

**Does the signature of the audit manager on the audit report
matter? Evidence from China**

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List of Abbreviations

PM	Audit report signed by an audit partner together with an audit manager
MM	Audit report signed by both audit managers
PP	Audit report signed by both audit partners

STATEMENT

I hereby certify that this thesis is the result of my own research and that it has not, nor has any part of it, been submitted for a higher degree to any other university or institution.

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Abstract

This study examines whether having an audit manager sign an audit report improves audit quality, using unique data from China, where an audit report can be signed by an audit manager with a CPA licence. We argue that, unlike an audit partner's signature that aims to improve audit quality through outcome accountability, the audit manager's signature could enhance audit quality through increased accountability in the audit process (process accountability). Consistent with this proposition, this study finds that the client firms with audit managers signing the audit report have higher audit quality (proxied by discretionary accruals and the propensity to issue modified audit opinions) and lower audit fees, compared to client firms without audit managers' signatures. Furthermore, this study examines if a client firm's auditor-pair choice affects audit quality. Our findings suggest that client firms audited by a manager-partner pair have higher audit quality and lower audit fees compared to client firms that use other auditor pairs, indicating that the increase in both process accountability and outcome accountability could be a better way to improve audit quality.

Chapter 1: Introduction

This study investigates if having an audit manager sign the audit report enhances audit quality. Our study is motivated by the recent development in audit standards requiring a mandatory signature of auditors on audit reports (EU, 2006, ISA, 2015). In 2006, the European Union (EU) Eighth Company Law Directive required that: “[w]here an audit firm carries out the statutory audit, the audit report shall be signed by at least the statutory auditor(s) carrying out the statutory audit on behalf of the audit firm” (EU, 2006). In 2015, International Standards on Auditing (ISA) 700 (revised) Forming an Opinion and Reporting on Financial Statements required that for audits of financial statements for periods ending on or after 15 December 2016, auditors' signatures should include either the name of the audit firm, the personal name of the auditor or both, as appropriate for the particular jurisdiction (ISA, 2015). In addition to EU's auditor signature mandate, the US Securities and Exchange Commission (SEC) has implemented new rule 3211 requiring mandatory disclosure of audit partners' identities for auditor reports issued on or after January 31 2017 (SEC, 2016). Although identifying auditors by name is different from requiring auditors to sign the report, Public Company Accounting Oversight Board (PCAOB) (2009) expects that the identification requirement will result in the same outcome because both requirements aim to increase the accountability of auditors. Similar partner identification or signature requirements are also enforced in other countries and regions. As of the end of 2015, 16 of the 20 largest capitalization markets¹ have required the disclosure of the auditor's identity by either disclosing the auditor's name or requiring the auditor to sign his or her own name to the audit report (PCAOB, 2015). The primary argument

¹ As of the end of 2015, the 16 capital markets are Japan, United Kingdom, France, Germany, Australia, India, Brazil, China, Switzerland, Spain, Russian Federation, the Netherlands, South Africa, Sweden, Mexico, and Italy. The rest that did not have such a requirement at that time are the United States, Canada, Republic of Korea, and Hong Kong.

for these requirements is the belief that the signature on the audit report will improve the auditor's sense of accountability, which will in turn lead to better audit quality (Reid and Youngman, 2017, Doxey et al., 2015, Cole, 2014, Anderson et al., 2014). This argument has been supported by experimental studies that document a positive relationship between an auditor's accountability and audit performance. For example, some studies find that when an auditor's sense of accountability is increased, he or she is more conservative in audit tasks such as inventory written-down valuation (Johnson and Kaplan, 1991), fraud assessment (Hoffman and Patton, 1997) and evaluation of audit evidence (Asare et al., 2000).

Although experimental studies indicate that an auditor's signature increases accountability and can lead to better audit quality, findings from empirical studies are still mixed. While some studies show a positive effect of an auditor's signature requirement and audit quality (Carcello and Li, 2013, Burke et al., 2017), others report no such an association (Cunningham et al., 2017, Blay et al., 2014). Furthermore, the mandatory auditor's signature requirement results in some unintended consequences such as more aggressive judgement in inventory valuation written down (Cianci et al., 2016, King et al., 2012). Hence, some researchers argue that auditors already have many other incentives to maintain audit quality and requiring individual auditors to sign the audit report will make no difference (Blay et al., 2014, King et al., 2012). Indeed, Francis (2004) reviews the US empirical research over the past 25 years and finds that outright audit failure rates are infrequent (i.e. far less than 1% annually) and audit fees are quite small (i.e. less than 0.1% of aggregate client sales), which suggests there currently may be an acceptable level of audit quality at a relatively low cost. Similarly, the audit practitioners who are against the auditor's signature requirement also argue that there is already sufficient

accountability of auditors to maintain a high level of audit quality under the current mechanism (i.e. strict auditing standards, qualified audit committee, external inspections from regulators, etc.) (Cole, 2014).

However, it is questionable that the auditor accountability level is sufficient and current audit quality is acceptable given the recent frequent severe penalties charged to accounting firms due to their misconduct. Therefore, our study aims to provide more insights into the relationship between the auditor's signature requirement and audit quality. We argue that another possible explanation for the mixed results could be partly due to the neglect of other members in the audit team. Studies on the effects of the auditor's signature requirement mainly focus on investigating the effect of the audit partner's signature (DeFond and Zhang, 2014, Tepalagul and Lin, 2015). This emphasis on partner-level signatures has been criticized for focusing too much on outcome accountability² (final opinion) while overlooking accountability in the audit process (King et al., 2012, Doxey et al., 2015). Doxey et al. (2015) advocates the identity disclosure of concurring audit partner together with that of the engagement lead partner³. They argue that the concurring audit partner also has significant influence over the audit and quality of the work performed and the conclusion reached as recognised in Auditing Standard No. 7, Engagement Quality Review. Therefore, they suggest that the concurring partner's identity should also be disclosed as being in alignment with the identity disclosure purpose of the audit standards.

² We borrow the concept from King et al. (2012), who indicate defensive bolstering is more pronounced when subjects are held accountable for the decision itself (outcome accountability) rather than for the process they used to reach the decision (process accountability). In our paper, the concept refers to the components of audit engagement, in which outcome accountability refers to being accountable to the decision itself such as issuing the audit opinion. Process accountability refers to being accountable to audit processes such as supervision, investigation and collection of audit evidence. Review accountability refers to being accountable to the audit quality review stage.

³ Concurring partner refers to an audit partner who reviews the audit work independently from the audit engagement team. The engagement lead partner refers to an audit partner who leads the audit engagement team and issues the audit opinion.

Following the same rationale as Doxey et al. (2015), this study further investigates the audit quality effect of an audit manager's signature. An audit manager acts as a leader in the project team, taking part in the field work, reviewing audit working papers and preparing the audit report. The significant influence of audit managers on audit process has been well recognised in the literature in areas such as risk assessment, internal control evaluation, testing (Carcello et al., 1992, Tan and Jamal, 2001) and the review of audit working papers (Trotman et al., 2009, Owghoso et al., 2002, Tan and Jamal, 2001). They are more focused on audit process compared to audit partners, who are more focused on audit outcome. Therefore, audit managers, relative to audit partners, have more expertise in detecting mechanical errors and have different accountability within firms (Knechel et al., 2012, Harding and Trotman, 1999). The quality of their judgements is expected to have significant influence on both audit inputs and audit process. Furthermore, because both audit inputs and audit process are identified as two of the six categories of indicators of audit quality from the synthesis of audit quality literature (the remaining four are accounting firms, audit industry and audit markets, institutions and economic consequences of audit outcomes), audit managers are expected to exert a significant effect on audit quality (Knechel et al., 2012, Francis, 2011). If audit managers sign the audit report, the increased accountability will improve audit quality. Therefore, by analysing the effect of manager-level signatures on audit quality, this study can provide empirical evidence to complement current research with additional insights on how increased accountability in audit inputs and audit process level (process accountability) impacts audit quality.

To investigate the association between audit managers' signatures and audit quality, this study uses data from China because it is a unique setting where audit managers

are authorized to sign audit reports. China has employed the auditor's signature requirement since 1995. Specifically, China's Independent Auditing Standard (CIAS) No. 7, *Audit Report*, issued in 1995, requires auditors to sign audit reports. China's Ministry of Finance further specifies that an audit report is ineffective if it is not signed by two auditors who are qualified Certified Public Accountants (CPAs) (MOF, PRC 2001). Both signing auditors are subject to regulatory sanctions if an audit failure is detected (Chen et al., 2010). In practice, the signing auditors could be either audit partners or audit managers because they are qualified CPAs (Chen et al., 2017). By checking the signing auditors' titles in the system of The Chinese Institute of Certified Public Accountants (CICPA) to determine whether a signing auditor is an audit partner or an audit manager, we find there are three auditor pair types on audit reports: partner-partner (PP), partner-manager (PM) and manager-manager (MM). In addition, China as an emerging economy has a relatively weaker institutional environment in which market mechanisms against opportunistic reporting are still immature (He et al., 2017). Therefore, our sample from China enables us to explicitly examine how the increased manager's accountability associated with the manager's signature on the audit report affects audit quality.

Our study is anticipated to make several significant contributions. Firstly, our results contribute to the gap in the literature on audit quality. More specifically, our study provides empirical evidence of how increased accountability at the manager level affects audit quality. Research has mainly focused on studying the effect on audit quality from an audit partner's perspective. However, audit partners usually pay more attention to building and maintaining the relationship with client firms. Their involvement in the audit process is relatively limited. Comparatively, audit managers provide critical inputs within the audit process. They are involved in every detail in

the three phases of the audit process: planning, execution and completion. When audit managers sign the audit report, their specific expertise in the audit process such as mechanical error detection is likely to enhance the quality of the report. Experimental research has also documented the important role played by audit managers (e.g., Keyser III, 2017, Frank and Hoffman, 2014, Gibbins and Trotman, 2002, Harding and Trotman, 1999). Our study complements the literature by providing large-sample archival evidence.

Secondly, our results provide new insights into the effect of auditor mandatory signature requirement on audit quality. Regulators believe that auditors' accountability will increase if auditors either sign the audit report or disclose their identity to the public, as well as audit quality. Even though this rationale is consistent with the accountability theory, there is limited and mixed empirical evidence. Our study provides evidence to support the premise that mandatory requirement of auditors to sign the audit report increases auditor accountability and audit quality. In particular, our findings suggest that in addition to require audit partners to sign on the audit report, requiring audit managers to sign the audit report further increases audit quality.

Thirdly, our study extends the understanding of how the composition of the audit team impacts audit quality. Existing research has documented that the composition of an audit engagement team has significant influence on the audit quality such as audit partners' gender diversification (Al-Dhamari and Chandren, 2017, Srinidhi et al., 2017, Reheul et al., 2017) and auditors' knowledge diversification (Hossain et al., 2017, Cameran et al., 2017). Compared with audit partners who specialize in detecting conceptual errors, audit managers are more specialized in detecting mechanical errors. If audit managers sign the audit report together with audit partners,

auditor accountability will increase in both outcome accountability and process accountability. This synergy effect of signing audit manager and signing audit partner can further increase audit quality. The findings echo those of Doxey et al. (2015). In their commentary in response to the PCAOB request, Doxey et al. (2015) advocate the disclosure of the identities of other significant audit participants as well as the engagement partner. Our findings support that other auditor accountability such as managers is also crucial to audit quality.

Chapter 2: Institutional Background

Compared to developed countries, auditing standards are relatively new but are rapidly developing in China (see Figure 1). The audit profession was suspended in the early stages of the establishment of the People's Republic of China because at that time, China adopted a central planned economy. Consequently, the financial audit department was replaced by a newly created department, the People's Supervision Committee (PSC), which was expected to perform the duty of not only auditing finance and economy but also supervising fraud of government officials. However, the PSC did not function as was expected due to the Great Cultural Revolution in China between 1966 and 1976. Since 1980, audit profession regulatory bodies have been re-established and developed gradually from public sector audit development to internal audit development to external audit development. In 1983, the National Audit Office of the People's Republic of China (CNAO) was founded to perform auditing in the public sector. In 1987, China set up China's Institute of Internal Auditors (CIIA) to perform internal auditing. In the same year, China joined the Institute of Internal Auditors (IIA). In 1988, CICPA was founded as an independent department to facilitate the development of certified public accountants in the external audit sector. In 1995, CICPA merged with CIIA.

Auditing standards in China also promulgated with the development of regulatory bodies. In 1985, China's State Council promulgated interim auditing standards and CNAO promulgated interim internal auditing standards. In 1986, China's State Council promulgated 'Regulations of the People's Republic of China on CPA', which admitted CPAs in the jurisdictions. In 1995, CICPA promulgated China Independent Auditing Standards (CIAS). Since then, CIAS has been modified by CICPA 6 times until 2003. To get in line with the international audit market, CICPA promulgated China Registered Accountants Auditing Standards (CRAAS) to replace CIAS in 2006. While developing the CRAAS, the China Accounting Standards Committee (CASC) involved the International Accounting Standards Board (IASB) in confirming the extent to which CRAAS converged with IFRS. The joint statement by CASC and IASB, issued on November 8 2005, stated that CRAAS had achieved convergence with international financial reporting standards (KPMG, 2011). Both CIAS and CRAAS clearly stated that auditors are required to sign audit reports. CIAS' *No. 7 Audit Report* states, 'Audit reports should be signed and sealed with auditors' names who are Certified Public Accountants (CPAs)'. CRAAS' *No. 1501 Audit Report Chapter 3* states, 'Audit reports should include signatures and seals of auditors who

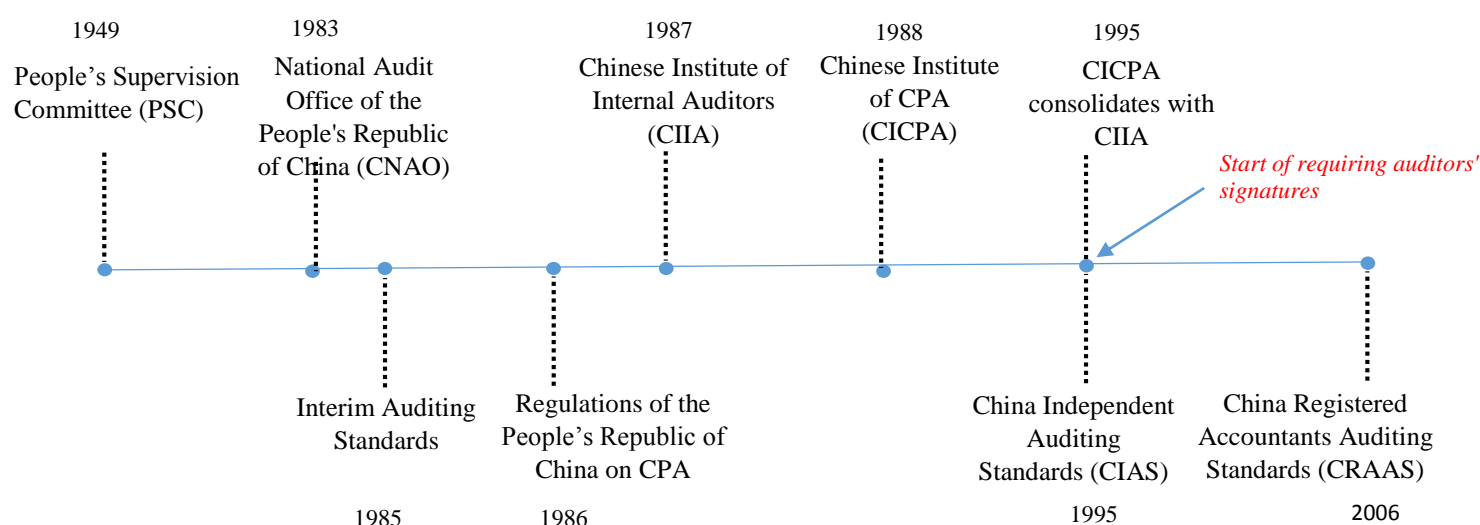


Figure 1 Development of Auditing Standards in China

are CPAs.’ China’s Ministry of Finance further specifies that an audit report is ineffective unless it is signed by two auditors who are CPAs (MOF, PRC 2001).

External accounting firms started being set up in the 1980s. After the Third Plenary Session of the 11th Central Committee in 1978, China started to open up to the outside world. Foreign-owned enterprises and joint venture enterprises started to emerge. To protect the interest of stakeholders such as creditors, shareholders and managers, external accounting firms were imperative at the time. Therefore, MOF issued interim provisions on the establishment of accounting firms in 1980. On 1 January 1981 as authorized by MOF, the first accounting firm was established in Shanghai. More accounting firms sprang up in the early 1990s with the opening of the Shanghai Stock Exchange in 1990 and the Shenzhen Stock Exchange in 1991. However, accounting firms at that time were mostly sponsored by and connected to government departments and universities as prescribed in regulations on enterprise registration issued by China State Council in 1988. The affiliation of accounting firms with the government was criticized broadly as an impediment to the independence of auditors. To improve the independence of auditors and audit quality, MOF issued regulations in 1998 to force accounting firms to be dissolved by 12 December 1999 except for those that have been entirely disaffiliated from the government. Since early 2000, accounting firms have been completely independent from the government.

According to the joint announcement from MOF and China Securities Regulatory Commission (CSRC) in 2014, 7316 accounting firms have provided professional accounting services to over 420 million entities, among which 40 limited liability partnership accounting firms are authorized by MOF to practice in stock exchange markets, including the Big Four accounting firms (KPMG, EY, Deloitte and PwC). Out of 58.9 billion RMB total revenue, 42.4 billion RMB revenue is generated by

auditing services. The Big-4 accounting firms are still dominant in listed company annual report auditing services, which is similar to other audit markets. In terms of total assets of the listed companies, nearly 86% of total assets in the stock exchange market is audited by the Big Four firms (MOF, 2014). In 2014 and 2015, respectively, 1.5 billion RMB (53.9%) and 1.7 billion RMB (41.96%) revenue of listed companies' annual audit services are from Big-4 firms (MOF, 2015). Notably, the Big-4 firms do not have an advantage in terms of client numbers. More specifically, 158 of 1743 listed companies are audit clients of Big-4 firms, an average of 40 audit clients for each Big-4 firm on average, which is less than the other 36 accounting firms that have 44 audit clients on average (MOF, 2014).

Chapter 3 Literature Review of Auditor Factors and Audit Quality

This chapter reviews the literature on factors of auditors that influence audit quality⁴. The first part reviews the auditor factors from an audit firm level perspective, and the second part reviews the auditor factors from the individual auditor level. The third part identifies the research gap.

3.1 Audit Firm and Audit Quality

Effect of Big N Audit Firm

On an audit firm level, researchers have found that an audit firm's characteristics such as size, tenure and expertise significantly impact audit quality. Firstly, Big N audit firms provide higher audit quality because they are more independent and have superior technology development and personnel training than other small to medium-size audit firms (DeAngelo, 1981, Boone et al., 2010). Big N firms are more independent because they have 'more to lose'. More specifically, if the independence of Big N audit firms is perceived to be compromised for reasons such as allowing a higher degree of discretionary accrual management, investors will view audit quality as unfavourable for all clients of Big N audit firms. As a result, clients of Big N firms will seek to either lower the audit fees or switch to other audit firms. Therefore, Big N audit firms are more independent than other small to medium-size audit firms to keep their audit clients (DeAngelo, 1981). Moreover, Big N audit firms are more advanced in their auditing technology because they have more capital to invest in technology development (Eshleman and Guo, 2014). Another advantage of Big N audit firms is that they have higher quality staff due to higher standards in their employment processes such as requiring higher education. Also, Big N audit firms provide more

⁴ The literature review only includes those studies that are most relevant to the research such as factors from auditors' perspective. Factors from clients' perspective are not included because they are not the focus of the study.

sophisticated personnel training, which further distinguishes their staff from that of other small to medium-size audit firms (Eshleman and Guo, 2014).

Evidence has been found that investors do recognise the reputation of Big N audit firms. For example, Teoh and Wong (1993) report that the earnings response coefficient (ERC) of client firms of Big N audit firms is significantly higher than those of Non-big N audit firms. Also, Boone et al. (2010) report that client firms of Big-4 audit firms have lower equity risk premiums than client firms of second-tier audit firms, indicating that investors recognise the reputation of Big N audit firms in the capital markets. On the other hand, some studies provide evidence that larger audit firms are significantly associated with decreased discretionary accruals. For example, Francis et al. (1999) report that even though client firms with higher total amounts of accruals endogenously employ Big N audit firms, they have lower amounts of discretionary accruals, which indicates Big N audit firms significantly constrain aggressive financial reporting as expected by investors and academics. Eshleman and Guo (2014) further control the endogenous choice of auditors by using a propensity-score matching procedure and find that client firms of Big N audit firms are less likely to issue accounting restatements than those audited by Non-big N audit firms.

Tenure of an Audit Firm

The second significant audit firm characteristic that influences audit quality is the auditor's tenure. There are two opposing views of how an auditor's tenure impacts audit quality. The view is that longer tenure increases audit quality as auditors gain more understanding and knowledge about their clients. The opposite view is that longer tenure decreases audit quality because the relationship between auditors and clients is too close and their independence are very likely compromised (Tepalagul and Lin, 2015). Regulators tend to take the second view because auditors are required

by auditing standards to rotate. However, studies that define audit tenure as audit firm tenure find that short audit tenure results in lower audit quality, but long audit tenure is not significantly associated with audit quality (Knechel and Vanstraelen, 2007, Ghosh and Moon, 2005, Myers et al., 2003, Johnson et al., 2002). They interpret their empirical results as a learning cost effect. In other words, auditors gain client-specific knowledge within their tenure, which is conducive to audit quality. A switch to an unacquainted client then in turn has a detrimental effect on audit quality. Rotation between firms ends learning and development between auditors within a firm.

More specifically, Johnson et al. (2002) measured audit quality by both absolute value of unexpected accruals and the persistence of the accrual components of earnings. Johnson et al. (2002) report a positive relationship between an auditor's tenure and audit quality. Myers et al. (2003) find that longer audit tenure is significantly associated with audit quality that is measured by both absolute current accruals and absolute abnormal accruals. Myers et al. (2003) further indicate that longer audit tenure results in auditors being more conservative about extreme management decisions. From the perception of investors, Ghosh and Moon (2005) find a positive relationship between an auditor's tenure and ERC, suggesting that investors perceive long audit tenure as positively associated with audit quality. Knechel and Vanstraelen (2007) examined the association between long audit tenure and an auditor's propensity to issue a going concern audit opinion for financially stressed companies and found no significant association between an auditor's long tenure and audit quality.

Expertise of an Audit Firm

Expertise is another characteristic that is significantly associated with audit quality. Firstly, academics argue that industry specialization improves audit quality in two

aspects, decrease in discretionary accruals and increase an auditor's propensity to issue modified audit opinions (Reichelt and Wang, 2010, Gramling and Stone, 2001, DeFond and Zhang, 2014). Empirical studies also find that an auditor's industry expertise does increase audit quality. Balsam et al. (2003) report that within the Big N audit firms, client firms that are audited by auditors with national industry expertise have higher ERC and lower discretionary accruals, indicating higher audit quality. Reichelt and Wang (2010) further find that auditors who are industry experts at both national and city-office levels have the lowest abnormal accruals for their client firms, suggesting joint industry expertise leads to highest audit quality. Secondly, auditors who are industry experts are more able to recognise aggressive accounting practices such as discretionary accruals because of their knowledge of the industry. Thirdly, auditors' industry expertise is more contextual, concentrating on designing audit procedures. Therefore, their audit procedures are expected to be more effective and stricter than non-expertise auditors. The propensity to issue a modified audit opinion increases based on stricter audit procedures. Fourthly, industry experts have greater incentive to protect their reputations against possible litigation liabilities. Therefore, they are more conservative in decreasing discretionary accruals of client firms and less likely to issue an unqualified audit opinion under pressure (DeFond and Zhang, 2014, Reichelt and Wang, 2010).

3.2 Individual Auditor and Audit Quality

Audit Partner and Audit Quality

Busyness of audit partners

Calls for individual auditor studies have been on-going for some time (DeFond and Francis, 2005, DeFond and Zhang, 2014). In response, researchers have stepped further from investigating audit firm's characteristics to examining audit partner's

characteristics. However, studies on individual auditors are still limited due to the availability of data (Gul et al., 2017). A unique characteristic of audit partners that significantly affects audit quality is their busyness. The argument is that auditors' efforts are significantly associated with audit quality. More specifically, more audit effort leads to higher audit quality because it increases auditors' opportunity to detect problems (Caramanis and Lennox, 2008). If audit partners are working on multiple assignments at the same time, their effort will be dissipated, resulting in lower audit quality (Gul et al., 2017).

Several empirical studies provide evidence that the busyness of audit partners is significantly associated with audit quality. Gul et al. (2017) report that the number of clients of an audit partner is significantly negatively associated with audit quality in public firms. For example, when audit partners have more clients, their clients' earnings management is significantly higher than that of clients audited by audit partners with fewer clients, whose clients appear to be more likely have a small earning in the current year and to suffer a loss in the lagged year. Audit partners are less likely to issue a going concern opinion when they are busier with more clients (Gul et al., 2017). Sundgren and Svanström (2014) find similar evidence in the private sector. Using private companies in Sweden, they find that auditors with larger portfolios of clients are less likely to issue a going concern opinion. Goodwin and Wu (2016) suggest that there is an equilibrium of the number of clients for an audit partner. They show that discretionary accruals of the client firms and an auditor's propensity to issue a modified audit opinion are not significantly impaired within the optimal of client firm numbers. A significant negative impact on audit quality only occurs when the number of clients exceed the optimal level (Goodwin and Wu, 2016).

Expertise of audit partners

Similar to auditor expertise on the audit firm level, studies also address how expertise on the individual auditor's level affects audit quality. The audit partners are supposed to have both capabilities and incentives to maintain a high level of audit quality. Firstly, audit partners are able to have significant influence on audit quality (Chi and Chin, 2011). Audit partners are involved in judgements on key audit procedures, and most importantly, they determine the type of audit opinion to be issued. Secondly, audit partners have incentives to maintain high audit quality because their remuneration schemes depend on their audit performance. Low audit quality results in a loss to their reputation, which turns out to be a loss of clients. Their remuneration decreases if they lose clients. Moreover, audit partners are ultimately responsible for the audit report. Therefore, they have an incentive to maintain a high level of audit quality to protect themselves from litigation (Chi and Chin, 2011). All in all, a specialized audit partner is expected to increase audit quality by utilizing his/her ability and incentives.

A bunch of empirical studies provides evidence echo the argument about how an audit partner's expertise is associated with audit quality. Hsieh and Lin (2015) indicate that auditor partners who are industry experts have incentives to protect their reputations. More specifically, industry expert auditors are less likely to accept client firms with higher financial risks than non-industry expert auditors. Moreover, Lee et al. (2017) suggest that client firms audited by industry specialized audit partners issue more transparent financial statements than those audited by industry non-specialized audit partners. Lee et al. (2017) test the association between client ranks in the Information Disclosure and Transparency Ranking System (IDTRS) and their auditor's expertise and find a positive relationship between a client's rank and its auditor's industry

expertise. Chi and Chin (2011) show that specialized audit partners are more likely to issue a modified audit opinion than non-specialized audit partners, indicating that audit quality is higher for specialized audit partners than non-specialized audit partners. Furthermore, the audit quality is at the highest level when auditors are experts at both the audit firm level and the audit partner's level (Chi and Chin, 2011).

Tenure of audit partners

The tenure of audit partners is another significant factor of individual auditors that influences audit quality. Regulators are concerned that auditors' longer tenure with client firms increases the probability of compromising their independence. As a result, a mandatory rotation requirement for audit partners has been added to the auditing standards. For example, in the Sarbanes-Oxley Act of 2002 (SoX Act) under title II-Auditor Independent, sec. 203 requires that the lead partner and partner who is responsible for reviewing the audit should not provide audit services to the issuer if the firm has provided audit services to that issuer for 5 consecutive years. In response to the concerns from the regulators, many studies have investigated how an audit partner's tenure affects audit quality. However, the evidence appears to be mixed. While some studies provide evidence that audit quality is negatively affected by long audit tenure, some studies find long audit tenure does not impair audit quality. Moreover, the relationship is associated with other factors such as the auditor's industry expertise, client size and investors' knowledge (Gul et al., 2017, Manry et al., 2008, Ghosh and Moon, 2005, Azizkhani et al., 2012).

More specifically, Chen et al. (2008) show that when an audit partner's tenure and the audit firm's tenure are analysed simultaneously, the audit firm's tenure is not significantly associated with audit quality measured by the absolute value of discretionary accruals, indicating that the audit partner's tenure is more associated

with the audit firm's tenure. Moreover, Chen et al. (2008) report that an auditor's tenure is actually negatively related with discretionary accruals, which is not what regulators are concerned about. Further controlling for client size, Manry et al. (2008) report that audit quality measured by estimated discretionary accruals of clients does not vary with the audit partner's tenure when the client size is big, whereas the audit quality of a small-size client is negatively associated with the audit partner's tenure. On the contrary, Carey and Simnett (2006) find that audit tenure is negatively associated with an auditor's propensity to issue a going concern audit opinion for stressed companies, indicating a decrease of audit quality, which supports the regulators' concerns. Furthermore, Bedard and Johnstone (2010) report that newly rotated engagement audit partners are more sceptical in designing audit procedures, suggesting increased professional scepticism is the reason for the increased audit quality.

Audit Manager and Audit Quality

Audit managers are critical to audit quality. The American Institute of CPAs' federal assistance audit quality task force determined what contributes to audit quality for federal inspectors general (IGs) when they are performing quality control reviews (unlike desk reviews that only involve audit reports, they also review audit working papers). Based on analysis of 93 responses, Aldhizer III et al. (1995) report 11 attributes of auditors that are significantly associated with audit quality. One significant characteristic to maintain audit quality is that audit managers' time on the engagement should represent a large percent of the total audit hours. Aldhizer III et al. (1995) further suggest that the extent of an audit manager's involvement is significant to audit quality. The reason for the importance of audit managers' involvement is their critical roles within the audit team. Large audit firms have a clear hierarchical

structure in which the audit manager directly report to an audit partner and senior associates directly report to the audit manager (Otley and Pierce, 1996). Otley and Pierce (1996) indicate that because the formal evaluation of senior associates' performance is carried out by the audit manager, the behaviour of the audit manager is expected to be an important influence on their behaviours. Furthermore, while audit partners are ultimately responsible for the audit report, audit managers are the leaders of the audit team. Audit partners base their judgements heavily on the audit manager's work. Because of the high charge rate, audit partners are focused on reviewing audit reports, while audit working papers are mainly reviewed by audit managers. The quality of audit working papers is an important part to audit quality (Aldhizer III et al., 1995). Hence, audit managers are critical to audit quality.

Several researches have reported the expertise of audit managers has a significant influence on audit quality. For instance, Bamber and Ramsay (2000) in their experimental study find that specialized audit managers are more confident in their audit working paper review task and less calibrated. Moreover, specialized audit managers spend more time in reviewing audit working papers, indicating an increase of professional scepticism (Bamber and Ramsay, 2000). A similar positive effect between an audit manager's expertise and audit quality is also found by Owahso et al. (2002). Owahso et al. (2002) organized an experiment in which senior associates and audit managers were put into three groups consisting of senior associates only, audit managers only and both senior associates and audit managers. The findings indicate that specialized audit managers are more effective in detecting conceptual errors compared to non-specialized audit managers. Tan and Jamal (2001) in their experimental study find that audit managers review known senior associates' work more favourably than that of unknown seniors, but outstanding audit managers are not

susceptible to this effect. Tan and Jamal (2001) further suggest that the ability to objectively review audit working papers is another expertise of audit managers that impacts audit review quality.

3.3 Identity Disclosure/Signature of Auditors and Audit Quality

Of the most relevance to our study is the identity disclosure/signature of auditors' impact on audit quality. Recent studies mainly focused on examining how disclosures/signatures of audit partners impact audit quality due to the availability of data. With the new requirement of mandatory disclosure of the audit partner's identity, effective in 2017 in U.S., studies on this characteristic can be grouped into U.S. studies and international studies.

U.S. Jurisdiction

On 9 May 2016, the SEC approved the proposal from PCAOB on disclosure of certain audit participants (Form AP) and related amendments to auditing standards (Rules 3210 and 3211) (SEC, 2016). Under Rule 3211, for each audit report it issues for an issuer, a registered public accounting firm must file with the PCAOB a Form AP that includes the disclosure of the names of engagement partners. The requirement of disclosure of engagement partners' identity is applicable for audits of all issuers and emerging growth companies after 31 January 2017 (PCAOB, 2015, SEC, 2016). In fact, the rule of the disclosure of engagement partners is not new. In 2009, PCAOB issued a Concept Release proposing a requirement that included the engagement partner's signature on the audit report in addition to the firm's name (Board, 2009). By the end of the comment period, PCAOB had received 23 letters commenting on the Concept Release, of which 17 were disputes from practicing auditors directly or organizations that represent practicing auditors (Bailey et al., 2010, King et al., 2012). In 2011, PCAOB replaced its proposal requiring the engagement partner's signature

on the audit report with a disclosure of the engagement partner's identity in Form AP, arguing that the disclosure serves the same purpose as the signature (PCAOB, 2011).

There are mainly two arguments for the disclosure of the engagement partner's identity. Firstly, it increases transparency of the audit process if the identify of the engagement partner who serves as a central pivot to the audit work is disclosed to the public (King et al., 2012). This transparency increase received from strong support from investors (LLC, 2014, Reid and Youngman, 2017). Secondly, the responsibility and accountability of the engagement partner for the audit report is increased by disclosing the engagement partner's identity, improving audit quality as a result (Cole, 2014, King et al., 2012, PCAOB, 2015).

As the new rules take effect and the engagement partner's identity is available to the public on PCAOB's website, researchers have found supportive empirical evidence for them. Burke et al. (2017) report that audit quality has improved after the disclosure of the engagement partner's identity by comparing the discretionary accruals level of the listed companies that have the same public accounting firms before and after the filing of Form AP, on which the identity of the engagement partner is disclosed. Moreover, the investors and shareholders have benefited from more timely information through a decrease in the number of days between the audit report issue date and the financial year reporting date (Burke et al., 2017). By making an analogy to the increase in audit fees after the application of Section 404 of Sarbanes-Oxley, Bailey et al. (2010) predict an increase in audit fees when Rule 3211 went into effect. Burke et al. (2017) find a significant increase in audit fees after Rule 3211 took effect in 2017. In an experimental study, Brown et al. (2017) find that the engagement partner reports less aggressively and exerts more effort when his or her identity is disclosed to the public than when it is unknown to the public, suggesting

that disclosure of the engagement partner's identity increases audit quality. Lee and Levine (2016) find a similar effect. In another experimental study, Lee and Levine (2016) compare the effort of engagement partners between partnership identification setting and the engagement partner's identification setting and find that engagement partners under the engagement partner's identification setting have higher incentives by increasing accountability. The need for the partnership's internal monitoring for motivating engagement partners to exert higher effort decreases as well.

There are many arguments against disclosure of the engagement partner's identity. The main argument is that there could be a ceiling for an auditor's accountability (King et al., 2012). The expectation of increasing an auditor's accountability by disclosing an engagement partner's identity implies that the current auditor's accountability is insufficient. With the current audit quality control standards in place, existing quality control mechanisms at the firm level, the audit committee, the stock exchanges, and PCAOB and the SEC, it is unlikely that engagement partners are insufficiently motivated to be accountable (Anderson et al., 2014). Cunningham et al. (2017) conduct a difference-in-difference analysis for companies between pre- and post-Rule 3211 implications and suggest that there is no difference of audit quality in terms of performance-adjusted discretionary accruals between treatment groups and control groups. In fact, Bagley (2010) suggests that multiple accountabilities can negatively affect auditors. In an experimental study, Bagley (2010) examines whether multiple accountabilities affect auditors' performance in both low and high audit tasks and finds that when auditors are accountable to multiple parties, they have negative affects, emotional states and moods. These negative affects in turn harm auditors' performance in both low and high complexity audit tasks.

Moreover, the client governance body, which is usually the audit committee, should communicate with the audit engagement team closely as required by auditing standards. Because the audit committee is elected by shareholders to represent their interests, the identities of engagement partners are already known to the shareholders indirectly (Bailey et al., 2010). The disclosure of an engagement partner's identity to the public exposes the engagement partner personally to higher litigation risk. Using a 2 x 2 between-participants experimental design, Lambert et al. (2017) show that investors are less likely to invest in the highest-performing company when it is linked to a restating company through disclosure of the identities of engagement partners than when linked through an audit firm only, suggesting that investors attribute more blame to engagement partners for a negative outcome due to disclosure of the engagement partner's identity. In fact, disclosure of the engagement partner's identity may result in partners being more conservative than the optimal level of what the audit firm requires, which in turn can reduce the efficiency of the audit (Carcello and Santore, 2014). For example, in an experimental study with 83 partner participants, Cianci et al. (2016) manipulate the audit partner's identity disclosure at three levels ((i.e. no identification, disclosure identification, signature identification) and find that the disclosure of an engagement partner's identity yields more aggressive write-down judgements than when the engagement partner's identity is not disclosed. Cianci et al. (2016) suggest regulators should be aware of unintended consequences of accountability-inducing regulations.

International Jurisdictions

While the U.S. just adopted the requirement of disclosure of the engagement partner's identity in 2016, many other jurisdictions have already implemented this requirement. By the end of 2015, 16 (Japan, United Kingdom, France, Germany, Australia, India,

Brazil, China, Switzerland, Spain, Russian, Federation, the Netherlands, South Africa, Sweden, Mexico, and Italy) of the 20 countries with the largest capitalization markets have required the disclosure of the engagement partner's identity. The four that did not have such a requirement at that time are the United States, Canada, Republic of Korea, and Hong Kong (PCAOB, 2015). Studies on the disclosure of the engagement partner's identity in these various jurisdictions provide mixed empirical results.

Carcello and Li (2013) examine this issue in the UK based on the passage of the Companies Act ("the Act"). The Act requires the engagement partner to sign the audit report for financial years ending in April 2009 or later. To test audit quality and fee changes following the Act, Carcello and Li (2013) use a pre-post design with and without control samples of companies from the U.S. and other European countries. Their findings generally indicate that audit quality and audit fees are higher for UK companies after the mandatory signature requirement. What is more, Liu (2017) suggests an improvement in the analysts' environment in UK through increased audit quality after the requirement of disclosure of the engagement partner's identity. Liu (2017) compares the analysts' absolute forecast errors and forecast dispersion and finds a significant decrease between a 2-year pre- to 2-year post-signature period in the UK with firms of control groups listed in France, Germany, and the Netherlands, where the engagement partner's signature requirement is already in place. Research also shows a positive capital market reaction to the mandatory disclosure of the engagement partner's identity in UK. John et al. (2017) compare the cost of capital (measured by either bond yields or PEG ratio) and firm value (measured by Tobin's Q) between pre- and post-engagement mandatory partner signature period and find both a significant decrease in cost of capital and a significant increase in firm value. The

positive reaction of the market to the disclosure of engagement partners' identity is also documented in studies in Sweden and Taiwan.

Using data from Sweden, Robert Knechel et al. (2015) find that both audit aggressive and conservative reporting persists over time with different clients of the same engagement partner, suggesting that report style is a systematic attribute of an engagement partner. Furthermore, Robert Knechel et al. (2015) suggest that the credit market recognizes this attribute of engagement partners with higher implicit interest rates, worse credit ratings, and a higher likelihood of insolvency of clients audited by an engagement partner that has an aggressive report style. The positive association between the engagement partner's identification and market reaction is also found in Taiwan. Using data from Taiwan, Aobdia et al. (2015) suggest an engagement partner's audit quality matters to capital market participants. More specifically, there is a positive association between the engagement partner's audit quality and the client firm's earnings response coefficient. When audited by higher quality engagement partners in initial public offerings (IPOs), firms experience smaller under-pricing and better debt contract terms. The market also reacts positively if a lower quality engagement partner is replaced by a higher engagement partner (Aobdia et al., 2015).

However, a study in Netherlands finds no positive association between an engagement partner's identity disclosure and audit quality. Blay et al. (2014) compare audit quality before and after the requirement of the audit partner's identity disclosure in Netherlands and report no improvement of audit quality as proxied by measurements such as abnormal accruals and meeting earnings benchmarks.

Identity Disclosure or Signature

These studies on the effect of disclosure of an auditor's identity mainly focus on two aspects, auditors' accountability and market creditability. More specifically, researchers who compare the audit quality before and after the adoption of auditors' identity disclosure are studying auditor identity disclosure from an accountability perspective. Under this perspective, researchers use audit quality proxies such as audit opinions, meeting analysts forecasts and abnormal accruals as indicators of the results from auditors' accountability (i.e., Carcello and Li, 2013, Blay et al., 2014, Burke et al., 2017). This perspective is also more direct compared with another stream of studies using market reactions.

From a market reaction perspective, researchers study the effect of auditors' identity disclosure from the stakeholder's perspective. The argument is that the audit report is a measure of the credibility of financial statements. The demand for auditing arises because of information asymmetry between firm management and stakeholders. A better audit decreases information asymmetry by increasing the transparency of financial statements. As a result, the stock market reacts to the release of financial statements differently based on the audit quality. Firms that release financial statements with higher audit quality are expected to receive a positive reaction from stock markets and vice versa (i.e., Liu, 2017).

While several studies address the effect of auditors' identity disclosure on financial statement quality and market reaction, another study investigates the effect of a different form of auditors' identity disclosure. There are mainly two ways to disclose auditors' identities. One is by disclosing an auditor's information such as name and ID number in the database, and the other is disclosing an auditor's information by requiring the auditor to sign his or her names on the audit report, as in China. The

different form of auditors' identity disclosure could also result in the difference in audit quality. Empirical evidence from other disciplines such as education and marketing indicates that mandatory requirement of signing names on a document changes the behaviours of the signatory. Particularly, the signatories are more mindful and considerate in their conduct compared with non-signatories. However, only limited studies compare the effects on audit quality from different auditor identity disclosure forms in accounting discipline. Researchers are calling for more studies in this area (King et al., 2012).

Chapter 4: Theory and Hypothesis Development

4.1 Accountability

The main argument of PCAOB in disclosing engagement partners' identity is that they will be more accountable for the audit report if their identities are known to the public. This increased accountability will increase audit quality (Board, 2009, PCAOB, 2011, PCAOB, 2015). The notion of accountability can be traced back to 1985, when Tetlock (1985) proposed a new measure that complemented the traditional cognitive research programme. Tetlock (1985) argues that traditional cognitive research relies mainly on experiments conducted within laboratories. Although this isolation provides favourable conditions to study determinants of human's cognitive and information processes, the generality of the findings is limited because the relative simplicity of a laboratory setting makes it difficult to apply the experimental findings to the real world. Therefore, accountability of conduct should be attributed to a universal feature of every natural decision-making environment. Moreover, people are either approval- or status-seekers. In other words, people are motivated to protect and enhance their social images or identities to those to whom they are accountable.

With the assumptions that accountability is a universal feature in decision-making and that people are approval- or status-seekers, Tetlock (1985) further proposes three generally adopted strategies to cope with accountability. The first is to simply make decisions that are acceptable to others (the acceptability heuristic). This strategy is bolstered by the notion that people are cognitive misers. It is often adopted by decision-makers when the view of those to whom they are accountable is obvious. In situations in which the norms are unknown, accountability will be a potent inducement to get people to abandon for being cognitively miserly and become more

vigilant, more complex and self-critical information processors. More specifically, people who are accountable to unknown others will consider both the positive and negative sides of issues more thoroughly to prepare themselves for the potential challenges a wide variety of unknown others may pose. Another possibility is that people will not be persistent in their initial beliefs (primacy effect) and will become more responsive to evidence. People will also be more aware of their cognitive strategies in making decisions. However, the second strategy only benefits when the views of those to whom people are accountable is known before the decision-making process (prospective rationality). When people only want to be accountable after the decision has been made, the third strategy is to search for justifications or excuses to free themselves from undesirable results arising from their decisions. The third strategy is harmful because it motivates people to over-assimilate new evidence in bolstering previous decisions. Besides the three general strategies to cope with accountability, Tetlock (1985) also recognises that each strategy is not mutually exclusive and that some situations give rise to a hybrid response to accountability. For example, people may be accountable to not only one but many individuals whose views may be either harmonious or in conflict. In other situations, the views of those to whom people are accountable may not be perfectly known or unknown. Sometimes, people may be called upon to be accountable both for decisions they have already made and decisions they have yet to make. All in all, a hybrid response will be chosen in such situations.

The empirical evidence is predominantly provided from experimental studies following the traditions of psychology. The results highlight that when the views of those to whom people are accountable are known, they tend to accept those views. However, decision-makers also try to minimise their cognitive effort and employ

situation-contingent strategies whenever possible. For example, types of audit opinions vary when auditors are accountable to different parties such as current clients, superiors and partners (Buchman et al., 1996); when audit managers are more likely to recommend bid to clients with aggressive accounting treatments in cost of research and development when their audit partners are aggressive in practice development (Cohen and Trompeter, 1998); when audit partner's exposed risk assessment has a significant influence on the accountable audit manager's risk assessment (Tan et al., 1997); and when audit managers make judgements on a client's going concern more consistently with partners if they know their partner's judgement beforehand (Wilks, 2002).

On the other hand, research results also support that accountability leads to more critical, integrative and analytical thinking. However, this is only effective when the views of those to whom people are accountable are unknown. For example, tax professionals make more effort when they are accountable than when they are not in the information search phase of a tax research task (Cloyd, 1997). Furthermore, effort-related bias (recency effect) is more significant for executive MBA students who do not have experience in auditing than for auditors, but recency effect is mitigated when executive MBA students become accountable (Kennedy, 1993). In addition, accountability of managers increases the use of unique measures to achieve strategic objectives of the business (Libby et al., 2004). Similar findings can be found in auditing settings. For example, accountable senior associates demonstrate higher consensus and self-insight in evaluating inventory obsolescence tasks than non-accountable senior associates (Johnson and Kaplan, 1991), senior associates are more conservative in fraud assessment when they are held accountable than when they are not (Hoffman and Patton, 1997), and senior associates increase the breadth of testing

in investigating the unexpected gross margin fluctuation when they are accountable to a superior with unspecified preference (Asare et al., 2000). Furthermore, King et al. (2012) argue that at least two conditions have a positive impact on accountability. Firstly, the subjects should be accountable to those who have unknown views; and secondly, the subjects should be aware of the possible justification in the future before they make decisions.

4.2 Accountability Performance Difference between Audit Partners and Audit Managers

The literature indicates that accountability performance is determined by both subjective characteristics (such as knowledge and problem-solving ability) and level of accountability (Rich, 2004, DeZoort et al., 2006, Tan and Kao, 1999). In the auditing context, accountability performance is audit quality. Accordingly, audit quality (accountability performance) is determined by the auditors' level of accountability (i.e. the disclosure of the auditor's identity) and characteristics such as error detection ability (personal characteristics). This theory also supports regulators' argument that disclosure of an auditor's identity increases the auditor's accountability (level of accountability) as well as audit quality (accountability performance).

Audit managers and audit partners are different in both level of accountability and characteristics such as error detection ability. Firstly, audit managers are different from audit partners in level of accountability. The difference in accountability between an audit partner and an audit manager may lead to different impacts on audit quality (Bell et al., 2008, Knechel and Payne, 2001, Aldhizer III et al., 1995). When audit partners sign the audit report, they become accountable to the public. The views of the public are unknown to the audit partners because people from different parties may have different views. Therefore, audit partners are more likely to cope with their

accountability more carefully according to accountability theory. On the other hand, audit managers are lower in rank than audit partners, and they are accountable to audit partners. The audit partner's view may be known to audit managers. Moreover, when audit managers sign the audit report, they become accountable to the public, whose view are unknown. Therefore, a hybrid response to accountability may arise because audit managers may know the audit partner's view, but not the public's view. In sum, we expect that when signing auditors include audit managers, the audit quality will be higher. We develop our first hypothesis as thus.

H1₀: *Audit quality is lower when an audit manager is a signing auditor compared to when no audit manager is a signing auditor.*

(H1: Firms with audit managers signing the audit reports have higher audit quality than firms without any auditor managers signing the audit reports.)

Secondly, the audit quality could be higher when signing auditors include both audit partners and audit managers (PM) compared with either only audit partners (PP) or only audit managers (MM), because there could be a diversification effect when there are both audit partners and audit managers acting as signing auditors. Studies have found that gender diversification increases audit quality due to differences in information, experience, knowledge, and views of male auditors and female auditors (Srinidhi et al., 2017). Similarly, audit managers are different from audit partners in terms of their knowledge. To improve audit effectiveness, auditing standards require superior auditors to review the work of their subordinates (AICPA, 2001). In practice, audit firms adopt a hierarchical review process in which associates' work is reviewed by audit managers and audit managers' work is reviewed by audit partners (Harding and Trotman, 1999). This hierarchical review process has two characteristics. One is that senior auditors concentrate more on conceptual errors, while subordinates

concentrate more on mechanical errors (Ramsay, 1994, Harding and Trotman, 1999). Due to the competitive audit market, audit firms save costs including those attributable to the review process, and both partners and managers mainly focus on reviewing job due to their high charge rate (Carcello et al., 1992). However, audit managers work more frequently with senior associates than audit partners do (Tan and Jamal, 2001). Audit managers are not only involved in reviewing auditing working papers, but also in administering fieldwork, whereas partners are mostly involved in the reviewing process. Another characteristic is that audit preparers effectively engage to take advantage of stylized working papers to persuade audit reviewers of the appropriateness of the audit process and the conclusions reached due to the motivation of reputation enhancement (Rich et al., 1997). Being in the middle of this hierarchical review process, audit managers are both senior auditors (audit reviewers) to the audit associates and junior auditors (audit preparers) to the audit partners.

H2₀: The audit quality is lower when signing auditors include both an audit partner and an audit manager compared to when signing auditors include either only audit partners or only audit managers.

(H2: Firms audited by a partner-manager pair have higher audit quality than firms audited by other auditor pairs.)

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Chapter 5: Research Method

5.1 Sample Construction

Despite the legislative difference between China and the U.S., the Chinese government has been actively engaged in the process of converging Chinese accounting standards with IFRS. On February 15, 2006, the Chinese Ministry of Finance announced the introduction of new Chinese accounting standards for business enterprises, effective January 1, 2007. The new accounting standards are collectively known as the New PRC GAAP, which consists of one basic standard and thirty-eight special treatments for specific issues. The China Accounting Standards Committee (CASC), while developing the New PRC GAAP, involved the International Accounting Standards Board (IASB) in confirming the extent to which the New PRC GAAP converged with IFRS. The joint statement by CASC and IASB, issued on November 8, 2005, stated that New PRC GAAP had achieved convergence with International Financial Reporting Standards (KPMG, 2011). To this extent, the Chinese audit market is comparable to the U.S. audit market.

Following the literature, our financial data are retrieved from the China Stock Market and Accounting Research database (CSMAR) from 2002 to 2017. We start our sample period at fiscal 2002 to mitigate the possible effects of the 1998 disaffiliation program on audit firms. Also in 2001, China's Ministry of Finance (MOF, 2001) clearly specified that an audit report is ineffective unless it is signed by two auditors who are qualified CPAs. Then, we collect information of signing auditors from a public enquiry system in the CICPA website (available at <http://cmis.cicpa.org.cn>, in Chinese). Data on individual auditors' demographic information are also obtained from this source. We manually input each auditor's full name into the relevant search

fields and match the search results with the audit firm and individual auditor data collected from companies' annual reports⁵.

5.2 Methodology

Auditor Signature Pattern

We firstly develop an auditor pair choice model to compute the propensity scores used to create the matched sample. The research identifies various factors that affect the choice of audit firms. In the context of a single audit, research shows that client firms are more likely to choose Big Four auditors when they are larger size, are growing and are more complex because Big Four auditors are believed to be able to provide more specialized services ((Lobo et al., 2017). Moreover, client firms with better profitability are also more able to hire Big Four auditors that charge higher audit fees. What is more, client firms that are more leveraged are more likely to have Big Four auditors as required by their creditors that demand more external scrutiny (Lennox and Pittman, 2010, Francis et al., 2009, Becker et al., 1998). On the other hand, in the context of joint audit setting, Francis et al. (2009) and Lobo et al. (2017) report that choice of client firm pairs is affected by factors such as cross-listing status, percentage of free float and ownership.

However, the factors for the choice of audit firms may not necessarily directly apply to the choice of signing auditor pairs. For example, a growing company's audit report may not need to be signed by two audit partners. It may be too expensive to have two partners signing the audit report. Replacing audit partners with audit managers may save costs. Moreover, with respect to audit firms, an audit team may have an audit

⁵ We collect our data in the year of 2018, which is the most updated information of auditors. Auditors' positions may change over years. For example, an audit partner at the present time may have been an audit manager in previous years, but current audit managers were still audit managers in previous years. Therefore, our sample has less PM/MM pairs than the original population, which makes our sample more conservative. We also conduct our test using 2016 as the latest year only in additional analysis, and our results are not changed.

manager as a signing auditor to share the audit risk with the audit partner when the client firm has a higher risk. Also, when audit partners are too busy because they have too many clients, the audit firm may have audit managers sign the audit report instead of audit partners. Similarly, it is less likely to have two audit partners signing the audit report when the audit firm simply has fewer audit partners. Therefore, based on the literature and context of our study, we estimate the following probit model to explain the auditor pair choice:

$$SIGNATURE_1 = \alpha + \beta * AuditFirm_i + \gamma * Project_i + \delta * Controls_i + \varepsilon_i \quad (1)$$

where $Auditor_SP_i$ is the dummy variable that equals to 1 if signing auditors include an audit manager and 0 otherwise;

$AuditFirm_i$ is the audit firm characteristic variable including whether or not the audit firm is one of the Big Four audit firms (AUDITOR), the ratio of audit partners over their firm's total number of clients (Ratio_PC);

$Project_i$ is the project characteristic variable including abnormal audit fees (abnAF1), client risk (LEVERAGE) and client profitability (ROA);

$Controls_i$ are control variables identified in the literature (Francis et al., 2009, Lobo et al., 2017) as factors that might affect the choice of auditor pair, including asset growth (growth_A), earnings volatility (VOLATILITY), client complexity (Complex), client market-to-book value (MB), if client firm suffers a loss in the current year (LOSS), year-fixed effects (i.year) and industry-fixed effects (i.industry);

and ε_i is the error term.

Audit Quality

We use the predicted probabilities computed from the *SIGNATURE_1* model to match each firm with audit reports that are signed by at least one audit manager with a firm with audit reports that are not signed by audit managers. Moreover, we impose a 5% maximum distance in the propensity score to exclude firms without a reasonable match in the sample. Within the propensity score matched sample, we then examine the relationship between the audit quality and signing auditor pair by estimating the following model:

$$\text{Audit_Quality}_i = \alpha + \beta * \text{Auditor_SP}_i + \delta * \text{Controls}_i + \varepsilon_i \quad (2)$$

where Audit_Quality_i is represented by discretionary accruals (DACC), propensity to measure modified audit opinions (MAO) and audit fees (AF).

SIGNATURE_1 is our interest variable, which is the dummy variable that equals to 1 if signing auditors include an audit manager and to 0 if signing auditors do not include any audit managers;

Controls_i are control variables identified in studies as the possible factors that might affect audit quality, which include four sectors: audit firm characteristics, client firm ratios, client firm internal governance and fixed effects. To control firm characteristics, we control whether the audit firm is a Big Four firm (AUDITOR), number of days from financial year end and audit report issue date. To control client firm ratios, we control earnings volatility (VOLATILITY), profitability (ROA and LOSS), leverage (LEVERAGE), market-to-book ratio (MB), growth (growth_A) and complexity (COMPLEX). To control the level of client firm internal control, we control the company age (Company_age) and board size (board_size). Moreover, we control the fixed effects of financial year (i.year) and industry (i.IND);

and ε_i is the error term.

5.3 Variable Measurements

Audit Quality

Because audit quality is unobservable, we adopt three commonly used proxies for audit quality: discretionary accruals (DACC), the likelihood a client firm receives a modified audit opinion (MAO) and audit fees (AF1). Audit quality is higher if clients (1) have lower discretionary accruals, (2) are more likely to receive a modified audit opinion and (3) expense less audit fees.

Discretionary accrual

Following the literature (e.g., Gul et al., 2013, Francis et al., 2005), our abnormal accruals measure is defined as the regression residuals estimated from the modified version of Dechow and Dichev (2002) model. The model expresses working capital accruals as a function of lagged, current and future operating cash flows, as well as sales growth and the level of fixed assets, as follows:

$$\Delta WC_t = \alpha + \beta_1 CFO_{t-1} + \beta_2 CFO_t + \beta_3 CFO_{t+1} + \beta_4 \Delta Sales_t + \beta_5 PPE_t + \varepsilon_i \quad (2.1)$$

where ΔWC_t is working capital accruals in year t , computed as operating net income plus depreciation, amortization and financial expenses, minus operating cash flows from *Equation 2.1.1*.

$$\Delta WC_t = \text{Operating Net Income}_t + \text{Depreciation and Amortization}_t - \text{Financial Expense}_t - \text{Operating Cash Flow}_t \quad (2.1.1)$$

CFO_{t-1} , CFO_t , and CFO_{t+1} are operating cash flows in years $t-1$, t , and $t+1$, respectively. $\Delta Sales_t$ is sales growth from $t-1$ to t , and PPE_t is the gross value of fixed

assets. All these variables are scaled by the average of the beginning and ending total assets in year t to reduce heteroscedasticity.

The model is estimated cross-sectionally in each industry year. We use the two-digit code for the manufacturing sector and one-digit code for other sectors, following the CSRC industry classification scheme, and require that there should be at least ten observations in an industry-year combination to estimate the regression.

According to H_0 , we expect our interest variable *SIGNATURE_1* to be negatively associated with *DACC* because studies show that higher audit quality indicates more conservative accounting and hence is associated with less discretionary accruals (Carcello and Li, 2013, Gul et al., 2013, Francis et al., 2009, Lobo et al., 2017).

Audit opinion

Our second proxy of audit quality is the propensity of an auditor to issue a qualified audit opinion for year t . There are two main types of audit opinions as defined in both CIAS and CRAAS: unmodified audit opinions (UMAOs) and modified audit opinions (MAOs). UMAO is the same as unqualified audit opinion in ISA and GAAP. MAOs include four subcategories: (1) unqualified opinions with explanatory notes, (2) qualified audit opinions, (3) disclaimed audit opinions, and (4) adverse audit opinions. Both CIAS and CRAAS require that audit firms issue qualified (disclaimed or adverse) opinions for (1) CIAS or CRAAS violations, (2) scope limitation, or (3) inconsistencies in applying accounting standards, and allow audit firms to use explanatory notes to indicate significant events, such as pending lawsuits. Following the literature (Chi and Chin, 2011, Gul et al., 2013), we define an indicator variable, MAO, which equals 1 if a client receives a modified audit opinion and 0 otherwise.

According to our H_0 , we expect our interest variable *Auditor_SP* to be positively associated with MAO because studies have found that higher audit quality indicates more conservative accounting and a lower threshold for auditors to issue MAOs.

Audit Fee

Our third proxy of audit quality is audit fee (AF), which is measured as the actual audit fees for year t . We expect *Auditor_SP* to be negatively associated with audit fee (AF1) for two reasons. Firstly, studies have found that audit quality is negatively associated with audit fees because a large audit fee could impair auditors' independence and in turn lower audit quality (Hoitash et al., 2007); Secondly, audit managers compared to audit partners charge lower audit fees. Therefore, audit firms may charge lower fees if the signing auditors include audit managers compared to if the audit report is signed by both audit partners.

Control Variables

Control Variables—Discretionary Accrual Model

Big Four Auditors

Big Four audit firms (AUDITOR) are measured as a dummy variable that equals 1 if the auditor firm is one of the Big Four audit firms and 0 otherwise. Prior research suggests that Big Four auditors are less likely to allow earnings management than non-Big Four auditors (Frankel et al., 2002, Francis et al., 1999). Hence, we include AUDITOR as a control for audit firms and expect it to be negatively associated with DACC.

Audit Report Lag

Audit report lag (DELAY) is measured as the number of days between the financial year end and audit report issue date. According to CSRC (2007), Chinese listed companies are required to disclose their financial statements within 4 months of the financial year end. Studies suggest that delaying audit report issuance is an indication of more audit effort because of the time taken to complete the year-end audit and that spent in audit-client negotiations (Whittred, 1980). Hence, we expect DELAY to positively associate with audit quality.

Earnings Volatility

Earnings volatility (VOLATILITY) is measured as the standard deviation of annual sales over the prior 3 years. We put this control variable into our models because prior studies show that earnings volatility is associated with audit quality (Carcello and Li, 2013). Consistent with the literature, we expect it to negatively associate with audit quality.

Return on Asset

Return on asset (ROA) is measured as net income over total assets. We include ROA to control for the operating risks of client firms. Consistent with the literature, we expect a negative relationship between ROA and audit quality (Wang et al., 2014).

Leverage

Leverage (LEVERAGE) is measured as total debts over total assets. We include this variable to control for the financial distress of the client firms. Because studies report that firms suffering more severe financial distress are more likely to aggressively manipulate their earnings (Lennox and Pittman, 2010, Becker et al., 1998). Therefore, we expect LEVERAGE to negatively associate with audit quality.

Growth Prospect

We use MB (market-to-book ratio, measured as the book value of equity divided by the market value of equity) and growth_A (change of total assets in current year over the total asset balance at the beginning of the year) to capture the growth of the client firm. Studies have shown that firms with growth prospects are more likely to manipulate their earnings to avoid missing their earnings benchmark (Matsumoto, 2002). Hence, we include MB and growth_A to control this factor and expect them to negatively associate with audit quality.

Loss

Loss (LOSS) is measured as a dummy variable that equals to 1 if the client firm suffers a loss in the current financial year and 0 otherwise. Brown (2001) finds that loss firms are less likely to report positive earnings surprises. Hence, we include LOSS to capture this factor and expect it to negatively associate with DACC.

Board Size

Board size (*board size*) is measured as the number of board members of the listed company. We also include it as a control for the company size because larger companies tend to have larger boards. Studies report that larger board size is positively related to earnings management (Wang et al., 2014). Hence, we expect *board size* to positively associate with audit quality.

Company_Age

Company_age (Company_age) is measured as the number of years the client company has been listed on the stock market. Prior studies report that older client firms are more likely to resort to earnings management (Wang et al., 2014). Hence, we expect Company_age to negatively associate with audit quality.

Fixed effects

To mitigate the effects of outliers, we winsorize all continuous variables at the 1st and 99th percentiles. Also we follow the research to control for industry and year fixed effects in all our test models (Wang et al., 2014, Chen et al., 2011).

Additional Variables in Audit Fee Test

Complexity

Complexity (COMPLEX) is measured as the ratio of annual sales over total assets. Research reports that audit fees are likely to be higher for clients with more complex business operations (Choi et al., 2010). Hence, we include COMPLEX to control this factor.

Additional Variables in MAOs Test

Receivable Ratio

Receivable ratio (RECEIVABLE) is measured as the ratio of current receivables over total assets. We include this variable to control for client characteristics because studies report a significant positive association between RECEIVABLE and type of audit opinion (DeFond et al., 2002, Carcello and Li, 2013).

Inventory Ratio

Inventory ratio (INVENTORY) is measured as the ratio of inventory over total assets. As with RECEIVABLE, we include this variable to control for client characteristics because studies report a significant positive association between INVENTORY and type of audit opinion (DeFond et al., 2002, Carcello and Li, 2013).

Additional Variables in Audit Pair Choice Test

Ratio of number of partners over total number of clients

The ratio of the number of partners over the total number of clients (Ratio_PC) is measured as the number of partners over the number of clients of an audit firm in the current year. We use Ratio_PC as a proxy for the busyness of audit partners in an audit firm.

Current Ratio

Current ratio (CATA) is measured as current assets over total assets. Following Xie et al. (2010), who report a significant positive association between CATA and abnormal audit fees, we control CATA for this factor.

Company Size

Company size (SIZE1) is measured as the logarithm of the company's total equity in the current financial year end. We put this variable in our estimation of abnormal audit fees (abnAF1), because studies report that a larger company is more likely to pay higher abnormal audit fees (Xie et al., 2010).

Auditor Firm Switch

Auditor Firm Switch (*switch*) is a dummy variable that equals to 1 if the current year audit firm is different from that of last year and 0 otherwise. Research suggests that audit fees are generally low in the first years of auditing (Xie et al., 2010, Simon and Francis, 1988). Hence, we include *switch* to control this factor.

Audit Opinion of Previous Financial Year

Prior audit opinion (PAO) measures the audit opinion of the last financial year, which equals to 1 if the client company received a MAO last year and 0 otherwise. We

include this variable because studies report a significant effect on abnormal audit fees from prior audit opinions (Xie et al., 2010).

Abnormal Audit Fees

Consistent with the literature, we estimate abnormal audit fees (abnAF1) by firstly constructing a regression model of the audit fee (1.1) and obtaining the abnormal fee as the residual (Alhadab, 2018, Blankley et al., 2012, Xie et al., 2010). We include in our abnAF1 estimation regression model the factors that affect abnormal audit fees from the literature.

$$\begin{aligned} AF_1 = & b_0 + b_1SIZE + b_2growth_A + b_3MB + b_4LEVERAGE + b_5CATA \\ & + b_6switch + b_7AUDITOR + b_8PAO + YearDummies \\ & + Industry Dummies. \end{aligned} \quad (1.1)$$

Table 1 lists the definitions and measurement for all variables.

[INSERT TABLE 1 HERE]

5.4 Univariate Analysis

Table 3 presents the mean difference between signing auditor pair including audit managers and signing auditor pair without audit managers. In particular, column Mean1 reports the mean of variable with a signing auditor pair that does not have any auditor managers, and column Mean2 reports the mean of variables with a signing auditor pair that includes auditor managers. Column MeanDiff reports the difference between Mean1 and Mean2.

The row of DA shows that companies with audit reports signed by an audit pair including audit managers have significantly less abnormal accruals than companies with signing auditors that do not include any audit managers (0.000 versus 0.002, $p <$

0.001), providing univariate evidence that companies have lower abnormal accruals when their audit managers sign their audit reports.

The mean audit fees (AF) of the companies that have the audit manager sign their audit reports and those companies with reports signed by two partners are 13.42 and 13.36, respectively. The mean difference is -0.068, which is significant at 5% level, providing univariate evidence of a significant drop of audit fees when audit managers replace audit partners as signing auditors. This is reasonable because audit managers generally charge lower hourly rates than audit partners.

The next row of MAO presents the difference of likelihood in issuing modified audit opinions between signing audit pairs. Compared to companies with signing auditor pairs that include no audit managers, those companies that have auditor manager sign their audit reports seem to not vary in the likelihood of receiving modified audit opinions. However, because the univariate test does not control for other factors that impact the likelihood of issuing a modified audit opinion, we use regression analysis in the next section for a more complete analysis of the likelihood of issuing modified audit opinion results.

In addition, some of other control variables are different between the two groups. In general, the difference indicate that companies with reports signed by audit managers take longer before issuing their audit report, have been listed in the stock market longer and are larger in company size. Moreover, mean difference of PAO is -0.010 ($p < 0.01$), suggesting those companies that received a modified audit opinion previously are less likely to have an audit manager as a signing auditor. Also, board size of the company has a mean difference of 0.257 ($p < 0.01$), indicating companies with larger board size are more likely to have audit managers as signing auditors. Again, these

results are univariate results only and do not control for other factors. We use probit model in the next section for a more complete analysis.

[INSERT TABLE 3 HERE]

5.5 Signing Auditor Pair Analysis

Table 4 reports the results of testing the determinants on signing auditor pair using a probit model (1). The results suggest that personnel resources and cost saving seem to be determinants of signing auditor pairs. More specifically, Ratio_PC has an estimated coefficient of -2.342 ($p < 0.01$), indicating that when audit firms have fewer audit partners, audit managers are more likely to be included in signing auditor pairs. This suggests the choice of signing auditors partly depends on the human resources of an audit firm. Another variable, AUDITOR, has a negative coefficient of -0.345 ($p < 0.01$), showing that Big Four audit firms are less likely to have audit managers as signing auditors. This is consistent with Ratio_PC because Big-4 audit firms are more advanced in human resources (e.g. more partners). On the other hand, abnAF has a negative coefficient of 0.009, indicating a cost saving strategy of audit firms. As discussed, audit partners charge higher hourly rates than audit managers. Signing an audit report usually requires reviewing it thoroughly, so it will be more cost saving to replace audit partners with audit managers as signing auditors. This is also consistent with the literature showing that the relationship between abnormal audit fees and audit quality is negative (e.g., Blankley et al., 2012).

Our results also show some client characteristics seem to be considered by audit firms when they appoint signing auditors. More specifically, SIZE has a coefficient of -.062 ($p < 0.01$), indicating that a larger client firm is less likely to have audit managers as signing auditors. This may be because audit firms appoint more auditors,

including more audit partners, to audit larger client firms. Naturally, *Company_age* has a coefficient of -0.003, indicating that the longer client firms have been listed on the stock market, the less likely an audit manager will be appointed as a signing auditor. Moreover, *switch* is positively related to having audit managers sign audit reports with a coefficient of 0.078 ($p < 0.05$), suggesting that audit managers are more likely to be included in the first years of a client firm's auditing. This may be because of higher risk in the first auditing years and audit firms appointing audit managers as signing auditors to share the risk with audit partners. Another possible reason is that audit firms charge lower audit fees in the beginning years of auditing (Simon and Francis, 1988), so audit managers are appointed to sign audit reports to save costs.

However, not all the control variables, which are drawn from the literature, are significantly associated with choice of signing auditors. This may be because those variables from the literature are more relevant in the choice of audit firms but not in the choice of signing auditors. When it comes to the stage of appointing signing auditors, the audit firm has already been determined. Hence, the choice of signing auditors is much dependent on the appointment from audit firms.

[INSERT TABLE 4 HERE]

5.6 The Propensity Score Matched (PSM) Sample

We use the propensity score computed from the probit model of *Auditor_SP* model (1) to match each client firm with an audit report signed by an audit pair that includes at least one audit manager with a client firm with an audit report that is signed by an audit pair without any audit manager. We use matching in 1:1 with no replacement and impose a 1% maximum distance in the propensity score to exclude client firms without a reasonable match in the sample.

Table 5 exhibits the descriptive statistics of the propensity score matched sample. The requirement results in a matched sample of 6416 firm-year observations, including 3208 signing auditor pairs without audit managers and 3208 signing auditor pairs with at least one audit manager. This shows that the differences of all control variables except *RECEIVABLE*, *board_size*, *MB*, *LEVERAGE* and *DELAY* are well controlled, with no significant difference in means.

[INSERT TABLE 5 HERE]

Chapter 6: Results and Discussions

6.1 Descriptive Statistics

Table 2 reports descriptive statistics for all variables used in the analysis, including the interest test variable signing auditor pair (*SIGNATURE_1*); audit quality measurements: abnormal accruals (*DA*), modified audit opinions (*MAO*) and audit fees (*AF*); control variables for the DACC regression model and additional control variables for the *AF_1* regression model, *MAO* logit model and *Auditor_SP* probit model. To mitigate the undue influence of outliers, we winsorize all the continuous variables at the bottom and top 1 percentiles.

DA is the estimated result from model 2.1.2. Its mean (0.001) is close to 0, which is expected because *DA* is essentially regression residuals. *AF* is the audit fees for the current financial year end. It is worth noting that there is a larger variation between audit fees with a standard deviation of 0.618. *MAO* is the dummy variable that equals 1 if the client firm receives one of the modified audit opinions in the current financial year end and 0 otherwise. The mean (median) value of *MAO* is 0.05 (0.00), which shows a very small portion of client companies receives modified audit opinions.

The statistics for *SIGNATURE_1* show that most signing auditor pairs include audit managers, with the mean value of 0.77. This is probably because the audit market is very big in China, but there are few audit partners in the audit market. This lack of audit partners is also reflected in the quite low value of ratio of the number of audit partners over the number of client firms, Ratio PC, which has the mean value of 0.063. The CICPA development is relatively late compared to other developed stock markets and so are professional auditors. It usually takes at least 10 years for a junior auditor

to become an audit partner. However, there were only a few professional auditors in China in the early 2000s, and there is still a huge demand in China at the time of our research.

Table 2 also presents the descriptive statistics for control variables of both audit firm and client firm. The results show that only 4.6% of client firms are audited by Big Four firms, which is consistent with the literature (e.g. Gul et al., 2013). This low market share means Big Four audit firms do not dominate the number of client firms in the Chinese stock market. The *DELAY* has a mean (median) of 89.44 (89), which is reasonable because Chinese listed firms are required by CSRC (2007) to publish their financial statements by the end of April.

[INSERT TABLE 2 HERE]

6.2 Multivariate Regression Analysis Results

6.2.1 Test of Audit Manager Effect

Abnormal Accruals

Columns 1 and 2 of Table 6 report the regression results for the association between the signing auditor pair and abnormal accruals. Column 1 reports the results for the full sample, and column 2 reports the results for the matched sample. *SIGNATURE_1* is significantly negative (coefficient = - 0.003, $p < 0.01$), which suggests that client firms that have audit managers sign their audit reports have lower abnormal accruals than those client firms that have no audit managers signing the audit report, providing support for H_0 . Economically, client firms' abnormal accruals are, on average, 0.003 smaller than those of client firms that have no audit managers signing their audit reports. This is economically significant because the magnitude of the mean abnormal accruals in our sample is 0.01. When the difference of our control variables is controlled, our result is still valid (coefficient = - 0.003, $p < 0.01$).

The results of the control variables are consistent with studies in both the full sample and matched sample. More specifically, *ROA* (coefficient = 0.597, $p < 0.01$ and coefficient = 0.590, $p < 0.01$ in the full sample and matched sample, respectively) is positively associated with abnormal accruals, indicating that companies with higher growth are more likely to manipulate their earnings. *LEVERAGE* (coefficient = 0.063, $p < 0.01$ and coefficient = 0.059, $p < 0.01$ in the full sample and matched sample, respectively) is also positively associated with abnormal accruals, suggesting that firms suffering more severe financial stress are more likely to manipulate their earnings. Also, *RECEIVABLE* (coefficient = 0.024, $p < 0.01$ and coefficient = 0.012, $p < 0.05$ in the full sample and matched sample, respectively) and *INVENTORY* (coefficient = 0.008, $p < 0.01$ and coefficient = 0.014, $p < 0.05$ in the full sample and matched sample, respectively) are positively associated with abnormal accruals, showing that firms with more current assets are more likely to manipulate their earnings. On the other hand, *DELAY* ($p < 0.01$) is positively associated with abnormal accruals, indicating abnormal accruals may complicate the financial statement and result in more time-consuming audits.

When viewed as a whole, the empirical results suggest that compared with client firms that have no audit manager signing their audit reports, those client firms that have audit managers signing their audit reports have less abnormal accruals. In other words, their audit quality is higher when audit managers sign the audit report.

Audit Fees

Columns 3 and 4 of Table 6 report the regression results for the association between the signing auditor pair and audit fees. Column 3 reports the results for the full sample, and column 4 reports the results for the matched sample. *SIGNATURE_1* is

significantly negative (coefficient = -0.027, $p < 0.01$), which suggests that client firms that have audit managers sign their audit reports were charged lower audit fees than those client firms have no audit managers signing their audit reports, providing support for H_0 . Economically, client firms' audit fees are, on average, 0.027 smaller than those of client firms that have no audit managers signing their audit reports. This is economically significant because the magnitude of the mean audit fees in our sample is 13. When the differences of our control variables are controlled, our result is still valid (coefficient = - 0.79, $p < 0.01$).

The results of the control variables are consistent with studies in both the full sample and matched sample. More specifically, *MB* (coefficient = 0.22, $p < 0.01$ and coefficient = 0.205, $p < 0.01$ in the full sample and matched sample, respectively) and *growth_A* (coefficient = 0.073, $p < 0.01$ and coefficient = 0.061, $p < 0.01$ in the full sample and matched sample, respectively) are positively associated with audit fees, indicating that companies with higher growth are considered to have higher risks and are charged higher audit fees as a result. Also, *Complex* (coefficient 0.155, $p < 0.01$ and coefficient = 0.147, $p < 0.01$ in the full sample and matched sample, respectively) is positively associated with audit fees, indicating more complicated client firms are charged more by audit firms. On the other hand, *AUDITOR* (coefficient = 0.912, $p < 0.01$ and coefficient = 0.962, $p < 0.01$ in the full sample and matched sample, respectively) is also positively associated with abnormal accruals, suggesting that Big Four audit firms charge more than non-Big Four audit firms, which is the same with other audit markets around the world.

When viewed as a whole, the empirical results suggest that compared with client firms that have no audit manager signing their audit reports, those client firms that have audit managers signing their audit reports are charged higher audit fees. This

indicates a more independent relationship between auditors and their client firms (Asthana and Boone, 2012, Hoitash et al., 2007). In other words, their audit quality is higher when audit managers sign the audit report.

Modified Audit Opinion

Columns 5 and 6 of Table 6 report the regression results for the association between the signing auditor pair and likelihood of modified audit opinions. Column 5 reports the results for the full sample, and column 6 reports the results for the matched sample. *SIGNATURE_1* is significantly positive (coefficient 0.223, $p < 0.1$), which suggests that when signing auditors include audit managers, the audit firm is more likely to issue modified audit opinions compared to when no audit managers sign the reports. This indicates audit firms may be more conservative when audit managers sign the audit reports, providing supporting for H_0 . Economically, the likelihood of client firms receiving modified audit opinions are, on average, 0.474 higher than those client firms that have no audit managers sign their audit reports. When the difference of our control variables is controlled, our result is still valid (coefficient = 0.578, $p < 0.01$).

The results of the control variables are consistent with studies in both the full sample and matched sample. More specifically, *ROA* (coefficient = -8.85, $p < 0.01$ and coefficient = -9.413, $p < 0.01$ in the full sample and matched sample, respectively) is negatively associated with MAO, and *LOSS* (coefficient = 0.651, $p < 0.01$ and coefficient = 0.895, $p < 0.01$ in the full sample and matched sample, respectively) is positively associated with MAO, indicating that companies that have performed badly are more likely to cook their financial statements and hence receive a modified audit opinion. Also, *LEVERAGE* (coefficient = 2.115, $p < 0.01$ and coefficient = 2.147, $p < 0.01$ in the full sample and matched sample, respectively) is positively associated with

MAO, indicating that complicated and more financially stressed client firms are more likely to receive modified audit opinions. This may be because their performance needs to meet the requirement of creditors to not breach their borrowing contracts. Auditors are more conservative when auditing such clients. On the other hand, *DELAY* (coefficient = 0.03, $p < 0.01$ and coefficient = 0.032, $p < 0.01$ in the full sample and matched sample, respectively) is also positively associated with MAO, suggesting a longer negotiation period between auditors and client firms when the modified audit opinion is issued.

In sum, the empirical results suggest that compared with client firms that have no audit managers signing their audit reports, those client firms that have audit managers signing their audit reports are more likely to receive modified audit opinions. This means audit firms are more conservative in issuing audit opinions when audit managers sign the audit report. Again, their audit quality is higher when audit managers sign the audit report.

[INSERT TABLE 6 HERE]

6.2.2 Further Test of Audit Manager Effect

We conduct comparisons of audit quality between different signing auditor pairs. More specifically, we further divide signing auditor pairs with audit managers *SIGNATURE_1* into two groups: *SIGNATURE_PM*, in which the signing auditors consist of one audit partner together with one audit manager, and *SIGNATURE_MM*, in which both signing auditors are audit managers. We also define the group of *SIGNATURE_PP* as both signing auditors being audit partners. We then compare audit quality using PM v.s. PP and MM v.s. PP. We also use the propensity score to

match with each subsample. In general, the difference between control variables is well controlled after the propensity score match.

Comparison between PP and PM

Table 7 reports the regression results for the association between *SIGNATURE_PM* and *SIGNATURE_PP*. Column 1 reports the abnormal accruals regression results for the full sample, and column 2 reports the abnormal accruals regression results for the matched sample. The results are not significantly changed compared to the results of *SIGNATURE_I* from model (2). In particular, *SIGNATURE_PM* is significantly negative (coefficient = - 0.003, $p < 0.01$), which suggests that client firms that have audit managers sign their audit reports have lower abnormal accruals than those client firms that have no audit managers sign their audit reports, thus supporting H_0 . Economically, client firms' abnormal accruals are, on average, 0.003 smaller than those client firms that have no audit managers sign their audit reports. This is economically significant because the magnitude of the mean abnormal accruals in our sample is 0.001. When the difference of our control variables is controlled, our result is still valid (coefficient = - 0.003, $p < 0.01$). Column 3 reports the audit fee regression results for the full sample, and column 4 reports the results for the matched sample. *SIGNATURE_PM* is significantly negative (coefficient = - 0.024, $p < 0.01$ and coefficient = - 0.095, $p < 0.01$ in the full sample and matched sample, respectively), which suggests that client firms that have PM groups (we define PM group as signing auditors consisting of one audit partner together with one audit manager) sign the audit report are charged lower audit fees than those client firms that have PP groups (we define PP group as signing auditors consisting of both audit partners) signing their audit reports. Column 5 reports the results for the full sample, and column 6 reports the results for the matched sample. *SIGNATURE_PM* is significantly positive

(coefficient = 0.308, $p < 0.05$ and coefficient = 0.702, $p < 0.05$ in the full sample and matched sample, respectively), which suggests that a PM group signing the audit report is more likely to issue modified audit opinions than PP groups that sign audit reports.

[INSERT TABLE 7 HERE]

Comparison between PP v.s. MM

Table 8 reports the regression results for the association between *SIGNATURE_MM* and *SIGNATURE_PP*. Column 1 reports the abnormal accruals regression results for the full sample, and column 2 reports the abnormal accruals regression results for the matched sample. The results show no significant difference. Column 3 reports the audit fee regression results for the full sample, and column 4 reports the results for the matched sample. *SIGNATURE_MM* is significantly negative (coefficient = -0.023, $p < 0.05$ in the full sample and coefficient = -0.095, $p < 0.01$ in the matched sample), which suggests that client firms that have MM groups sign the audit reports are charged significantly lower audit fees than those client firms that have PP groups sign the audit reports. Column 5 reports the results of MAO for the full sample, and column 6 reports the results for the matched sample. *SIGNATURE_MM* is negative (coefficient = 0.135 in the full sample and coefficient = 0.205 in the matched sample), which suggests that an MM group signing the audit report is less likely to issue modified audit opinions than a PP group signing the audit report, even though the difference is not significant. The results suggest that signing auditors consisting of one audit partner and one audit manager may lead to higher audit quality. We therefore conduct further tests in the next section.

[INSERT TABLE 8 HERE]

6.2.3 Diversification Effect of Signing Auditors

Table 8 reports the regression results for the association between the *PM group* and *MM plus PP group*. Column 1 reports the abnormal accruals regression results for the full sample, and column 2 reports the abnormal accruals regression results for the matched sample. In particular, *SIGNATURE_PM* is significantly negative (coefficient = - 0.002, $p < 0.01$ in the full sample and coefficient = - 0.002 $P < 0.01$ in the matched sample), which suggests that client firms that have PM groups sign their audit reports have lower abnormal accruals than those that have MM groups sign their audit reports. Column 3 reports the audit fee regression results for the full sample, and column 4 reports the results for the matched sample. The coefficient in the matched group is - 0.087 ($p < 0.01$), showing that the PM group charges less audit fees than the MM+PP group. Column 5 reports the results for the full sample, and column 6 reports the results for the matched sample. *SIGNATURE_PM* is significantly positive (coefficient = 0.237, $p < 0.05$ and coefficient = 0.627, $p < 0.05$ in the full sample and matched sample, respectively), which suggests that a PM group signing an audit report is more likely to issue modified audit opinions than a PP group signing an audit report. In summary, our results show that audit quality is the highest when the audit report is signed by a PM group, which supports *H2₀*.

[INSERT TABLE 10 HERE]

Chapter 7: Additional Analysis

7.1 Absolute Value of Abnormal Accruals

We supplement our abnormal accrual analysis with another commonly used general measure of abnormal accruals. Following the literature (e.g. Alhadab, 2018, Hossain et al., 2017, Asthana and Boone, 2012), abnormal accruals are measured using absolute values.

Table 9 presents the results. Columns 1 and 2 of Table 9 report the regression results for the association between the signing auditor pair and abnormal accruals. Column 1 reports the results for the full sample, and column 2 reports the results for the matched sample. *SIGNATURE_1* has the similar coefficient (-0.002 , $p < 0.05$) with prior regression result using abnormal accruals estimated from cash flow method, again suggesting that client firms that have audit managers sign their audit reports have lower abnormal accruals than those client firms that have no audit managers sign their audit reports, thus supporting $H1_0$. Similarly, our result is economically significant. The result is slightly different but with the same significant negative coefficient (coefficient = -0.002 , $p < 0.05$) when the difference of our control variables is controlled, showing our result is valid.

The results of the control variables still hold in the new model. More specifically, *growth_A* (coefficient = 0.004 , $p < 0.01$ and coefficient = 0.006 , $p < 0.01$ in the full sample and matched sample, respectively) is positively associated with abnormal accruals, indicating that companies with higher growth are more likely to manipulate their earnings. *VOLATILITY* (coefficient = 0.012 , $p < 0.01$ and coefficient = 0.01 , $p < 0.01$ in the full sample and matched sample, respectively) is also positively associated with abnormal accruals, suggesting that firms suffering more severe financial stress

are more likely to manipulate their earnings. Also, *COMPLEX* (coefficient = 0.005, $p < 0.01$ in both the full sample and coefficient = 0.006, $p < 0.01$ in the matched sample, respectively) is positively associated with abnormal accruals, showing larger firms are more likely to manipulate their earnings. On the other hand, *DELAY* ($p < 0.01$) is positively associated with abnormal accruals, indicating abnormal accruals may complicate the financial statement and result in more time-consuming audits.

In addition, we compare the abnormal accruals in three groups (i.e. PM group, PP group and MM group) and find that PM groups still have lower abnormal accruals than the other two groups. More specifically, columns 3 and 4 of Table 9 report the regression results for the comparison between PM group and PP group. Column 3 reports the results for the full sample, and column 4 reports the results for the matched sample, *SIGNATURE_PM* is significantly negative (coefficient = - 0.002 in the full sample and coefficient = - 0.002 in the matched sample), which suggests that client firms that have PM groups sign their audit reports have lower abnormal accruals than those that have PP groups sign their audit reports. Columns 5 and 6 report the results for the full sample and matched sample of comparison between MM group and PP group. *SIGNATURE_MM* is not significantly negative in the matched sample (coefficient = - 0.014, $p < 0.01$ in the matched sample), which suggests that client firms that have PM groups sign their audit reports have lower abnormal accruals.

Again, when viewed as a whole, the empirical results suggest that compared with client firms that have no audit manager sign their audit reports, client firms that have audit managers sign their audit reports have less abnormal accruals. In other words, their audit quality is higher when audit managers sign their audit reports. In addition, audit quality is the highest when the audit report is signed by a PM pair.

[INSERT TABLE 9 HERE]

7.2 Use Abnormal Accruals with Signs

We further divide our sample by signs of abnormal accruals to test our hypothesis. In general, our results are robust in positive abnormal accruals.

Table 11 reports the association between *SIGNATURE_1* and audit quality, which is the result of Hypothesis 1. Columns 1 and 2 report the abnormal accruals regression results for the full sample and matched sample of positive accruals. The results are only significant for positive abnormal accruals. In particular, *SIGNATURE_1* is significantly negative (coefficient = - 0.002 in both the full sample and matched sample, $p < 0.01$ and $p < 0.05$, respectively), which suggests that client firms that have audit managers sign their audit reports have lower positive abnormal accruals than those client firms that have no audit managers sign their audit reports, thus supporting $H1_0$. Column 6 shows the audit fee regression results for the matched sample. *SIGNATURE_1* is significantly negative (coefficient = -0.071, $p < 0.01$), which suggests that client firms with positive abnormal accruals but that have PM groups sign their audit reports are charged lower audit fees than those client firms that have PP groups sign their audit reports. Column 10 reports the results of MAO for the matched sample. *SIGNATURE_1* is significantly positive (coefficient = 0.410, $p < 0.1$ in the matched sample), which suggests that signing auditor groups that include audit managers are more likely to issue modified audit opinions than PP groups that sign audit reports.

[INSERT TABLE 11 HERE]

Table 12 reports the association between *SIGNATURE_PM* and audit quality, which is the result of Hypothesis 2. Columns 1 and 2 report the abnormal accruals regression results for the full sample and matched sample of positive accruals. The results are only significant for positive abnormal accruals. In particular, *SIGNATURE_PM* is significantly negative (coefficient = - 0.002 in both the full sample and matched sample, $p < 0.01$ and $p < 0.05$, respectively), which suggests that client firms that have audit managers sign their audit

reports have lower positive abnormal accruals than those client firms that have no audit managers signing their audit reports, thus supporting *H2_o*. Columns 6 and 8 show the audit fee regression results for the matched sample. *SIGNATURE_PM* is significantly negative (coefficient = -0.071, $p < 0.01$ in positive abnormal accruals and coefficient = -0.092, $p < 0.01$ in negative abnormal accruals), which suggests that client firms with both positive and negative abnormal accruals are charged lower audit fees when their audit reports are signed by PM groups. Columns 10 and 12 report the results of MAO for the matched sample. *SIGNATURE_PM* is significantly positive (coefficient = 0.41, $p < 0.1$ in positive abnormal accruals and coefficient = 0.519, $p < 0.01$ in negative abnormal accruals), which suggests that a signing auditor group with a PM pair is more likely to issue modified audit opinions than a signing auditor pair that is not diversified.

[INSERT TABLE 12 HERE]

7.3 Use Sample of Year 2016 Only

Because the model of Dechow and Dichev (2002) requires CFO of year $t+1$, year 2016 is the latest year we can use to test our hypotheses. We then use a sample of the single year 2016 only to further test our hypotheses.

Table 13 reports the association between *SIGNATURE_I* and audit quality, which is the result of Hypothesis 1. Column 1 reports the abnormal accruals regression results for the full sample, and column 2 reports the abnormal accruals regression results for the matched sample. In particular, *SIGNATURE_1* is significantly negative (coefficient = - 0.014 $P < 0.01$ in the matched sample), which suggests that client firms that have audit managers sign their audit reports have lower abnormal accruals than that that have PP groups sign their audit reports. Column 3 reports the audit fee regression results for the full sample, and column 4 reports the results for the matched sample. The coefficients are significantly negative in both samples (coefficient = -1.131, $p < 0.05$ and coefficient = -1.68, $p < 0.01$ in the full sample and matched sample, respectively), showing that including audit managers as signing auditors

results in lower audit fees than those charged by PP groups. Column 5 reports the results for the full sample, and column 6 reports the results for the matched sample. *SIGNATURE_1* is positively associated with MAO even though it is not significant. In summary, our results show that audit quality is the highest when the audit report is signed by a PM group, which supports H10.

[INSERT TABLE 13 HERE]

Table 14 reports the association between *SIGNATURE_PM* and audit quality, which is the result of Hypothesis 2. Even though there is no significant association, the signs of coefficients are consistent with our prior results, which also support Hypothesis 2.

[INSERT TABLE 14 HERE]

Chapter 8: Conclusion

8.1 Summary of Results

Requiring auditors to disclose their identities is expected to enhance audit quality by stressing and increasing the accountability of auditors. Unlike from the prior literature that focuses on the relationship between the disclosure of the audit partner's identity and audit quality, this study examines if disclosure of an audit manager's identity via signing the audit report increases the audit quality.

The overall results of this study suggest that audit quality is higher when audit managers are included as signing auditors. More specifically, our results show that the client firms have lower abnormal accruals, suggesting a conservative accounting treatment in their financial reporting. On the other hand, when audit managers sign the audit reports, the audit firms are more likely to issue modified audit opinions, which indicates audit firms are more conservative in conducting audits. Another result of our study is that there is a significant cut in audit fees when audit managers replace audit partners in signing the audit report. Nonetheless, the audit quality is higher as indicated from both audit quality proxies (e.g. abnormal accruals and MAO). This is may be because auditors are more independent when audit fees are low, which is consistent with the literature (Asthana and Boone, 2012, Hoitash et al., 2007).

In addition, we find that the choice of signing auditors depends on the audit firms. In particular, the results from the probit model of signing auditor pair choice indicate that audit firms with better personnel resources such as Big Four audit firms, which have a larger number of audit partners, are less likely to appoint audit managers as signing auditors. Moreover, our findings suggest that when audit managers sign audit reports, the client firms are charged less abnormal audit fees compared with when

audit reports are signed by only audit partners. This may be because audit managers charge much lower hourly rates than audit partners and audit firms seem to adopt a cost-saving strategy by appointing audit managers instead of audit partners to sign audit reports.

8.2 Implications

Our study makes several contributions. Firstly, the principle finding of our study is that audit quality is improved when audit managers sign audit reports. It contributes to understanding the effect of the requirement of disclosing auditors' identities. Regulators believe that auditors' accountability will be increased if their identities are disclosed to the public and audit quality will be increased as a result. Even though this rationale is inconsistent with accountability theory, there is limited empirical evidence in the literature. Furthermore, the relevant studies find mixed results. For example, while Carcello and Li (2013) and Burke et al. (2017) find supportive evidence, Cunningham et al. (2017) and Blay et al. (2014) provide evidence that there is no such relationship. Some researchers and audit practitioners even propose that auditor accountability may be at its ceiling at present, so disclosure of auditors' identities will make no difference. Our results provide supportive evidence that disclosure of auditors' identities does increase auditor accountability and increases audit quality. Furthermore, our findings suggest that besides emphasis on audit partner, accountability of other significant audit participants such as audit managers should also be emphasized.

Secondly, our results contribute to bridging the literature gap in audit quality studies. More specifically, our study provides empirical evidence on audit inputs such as individual auditor level in understanding how characteristics of an individual auditor impact audit quality. The impacts on audit quality are different depending on the rank

of the signing auditor (Gul et al., 2013, Trotman et al., 2009). The literature mainly studies if audit partners signing audit reports has a positive effect on audit quality. However, audit partners focus more on marketing and maintaining relationships with client firms. Their involvement in the audit process is limited. Due to their busyness and high charge rates, audit partners rely heavily on audit managers' work. Audit managers are the key inputs within the audit process. They are involved in every detail in the audit process, from planning the audit to completing it. They are not only involved in deciding auditing procedures, but also are the executors and supervisors of the auditing procedures. When audit managers sign the audit report, it improves the audit quality because of their specific expertise in the audit process such as detecting mechanical errors. Studies have documented the significance of audit managers, mostly in experimental studies (Keyser III, 2017, Frank and Hoffman, 2014, Gibbins and Trotman, 2002, Harding and Trotman, 1999). Our study complements the literature in providing evidence from an archival perspective.

Thirdly, our study extends understanding of how audit team composition impacts audit quality. Our results show that when both an audit manager and an audit partner sign an audit report, the audit quality outperforms others that are signed by only audit partners or only audit managers. This finding is important to the practice. Studies have reported the composition of an audit engagement team has significant influence on the audit quality because of audit partners' gender diversification (Al-Dhamari and Chandren, 2017, Srinidhi et al., 2017, Reheul et al., 2017) and knowledge diversification (Hossain et al., 2017, Cameran et al., 2017). Compared with audit partners who specialize in detecting conceptual errors, audit managers are more specialized in detecting mechanical errors. If audit managers sign the audit report, it complements the auditor's increased outcome accountability with an increased process

accountability. This synergy effect of a signing audit manager and signing audit partner further increases audit quality. The findings echo those of Doxey et al. (2015). In their commentary response to the PCAOB request, Doxey et al. (2015) advocate the disclosure of concurring partners as well as engagement partners. Because concurring partners specialize in audit quality review, increasing their accountability improves the audit quality by increasing audit quality review accountability. It also complements outcome accountability from the audit partner. Following the same rationale that accountability of other significant audit participants should also be emphasized, our findings support that other auditor accountability such as audit process accountability is another important contributor to audit quality.

8.3 Limitations and Future Research Opportunities

This study has two limitations that should be addressed in future research. Firstly, this study investigates the association between disclosure of audit managers' identities and audit quality. Unfortunately, to our best knowledge, we recognise that other countries only authorize audit partners to sign audit reports, and China is the only country that permits audit managers to sign the audit reports. Therefore, our research context is confined to data from China, where the unique social culture should not be overlooked. However, we do not include impacts from cultural factors in our study. We call for future research to extend our study in other cultural contexts and examine how the results vary in different cultural contexts.

The literature reports that individual auditors' characteristics such as educational background, gender, political party membership also have a significant association with audit quality (e.g., Gul et al., 2013). Some studies investigating audit partners find that partners' characteristics such as tenure, industry expertise, client importance and social relationship have a significant association with audit quality (DeFond and

Zhang, 2014, Knechel et al., 2012). Therefore, it is expected that audit quality may vary among audit managers with different individual characteristics. However, we do not examine how those individual characteristics interact with our results because this is not the focus of our study. Nonetheless, we call for future research to examine if how the characteristics of individual audit managers impact audit quality as audit partners' characteristics do.

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Appendix

Table 1 Variable Definitions

Variable	Measurement
Panel A: Audit Quality	
Variable	
DA	Abnormal accruals at the end of year t;
MAO	Equals to 1 if a client receives a modified audit opinion and 0 otherwise
AF	Natural logarithm of audit fees for year t
Panel B: Test Variable	
SIGNATURE 1	Equals to 1 if signing auditors include audit manager and 0 otherwise
SIGNATURE PM	Equals to 1 if signing auditors include both audit partner or audit manager and 0 otherwise
SIGNATURE MM	Equals to 1 if signing auditors are both audit managers and 0 otherwise
SIGNATURE PP	Equals to 1 if signing auditors are both audit partners and 0 otherwise
Panel C: Control Variables	
AUDITOR	Equals 1 if the auditor firm is one of the Big Four audit firms and 0 otherwise
DELAY	Number of days between the financial year end and audit report issue date
VOLATILI~1	
ROA	Net income over total asset
LEVERAGE	Total debts over total assets
MB	Book value of equity divided by the market value of equity
growth A	Change of total assets in current year over the total asset balance at the beginning of the year)
LOSS	Equals to 1 if client firm suffers a loss in the current financial year and 0 otherwise
Company age	Number of years client company has been listed on the stock market
board size	
Complex	Ratio of annual sales over total assets
RECEIVABLE	Ratio of current receivables over total assets
INVENTORY	Ratio of inventory over total assets
Ratio PC	Number of partners over number of clients of an audit firm in the current year
CATA	Current assets over total assets
SIZE1	Logarithm of the company total equity in the current financial year end
switch	Equals to 1 if current year audit firm is different from last year and 0 otherwise
PAO	Equals to 1 if client company receives a MAO last year and 0 otherwise
abnAF1	Audit fee, calculated as the residuals of Model (1.1)

Table 2 *Descriptive Statistics*

Variable	N	mean	p50	sd	p25	p75
Panel A: Audit Quality Variable						
DA CF1	19300	0.001	0.002	0.053	-0.024	0.028
MAO	19300	0.058	0.000	0.234	0.000	0.000
AF 1	19300	13.370	13.300	0.618	12.900	13.710
Panel B: Test Variable						
SIGNATURE 1	15430	0.762	1.000	0.426	1.000	1.000
SIGNATURE PM	19300	0.500	1.000	0.500	0.000	1.000
SIGNATURE MM	19300	0.109	0.000	0.311	0.000	0.000
SIGNATURE PP	19300	0.191	0.000	0.393	0.000	0.000
Panel C: Control Variables						
AUDITOR	19300	0.046	0.000	0.210	0.000	0.000
DELAY	19111	89.440	89.000	22.000	77.000	109.000
VOLATILITY	19298	0.350	0.264	0.318	0.159	0.420
ROA	19300	0.030	0.031	0.073	0.007	0.062
LEVERAGE	19300	0.189	0.170	0.154	0.055	0.291
MB	18682	0.976	0.693	0.876	0.398	1.240
growth A	19300	0.184	0.093	0.410	0.003	0.230
LOSS	19300	0.121	0.000	0.326	0.000	0.000
Company age	19238	10.300	10.000	5.405	6.000	14.000
board size	19204	8.991	9.000	1.892	8.000	9.000
Complex	19300	0.637	0.525	0.469	0.324	0.801
RECEIVABLE	19300	0.109	0.082	0.103	0.028	0.161
INVENTORY	19300	0.166	0.125	0.154	0.063	0.212
Ratio PC	19240	0.063	0.045	0.056	0.034	0.079
CATA	19300	0.537	0.545	0.210	0.385	0.693
SIZE1	19300	21.850	21.740	1.232	21.000	22.580
switch	19300	0.176	0.000	0.381	0.000	0.000
PAO	19300	0.060	0.000	0.237	0.000	0.000
abnAF1	19300	-0.004	-0.007	0.360	-0.237	0.232

This table presents summary statistics for selected variables used in the analysis. The sample consists of 23,792 firm-year observations between 2002 and 2017.

Panel A reports descriptive statistics for audit quality variables. The test variable ‘SIGNATURE 1’ is reported in Panel B. Panel C reports control variables, including control variables for DACC and additional control variables for test of Audit Fee, MAO and Audit Pair Choice. All variables are defined in Table 1.

Table 3 Full Sample T-test Results

Variables	G1(0)	Mean1	G2(1)	Mean2	MeanDiff
DA CF1	3678	0.002	11752	0	0.003***
AF	3678	13.36	11752	13.42	-0.068***
MAO	3678	0.056	11752	0.05	0.006
AUDITOR	3678	0.062	11752	0.035	0.027***
DELAY	3644	88.11	11672	90.77	-2.658***
VOLATILI TY	3678	0.362	11750	0.341	0.021***
ROA	3678	0.03	11752	0.03	0
LEVERAG E	3678	0.199	11752	0.176	0.024***
MB	3578	1.062	11333	0.928	0.135***
growth A	3678	0.191	11752	0.189	0.001
LOSS	3678	0.119	11752	0.117	0.002
Company	3668	10.14	11721	10.77	-0.628***
board size	3656	9.113	11708	8.856	0.257***
Complex	3678	0.675	11752	0.623	0.052***
REVCEIVA BLES	3678	0.108	11752	0.107	0.00
INVENTO RY	3678	0.171	11752	0.163	0.008***
Ratio PC	3678	0.072	11741	0.06	0.011***
CATA	3678	0.54	11752	0.539	0.00
SIZE1	3678	21.88	11752	21.93	-0.051**
switch	3678	0.182	11752	0.157	0.026***
PAO	3678	0.061	11752	0.051	0.010**
abnAF	3678	48.32	11752	38.53	9.787***

Table 4 Signing Auditor Pair Analysis		
Variables	Predicted Signs	SIGNATURE_1
AUDITOR	-	-0.345*** (-5.94)
DELAY	+/-	0.000 (0.04)
VOLATILITY1	+/-	-0.012 (-0.29)
LEVERAGE	+	0.044 (0.46)
MB	+	0.021 (1.00)
Company_age	-	-0.003 (-1.33)
board_size	-	0.001 (0.10)
Complex	-	-0.052* (-1.76)
Ratio_PC	-	-2.342*** (-10.74)
CATA	-	-0.101 (-1.49)
SIZE1	+/-	-0.062*** (-4.05)
switch	+	0.078** (2.31)
PAO	?	-0.072 (-1.24)
abnAF	-	-0.009 (-0.26)
ROA	+/-	0.270 (1.32)
growth_A		-0.059* (-1.91)
Constant	?	1.775*** (5.30)
Observations		14,687

z-statistics in parentheses

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

Table 5 PS Matched Sample T-test Results

Variables	G1(0)	Mean1	G2(1)	Mean2	Mean Diff
DA	3449	0.003	3449	0.001	0.003**
AF	3449	13.37	3449	13.4	-0.036**
MAO	3449	0.051	3449	0.057	-0.01
AUDITO					
R	3449	0.064	3449	0.075	-0.011*
DELAY	3449	88.43	3449	87.65	0.78
VOLATI					
LITY	3449	0.358	3449	0.372	-0.013*
ROA	3449	0.032	3449	0.031	0
LEVERA					
GE	3449	0.199	3449	0.207	-0.008**
MB	3449	1.059	3449	1.106	-0.046**
growth A	3449	0.191	3449	0.187	0.005
LOSS	3449	0.114	3449	0.112	0.002
Company	3449	10.23	3449	10.01	0.214*
board size	3449	9.125	3449	9.224	-0.099**
Complex	3449	0.677	3449	0.691	-0.014
REVCEI					
VABLE	3449	0.107	3449	0.109	0.00
INVENT					
ORY	3449	0.173	3449	0.166	0.007*
Ratio PC	3449	0.072	3449	0.073	-0.001
CATA	3449	0.54	3449	0.538	0.002
SIZE1	3449	21.92	3449	21.9	0.021
switch	3449	0.178	3449	0.178	0.001
PAO	3449	0.055	3449	0.062	-0.007
abnAF	3449	44.62	3449	45.7	-1.085

Table 6 Audit Quality Analysis of SIGNATURE_1

Variables	Predicted Signs	Column (1) Full Sample	Column (2) Matched	Predicted Signs	Column (3) Full Sample	Column (4) Matched	Predicted Signs	Column (5) Full Sample	Column (6) Matched
		DA_BS1_w			AF			MAO	
SIGNATURE_1	-	- 0.003*** (-3.44)	-0.003*** (-2.70)	-	-0.027** (-2.48)	-0.079*** (-5.69)	+	0.223* (1.66)	0.578*** (3.46)
Complex	+	- 0.012*** (-14.21)	-0.013*** (-10.59)	+	0.155*** (13.39)	0.147*** (9.56)	+	-0.230* (-1.66)	-0.211 (-1.18)
board_size	+	0.000 (1.52)	-0.000 (-0.07)	+	0.023*** (8.78)	0.025*** (6.86)	-	0.055* (1.73)	0.030 (0.70)
AUDITOR	-	-0.002 (-0.85)	-0.000 (-0.17)	+	0.912*** (36.32)	0.962*** (33.57)	+	0.203 (0.52)	0.237 (0.55)
DELAY	+	0.000 (1.50)	0.000* (1.90)	+	0.002*** (9.02)	0.002*** (7.06)	+	0.030*** (8.86)	0.032*** (6.99)
VOLATILITY1	+	-0.000 (-0.10)	-0.000 (-0.18)	+	0.080*** (4.90)	0.077*** (3.53)	+	1.294*** (8.93)	0.904*** (4.44)
ROA	+	0.597*** (90.69)	0.590*** (60.14)	+	0.976*** (10.84)	1.004*** (7.89)	-	8.850*** (-10.38)	9.413*** (-7.53)
LEVERAGE	+	0.063*** (23.05)	0.059*** (14.75)	+	0.233*** (6.22)	0.235*** (4.54)	+	2.115*** (5.60)	2.147*** (4.12)
MB	+	- 0.002*** (-4.61)	-0.003*** (-4.61)	+/-	0.220*** (33.77)	0.205*** (23.82)	+	- 0.587*** (-6.24)	- 0.565*** (-4.93)
growth_A	+	-0.000 (-0.11)	-0.000 (-0.39)	+/-	0.073*** (6.31)	0.061*** (3.67)	+	0.850*** (-3.81)	-0.644** (-2.25)
LOSS	+	-0.002 (-1.58)	-0.001 (-0.58)	-	0.012 (0.64)	0.042 (1.55)	+	0.651*** (4.06)	0.895*** (4.01)
Company_age	+	0.000*** (6.40)	0.000** (2.45)	-	0.001 (1.01)	-0.002 (-1.57)	+	0.070*** (5.94)	0.103*** (5.42)
RECEIVABLE	+	0.024*** (6.66)	0.012** (2.25)	+/-	-0.061 (-1.21)	-0.111 (-1.57)	+	0.607 (1.07)	0.010 (0.01)
INVENTORY	+	0.008*** (2.77)	0.014*** (3.25)	+/-	-0.027 (-0.70)	0.007 (0.12)	+	1.497*** (-3.35)	-1.275** (-2.01)
Constant	?	- 0.038*** (-10.00)	-0.034*** (-6.48)	?	12.096*** (232.25)	12.103*** (177.17)	?	- 6.943*** (-10.54)	- 8.049*** (-8.56)
Observations		10,261	4,989		10,261	4,989		10,261	4,976
R-squared		0.572	0.552		0.407	0.464		0.3205	0.3701

t-statistics in parentheses

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

p<0.1

Table 7 Audit Quality Analysis of PP v.s. PM

Variables	Predicted Signs	Column (1) Full Sample	Column (2) Matched	Predicted Signs	Column (3) Full Sample	Column (4) Matched	Predicted Signs	Column (5) Full Sample	Column (6) Matched
			DA_CF1_w			AF			MAO
SIGNATURE_PM	-	- 0.003*** (-3.74)	-0.003*** (-3.34)	-	-0.024** (-2.08)	-0.095*** (-7.81)	+	0.308** (2.22)	0.702*** (4.47)
Complex		- 0.012*** (-14.06)	-0.012*** (-11.92)	+	0.161*** (13.26)	0.150*** (10.69)	+	-0.219 (-1.51)	-0.144 (-0.87)
board_size	+	0.000 (1.39)	0.000 (1.06)	+	0.023*** (8.19)	0.024*** (7.34)	-	0.048 (1.44)	0.012 (0.29)
AUDITOR	-	-0.002 (-1.06)	-0.001 (-0.52)	+	0.907*** (35.25)	0.962*** (33.91)	+	0.252 (0.64)	0.184 (0.41)
DELAY	+	0.000 (1.48)	0.000** (1.97)	+	0.002*** (8.47)	0.002*** (6.93)	+	0.030*** (8.57)	0.033*** (7.91)
VOLATILITY1	+	-0.000 (-0.36)	-0.001 (-0.38)	+	0.076*** (4.47)	0.068*** (3.44)	+	1.350*** (9.03)	1.195*** (6.83)
ROA	+	0.609*** (89.01)	0.615*** (73.75)	+	0.997*** (10.46)	0.900*** (7.99)	-	8.860*** (-9.71)	9.922*** (-8.73)
LEVERAGE	+	0.065*** (23.07)	0.068*** (20.24)	+	0.230*** (5.84)	0.250*** (5.53)	+	2.115*** (5.37)	1.685*** (3.68)
MB	+	- 0.002*** (-4.05)	-0.003*** (-4.46)	+/-	0.220*** (32.46)	0.211*** (27.55)	+	- 0.551*** (-5.83)	- 0.555*** (-5.29)
growth_A	+	0.000 (0.36)	-0.000 (-0.29)	+/-	0.078*** (6.46)	0.073*** (5.03)	+	1.125*** (-4.23)	1.027*** (-3.37)
LOSS	+	-0.001 (-1.02)	-0.001 (-0.37)	-	0.015 (0.77)	0.009 (0.42)	+	0.647*** (3.88)	0.536*** (2.70)
Company_age	+	0.000*** (6.46)	0.000*** (3.90)	-	0.000 (0.48)	-0.002 (-1.49)	+	0.064*** (5.20)	0.087*** (5.65)
RECEIVABLE		0.027*** (7.05)	0.024*** (5.26)		-0.096* (-1.82)	-0.142** (-2.29)	+	0.608 (1.03)	0.013 (0.02)
INVENTORY		0.010*** (3.44)	0.013*** (3.65)		-0.023 (-0.57)	-0.011 (-0.24)	+	1.352*** (-2.86)	1.395*** (-2.61)
Constant	?	- 0.038*** (-9.68)	-0.041*** (-8.79)	?	12.103*** (219.99)	12.133*** (193.94)	?	- 6.952*** (-10.06)	- 6.915*** (-8.66)
Observations		9,468	6,528		9,468	6,528		9,468	6,528
R-squared		0.582	0.581		0.405	0.437		0.3213	0.3372

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

Table 8 Audit Quality Analysis of PP v.s. MM

Variables	Predicted Signs	Column (1) Full Sample	Column (2) Matched	Predicted Signs	Column (3) Full Sample	Column (4) Matched	Predicted Signs	Column (5) Full Sample	Column (6) Matched
		DA_CF1_w			AF			MAO	
SIGNATURE_MM	-	-0.002 (-1.48)	0.002 (0.72)	-	-0.023 (-1.20)	-0.095*** (-3.78)	+	-0.381 (-1.41)	-0.187 (-0.47)
Complex		0.012*** (-8.07)	-0.011*** (-4.32)	+	0.135*** (7.22)	0.115*** (3.76)	+	-0.414* (-1.65)	-0.494 (-0.97)
board_size	+	-0.000 (-0.08)	0.001 (1.37)	+	0.024*** (5.49)	0.022*** (3.24)	-	0.067 (1.25)	0.128 (1.28)
AUDITOR	-	0.001 (0.41)	0.009 (1.19)	+	0.949*** (27.00)	1.024*** (11.17)	+	0.653 (1.28)	
DELAY	+	0.000** (2.00)	0.000 (1.17)	+	0.002*** (6.14)	0.002*** (4.01)	+	0.035*** (5.60)	0.040*** (3.51)
VOLATILITY1	+	0.003 (1.64)	0.005 (1.45)	+	0.106*** (3.98)	0.088** (2.08)	+	0.749** (2.52)	1.387** (2.52)
ROA	+	0.579*** (50.42)	0.541*** (28.87)	+	0.938*** (6.41)	0.922*** (4.18)	-	10.494*** (-6.96)	12.485*** (-5.11)
LEVERAGE	+	0.054*** (11.34)	0.046*** (5.55)	+	0.210*** (3.42)	0.409*** (4.21)	+	3.502*** (5.38)	2.952** (2.41)
MB	+	0.004*** (-4.52)	-0.005*** (-3.19)	+/-	0.231*** (20.78)	0.226*** (11.33)	+	-0.887*** (-4.74)	-0.881** (-2.36)
growth_A	+	-0.001 (-0.91)	-0.003 (-1.29)	+/-	0.059*** (2.99)	0.071** (2.26)	+	-0.438 (-1.35)	0.022 (0.05)
LOSS	+	-0.002 (-0.98)	-0.008* (-1.93)	-	0.001 (0.02)	-0.041 (-0.88)	+	0.494* (1.68)	0.064 (0.12)
Company_age	+	0.000* (1.78)	0.000 (1.32)	-	0.001 (0.58)	0.002 (0.62)	+	0.093*** (3.70)	0.084** (1.98)
RECEIVABLE		0.006 (0.89)	0.008 (0.65)		-0.028 (-0.34)	0.155 (1.13)	+	0.991 (1.03)	-0.522 (-0.28)
INVENTORY		0.003 (0.68)	-0.006 (-0.69)		-0.015 (-0.24)	-0.041 (-0.41)	+	-0.723 (-0.93)	-0.908 (-0.63)
Constant	?	0.035*** (-5.73)	-0.044*** (-4.13)	?	12.020*** (153.49)	12.068*** (95.88)	?	-7.974*** (-7.13)	-8.402*** (-4.13)
Observations		3,686	1,311		3,686	1,311		3,686	1,119
R-squared		0.557	0.560		0.457	0.435		0.4136	0.4226

t-statistics in parentheses

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

* p<0.1

**Table 9 PM v.s.
MM+PP**

Variables	Predicted Signs	Column (1) Full Sample	Column (2) Matched	Predicted Signs	Column (3) Full Sample	Column (4) Matched	Predicted Signs	Column (5) Full Sample	Column (6) Matched
		DA_CF1_w			AF			MAO	
SIGNATURE_PM	-	- 0.002*** (-3.23)	-0.002*** (-3.06)	-	-0.013 (-1.34)	-0.087*** (-8.40)	+	0.237** (2.02)	0.627*** (4.75)
Complex		- 0.012*** (-15.11)	-0.011*** (-12.18)	+	0.151*** (13.70)	0.156*** (12.96)	+	-0.293** (-2.23)	-0.317** (-2.10)
board_size	+	0.000 (1.34)	0.000 (0.66)	+	0.023*** (9.23)	0.032*** (11.35)	-	0.054* (1.87)	0.038 (1.12)
AUDITOR	-	-0.001 (-0.62)	-0.001 (-0.71)	+	0.909*** (37.46)	0.996*** (37.90)	+	0.353 (1.05)	0.058 (0.13)
DELAY	+	0.000* (1.72)	0.000 (0.46)	+	0.002*** (9.44)	0.002*** (7.66)	+	0.027*** (8.81)	0.033*** (9.04)
VOLATILITY1	+	-0.000 (-0.29)	-0.000 (-0.09)	+	0.077*** (4.92)	0.110*** (6.57)	+	1.167*** (8.34)	1.160*** (7.56)
ROA	+	0.601*** (94.11)	0.596*** (81.66)	+	0.944*** (10.94)	0.926*** (9.72)	-	8.862*** (-11.19)	10.199*** (-10.62)
LEVERAGE	+	0.061*** (22.90)	0.065*** (21.73)	+	0.214*** (5.97)	0.298*** (7.67)	+	2.113*** (6.06)	1.257*** (3.11)
MB	+	- 0.002*** (-4.17)	-0.002*** (-4.63)	+/-	0.219*** (34.78)	0.205*** (30.39)	+	0.502*** (-6.12)	-0.414*** (-4.70)
growth_A	+	-0.000 (-0.18)	0.001 (1.16)	+/-	0.072*** (6.42)	0.058*** (4.53)	+	0.901*** (-4.07)	-1.046*** (-3.89)
LOSS	+	-0.002 (-1.19)	-0.001 (-0.68)	-	0.009 (0.51)	0.003 (0.15)	+	0.624*** (4.23)	0.497*** (2.96)
Company_age	+	0.000*** (6.64)	0.000*** (5.24)	-	0.001 (0.96)	-0.002* (-1.89)	+	0.075*** (6.46)	0.089*** (6.70)
RECEIVABLE		0.027*** (7.56)	0.026*** (6.37)		-0.060 (-1.23)	-0.067 (-1.27)	+	1.449*** (2.82)	0.630 (1.04)
INVENTORY		0.006** (2.29)	0.010*** (3.31)		-0.026 (-0.71)	-0.031 (-0.77)	+	1.520*** (-3.63)	-1.702*** (-3.59)
Constant	?	- 0.037*** (-10.54)	-0.038*** (-9.55)	?	12.104*** (253.49)	12.089*** (232.14)	?	6.431*** (-11.22)	-7.106*** (-10.29)
Observations		10,951	8,627		10,951	8,627		10,951	8,627
R-squared		0.576	0.565		0.411	0.427		0.3325	0.3403

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

Table 10 Abnormal Accruals Using Balance Sheet Method

Variables	PM+MM PP		PM vs pp		MM vs PP		PM vs MM+PP	
	Column (1)	Column (2)	Column (1)	Column (4)	Column (7)	Column (8)	Column (5)	Column (6)
	absDA	absDA	absDA	absDA	absDA	absDA	absDA	absDA
	Full Sample	Matched Sample	Full Sample	Matched Sample	Full Sample	Matched Sample	Full Sample	Matched Sample
SIGNATURE_PM	-0.002** (-2.48)	-0.002* (-1.86)	-0.002** (-2.36)	-0.002** (-2.01)	-0.003** (-2.01)	-0.002 (-1.01)	-0.001 (-1.34)	-0.001 (-1.30)
Complex	0.005*** (5.93)	0.006*** (5.33)	0.005*** (6.20)	0.006*** (5.35)	0.006*** (4.03)	0.002 (0.79)	0.005*** (6.23)	0.005*** (5.11)
board_size	-0.000 (-1.41)	-0.000 (-0.83)	-0.000 (-0.95)	0.000 (0.39)	-0.000 (-0.95)	-0.000 (-0.57)	-0.000 (-1.42)	-0.000 (-0.41)
AUDITOR	0.003* (1.76)	0.002 (0.89)	0.003 (1.62)	0.003 (1.32)	0.004 (1.49)	0.014** (2.01)	0.005*** (2.76)	0.005*** (2.71)
DELAY	0.000** (2.12)	0.000* (1.86)	0.000* (1.90)	0.000 (1.36)	0.000*** (2.95)	0.000* (1.72)	0.000* (1.89)	0.000 (1.26)
VOLATILITY1	0.012*** (10.18)	0.010*** (6.22)	0.012*** (10.09)	0.013*** (8.79)	0.012*** (6.27)	0.012*** (3.45)	0.013*** (11.38)	0.012*** (9.28)
ROA	-0.020*** (-3.13)	0.002 (0.18)	-0.016** (-2.43)	-0.008 (-0.98)	-0.007 (-0.66)	-0.081*** (-4.67)	-0.036*** (-5.73)	-0.016** (-2.26)
LEVERAGE	-0.006** (-2.33)	-0.004 (-1.09)	-0.007** (-2.37)	-0.003 (-1.00)	-0.003 (-0.69)	-0.008 (-1.08)	-0.004 (-1.42)	-0.002 (-0.72)
MB	-0.008*** (-17.72)	-0.008*** (-12.28)	-0.008*** (-17.00)	-0.008*** (-14.19)	-0.010*** (-11.92)	-0.009*** (-5.50)	-0.009*** (-18.92)	-0.008*** (-16.14)
growth_A	0.004*** (5.19)	0.006*** (4.73)	0.004*** (5.07)	0.005*** (4.82)	0.004*** (2.76)	0.001 (0.41)	0.004*** (4.95)	0.005*** (5.05)
LOSS	0.037*** (28.31)	0.040*** (20.43)	0.038*** (27.46)	0.037*** (22.49)	0.042*** (18.10)	0.031*** (8.50)	0.036*** (28.25)	0.036*** (25.55)
Company_age	0.000*** (4.52)	0.000*** (2.89)	0.000*** (4.75)	0.000*** (3.44)	0.000 (1.63)	0.000 (0.61)	0.000*** (4.08)	0.000*** (3.53)
REVCEIVABLE	-0.002 (-0.57)	-0.009* (-1.74)	-0.002 (-0.64)	-0.001 (-0.32)	-0.006 (-1.06)	-0.025** (-2.31)	-0.002 (-0.71)	0.001 (0.32)
INVENTORY	-0.002 (-0.69)	-0.001 (-0.27)	-0.001 (-0.49)	-0.001 (-0.36)	-0.004 (-0.80)	-0.009 (-1.13)	-0.003 (-1.17)	-0.002 (-0.50)
Constant	0.030*** (7.96)	0.029*** (5.78)	0.029*** (7.34)	0.024*** (5.30)	0.025*** (4.33)	0.033*** (3.38)	0.032*** (9.32)	0.027*** (6.98)
Observations	10,261	4,989	9,468	6,528	3,686	1,311	10,951	8,627
R-squared	0.183	0.182	0.182	0.176	0.215	0.245	0.192	0.178
t-statistics in parentheses								
*** p<0.01, **								
p<0.05, * p<0.1								

Table 11 Test of
SIGNATURE_1

Variables	Predicted Signs	Column (1) Full Sample	Column (2) Matched	Column (3)	Column (4)	Column (5) Full Sample	Column (6) Matched	Column (7)	Column (8)	Column (9) Full Sample	Column (10) Matched	Column (11)	Column (12)
		Positive	DA	Negative	DA	Positive	AF	Negative	AF	Positive	MAO	Negative	MAO
SIGNATURE_1	-	-0.002** (-2.21)	-0.001 (-1.31)	-0.000 (-0.52)	-0.001 (-0.74)	-0.023 (-1.47)	-0.079*** (-4.09)	-0.028* (-1.83)	-0.087*** (-4.32)	0.174 (0.71)	0.517* (1.76)	0.240 (1.46)	0.282 (1.36)
Complex	+	-0.004*** (-4.30)	-0.003** (-2.48)	-0.012*** (-13.49)	-0.013*** (-10.50)	0.146*** (8.27)	0.122*** (5.32)	0.161*** (10.56)	0.179*** (8.57)	0.186 (0.77)	0.094 (0.32)	-0.408** (-2.42)	-0.387* (-1.68)
board_size	+	-0.000 (-0.19)	-0.000 (-0.38)	0.001** (2.57)	0.000 (0.96)	0.019*** (5.00)	0.021*** (4.00)	0.026*** (7.18)	0.020*** (3.77)	-0.064 (-1.07)	-0.120 (-1.44)	0.104*** (2.78)	0.161*** (2.94)
AUDITOR	-	-0.000 (-0.24)	-0.001 (-0.38)	-0.000 (-0.13)	-0.001 (-0.48)	0.860*** (24.21)	0.888*** (22.35)	0.943*** (26.48)	0.983*** (23.45)	-0.048 (-0.06)	-0.790 (-0.76)	0.134 (0.28)	-0.148 (-0.26)
DELAY	+	0.000*** (4.14)	0.000*** (3.62)	0.000 (0.77)	0.000* (1.78)	0.002*** (6.42)	0.002*** (4.31)	0.002*** (6.23)	0.002*** (3.58)	0.034*** (5.41)	0.030*** (3.80)	0.030*** (7.53)	0.030*** (5.37)
VOLATILITY1	+	0.004*** (2.80)	0.002 (1.29)	-0.007*** (-5.55)	-0.008*** (-4.21)	0.121*** (5.15)	0.125*** (4.13)	0.025 (1.10)	0.011 (0.33)	1.081*** (4.16)	0.963*** (2.66)	1.424*** (7.71)	1.403*** (4.95)
ROA	+	0.399*** (46.92)	0.408*** (33.90)	0.424*** (54.15)	0.440*** (38.00)	1.342*** (8.82)	1.340*** (6.54)	0.576*** (4.27)	0.308 (1.57)	-8.740*** (-3.48)	-6.845** (-2.29)	9.081*** (-9.31)	9.917*** (-6.80)
LEVERAGE	+	0.037*** (11.35)	0.035*** (7.60)	0.037*** (12.59)	0.039*** (9.53)	0.205*** (3.56)	0.253*** (3.23)	0.256*** (5.10)	0.143** (2.04)	2.769*** (3.50)	2.046* (1.87)	2.128*** (4.84)	2.626*** (4.30)
MB	+	-0.004*** (-6.84)	-0.004*** (-4.19)	0.003*** (5.68)	0.003*** (4.63)	0.245*** (22.23)	0.243*** (16.56)	0.215*** (25.81)	0.206*** (18.62)	-0.877*** (-4.11)	-0.546** (-2.22)	0.503*** (-4.71)	0.575*** (-4.05)
growth_A	+	0.006*** (7.13)	0.008*** (5.76)	-0.006*** (-6.64)	-0.009*** (-6.30)	0.064*** (4.01)	0.048** (2.13)	0.085*** (5.11)	0.109*** (4.37)	-1.869*** (-3.43)	2.143*** (-2.89)	-0.480** (-2.11)	-0.274 (-0.95)
LOSS	+	0.022*** (9.15)	0.024*** (6.63)	-0.005*** (-3.85)	-0.004** (-2.10)	-0.070 (-1.61)	-0.052 (-0.86)	-0.008 (-0.35)	-0.030 (-0.90)	0.512 (1.32)	0.692 (1.36)	0.671*** (3.74)	0.647** (2.43)
Company_age	+	0.001*** (8.16)	0.001*** (4.85)	0.000 (1.03)	-0.000 (-0.07)	0.000 (0.38)	0.000 (0.15)	0.001 (0.90)	-0.001 (-0.45)	0.077*** (3.50)	0.105*** (3.09)	0.063*** (4.41)	0.057** (2.42)
RECEIVABLE	+	0.013*** (3.27)	0.008 (1.47)	0.013*** (3.19)	0.007 (1.16)	-0.072 (-1.02)	-0.139 (-1.47)	-0.023 (-0.32)	0.012 (0.12)	0.928 (0.93)	0.735 (0.56)	0.673 (0.97)	0.129 (0.13)

INVENTORY	+	0.012*** (3.94)	0.011*** (2.60)	0.001 (0.21)	-0.003 (-0.53)	-0.031 (-0.57)	-0.050 (-0.68)	0.007 (0.12)	0.009 (0.12)	-0.792 (-1.00)	0.938 (0.95)	- 1.902*** (-3.44)	- -2.076** (-2.53)
Constant	?	-0.009** (-2.06)	-0.012** (-2.12)	-0.046*** (-8.73)	-0.043*** (-6.41)	12.165*** (164.09)	12.094*** (122.24)	12.116*** (134.23)	12.269*** (108.17)	-5.151*** (-4.74)	4.426*** (-3.10)	- 7.266*** (-8.01)	- 8.266*** (-6.72)
Observations		5,306	2,727	4,996	2,393	5,306	2,727	4,996	2,393	5,168	2,632	4,996	2,393
R-squared		0.383	0.395	0.562	0.583	0.380	0.432	0.445	0.500			0.4064	0.4064
t-statistics in parentheses													
*** p<0.01, ** p<0.05, * p<0.1													

**Table 12 Test of
SIGNATURE_PM**

Variables	Predicted Signs	Column (1) Full Sample	Column (2) Matched	Column (3)	Column (4)	Column (5) Full Sample	Column (6) Matched	Column (7)	Column (8)	Column (9) Full Sample	Column (10) Matched	Column (11)	Column (12)
		Positive	DA	Negative	DA	Positive	AF	Negative	AF	Positive	MAO	Negative	MAO
SIGNATURE_PM	-	-0.002** (-2.24)	-0.002* (-1.79)	-0.001 (-1.24)	-0.001 (-1.08)	-0.005 (-0.37)	-0.071*** (-4.93)	-0.021 (-1.52)	-0.092*** (-6.29)	0.149 (0.70)	0.410* (1.77)	0.256* (1.82)	0.519*** (3.33)
Complex	+	-0.004*** (-4.64)	-0.005*** (-4.72)	0.012*** (-13.99)	-0.011*** (-11.63)	0.146*** (8.65)	0.132*** (7.16)	0.156*** (10.76)	0.164*** (10.08)	0.060 (0.26)	-0.004 (-0.01)	0.465*** (-2.90)	-0.436** (-2.37)
board_size	+	-0.000 (-0.09)	-0.000 (-0.10)	0.000** (2.25)	0.000* (1.72)	0.019*** (5.26)	0.029*** (7.26)	0.026*** (7.50)	0.032*** (8.15)	-0.049 (-0.93)	-0.092 (-1.48)	0.092*** (2.65)	0.105*** (2.66)
AUDITOR	-	0.000 (0.08)	0.001 (0.49)	-0.001 (-0.63)	-0.002 (-1.00)	0.856*** (25.09)	0.931*** (25.25)	0.940*** (27.17)	1.018*** (26.62)	-0.301 (-0.40)	-0.045 (-0.06)	0.424 (1.06)	-0.152 (-0.28)
DELAY	+	0.000*** (4.35)	0.000*** (2.61)	0.000 (1.06)	0.000 (1.41)	0.002*** (6.71)	0.002*** (4.88)	0.002*** (6.55)	0.002*** (5.18)	0.030*** (5.41)	0.034*** (5.29)	0.028*** (7.56)	0.028*** (6.81)
VOLATILITY1	+	0.004*** (3.39)	0.003** (2.28)	0.008*** (-6.20)	-0.007*** (-4.65)	0.117*** (5.17)	0.147*** (6.26)	0.021 (0.96)	0.050** (2.12)	0.895*** (3.63)	0.855*** (3.15)	1.287*** (7.25)	1.164*** (5.95)
ROA	+	0.394*** (47.26)	0.403*** (43.67)	0.435*** (58.44)	0.437*** (50.53)	1.329*** (9.05)	1.276*** (8.16)	0.535*** (4.19)	0.510*** (3.54)	-7.629*** (-3.26)	8.667*** (-3.28)	9.022*** (-10.01)	9.460*** (-8.91)
LEVERAGE	+	0.035*** (11.40)	0.041*** (11.87)	0.035*** (12.33)	0.036*** (11.18)	0.187*** (3.42)	0.258*** (4.42)	0.234*** (4.88)	0.284*** (5.32)	2.995*** (4.17)	2.629*** (3.26)	2.039*** (5.06)	1.370*** (2.96)
MB	+	-0.004*** (-6.45)	-0.004*** (-5.59)	0.003*** (6.27)	0.003*** (5.28)	0.248*** (23.35)	0.220*** (19.41)	0.212*** (26.40)	0.211*** (23.68)	-0.636*** (-3.68)	0.563*** (-2.95)	0.464*** (-4.88)	0.486*** (-4.48)
growth_A	+	0.006*** (7.11)	0.007*** (6.97)	0.006*** (-6.50)	-0.007*** (-6.73)	0.065*** (4.15)	0.040** (2.25)	0.085*** (5.23)	0.087*** (4.70)	-2.078*** (-3.92)	1.482*** (-2.78)	-0.531** (-2.39)	-0.533** (-2.16)
LOSS	+	0.024*** (10.26)	0.020*** (8.27)	0.004*** (-3.28)	-0.004*** (-2.70)	-0.096** (-2.37)	-0.062 (-1.48)	-0.008 (-0.40)	-0.015 (-0.64)	0.780** (2.34)	0.654* (1.79)	0.606*** (3.66)	0.542*** (2.88)
Company_age	+	0.001*** (7.86)	0.001*** (6.13)	0.000 (1.44)	0.000 (0.78)	0.000 (0.20)	-0.003** (-2.16)	0.001 (0.98)	-0.002 (-1.29)	0.081*** (3.78)	0.085*** (3.58)	0.067*** (4.80)	0.092*** (5.80)

RECEIVABLE	+	0.014*** (3.53)	0.014*** (3.33)	0.015*** (3.72)	0.014*** (3.10)	-0.075 (-1.11)	-0.070 (-0.97)	-0.038 (-0.55)	-0.037 (-0.48)	1.662* (1.85)	2.067** (2.11)	1.514** (2.44)	0.794 (1.09)
INVENTORY	+	0.009*** (3.07)	0.010*** (3.19)	-0.000 (-0.06)	0.002 (0.46)	-0.018 (-0.33)	-0.033 (-0.60)	-0.018 (-0.33)	-0.030 (-0.51)	-1.442* (-1.93)	-1.330 (-1.62)	1.744*** (-3.43)	1.771*** (-3.06)
Constant	?	-0.026*** (-5.61)	-0.024*** (-4.54)	0.047*** (-9.85)	-0.044*** (-7.88)	12.264*** (147.70)	12.264*** (136.19)	12.140*** (148.25)	12.203*** (132.03)	-5.067*** (-4.62)	5.459*** (-4.28)	6.813*** (-8.53)	7.105*** (-7.41)
Observations		5,721	4,604	5,346	4,115	5,721	4,604	5,346	4,115	5,637	4,536	5,346	4,115
R-squared		0.371	0.381	0.582	0.570	0.389	0.386	0.446	0.465			0.4064	0.4064

**Table 13 Test of
SIGNATURE_1 in Year
2016**

Variables	Predicted Signs	Column (1) Full Sample	Column (2) Matched	Predicted Signs	Column (3) Full Sample	Column (4) Matched	Predicted Signs	Column (5) Full Sample	Column (6) Matched
			DA			AF			MAO
SIGNATURE_PM	-	-0.003 (-0.76)	- 0.014*** (-3.44)	-	-1.131** (-2.32)	-1.680*** (-3.77)	+	0.135 (0.57)	0.205 (0.63)
Complex		- 0.014*** (-3.88)	- 0.013*** (-2.65)	+	1.399*** (2.82)	1.487*** (2.79)	+	-0.263 (-1.06)	-0.103 (-0.26)
board_size	+	0.003*** (3.57)	0.004*** (3.44)	+	0.274** (2.41)	0.261** (2.24)	-	0.135** (2.54)	0.271*** (3.51)
AUDITOR	-	0.000 (0.03)	-0.010 (-0.91)	+	25.606*** (28.28)	29.397*** (25.76)	+	0.056 (0.10)	0.912 (1.06)
DELAY	+	0.000*** (3.84)	0.000*** (2.98)	+	0.008 (0.82)	0.005 (0.47)	+	0.031*** (5.24)	0.050*** (4.63)
VOLATILITY1	+	0.006 (1.05)	0.023*** (3.39)	+	1.222* (1.75)	1.197* (1.67)	+	1.285*** (4.66)	1.046** (2.39)
ROA	+	0.898*** (29.57)	0.790*** (20.62)	+	4.369 (1.11)	8.240** (2.02)	-	10.888*** (-6.99)	10.983*** (-4.53)
LEVERAGE	+	0.091*** (7.34)	0.114*** (7.14)	+	0.069 (0.04)	-0.265 (-0.16)	+	2.981*** (4.40)	1.372 (1.25)
MB	+	0.018*** (8.35)	0.013*** (4.56)	+/-	4.552*** (16.04)	4.055*** (13.03)	+	-0.724*** (-4.04)	-0.945*** (-2.99)
growth_A	+	0.029*** (7.77)	0.025*** (5.83)	+/-	1.135** (2.37)	1.063** (2.31)	+	-0.461 (-1.45)	-0.069 (-0.21)
LOSS	+	0.004 (0.65)	-0.007 (-0.88)	-	-0.177 (-0.22)	-0.214 (-0.27)	+	0.818*** (2.85)	0.974** (2.32)
Company_age	+	-0.000 (-0.62)	-0.000 (-0.54)	-	-0.117*** (-2.79)	-0.114*** (-2.77)	+	0.049** (2.09)	0.033 (1.09)
RECEIVABLE		0.105*** (6.40)	0.101*** (4.86)		0.450 (0.21)	2.875 (1.30)	+	1.232 (1.27)	1.292 (0.88)
INVENTORY		0.106*** (8.54)	0.091*** (5.95)		-2.160 (-1.33)	-1.627 (-0.99)	+	-1.182 (-1.58)	-1.255 (-1.07)
Constant	?	- 0.197*** (-11.97)	- 0.187*** (-8.67)	?	-3.954* (-1.82)	-2.044 (-0.89)	?	-8.229*** (-7.44)	10.515*** (-5.41)
Observations		4,040	2,445		3,754	2,445		4,024	2,120
R-squared		0.369	0.333		0.330	0.366			

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

**Table 14 Test of
SIGNATURE_PM in
Year 2016**

Variables	Predicted Signs	Column (1) Full Sample	Column (2) Matched	Predicted Signs	Column (3) Full Sample	Column (4) Matched	Predicted Signs	Column (5) Full Sample	Column (6) Matched
			DA			AF			MAO
SIGNATURE_PM	-	-0.001 (-0.31)	-0.002 (-1.06)	-	-0.014 (-0.46)	0.110*** (3.06)	+	0.289 (0.73)	0.281 (0.59)
Complex		0.012*** (-5.93)	-0.015*** (-5.48)	+	0.192*** (5.21)	0.215*** (4.27)	+	-0.414 (-0.88)	-0.497 (-0.80)
board_size	+	0.000 (0.63)	0.000 (0.32)	+	0.020*** (2.64)	0.014 (1.28)	-	0.211** (2.39)	0.384*** (2.99)
AUDITOR	-	0.002 (0.45)	0.003 (0.82)	+	0.720*** (11.85)	0.611*** (9.36)	+	0.349 (0.33)	0.103 (0.09)
DELAY	+	0.000 (0.26)	0.000 (0.63)	+	0.002*** (3.43)	0.003*** (2.94)	+	0.006 (0.76)	-0.006 (-0.50)
VOLATILITY1	+	0.005** (2.22)	0.008*** (2.67)	+	0.174*** (4.02)	0.056 (1.04)	+	1.494*** (3.92)	1.557*** (3.05)
ROA	+	0.683*** (45.21)	0.681*** (33.82)	+	0.618** (2.30)	0.896** (2.49)	-	6.930*** (-2.79)	10.386*** (-3.02)
LEVERAGE	+	0.067*** (10.42)	0.054*** (5.50)	+	0.317*** (2.77)	0.631*** (3.61)	+	2.756** (2.33)	4.248** (2.29)
MB	+	0.003*** (-2.59)	-0.002* (-1.65)	+/-	0.283*** (15.28)	0.310*** (12.12)	+	1.025*** (-2.94)	-1.104** (-2.00)
growth_A	+	0.001 (1.01)	-0.003 (-1.46)	+/-	0.114*** (4.57)	0.162*** (4.23)	+	-0.602 (-1.44)	-0.784 (-1.10)
LOSS	+	-0.004 (-1.22)	-0.005 (-1.30)	-	-0.015 (-0.28)	-0.027 (-0.37)	+	0.898* (1.93)	0.370 (0.59)
Company_age	+	0.000*** (3.45)	0.000*** (2.60)	-	-0.004** (-2.05)	-0.003 (-1.10)	+	0.069*** (2.69)	0.054 (1.41)
RECEIVABLE		0.030*** (4.01)	0.030*** (2.86)		0.104 (0.78)	0.118 (0.63)	+	0.600 (0.40)	-0.630 (-0.29)
INVENTORY		0.004 (0.54)	-0.004 (-0.39)		-0.058 (-0.47)	-0.096 (-0.60)	+	0.645 (0.51)	-1.669 (-0.88)
Constant	?	0.048*** (-6.94)	-0.043*** (-4.42)	?	12.806*** (103.81)	12.806*** (73.25)	?	7.256*** (-4.92)	-8.663*** (-4.02)
Observations		1,643	827		1,643	827		1,494	732
R-squared		0.680	0.710		0.329	0.416			

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