment from year t-1 to year t.
<i>LAG_LOSS</i>	= an indicator variable that equals 1 if a client's net income is below zero in year t-1 and 0 otherwise.
<i>MB</i>	= a client's market value of equity scaled by book value of equity at the end of year t.
<i>TENURE</i>	= the number of years of auditor-client relationship.
<i>LNGDP</i>	= the natural log of the country's GDP.



**Table 1 Sample Description***Panel A Sample Selection Procedures*

	Client-year observations	Number of distinct client firms
Test Sample for Hypothesis H1(Sample on US-listed Clients):		
US-listed companies with a non-US auditor available in both Audit Analytics and Compustat NA from 2002 to 2011	4,549	602
Less: Observations in financial industries or with missing data	<u>(1,377)</u>	<u>(175)</u>
Test Sample for H1 <sup>1</sup>	3,172	428
Composition of Test Sample:		
Observations with non-US auditors inspected by PCAOB	612	160
Observations with non-US auditors registered with the PCAOB but not yet inspected by the PCAOB	2,560	401
Test Samples for Hypotheses H2 and H3 (Samples on Non-US-listed Clients):		
Non-US-listed companies in Compustat Global Vantage from 2002 to 2011	187,395	26,918
Less: Observations from countries with no PCAOB-registered auditors	<u>(262)</u>	<u>(39)</u>
Less: Observations in financial industries or with missing data	<u>(44,158)</u>	<u>(3,450)</u>
Primary sample for H2 and H3 <sup>1</sup>	142,975	23,429
Composition of Primary Sample:		
Observations with non-US auditors that are both PCAOB-registered and PCAOB-inspected (H2 and H3)	2,346	982
Observations with non-US auditors that are PCAOB-registered but <i>not</i> PCAOB-inspected (H2 and H3)	45,134	10,121
Observations with non-US auditors that are not PCAOB-registered (H3)	95,495	18,503

Note:

1. The number of observations further reduces from 3,172 to 609 for the test samples for H1 (and reduces from 142,975 to 32,256) for test samples for H2 and H3) when we use *Prob(OPINION)* as the dependent variable because we only include clients that are financially distressed (i.e. with negative return on assets) for this test (see DeFond et al. 2002).

**Table 1 Sample Description (continued)***Panel B Sample Distribution of US-listed and non-US-listed Client-year Observations with Non-US Auditors across Countries*

Country	Client-year Obs.	Number of Registered Non-US Auditors	Number of Inspected Non-US Auditors	Allow PCAOB?
<i>US-listed Sample</i>				
United States	3,172	79	11	Yes
<i>Non-US-listed Sample</i>				
Argentina	453	4	3	Yes
Australia	9,482	7	5	Yes
Austria	503	4	0	Yes
Belgium	656	6	0	No
Brazil	1,348	5	4	Yes
Canada	6,983	11	6	Yes
Chile	508	5	2	Yes
China	10,992	7	0	No
Colombia	109	5	1	Yes
Cyprus	148	1	0	Yes
Czech Republic	83	1	0	No
Denmark	865	4	0	No
Egypt	125	1	0	Yes
Finland	988	4	0	Yes
France	5,330	9	0	Yes
Germany	4,152	7	0	Yes
Ghana	10	1	0	Yes
Greece	1,096	6	0	No
Hong Kong <sup>2</sup>	6,077	5	1	Yes
Hungary	146	3	0	Yes
Iceland	35	1	0	Yes
India	8,765	5	4	Yes
Indonesia	1,617	1	1	Yes
Ireland	273	5	0	No
Israel	513	2	2	Yes
Italy	1,270	4	0	No
Jamaica	96	1	0	Yes
Japan	28,714	6	1	Yes
Kazakhstan	10	1	0	Yes
Korea	5,096	5	2	Yes
Luxembourg	101	4	0	No
Malaysia	6,953	6	1	Yes
Mexico	683	8	6	Yes

Netherlands	968	6	0	Yes
New Zealand	647	5	1	Yes
Norway	964	4	0	Yes
Pakistan	1,162	1	0	Yes
Papua New Guinea	5	1	0	Yes
Peru	308	2	1	Yes
Philippines	860	1	1	Yes
Poland	1,565	6	0	No
Portugal	311	4	0	No
Russia	269	2	1	Yes
Singapore	3,995	7	4	Yes
Slovakia	14	1	0	Yes
South Africa	1,989	6	0	Yes
Spain	588	4	0	Yes
Sweden	2,506	7	0	No
Switzerland	1,354	5	0	Yes
Taiwan	7,312	6	4	Yes
Thailand	2,971	3	2	Yes
Turkey	737	1	0	Yes
Ukraine	11	1	0	Yes
United Kingdom	10,206	9	4	Yes
Venezuela	53	1	0	Yes
Total	142,975	228	57	

Note:

1. US-listed clients are companies (audit clients) that are listed in US exchanges. Non-US-listed clients are companies that are not listed in US exchanges. Non-US auditors are audit firms located outside the US.
2. Hong Kong allows PCAOB to inspect its auditors (except for clients with operations in China); China does not allow PCAOB to inspect its auditors (PCAOB 2010b).

**Table 2 Descriptive Statistics of the Sample**

## Panel A Descriptive Statistics

Variable	N	Mean	Std. Dev	25%	Median	75%
<b>Sample of US-listed client-years with non-US auditors:</b>						
Dep. variables:						
<i>AB_ACC</i>	3,172	0.000	0.065	-0.036	0.001	0.036
<i>SMALLPROFIT</i>	3,172	0.039	0.194	0.000	0.000	0.000
<i>OPINION</i>	609	0.100	0.300	0.000	0.000	0.000
Indep. variables:						
<i>INSPECT</i>	3,172	0.443	0.497	0.000	0.000	1.000
<i>AFTERINSPECT</i>	3,172	0.164	0.370	0.000	0.000	0.000
<i>BIG4</i>	3,172	0.911	0.284	1.000	1.000	1.000
<i>SIZE</i>	3,172	7.509	2.172	6.006	7.647	9.131
<i>CFO</i>	3,172	0.109	0.121	0.057	0.106	0.163
<i>LEV</i>	3,172	0.495	0.199	0.346	0.507	0.637
<i>SALES_GROWTH</i>	3,172	0.137	0.326	0.000	0.036	0.208
<i>PPE_GROWTH</i>	3,172	0.129	0.298	0.000	0.047	0.168
<i>LAG_LOSS</i>	3,172	0.197	0.398	0.000	0.000	0.000
<i>MB</i>	3,172	2.796	3.383	1.246	1.925	3.103
<i>TENURE</i>	3,172	7.902	6.978	3.000	6.000	10.000
<b>Sample of Non-US-listed client-years with non-US auditors:</b>						
Dep. variables:						
<i>AB_ACC</i>	142,975	0.000	0.076	-0.043	0.001	0.044
<i>SMALLPROFIT</i>	142,975	0.082	0.274	0.000	0.000	0.000
<i>OPINION</i>	32,256	0.066	0.246	0.000	0.000	0.000
Indep. variables:						
<i>INSPECT</i>	142,975	0.052	0.222	0.000	0.000	0.000
<i>AFTERINSPECT</i>	142,975	0.016	0.127	0.000	0.000	0.000
<i>REGISTER</i>	142,975	0.332	0.471	0.000	0.000	1.000
<i>BIG4</i>	142,975	0.470	0.499	0.000	0.000	1.000
<i>SIZE</i>	142,975	4.953	2.278	3.753	5.036	6.337
<i>CFO</i>	142,975	0.075	0.113	0.007	0.061	0.119
<i>LEV</i>	142,975	0.483	0.216	0.323	0.494	0.644
<i>SALES_GROWTH</i>	142,975	0.310	1.397	-0.045	0.066	0.228
<i>PPE_GROWTH</i>	142,975	0.193	0.814	-0.040	0.045	0.175
<i>LAG_LOSS</i>	142,975	0.253	0.434	0.000	0.000	1.000
<i>MB</i>	142,975	2.122	4.051	0.614	1.155	2.198
<i>LNGDP</i>	142,975	27.735	1.254	26.653	27.945	28.917
<i>TENURE</i>	142,975	6.929	4.908	3.000	6.000	10.000

**Table 2 Descriptive Statistics of the Sample (continued)**

Panel B Correlations Among Variables used in Tests

Sample of US-listed client-years with non-US auditors (N = 3,172)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) <i>AB_ACC</i>	1.000													
(2) <i>SMALLPROFIT</i>	<b>0.089</b>	1.000												
(3) <i>OPINION</i>	<b>-0.036</b>	0.013	1.000											
(4) <i>INSPECT</i>	<b>-0.049</b>	<b>-0.031</b>	-0.016	1.000										
(5) <i>AFTERINSPECT</i>	<b>-0.028</b>	<b>-0.036</b>	-0.006	<b>0.497</b>	1.000									
(6) <i>BIG4</i>	<b>-0.104</b>	<b>-0.030</b>	<b>-0.059</b>	<b>0.095</b>	<b>0.060</b>	1.000								
(7) <i>SIZE</i>	<b>-0.229</b>	0.002	<b>-0.125</b>	<b>-0.129</b>	<b>-0.154</b>	<b>0.290</b>	1.000							
(8) <i>CFO</i>	<b>-0.717</b>	<b>-0.103</b>	<b>-0.037</b>	<b>0.037</b>	<b>-0.043</b>	<b>0.097</b>	<b>0.307</b>	1.000						
(9) <i>LEV</i>	<b>0.039</b>	<b>0.104</b>	-0.006	<b>-0.082</b>	<b>-0.038</b>	<b>0.138</b>	<b>0.395</b>	<b>-0.066</b>	1.000					
(10) <i>SALES_GROWTH</i>	<b>0.080</b>	<b>-0.051</b>	-0.019	-0.001	<b>-0.048</b>	0.010	<b>-0.101</b>	<b>0.073</b>	<b>-0.098</b>	1.000				
(11) <i>PPE_GROWTH</i>	<b>0.100</b>	<b>-0.033</b>	<b>-0.033</b>	-0.018	<b>-0.065</b>	-0.024	<b>-0.141</b>	<b>0.074</b>	<b>-0.126</b>	<b>0.516</b>	1.000			
(12) <i>LAG_LOSS</i>	<b>0.206</b>	<b>0.032</b>	<b>0.098</b>	<b>0.035</b>	<b>0.081</b>	<b>-0.084</b>	<b>-0.319</b>	<b>-0.383</b>	0.001	<b>0.074</b>	-0.025	1.000		
(13) <i>MB</i>	<b>-0.114</b>	<b>-0.058</b>	<b>-0.042</b>	0.007	0.005	<b>0.052</b>	-0.003	<b>0.115</b>	<b>0.228</b>	<b>0.053</b>	<b>0.030</b>	<b>-0.031</b>	1.000	
(14) <i>TENURE</i>	0.005	-0.011	<b>0.047</b>	0.029	<b>0.157</b>	<b>0.093</b>	<b>0.061</b>	<b>-0.081</b>	<b>0.031</b>	<b>-0.170</b>	<b>-0.180</b>	0.020	<b>0.030</b>	1.000

Sample of non-US-listed client-years with non-US auditors (N =142,975)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) <i>AB_ACC</i>	1.000															
(2) <i>SMALLPROFIT</i>	<b>0.044</b>	1.000														
(3) <i>OPINION</i>	<b>0.009</b>	<b>-0.005</b>	1.000													
(4) <i>INSPECT</i>	<b>-0.041</b>	<b>-0.030</b>	<b>0.022</b>	1.000												
(5) <i>AFTERINSPECT</i>	<b>-0.031</b>	<b>-0.020</b>	<b>0.016</b>	<b>0.550</b>	1.000											
(6) <i>REGISTER</i>	<b>-0.059</b>	<b>-0.066</b>	<b>-0.030</b>	<b>0.289</b>	<b>0.183</b>	1.000										
(7) <i>BIG4</i>	<b>-0.069</b>	<b>-0.057</b>	<b>-0.081</b>	<b>0.007</b>	<b>0.011</b>	<b>0.338</b>	1.000									
(8) <i>SIZE</i>	<b>-0.061</b>	<b>0.056</b>	<b>-0.066</b>	<b>0.005</b>	0.000	<b>0.045</b>	<b>0.212</b>	1.000								
(9) <i>CFO</i>	<b>-0.633</b>	<b>-0.089</b>	<b>-0.040</b>	<b>0.061</b>	<b>0.021</b>	<b>0.111</b>	<b>0.134</b>	<b>0.290</b>	1.000							
(10) <i>LEV</i>	<b>-0.039</b>	<b>0.112</b>	<b>0.043</b>	<b>-0.031</b>	<b>-0.023</b>	<b>-0.040</b>	<b>-0.023</b>	<b>0.407</b>	<b>-0.022</b>	1.000						
(11) <i>SALES_GROWTH</i>	<b>-0.040</b>	<b>-0.051</b>	0.000	<b>0.032</b>	<b>0.010</b>	<b>0.076</b>	<b>0.018</b>	<b>0.011</b>	<b>0.290</b>	<b>-0.046</b>	1.000					
(12) <i>PPE_GROWTH</i>	<b>-0.077</b>	<b>-0.061</b>	-0.003	<b>0.033</b>	<b>0.007</b>	<b>0.082</b>	<b>0.026</b>	<b>0.040</b>	<b>0.365</b>	<b>-0.031</b>	<b>0.671</b>	1.000				
(13) <i>LAG_LOSS</i>	<b>0.020</b>	<b>0.020</b>	<b>0.054</b>	<b>0.019</b>	<b>0.033</b>	<b>0.022</b>	<b>-0.066</b>	<b>-0.380</b>	<b>-0.273</b>	<b>0.006</b>	<b>0.069</b>	<b>-0.008</b>	1.000			
(14) <i>MB</i>	<b>-0.027</b>	<b>-0.042</b>	<b>0.007</b>	<b>-0.056</b>	<b>-0.046</b>	<b>0.007</b>	<b>-0.016</b>	<b>-0.062</b>	<b>0.060</b>	<b>0.125</b>	<b>0.032</b>	<b>0.028</b>	<b>0.051</b>	1.000		
(15) <i>LNGDP</i>	<b>0.015</b>	<b>0.089</b>	<b>-0.056</b>	<b>-0.011</b>	<b>0.025</b>	<b>-0.217</b>	<b>-0.235</b>	<b>0.213</b>	<b>-0.057</b>	<b>0.135</b>	<b>-0.031</b>	<b>-0.045</b>	<b>-0.030</b>	<b>0.004</b>	1.000	
(16) <i>TENURE</i>	0.003	<b>0.055</b>	<b>-0.049</b>	<b>0.013</b>	<b>0.028</b>	<b>-0.045</b>	<b>-0.261</b>	<b>0.169</b>	<b>-0.008</b>	<b>0.088</b>	<b>-0.041</b>	<b>-0.035</b>	<b>-0.067</b>	<b>-0.032</b>	<b>0.205</b>	1.000

Note: Bold text indicates two-tail significance at the .10 level or less. See Appendix for variable definitions.

**Table 3 PCAOB Inspections and Audit Quality for US-listed Clients: Test of H1**  
Panel A Full Sample

Column Dependent Variable =	(1) <i>AB_ACC</i>	(2)	(3) <i>Prob. (SMALLPROFIT)</i>	(4)	(5) <i>Prob. (OPINION)</i>	(6)
Intercept	0.018*** (3.16)	0.034*** (3.77)	-3.053*** (-5.42)	-9.755** (-2.17)	-2.900*** (-1.39)	-7.647* (-1.81)
<i>INSPECT</i>	0.002 (1.15)		0.193 (0.91)		-0.455 (-0.93)	
<i>AFTERINSPECT</i>	<b>-0.009*** (-3.36)</b>	<b>-0.007*** (-3.05)</b>	<b>-0.779** (-2.26)</b>	<b>-1.180** (-2.16)</b>	<b>1.100** (2.08)</b>	<b>2.657** (2.04)</b>
<i>BIG4</i>	0.009 (1.46)	0.005 (0.90)	-0.335 (-1.22)	-1.129* (-1.85)	-0.130 (-0.49)	0.768 (1.41)
<i>SIZE</i>	0.002*** (4.15)	0.002*** (2.97)	-0.021 (-0.39)	0.636 (1.52)	-0.173*** (-3.23)	-0.154 (-0.36)
<i>CFO</i>	-0.388*** (-27.76)	-0.412*** (-20.30)	-3.866*** (-4.81)	-4.740* (-1.81)	0.313*** (2.35)	-5.731 (-1.25)
<i>LEV</i>	0.008 (1.45)	-0.009 (-1.08)	3.261*** (5.44)	-0.476 (-0.25)	1.376** (2.21)	8.832* (1.81)
<i>SALES_GROWTH</i>	0.014*** (3.14)	0.015*** (3.04)	-0.749** (-2.22)	-0.883* (-1.68)	-0.075 (0.30)	0.448 (0.55)
<i>PPE_GROWTH</i>	0.015*** (2.86)	0.013** (2.51)	-0.285 (-0.57)	-0.019 (-0.10)	-0.550 (-0.96)	-1.197 (-0.87)
<i>LAG_LOSS</i>	-0.019*** (-6.81)	-0.017*** (-5.42)	-0.187 (-0.71)	0.185 (0.51)	0.144 (0.57)	-0.657 (-0.51)
<i>MB</i>	-0.001*** (-3.36)	-0.001** (-2.48)	-0.222* (-1.88)	-0.012 (-0.22)	-0.117** (-2.07)	-0.229 (-0.93)
<i>TENURE</i>	0.001 (0.17)	-0.000 (-0.83)	-0.025 (-1.35)	-0.013 (-0.18)	0.019 (1.27)	-0.002 (-0.18)
<i>lag (Dep. Var.)</i>	Included	Included	Included	Included	Included	Included
Firm fixed effects	Excluded	Included	Excluded	Included	Excluded	Included
Year fixed effects	Included	Included	Included	Included	Included	Included
Industry fixed effects	Included	Excluded	Included	Excluded	Included	Excluded
N	3,172	3,172	3,172	3,172	609	609
R-square / Pseudo R-square	0.479	0.606	0.036	0.142	0.416	0.411

Panel B Propensity Score Matched Sample

Column	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable =	<i>AB_ACC</i>		<i>Prob. (SMALLPROFIT)</i>		<i>Prob. (OPINION)</i>	
Intercept	0.017** (2.55)	0.049*** (4.82)	-1.825*** (-2.76)	-2.051*** (-2.97)	-4.208*** (-3.52)	-2.231*** (-2.59)
<i>INSPECT</i>	0.004* (1.74)		0.218 (0.99)		-0.096 (-0.48)	
<i>AFTERINSPECT</i>	<b>-0.010*** (-3.22)</b>	<b>-0.008*** (-2.85)</b>	<b>-0.858*** (-2.41)</b>	<b>-0.793*** (-2.57)</b>	<b>1.143** (2.38)</b>	<b>0.902** (2.36)</b>
<i>BIG4</i>	0.012 (1.38)	0.001 (0.12)	-0.576* (-1.79)	-0.651** (-2.02)	1.027 (1.25)	1.338 (1.63)
<i>SIZE</i>	0.003*** (4.74)	0.001 (1.13)	-0.085 (-1.22)	-0.119 (-1.08)	-0.221** (-2.07)	-0.259** (-2.50)
<i>CFO</i>	-0.413*** (-26.50)	-0.424*** (-17.39)	-3.994*** (-4.13)	-1.227 (-1.00)	0.897 (0.55)	0.815 (0.61)
<i>LEV</i>	-0.008 (-1.32)	-0.019* (-1.88)	2.818*** (4.72)	3.286*** (4.19)	0.824 (0.73)	0.398 (0.44)
<i>SALES_GROWTH</i>	0.014*** (3.61)	0.011*** (2.84)	-0.501 (-1.28)	-0.749** (-2.45)	-0.392 (-0.58)	-0.641 (-0.96)
<i>PPE_GROWTH</i>	0.022*** (4.53)	0.015*** (3.17)	-0.411 (-0.87)	-0.154 (-0.55)	-1.567 (-1.38)	-0.952 (-1.33)
<i>LAG_LOSS</i>	-0.015*** (-4.63)	-0.011*** (-3.62)	-0.569* (-1.66)	-0.197 (-0.58)	-1.301 (-1.15)	-1.202 (-1.01)
<i>MB</i>	-0.001*** (-3.52)	-0.001*** (-2.79)	-0.340** (-2.14)	-0.176* (-1.79)	-0.196* (-1.70)	-0.197 (-1.27)
<i>TENURE</i>	0.001 (0.49)	-0.001 (-0.62)	-0.018 (-1.02)	0.016 (0.85)	0.017 (0.61)	0.019 (0.84)
<i>lag (Dep. Var.)</i>	Included	Included	Included	Included	Included	Included
Firm fixed effects	Excluded	Included	Excluded	Included	Excluded	Included
Year fixed effects	Included	Included	Included	Included	Included	Included
Industry fixed effects	Included	Excluded	Included	Excluded	Included	Excluded
N	2,592	2,592	2,592	2,592	438	438
R-square / Pseudo R-square	0.516	0.625	0.036	0.051	0.498	0.425

Notes:

- Panel A includes all US-listed clients audited by PCAOB-registered non-US auditors with available data for the period 2002 to 2011. The sample contains 3,172 client-year observations, with 612 observations where the non-US auditor is PCAOB-inspected (*AFTERINSPECT* = 1). Panel B includes US-listed clients audited by PCAOB-inspected non-US auditors (treatment sample) and a control sample of non-inspected non-US auditors obtained through a propensity score matching procedure, where propensity score is estimated from the following model:  $AFTERINSPECT = \beta_0 + \beta_1 BIG4 + \beta_2 SIZE + \beta_3 LEV + \beta_4 LAG\_LOSS + \beta_5 MB + fixed\ effects$ . This sub-sample contains 2,592 client-year observations when dependent variables are *AB\_ACC* and *Prob (SMALLPROFIT)*, and 438 client-year observations when the dependent variable is *Prob (OPINION)*.
- See Appendix for variable definitions. Industry, year and firm level fixed effects are not reported for brevity.
- T-statistics, shown in parentheses for OLS regressions, are calculated based on robust standard errors clustered at the firm level. Z-statistics are shown in parentheses for PROBIT regressions. \*, \*\* and \*\*\* represent two-tailed significance at level of 10%, 5% and 1% respectively. *N* denotes the number of client-year observations.

**Table 4 PCAOB Inspections and Audit Quality for Non-US-listed Clients: Test of H2**

Panel A Full Sample

Column Dependent Variable =	(1) <i>AB_ACC</i>	(2)	(3) <i>Prob. (SMALLPROFIT)</i>	(4)	(5) <i>Prob. (OPINION)</i>	(6)
Intercept	0.168 (1.27)	0.053 (0.83)	-3.802*** (-4.15)	-4.315*** (-5.60)	-2.948 (-0.82)	-2.246 (-0.80)
<i>INSPECT</i>	0.001 (0.27)		0.067 (1.02)		0.007 (0.10)	
<b><i>AFTERINSPECT</i></b>	<b>-0.006*** (-3.35)</b>	<b>-0.004** (-2.42)</b>	<b>-0.276** (-2.20)</b>	<b>-0.215*** (-3.15)</b>	<b>0.549** (2.01)</b>	<b>0.319*** (3.33)</b>
<i>BIG4</i>	-0.001 (-1.02)	-0.006*** (-3.06)	-0.278*** (-5.15)	-0.346*** (-3.01)	-0.955*** (-4.24)	-1.113*** (-4.67)
<i>SIZE</i>	0.008*** (9.44)	0.013*** (16.71)	0.048*** (3.92)	0.099*** (7.60)	-0.028 (-0.75)	-0.067* (-1.87)
<i>CFO</i>	-0.548*** (-23.21)	-0.587*** (-39.45)	-2.469*** (-10.19)	-2.837*** (-9.75)	-0.079 (-0.51)	0.014 (0.90)
<i>LEV</i>	-0.057*** (-13.28)	-0.082*** (-20.50)	1.135*** (9.29)	1.039*** (7.69)	0.549 (1.39)	1.502* (1.71)
<i>SALES_GROWTH</i>	0.005*** (7.00)	0.005*** (9.25)	-0.011 (-0.53)	-0.031 (-1.45)	-0.029 (-0.91)	-0.045 (-0.83)
<i>PPE_GROWTH</i>	0.013*** (5.87)	0.011*** (13.34)	-0.303*** (-6.82)	-0.364*** (-7.19)	-0.022 (-0.46)	-0.035 (-0.78)
<i>LAG_LOSS</i>	-0.021*** (-14.60)	-0.006*** (-7.82)	0.262*** (4.67)	0.199*** (5.21)	-0.088 (-0.89)	-0.218** (-2.02)
<i>MB</i>	0.001** (2.28)	0.001*** (5.99)	-0.061*** (-3.81)	-0.055*** (-9.02)	-0.006 (-0.47)	-0.019 (-0.87)
<i>LNGDP</i>	-0.006 (-1.11)	-0.001 (-0.65)	0.033 (0.99)	0.036 (0.74)	-0.003 (-0.11)	-0.004 (-0.39)
<i>TENURE</i>	-0.001 (-1.12)	-0.001 (-1.25)	0.041 (1.59)	0.028 (1.36)	-0.008 (-0.67)	-0.042 (-0.72)
<i>lag (Dep. Var.)</i>	Included	Included	Included	Included	Included	Included
Firm fixed effects	Excluded	Included	Excluded	Included	Excluded	Included
Year fixed effects	Included	Included	Included	Included	Included	Included
Industry fixed effects	Included	Excluded	Included	Excluded	Included	Excluded
Country fixed effects	Included	Excluded	Included	Excluded	Included	Excluded
N	47,480	47,480	47,480	47,480	9,918	9,918
R-square / Pseudo R-square	0.514	0.481	0.023	0.049	0.068	0.089



Panel B Propensity Score Matched Sample

Column Dependent Variable =	(1) <i>AB_ACC</i>	(2)	(3) <i>Prob. (SMALLPROFIT)</i>	(4)	(5) <i>Prob. (OPINION)</i>	(6)
Intercept	0.168*** (6.19)	0.324 (1.20)	1.947 (0.90)	-1.968 (-0.31)	1.611 (0.43)	8.658 (1.12)
<i>INSPECT</i>	-0.001 (-0.47)		0.293* (1.77)		-0.147 (-0.32)	
<i>AFTERINSPECT</i>	<b>-0.008*** (-3.05)</b>	<b>-0.007*** (-2.63)</b>	<b>-0.354*** (-3.49)</b>	<b>-0.258** (-2.33)</b>	<b>0.578** (2.01)</b>	<b>0.728*** (2.84)</b>
<i>BIG4</i>	-0.002 (-1.02)	0.001 (0.04)	-0.723*** (-3.58)	-1.011*** (-3.36)	-0.522** (-1.97)	-0.395 (-8.67)
<i>SIZE</i>	0.008*** (16.21)	0.009*** (5.10)	0.066* (1.69)	0.129** (2.18)	0.072 (0.77)	0.062 (0.58)
<i>CFO</i>	-0.551*** (-27.66)	-0.581*** (-30.42)	-4.093*** (-4.37)	-3.925** (-2.48)	-2.075 (-1.19)	-2.825 (-1.28)
<i>LEV</i>	-0.067*** (-14.92)	-0.083*** (-8.85)	1.260*** (3.86)	1.273*** (2.94)	1.953*** (2.82)	1.181 (1.14)
<i>SALES_GROWTH</i>	0.005*** (4.96)	0.006*** (5.55)	-0.036 (-0.61)	-0.195** (-2.49)	-0.039 (-0.59)	-0.011 (-0.20)
<i>PPE_GROWTH</i>	0.013*** (6.92)	0.013*** (6.20)	-0.438 (-1.43)	-0.240 (-1.18)	-0.131 (-0.76)	-0.083 (-0.37)
<i>LAG_LOSS</i>	-0.024*** (-11.77)	-0.012*** (-4.86)	-0.085 (-0.67)	0.262 (1.28)	-0.332 (-0.97)	-0.487 (-1.37)
<i>MB</i>	0.002*** (3.96)	0.001** (2.47)	-0.223** (-2.38)	-0.138 (-1.37)	-0.059 (-1.47)	-0.082** (-1.94)
<i>LNGDP</i>	-0.006*** (-5.91)	-0.012 (-1.20)	-0.171** (-2.03)	-0.032 (-0.17)	-0.186 (-1.12)	-0.421 (-1.51)
<i>TENURE</i>	-0.001 (-1.17)	-0.001* (-1.86)	0.019 (0.42)	-0.061 (-0.66)	-0.087*** (-3.87)	-0.039 (-8.61)
<i>lag (Dep. Var.)</i>	Included	Included	Included	Included	Included	Included
Firm fixed effects	Excluded	Included	Excluded	Included	Excluded	Included
Year fixed effects	Included	Included	Included	Included	Included	Included
Industry fixed effects	Included	Excluded	Included	Excluded	Included	Excluded
Country fixed effects	Included	Excluded	Included	Excluded	Included	Excluded
N	10,438	10,438	10,438	10,438	1,262	1,262
R-square / Pseudo R-square	0.539	0.665	0.592	0.639	0.163	0.237

Notes:

- 1.1. Panel A includes all non-US-listed clients audited by PCAOB-registered non-US auditors with available data for the period 2002 to 2011. The sample contains 47,480 client-year observations, with 2,346 observations where the non-US auditor is PCAOB-inspected (AFTERINSPECT = 1). Panel B includes non-US-listed clients audited by PCAOB-inspected non-US auditors (treatment sample) and a control sample non-inspected non-US auditors obtained through a propensity score matching procedure, where the propensity score is estimated from the following model:  $AFTERINSPECT = \beta_0 + \beta_1 BIG4 + \beta_2 SIZE + \beta_3 LEV + \beta_4 LAG\_LOSS + \beta_5 MB + \text{fixed effects}$ . This sub-sample contains 10,438 client-year observations when dependent variables are AB\_ACC and Prob (SMALLPROFIT), and 1,262 client-year observations when the dependent variable is Prob (OPINION).
2. See Appendix for variable definitions. Industry, year, country and firm level fixed effects are not reported for brevity.
3. T-statistics, shown in parentheses for OLS regressions, are calculated based on robust standard errors clustered at the firm level. Z-statistics are shown in parentheses for PROBIT regressions. \*, \*\* and \*\*\* represent two-tailed significance at level of 10%, 5% and 1% respectively. *N* denotes the number of client-year observations.

**Table 5 PCAOB Registration and Audit Quality for Non-US-listed Clients: Test of H3**  
Panel A Tests of PCAOB Registration and PCAOB Inspections

Column	(1)	(2)	(3)
Dependent Variable =	<i>AB_ACC</i>	<i>Prob. (SMALLPROFIT)</i>	<i>Prob. (OPINION)</i>
Intercept	0.291*** (9.73)	-7.292*** (-21.21)	1.871** (1.97)
<b>REGISTER</b>	<b>-0.002***</b> <b>(-3.40)</b>	<b>-0.158***</b> <b>(-3.44)</b>	<b>0.371***</b> <b>(4.26)</b>
<i>INSPECT</i>	0.002 (1.21)	-0.192*** (-2.91)	-0.201 (-0.98)
<b>AFTERINSPECT</b>	<b>-0.005**</b> <b>(-2.49)</b>	<b>-0.261**</b> <b>(-2.04)</b>	<b>0.650**</b> <b>(2.09)</b>
<i>BIG4</i>	-0.001 (-0.73)	-0.288*** (-4.67)	-1.341*** (-12.41)
<i>SIZE</i>	0.007*** (36.79)	0.063*** (5.12)	-0.078*** (-4.71)
<i>CFO</i>	-0.598*** (-75.20)	-3.791*** (-24.53)	-0.134 (-0.46)
<i>LEV</i>	-0.048*** (-37.26)	1.560*** (18.92)	1.479*** (9.54)
<i>SALES_GROWTH</i>	0.005*** (18.23)	-0.129*** (-4.34)	-0.008 (-0.36)
<i>PPE_GROWTH</i>	0.010*** (14.48)	-0.656*** (-11.34)	-0.013 (-0.81)
<i>LAG_LOSS</i>	-0.023*** (-31.46)	0.011 (1.53)	0.001 (0.08)
<i>MB</i>	0.001*** (9.42)	-0.076*** (-6.89)	-0.017*** (-2.75)
<i>LNGDP</i>	-0.010*** (-8.66)	0.152*** (14.77)	-0.192*** (-6.68)
<i>TENURE</i>	-0.001 (-0.83)	-0.001 (-0.09)	-0.023*** (-5.82)
<i>lag (Dep. Var.)</i>	Included	Included	Included
Firm fixed effects	Excluded	Excluded	Excluded
Year fixed effects	Included	Included	Included
Industry fixed effects	Included	Included	Included
Country fixed effects	Included	Included	Included
N	142,975	142,975	32,256
R-square / Pseudo R-square	0.551	0.039	0.102

**Table 5 PCAOB Registration and Audit Quality for Non-US-listed Clients: Test of H3 (continued)**

Panel B Test of PCAOB Registration Only

Column	(1)	(2)	(3)
Dependent Variable =	<i>AB_ACC</i>	<i>Prob. (SMALLPROFIT)</i>	<i>Prob. (OPINION)</i>
Intercept	-0.156** (-2.80)	-7.538*** (-20.73)	2.778*** (3.38)
<b><i>REGISTER</i></b>	<b>-0.002** (-2.59)</b>	<b>-0.166*** (-3.55)</b>	<b>0.163** (2.51)</b>
<i>BIG4</i>	-0.001 (-1.12)	-0.226*** (-7.46)	-0.913*** (-11.96)
<i>SIZE</i>	0.008*** (39.51)	0.040*** (5.19)	-0.084*** (-4.77)
<i>CFO</i>	-0.588*** (-59.66)	-3.775*** (-24.47)	-0.096 (-0.32)
<i>LEV</i>	-0.051*** (-41.75)	1.385*** (18.17)	1.404*** (9.66)
<i>SALES_GROWTH</i>	0.006*** (13.76)	-0.120*** (-4.35)	-0.004 (-0.14)
<i>PPE_GROWTH</i>	0.013*** (12.27)	-0.642*** (-11.15)	-0.031 (-1.20)
<i>LAG_LOSS</i>	-0.021*** (-27.66)	0.047** (2.14)	0.005 (0.22)
<i>MB</i>	0.001*** (6.81)	-0.066*** (-6.85)	-0.015*** (-2.64)
<i>LNGDP</i>	0.006*** (3.15)	0.180*** (14.63)	-0.202*** (-7.49)
<i>TENURE</i>	-0.001 (-0.55)	-0.001 (-0.16)	-0.052*** (-6.66)
<i>lag (Dep. Var.)</i>	Included	Included	Included
Firm fixed effects	Excluded	Excluded	Excluded
Year fixed effects	Included	Included	Included
Industry fixed effects	Included	Included	Included
Country fixed effects	Included	Included	Included
N	140,629	140,629	32,027
R-square / Pseudo R-square	0.540	0.043	0.109

Notes:

- 1.1. Panel A includes all non-US-listed clients audited by non-US auditors with available data for the period 2002 to 2011. The sample contains 142,975 client-year observations, with 47,480 observations where the non-US auditor is PCAOB-registered (REGISTER = 1) of which 2,346 observations are actually PCAOB-inspected (AFTERINSPECT = 1). Panel B excludes these actually PCAOB-inspected observations, i.e., Panel B includes only client-year observations ( $N = 142,975 - 2,346 = 140,629$ ) where the non-US auditor was not actually inspected by PCAOB. The sample with 140,629 observations includes 45,083 observations where the non-US auditor is registered with PCAOB (REGISTER = 1).
2. See Appendix for variable definitions. Industry, year, country and firm level fixed effects are not reported for brevity.
3. T-statistics, shown in parentheses for OLS regressions, are calculated based on robust standard errors clustered at the firm level. Z-statistics are shown in parentheses for PROBIT regressions. \*, \*\* and \*\*\* represent two-tailed significance at level of 10%, 5% and 1% respectively.  $N$  denotes the number of client-year observations.

**Table 6 PCAOB Registration and Audit Quality for Countries Allowing/ Not Allowing Inspections**

Column	(1)	(2)		(3)	(4)		(5)	(6)	
Dependent Variable =	<i>Allow=1</i>	<i>Allow=0</i>	<i>Diff</i>	<i>Allow=1</i>	<i>Allow=0</i>	<i>Diff</i>	<i>Allow=1</i>	<i>Allow=0</i>	<i>Diff</i>
	<i>AB_ACC</i>			<i>Prob. (SMALLPROFIT)</i>			<i>Prob. (OPINION)</i>		
Intercept	0.392*** (23.89)	0.065*** (2.59)		-6.467*** (-21.52)	-13.919*** (-14.15)		4.221*** (6.56)	31.31*** (2.69)	
<b>REGISTER</b>	<b>-0.002**</b> <b>(-2.36)</b>	<b>0.001</b> <b>(0.95)</b>	<b>-0.003*</b> <b>(p&lt;0.10)</b>	<b>-0.226***</b> <b>(-5.91)</b>	<b>-0.100</b> <b>(-1.35)</b>	<b>-0.126***</b> <b>(p&lt;0.01)</b>	<b>0.173**</b> <b>(2.33)</b>	<b>-0.214</b> <b>(-0.65)</b>	<b>0.387***</b> <b>(p&lt;0.01)</b>
<i>BIG4</i>	-0.001 (-0.94)	-0.002* (-1.71)		-0.187*** (-4.38)	-0.499*** (-4.55)		-1.183*** (-10.65)	-1.287*** (-3.33)	
<i>SIZE</i>	0.008*** (64.42)	0.010*** (39.44)		0.058*** (8.81)	-0.043** (-2.37)		-0.094*** (-5.99)	-0.081* (-1.64)	
<i>CFO</i>	-0.576*** (-79.92)	-0.647*** (-69.01)		-3.776*** (-23.62)	-3.436*** (-9.58)		0.633 (1.42)	-4.481*** (-4.29)	
<i>LEV</i>	-0.048*** (-50.98)	-0.072*** (-37.05)		1.349*** (22.42)	1.949*** (13.09)		1.387*** (9.95)	1.108*** (3.10)	
<i>SALES_GROWTH</i>	0.006*** (41.35)	0.006*** (31.96)		-0.120*** (-5.29)	-0.070 (-1.52)		-0.002 (-0.31)	-0.088 (-0.47)	
<i>PPE_GROWTH</i>	0.011*** (43.60)	0.020*** (31.81)		-0.632*** (-13.32)	-0.991*** (-8.80)		-0.019 (-0.81)	0.102 (0.66)	
<i>LAG_LOSS</i>	-0.021*** (-58.63)	-0.017*** (-17.11)		0.026 (0.97)	0.386*** (5.78)		0.023 (0.25)	0.079 (0.44)	
<i>MB</i>	0.001*** (13.15)	0.002*** (20.59)		-0.088*** (-13.28)	-0.084*** (-9.04)		-0.019*** (2.90)	0.004 (0.55)	
<i>LNGDP</i>	-0.014*** (-22.06)	-0.002 (-1.68)		0.138*** (13.30)	0.418*** (14.57)		-0.280*** (-12.02)	-1.334*** (-2.94)	
<i>TENURE</i>	-0.001 (-1.43)	0.001 (0.55)		0.016 (0.92)	-0.109 (-1.28)		-0.007 (-0.91)	-0.072*** (-3.56)	
<i>lag (Dep. Var.)</i>	Included	Included		Included	Included		Included	Included	
Firm fixed effects	Excluded	Excluded		Excluded	Excluded		Excluded	Excluded	
Industry fixed effects	Included	Included		Included	Included		Included	Included	
Year fixed effects	Included	Included		Included	Included		Included	Included	
Country fixed effects	Excluded	Excluded		Excluded	Excluded		Excluded	Excluded	
N	123,111	19,864		123,111	19,864		28,554	3,716	
R-square / Pseudo R-square	0.524	0.635		0.043	0.062		0.092	0.207	

Notes:

1. The sample ( $N = 142,975$ ) consists of all non-US-listed client-year observations with audited by non-US auditors with available data for the period 2002 to 2011. *ALLOW* is an indicator variable, coded as 1 if a country allows PCAOB inspections, and 0 otherwise. The sub-samples  $ALLOW = 1$  and  $ALLOW = 0$  consist of 123,111 and 19,864 client-year observations, respectively.
2. See Appendix for variable definitions. Industry, year, country and firm level fixed effects are not reported for brevity.
3. T-statistics, shown in parentheses for OLS regressions, are calculated based on robust standard errors clustered at the firm level. Z-statistics are shown in parentheses for PROBIT regressions. \*, \*\* and \*\*\* represent two-tailed significance at level of 10%, 5% and 1% respectively.  $N$  denotes the number of client-year observations.

**Table 7 PCAOB Inspections and Audit Quality for Countries with High vs. Low Liability Standards for Accountants**

Column	(1)	(2)		(3)	(4)		(5)	(6)	
Dependent Variable =	<i>Low Standard</i> <i>AB_ACC</i>	<i>High Standard</i>	<i>Diff</i>	<i>Low Standard</i> <i>Prob. (SMALLPROFIT)</i>	<i>High Standard</i>	<i>Diff</i>	<i>Low Standard</i> <i>Prob. (OPINION)</i>	<i>High Standard</i>	<i>Diff</i>
Intercept	0.048*** (5.74)	0.117*** (8.92)		-7.437*** (-4.56)	-0.218 (-1.62)		19.59*** (4.19)	0.749 (0.35)	
<i>INSPECT</i>	-0.024*** (-5.28)	-0.003*** (-2.76)		0.899*** (4.18)	-0.278*** (-3.27)		0.150 (0.33)	-0.326 (-1.08)	
<i>AFTERINSPECT</i>	<b>-0.012*</b> <b>(-1.85)</b>	<b>-0.002</b> <b>(-1.42)</b>	<b>-0.010*</b> <b>(p&lt;0.10)</b>	<b>-0.903**</b> <b>(-2.56)</b>	<b>-0.235</b> <b>(-1.63)</b>	<b>-0.668***</b> <b>(p&lt;0.01)</b>	<b>1.048*</b> <b>(1.93)</b>	<b>0.033</b> <b>(0.21)</b>	<b>1.015***</b> <b>(p&lt;0.01)</b>
<i>BIG4</i>	-0.013*** (-2.58)	-0.008*** (-4.48)		-0.320 (-0.53)	-0.345* (-1.72)		-1.453*** (-6.72)	-1.253*** (-8.35)	
<i>SIZE</i>	0.018*** (11.70)	0.011*** (28.73)		0.070*** (10.81)	0.064*** (10.67)		-0.034 (0.35)	-0.056** (-2.23)	
<i>CFO</i>	-0.441*** (-54.38)	-0.538*** (-112.43)		-0.951*** (-5.54)	-1.339*** (-14.26)		1.237 (0.45)	-0.374 (-0.26)	
<i>LEV</i>	-0.033*** (-13.14)	-0.057*** (-25.64)		1.276*** (5.59)	1.218*** (11.01)		-0.179 (-0.84)	1.777*** (5.52)	
<i>SALES_GROWTH</i>	0.003*** (4.64)	0.005*** (11.68)		-0.125 (-0.85)	-0.078 (-1.36)		0.001 (0.35)	-0.039 (-1.40)	
<i>PPE_GROWTH</i>	0.018*** (7.34)	0.012*** (13.33)		-0.951*** (-4.69)	-0.645*** (-9.28)		0.127 (0.32)	-0.043 (-1.28)	
<i>LAG_LOSS</i>	-0.017*** (-11.86)	-0.024*** (-31.29)		0.278* (1.86)	0.139*** (2.25)		-0.461** (-2.78)	-0.029 (-0.44)	
<i>MB</i>	0.000*** (3.21)	0.001*** (4.62)		-0.006*** (-2.45)	-0.225*** (-6.56)		0.004 (0.99)	-0.031** (-2.05)	
<i>LNGDP</i>	-0.003*** (-4.63)	-0.003*** (-10.22)		0.134*** (2.91)	-0.104*** (-3.29)		-0.744*** (-6.27)	-0.122** (-2.24)	
<i>TENURE</i>	-0.002 (-1.56)	0.002 (1.11)		0.126* (1.76)	0.017 (0.62)		-0.019*** (-2.56)	-0.042*** (-3.56)	
<i>lag (Dep. Var.)</i>	Included	Included		Included	Included		Included	Included	
Firm fixed effects	Included	Included		Included	Included		Included	Included	
Industry fixed effects	Excluded	Excluded		Excluded	Excluded		Excluded	Excluded	
Year fixed effects	Included	Included		Included	Included		Included	Included	
Country fixed effects	Excluded	Excluded		Excluded	Excluded		Excluded	Excluded	
N	8,296	35,947		8,296	35,947		1,945	7,689	
R-square / Pseudo R-square	0.537	0.494		0.026	0.019		0.122	0.105	



Notes:

1. The sample ( $N = 44,243$ ) consists of all non-US-listed client-year observations audited by non-US auditors registered with PCAOB with available data on country-specific liability standards for accountants for the period 2002 to 2011. The sample is split into countries with high and low liability standards for accountants based on the median value of the liability variable (La Porta et al. 2006). The sub-samples from countries with high (HIGH) and low (LOW) liability standards consists of 35,947 and 8,296 client-year observations, respectively.
2. See Appendix for variable definitions. Industry, year, country and firm level fixed effects are not reported for brevity.
3. T-statistics, shown in parentheses for OLS regressions, are calculated based on robust standard errors clustered at the firm level. Z-statistics are shown in parentheses for PROBIT regressions. \*, \*\* and \*\*\* represent two-tailed significance at level of 10%, 5% and 1% respectively.  $N$  denotes the number of client-year observations.