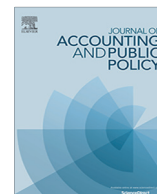




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Does sharing the same network auditor in group affiliated firms affect audit quality?

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ABSTRACT

We contribute to the literature on audit quality by examining whether sharing the same network auditor among group affiliated firms is related to lower or higher audit quality in China. We find that choosing the same network audit firm among group affiliated firms is associated with more sanctions by regulators regarding fraudulent financial reporting, higher abnormal accruals, larger standard deviation of abnormal accruals, higher likelihood of a downward restatement in earnings, and lower likelihood of receiving a going concern modified opinion. We further identify contexts that moderate audit quality. Higher audit quality is associated with the use of a specialist auditor and firms that operate in more homogeneous industries. Lower audit quality is associated with longer auditor tenure (more than five years), greater geographic distance between a parent company and its subsidiaries, and greater control by a parent company over its subsidiaries.

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1. Introduction

Our first objective in this study is to provide evidence on whether sharing the same network audit firm rather than using unaffiliated audit firms for the parent and/or subsidiaries of a business group audit is associated with audit quality for Chinese listed firms. Second, we identify different contexts when using the same network or unaffiliated audit firms for parents and/or subsidiaries of business groups moderates audit quality. Group affiliated firms tend to be large and economically important relative to unaffiliated (stand-alone) firms (Khanna and Yafeh, 2007; Shi et al., 2015).¹ There is little research on the role of auditing in group affiliated firms despite the importance of group affiliated firms and the extensive prior research on group affiliated firms in economics and finance literature (see Coase, 1960; Williamson, 1985; Claessens et al., 2006).

Prior research finds that group affiliated firms exacerbate agency problems between large controlling shareholders and minority owners. That is, complex ownership structures and opaque intra-group transactions can be used by majority owners to generate private benefits, including tunneling at the expense of minority owners especially in countries with weak investor protection mechanisms (La Porta et al., 1999; Wolfenzon, 1999; Bae et al., 2002; Bertrand et al., 2002; La Porta et al., 2002; Claessens et al., 2006). Further, insider controlled firms are associated with more earnings management than

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¹ Group affiliated firms typically consist of legally independent firms that are controlled by the same parent (controller) company.

non-insider controlled firms in countries with weak investor protection (Gopalan and Jayaraman, 2012). This raises questions regarding the skill of auditors in maintaining audit quality for group affiliated firms.

Sharing the same network auditor occurs when the parent and/or subsidiaries in group affiliated firms engage the same network auditor. China provides an ideal context to study this question. First, most of the publicly traded firms in China are group affiliated firms. Second, competition in the Chinese audit market is strong (Wang et al., 2008; Yang, 2013; Ke et al., 2015; Chen et al., 2016). Third, investor protection in China is weak (DeFond et al., 2000; Chen et al., 2001; Chan et al., 2006; Djankov et al., 2008).

Ex ante, the association between sharing the same network auditor on audit quality is unclear. One perspective is that sharing the same network auditor among group affiliated firms is likely to enhance audit quality due to potential knowledge spillovers. Group affiliated firms engage extensively with other firms in the business group. Sharing the same network auditor decreases information asymmetry between the client firm and auditor, leading to better assessment of risk and timely detection of critical accounting issues (such as related party transactions) relative to using unaffiliated auditors.

Another perspective is that sharing the same network auditor can have an adverse impact on audit quality due to potential loss of auditor independence due to client importance. *Ceteris paribus*, auditors have strong incentives to retain group affiliated clients due to their size and economic significance. Auditors' economic dependence on important clients is likely to compromise their independence and be associated with impaired audit quality. Prior research finds that the presence of large shareholders results in managerial entrenchment (Attig et al., 2006; Claessens et al., 2006) and the combination of entrenched owners and economically dependent auditors can exacerbate the association between audit quality. Thus, the net influence of sharing auditors on audit quality is unclear, requiring empirical evidence from alternative institutional settings.

This is important research for policy makers because regulators and researchers recognize the importance of audit firms maintaining audit independence and quality (Hossain et al., 2016). The use of network and unaffiliated auditors in group affiliated audits adds an additional level of complexity that increases regulators' concerns regarding the maintenance of independence and audit quality (Sunderland and Trompeter, 2017). Data has not been available in the US to allow longitudinal analysis to be conducted on the associations between audit quality and the use of network and unaffiliated auditors. This data is available in China and Chinese evidence has the potential to provide insights outside China. The major principles of International Financial Reporting Standards (IFRS) and International Auditing and Assurance Standards Board (IAASB) are adopted in China (Jones, 2016; Li et al., 2017). The Chinese Institute of Certified Public Accountants (CICPA) focuses on maintaining the quality of practicing audit firms, similar to the role played by the Public Company Accounting Oversight Board (PCAOB) in the US. In addition, the China Securities Regulatory Commission (CSRC) plays a more general role, acting as the monitor of China's capital markets, similar to the Securities and Exchange Commission (SEC) in the US (Li et al., 2017).

Our sample covers 2003–2012 and consists of 9260 firm-year observations representing 1568 Chinese firms. We use multiple measures of audit quality (DeFond and Zhang, 2014) including the issuance of misleading or fraudulent financial statements, absolute value of performance-adjusted abnormal (discretionary) accruals, the standard deviation of abnormal working capital accruals, modified opinions, and restatements. We estimate a regression of (or a logit model of) audit quality measures based on sharing the same auditor and a set of common controls, including control intensity (the percent of subsidiaries' shares held by the parent), firm age, inventory intensity, leverage, sales growth, market-to-book, cash flow and cash flow variance, sales and sales variance, financial distress, mergers or acquisitions, state ownership, and whether the firm is a Top Ten auditor. We also include fixed effects for industry, year, and the auditor.

We document several key findings. First, group affiliated firms that share the same network auditor are more likely to be sanctioned by regulators for misleading or fraudulent financial reporting. Further, sharing the same network auditor is associated with higher absolute value of performance-adjusted abnormal accruals, standard deviation of abnormal working capital accruals, likelihood of a downward restatement in earnings, and fewer modified opinions. However, lower audit quality associated with sharing the same network auditor is less pronounced for clients using industry auditor specialists and when group affiliated firms are operating in more homogeneous industries. Contexts in which sharing the same network auditor is moderated with lower audit quality include: auditor tenure of more than five years; increased control by the parent over its subsidiaries; and increased geographic distance between the parent company and its subsidiaries. Finally, we find that the negative influence of sharing the same network auditor on audit quality extends to Top 10 auditors and non Top 10 auditors.

We extend prior research and contribute to the literature in several ways. First, we contribute to auditor independence research by using group affiliated firms as an alternative measure of client economic importance. In doing so, we determine whether audit quality is compromised for economically significant clients (Reynolds and Francis, 2000; Chung and Kallapur, 2003). Most research on economic bonding focuses on client importance at the office or firm levels (Chen et al., 2010; Francis et al., 2013) with inconclusive results (Lennox and Wu, 2018). Group affiliated firms tend to be large relative to unaffiliated (stand-alone) firms and economically important (Khanna and Yafeh, 2007). We extend previous research by using group affiliated firms as a measure of client economic importance. Our findings support the concept that lower audit quality associated with sharing the same network auditor is consistent with client pressures impairing auditor independence.

Second, we extend an Australian study that finds that increased extent of involvement of component audit firms is associated with lower audit quality for group affiliated firms' audits regardless of whether those audit firms are part of an international network or unaffiliated audit firms (Carson et al., 2019). Our Chinese environment differs from the Australian setting in that we can employ the use of additional measures of earnings quality because unlike Australia, China has publicly available data identifying fraud (Li et al., 2017) and restatements. In addition, our focus is audit quality for domestically

listed firms in China whereas the Australian study concentrates on components of multinational firms excluding companies with domestic subsidiaries. Our results differ from Carson et al. (2019), who find that the use of component auditors (network and unaffiliated auditors) are associated with lower audit quality for international components. We find that sharing the same network audit firm as opposed to using an unaffiliated firm for the parent and/or subsidiaries of the audit is associated with increased identified fraudulent financial reporting, higher abnormal accruals, larger standard deviation of abnormal accruals, higher likelihood of a downward restatement in earnings, and lower likelihood of receiving a going concern modified opinion.

We further contribute to research by extending US working papers (Dee et al., 2015; Dee et al., 2018; Burke et al., 2019). Unlike our study, these working papers focus on multinational components; our study provides longitudinal data which is not available in the US. Greater variation exists in China compared to the US market with a greater use of unaffiliated audit firms in China (Dee et al., 2018; Burke et al., 2019) and a wider choice of audit firms for larger firms. The Chinese audit market is not as concentrated as the US and most other countries (Carson et al., 2012; Bleibtreu and Stefani, 2018). About 45 audit firms are qualified to audit listed companies and Big 4 audit firms account for less than 10 percent of the total market share in China. There is intense competition for audit clients among audit firms in China (Wang et al., 2008; Yang, 2013; Ke et al., 2015; Chen et al., 2016). Therefore, retaining group affiliated clients is critical to Chinese audit firms, leading to increased potential for Chinese audit firms to acquiesce to client demands from economically important clients by performing a lower quality audit.

Our final contribution arises because of the importance of Chinese evidence to US regulators and researchers. China is the second largest economy and second biggest stock market by market capitalization in the world (Jones, 2016). China is one of the few countries that does not allow Public Company Accounting Oversight Board (PCAOB) inspections and US regulators are unable to assess audit quality for audit firms in China (DeFond and Lennox, 2017; Fung et al., 2017). China's A shares are included in the Morgan Stanley Capital International index from June 2019, and this leads to an increasing number of foreign investors buying Chinese listed shares. These investors require an understanding of China's capital market and the issues covered in this paper. We provide evidence on the important issue of audit quality for component audit firms for Chinese listed group affiliated firms that can be applied by policy makers to their regulation of component auditors in other countries.

The remainder of the paper is organized as follows. Section 2 provides a summary of related prior research and develops our hypothesis. Section 3 describes the sample, our measures of audit quality, and research design. Section 4 presents the results and Section 5 concludes.

2. Hypothesis development

Sharing the same network auditor among group affiliated firms rather than using unaffiliated auditors can enhance or exacerbate audit quality. The first perspective is that using the same network auditors for group affiliated firm audits is associated with higher quality auditing (IAASB, 2014). An auditor aiming to maintain high audit quality for an affiliated group has increased control on the quality of evidence collected by using the network auditor. Work of unaffiliated component auditors are potentially not adequately planned and supervised by the group affiliated audit team. These reservations increase when multinational firms are part of the group affiliated audit because of legal, cultural, auditing standards, and timing differences for components of the audit. In addition, language barriers frequently exist, and the parent auditor is likely to have a general lack of understanding of the component auditor. Auditors, investors, and regulators frequently have concerns that the work of unaffiliated auditors is not of the uniform quality of the auditor for the group (Nolder and Riley, 2014; IAASB, 2014; PCAOB, 2016; Sunderland and Trompeter, 2017).

Sharing the same network auditor is likely to enhance audit quality due to potential knowledge spillovers that provide insights learned from auditing multiple firms within the group affiliated firm. Firms belonging to a group affiliated firm routinely transfer resources across firms and related party transactions are difficult to monitor and audit (Gopalan and Jayaraman, 2012). Prior research from China also finds that business affiliated firms use abnormal sales to their parent firms to meet earnings targets (Jian and Wong, 2010), shift incomes within the group to lower their tax burden (Shevlin et al., 2012), or pay a higher premium for goods or services to a parent company (Jia et al., 2013). This suggests that group affiliated firms have higher inherent audit risk relative to stand-alone firms. Network auditors have an information advantage relative to unaffiliated auditors in managing the higher inherent risk of group affiliated firms.

This is consistent with prior research that finds that financial reporting quality is higher when the auditor performs non-audit services, especially tax services, in addition to auditing (Kinney et al., 2004; Robinson, 2008; Krishnan and Visvanathan, 2011; Seetharaman et al., 2011). Further, two recent concurrent studies examine the relation between having shared auditors in mergers and acquisitions' transactions and find that shared auditors act as information intermediaries for merging firms, associated with higher quality acquisitions and other benefits to the bidder firms (Cai et al., 2016; Dhaliwal et al., 2016).

Further, using the network auditor can lead to higher quality auditing because the market for high quality auditing operates to ensure auditors maintain quality and independence in conducting the audit. Auditors know that reducing quality and independence increases litigation risk, loss of reputation, and leads to regulatory intervention (Ball, 2009).

A second perspective is that sharing the same network auditor can have an adverse impact on audit quality. Prior research suggests that majority owners use complex ownership structures and opaque intra-group transactions to generate private

benefits at the expense of minority owners, especially in countries with weak investor protection mechanisms (Bertrand et al., 2002; La Porta et al., 2002; Allen et al., 2005; Claessens et al., 2006; Chen et al., 2013). Consistent with this notion, Fan and Wong (2002) find that concentrated ownership is associated with low earnings informativeness and higher earnings management (Burgstahler et al., 2006; Kim and Yi, 2010), with insider controlled firms being associated with more earnings management than non-insider controlled firms (Gopalan and Jayaraman, 2012). Further, prior research finds that the presence of large shareholders results in managerial entrenchment (Attig et al., 2006; Claessens et al., 2006).

Sharing the same network auditor can contribute to impaired auditor independence due to client pressures. Group affiliated firms are unlikely to want to relinquish their private arrangements such as use of opaque intra-group transactions that generate private benefits or earnings management. Auditors have strong incentives to impair independence to retain group affiliated clients due to the size and economic significance of the group affiliated firm. Failure to yield to client pressure from group affiliated firms can result in loss of multiple clients (DeAngelo, 1981; Reynolds and Francis, 2000; Chen et al., 2016).

Use of the same network auditors assists the audit process when the auditor of the affiliated group has incentives to act in their own self interest by compromising their independence and conceding to client pressures. Network auditor interests are more likely to be aligned with the interests of the group affiliated auditor. Unaffiliated auditors have their own private incentives to maintain their reputation and avoid litigation risk and loss of reputation. The financial loss from losing a group audit client is likely to be much higher for the group affiliated auditor than unaffiliated auditors. Sharing network auditors allows the auditor for the group affiliated firm to increase their control of the audit and thus mitigate conflicts between the auditor and any unaffiliated firms (Carson et al., 2019).

The risk of litigation against auditors is low in China compared to the U.S. (Allen et al., 2005; Chen et al., 2013) with China having the worst shareholder protection regimes among the East Asian countries (Djankov et al., 2008). This means that the market mechanism for maintaining audit quality (through reputation and lawsuits) is less likely to deter managers and auditors from violating the trust placed in them by investors and others. Thus, market-based incentives are expected to play a modest role in motivating auditors in China to maintain a high quality audit when faced with client pressure.

Given the opposing influences of sharing the same network auditor on audit quality, it is not clear whether sharing the same network auditor increases or decreases audit quality. We therefore present the following null hypothesis:

H1: Sharing the same network auditors for group affiliated firms is not associated with audit quality.

3. Research design

3.1. Sample selection

Our sample is from 2003 to 2012. We obtain financial data to calculate our variables from the *China Securities Markets & Accounting Research* (CSMAR) database. This data base provides data on Chinese stock markets and financial statements of China's listed companies and is the most widely used source of financial data for listed firms in China. This includes all listed firms in China, consisting of national and international firms. Panel A, Table 1 describes the sample selection process. We begin with 18,321 firm-year observations available in CSMAR with non-missing total differences in client characteristics between shared auditors and non-shared auditors. We match the two groups of observations based on the same business group, firm size (total assets), and return on assets (ROA). Specifically, we run all control variables on *SAMEAUD* by year, and calculate the propensity score. For each treatment observation, we match it with a control observation with minimum difference in propensity score and no replacement. We further require that the difference in propensity scores is not larger than 0.05. Finally, we construct a matched sample of 9260 observations consisting of 4630 observations audited by the same auditors and 4630 observations audited by unaffiliated auditors.

Panel B of Table 1 reports the industry distribution for the observations audited by the same and unaffiliated auditors. The largest industry group (with more than half of the sample) comes from the manufacturing industry. This is followed by retailing, transportation and warehousing, utilities, real estate and information technology.

3.2. Empirical model

We estimate the following model to test our hypothesis:

$$\begin{aligned} VIOLATE/AQ/MAO/RESTATE = & \beta_0 + \beta_1 SAMEAUD + \beta_2 CONTROL + \beta_3 SIZE + \beta_4 AGE + \beta_5 INV + \beta_6 LEV + \\ & \beta_7 GROWTH + \beta_8 MTB + \beta_9 CFO + \beta_{10} CFOVAR + \beta_{11} SALES + \beta_{12} SALESVAR + \beta_{13} ZSCORE + \beta_{14} LOSS + \beta_{15} \\ & M\&A + \beta_{16} SOE + \beta_{18} BIG10 + \sum IND + \sum YR + \sum AU + \varepsilon \end{aligned} \quad (1)$$

where (*VIOLATE*) is cases of fraudulent financial reporting identified by the China Securities Regulatory Commission (CSRC) as our first measure of audit quality. *AQ* equals the absolute value of performance-adjusted abnormal accruals and the standard deviation of abnormal working capital accruals. Modified audit opinion (*MAO*) is a binary measure when a firm receives a modified audit opinion and *RESTATE* is a binary measure when a firm restates its earnings downward.

Table 1

Sample.

<i>Panel A: Sample selection</i>		
		Number of client firm-years
Observations available in the CSMAR over period 2003–2012 with non-missing total assets		<u>18,321</u>
<i>Less:</i>		
Observations associated with B shares		(1088)
Observations from financial services industry		(243)
Observations with missing data to calculate firm-level variables		(2707)
Observations with only one affiliated firm		(3142)
		<u>11,141</u>
Include:		
Observations audited by same network auditors		4630
Observations audited by unaffiliated auditors		6511
Final matched sample		<u>9260</u>
Observations audited by same network auditors		4630
Observations audited by unaffiliated auditors		4630
<i>Panel B: Industry distribution</i>		
Industry	Sample sharing the same network auditor	Matched sample of unaffiliated auditor
Agriculture and fishery	74	74
Mining	134	134
Manufacturing	2593	2593
Utilities	236	236
Construction	110	110
Transportation and warehousing	251	251
Information technology	217	217
Retailing	413	413
Real estate	221	221
Social services	168	168
Cultural industry	18	18
Comprehensive industry	195	195
Total	4630	4630

We adopt a frequently used set of variables used in prior research to control for various firm level characteristics that can be associated with our audit quality measures. We control for the extent of control (*CONTROL*) by the parent, client–firm size for the listed entity (*SIZE*), firm age (*AGE*), inventory intensity (*INV*), leverage ratio (*LEV*), sales growth (*GROWTH*), market-to-book ratio (*MTB*), cash flow from operations (*CFO*), variance in cash flows from operations (*CFOVAR*), sales (*SALES*), and variance in sales (*SALESVAR*). We also control for financial distress (*ZSCORE*), performance (*LOSS*), mergers or acquisitions (*M&A*), state ownership of firms (*SOE*) (Francis and Michas, 2013; Francis et al., 2014), and Top 10 (*BIG10*). Consistent with prior research, we expect *SIZE*, *CFO*, *CFOVAR*, *LOSS*, *SOE*, *ZSCORE* and *BIG10* to be associated with higher audit quality, while we expect *AGE*, *INV*, *GROWTH*, *MTB*, and *M&A* to be associated with lower audit quality (Gul and Lynn, 2002; Francis and Yu, 2009; Choi et al., 2010; Reichelt and Wang, 2010; Demirkan et al., 2012). We do not predict a sign for *LEV*, *SALES*, and *SALESVAR* due to conflicting results in prior studies.

We also include industry (*IND*), year (*YR*), and audit firm (*AU*) fixed effects to control for the influence of industry, year, and audit firm on our audit quality measures. To address potential cross-sectional correlation across firms or across time, we calculate *t*-statistics based on standard errors that are clustered by firm and year.

3.3. Measurement of the variables

3.3.1. Dependent variables

We use multiple measures to infer audit quality to enhance the robustness of our findings. We use instances of fraudulent financial reporting identified by the CSRC in the year of the violation as our first measure of low audit quality (*VIOLATE*). The CSRC, Shanghai, and Shenzhen Stock Exchanges investigate and impose sanctions on firms and auditors associated with financial statements that are not in compliance with Chinese accounting standards and these firms are publicly identified. Examples of misleading accounting practices include reporting fictitious profit, disclosure of false or misleading statements, and others. We create an indicator variable *VIOLATE* that equals 1 if a firm is identified by the CSRC as having conducted fraudulent or misleading financial reporting and 0 otherwise.

We use several additional measures of audit quality accepted in the literature. The first two are based on accruals and are described in detail in Appendix B. We use the absolute value of performance-adjusted abnormal accruals (*ABSDA*) following Kothari et al. (2005) and Francis and Michas (2013) and the standard deviation of abnormal working capital accruals (*STDWCA*) suggested by McNichols (2002). Higher values of *ABSDA* and *STDWCA* are consistent with lower audit quality. Our fourth measure of audit quality is the likelihood of issuing a modified audit opinion (*MAO*). Following prior research,

we interpret greater likelihood of a modified opinion as consistent with higher audit quality. Our fifth measure of lower audit quality is downward restatements of earnings (*RESTATE*) in the year of the error² (Francis and Michas, 2013).

3.3.2. Independent variable

Our variable of interest, *SAMEAUD*, equals 1 for group affiliated firms that share the same network auditor for the parent and a component or a minimum of two components of the group, and 0 otherwise. The process of identifying the *SAMEAUD* variable is illustrated in Appendix C. Descriptions of variables used in the study appear in Appendix A.

3.3.3. Moderating variables

Recall that an objective of this study is to identify different contexts where sharing the same network auditor in group affiliated firms' audits moderates fraudulent financial reporting and other measures of audit quality. The variables that we consider as potentially moderating the relation between sharing the same network auditor and audit quality are auditor tenure, industry specialists, group homogeneity, geographical dispersion between the parent and subsidiaries, and control intensity.³ These variables are discussed as follows.

3.3.3.1. Auditor tenure. First, we consider the role of audit firm tenure in moderating the relation between sharing the same network auditor and audit quality. We focus on long auditor tenure since there is greater opportunity for the auditor to learn more about the client (and thus less information asymmetry), which helps the auditor to understand the client's business and rely less on management estimates (Myers et al., 2003). Another perspective stems from regulators and others expressing concern that longer auditor client relationships can impair an auditor's independence, resulting in lower audit quality (Farmer et al., 1987; SEC, 1994). We create two indicator variables to separate long tenure observations from short tenure observations. *SHORT* equals 1 if audit firm tenure is within two years, and 0 otherwise; *LONG* equals 1 if audit firm tenure is longer than five years, and 0 otherwise. Thus, the base case captures medium tenure observations (between two and five years). A threshold of two years for short tenure is consistent with the findings of Johnson et al. (2002) and Carey and Simnett (2006). A threshold of five years or more is used for long tenure because this is consistent with requirements for partner rotation set by regulators in the US (Litt et al., 2014) and Australia (Stewart et al., 2016) and is consistent with previous studies (Chen et al., 2008). Thresholds of three and seven are also supported by the literature (Johnson et al., 2002; Carey and Simnett, 2006; Chen et al., 2008) and sensitivity tests are conducted for three years or less and seven or more years as alternative definitions. Results are qualitatively similar for these alternative thresholds.

3.3.3.2. Industry specialists. We also consider the role of the auditor's industry specialization or expertise in moderating the relation between sharing the same network auditor and audit quality. Prior research indicates that industry knowledge and expertise enhance auditor judgment and thereby improve audit quality (Gramling and Stone, 2001; Owthoso et al., 2002; Balsam et al., 2003; Krishnan, 2003; Reichelt and Wang, 2010). For example, Balsam et al. (2003) and Krishnan (2003) find a negative relation between auditor industry specialization and the client's absolute discretionary accruals. Reichelt and Wang (2010) also find that auditor industry specialization is negatively associated with the likelihood of meeting or beating analysts' earnings forecasts, but positively associated with an auditor's propensity to issue a going-concern opinion. Consistent with this argument, we expect that an auditor's industry specialization moderates the negative influence of sharing the same network auditor on audit quality. The use of industry specialist auditors implies that the client is demanding a higher quality audit. We define industry specialist (*INDSPE*) as an indicator variable that equals 1 if the audit firm has the largest market share in an industry in year *t* and 0 otherwise, consistent with prior research (Ferguson et al., 2003; Reichelt and Wang, 2010).

3.3.3.3. Group homogeneity. Research finds that auditors are more likely to specialize in more homogeneous industries with similar operations and investment (Cairney and Young, 2006; Cahan et al., 2008). Group affiliated firms are likely to operate in industries with greater homogeneity. Greater commonality across affiliated firms creates a potential for knowledge overlap such that similar audit tasks can be completed in less time, or by lower level personnel. This allows for more efficient planning and oversight, and improves efficiency from shared technology (Brown, 2017). As a result, auditors can apply similar substantive testing across affiliated clients in operationally homogeneous industries to achieve an acceptable level of planned detection risk more efficiently than those in non-homogeneous industries. Industry homogeneity is an important characteristic of group affiliated firms and we expect client industry homogeneity to moderate the relation between sharing the same network auditor and audit quality.

Following Bills et al. (2015), we calculate group homogeneity (*GHOMO*) as the mean value of the Pearson correlation coefficients of the annual percentage change in operating expenses for all companies in a group over the ten years from 2003 to 2012. Higher values of *GHOMO* indicate greater group homogeneity.

² The reasons for restatements, the restated renminbi (RMB) amounts, and the periods of the restatements are manually collected from annual financial statements and restatement reports from the China Information website. We retrospectively adjust the relevant time periods.

³ We acknowledge the limitations of inferring that client characteristics are related to audit quality. It is possible that clients with low quality financial reporting self select and choose the same network auditor for all components of the group affiliated firm audit.

3.3.3.4. *Geographical dispersion between parent and subsidiaries.* Next, we examine the physical distance between a parent and its subsidiaries because greater distances between a parent and subsidiaries reduce monitoring capacity and are associated with fewer opportunities for knowledge spillovers (Roth and O'Donnell, 1996; Shroff et al., 2014). Geographic distance of entities has been shown to be associated with corporate responsibility scores (Shia et al., 2017), stock returns (Garcia and Norli, 2012), firm value (Gao et al., 2008) and earnings management (Zang, 2012; Shi et al., 2015). We include a measure for geographic distance between a parent and its subsidiaries while acknowledging the difficulty in determining whether financial reporting quality is related to the choice of audit firm or the client's financial reporting characteristics. We include *GEODIS*, the standard deviation of the geographic distance between a parent company and its subsidiaries, to capture the geographic distance between a parent company and its subsidiary and interact *GEODIS* with *SAMEAUD*. Higher values of *GEODIS* indicate greater geographical dispersion in location between a parent and its subsidiaries (Kang and Kim, 2008).

3.3.3.5. *Control intensity.* We further consider the extent of control intensity; that is, the level of ownership by a parent company over its subsidiaries as a moderating variable in addition to measurement as a control variable. Increased control by the parent is associated with greater use of intra-group transactions to achieve managements' reporting goals and thus more entrenched management. We expect that there is increased pressure by the affiliated group client to demand consent by the parent auditor to clients' demands for lower audit quality. This is associated with a more pronounced reduction in audit quality associated with sharing the same network auditor for components of the audit.

4. Results

4.1. Descriptive statistics and hypothesis testing

Table 2 presents the descriptive statistics for variables in model (1) separately for the shared and unaffiliated auditor samples. We find that clients that share the same network auditor report on average, higher abnormal accruals (*ABSDA* and *STDWCA*), lower likelihood of receiving modified audit opinions (*MAO*), and higher likelihood of restatements (*RESTATE*) that reduces earnings relative to clients that use unaffiliated auditors. These mean differences in our test variables are significant at the 0.05 level or better, suggesting that lower audit quality is associated with auditor sharing. Turning to control variables, relative to clients that use unaffiliated auditors, clients that share the same network auditor on average, have higher control over their subsidiaries (*CONTROL*), are larger (*SIZE*), older (*AGE*), report higher growth (*GROWTH*), have higher leverage (*LEV*), lower market-to-book (*MTB*), higher cash flows (*CFO*) and sales (*SALES*), lower variance in cash flows (*CFOVAR*) and sales (*SALESVAR*), lower bankruptcy risk (*ZSCORE*),⁴ lower incidence of loss (*LOSS*), fewer mergers or acquisitions (*M&A*), and are subject to higher state ownership (*SOE*). We control for these factors in our multivariate analyses.

Tests of the hypothesis reported in Table 3 indicate a rejection of the null hypothesis. First, we find that the coefficient of *SAMEAUD* is positive and significant at the 0.01 level for *VIOLATE*, indicating that clients sharing the same network auditor are more likely to be sanctioned by regulators for misleading or fraudulent financial reporting relative to clients of unaffiliated auditors. Second, we find that the coefficient of *SAMEAUD* is positive and significant at the 0.01 or 0.05 level for *ABSDA* and *STDWCA* respectively, indicating that clients sharing the same network auditor report higher abnormal accruals than clients that do not share auditors.⁵ Next, the coefficient of *SAMEAUD* is negative and significant at the 0.05 level for *MAO*. This indicates that relative to clients with unaffiliated auditors, clients that share the same network auditor are less likely to receive modified audit opinions. Turning to our fifth proxy, we find that clients that share the same network auditor are more likely to restate their earnings downward relative to clients that do not share auditors. This finding is significant at the 0.05 level.

Overall, our results consistently support the notion that lower audit quality is associated with clients that share the same network auditor relative to clients that use unaffiliated auditors. It appears that concerns related to potential loss of auditor independence due to client pressure dominate the positive association of potential knowledge spillovers on audit quality. Market-based incentives are possibly not a powerful mechanism to resist client pressure for Chinese auditors due to the lower risk of litigation against auditors and weaker investor protection laws in China relative to Western countries (Claessens and Yurtoglu, 2013).

Turning to control variables, we find that firm size (*SIZE*), cash flows (*CFO*), bankruptcy risk (*ZSCORE*), and government ownership (*SOE*) are negatively related to abnormal accruals, whereas firm age (*AGE*), inventory intensity (*INV*), leverage (*LEV*), sales growth (*GROWTH*), variance in cash flow (*CFOVAR*) and sales (*SALESVAR*), and mergers or acquisitions (*M&A*) are positively related to accruals. We also find that older firms are less likely to receive modified opinions and restate earnings.

4.2. Two-stage analysis

We use a two-stage model in addition to using a matched sample to address potential endogeneity in the auditor composition decision. In the first stage we estimate a logistic regression of *SAMEAUD* on several client-firm characteristics, including control intensity, firm size, age, growth, market-to-book, performance, volatility in sales and cash flows, state ownership, and others. In addition, we expect industry homogeneity, an important characteristic of group affiliated firms,

⁴ A higher *ZSCORE* indicates lower bankruptcy risk.

⁵ We also find that income increasing accruals are significantly higher at $p \leq 0.01$ when clients share the same auditor.

Table 2
Descriptive statistics.

	SAMEAUD = 1				SAMEAUD = 0				Difference	
	Obs	Mean	Median	Std.dv	Obs	Mean	Median	Std.dv	Mean_diff	Median_diff
ABSDA	4630	0.080	0.047	0.199	4630	0.065	0.042	0.121	0.015***	0.005*
STDWCA	3845	0.043	0.029	0.055	3845	0.036	0.025	0.045	0.007**	0.004
MAO	4630	0.052	0.000	0.225	4630	0.071	0.000	0.252	-0.019***	0.000
RESTATE	4630	0.087	0.000	0.283	4630	0.070	0.000	0.257	0.017***	0.000
CONTROL	4630	0.415	0.396	0.272	4630	0.404	0.391	0.265	0.011*	0.005
SIZE	4630	21.888	21.758	1.181	4630	21.340	21.265	1.196	0.488**	0.493**
AGE	4630	9.751	10.000	4.528	4630	7.768	8.000	4.995	1.983***	2.000***
INV	4630	0.169	0.136	0.151	4630	0.174	0.132	0.160	-0.005	0.004*
LEV	4630	0.520	0.526	0.214	4630	0.487	0.485	0.259	0.033***	0.041***
GROWTH	4630	0.245	0.217	0.164	4630	0.226	0.201	0.125	0.019***	0.016***
MTB	4630	1.522	1.213	0.926	4630	1.758	1.337	1.205	-0.236***	-0.124***
CFO	4630	0.053	0.051	0.080	4630	0.041	0.043	0.086	0.012**	0.008**
CFOVAR	4630	0.254	0.232	0.094	4630	0.274	0.249	0.094	-0.020**	-0.017**
SALES	4630	0.763	0.633	0.526	4630	0.648	0.534	0.471	0.115***	0.099***
SALESVAR	4630	0.117	0.102	0.086	4630	0.140	0.117	0.880	-0.023***	-0.015**
ZSCORE	4630	1.738	1.522	0.995	4630	1.453	1.389	1.016	0.285***	0.133**
LOSS	4630	0.098	0.000	0.298	4630	0.117	0.000	0.320	-0.019***	0.000
M&A	4630	0.271	0.000	0.445	4630	0.358	0.000	0.482	-0.087***	0.000
SOE	4630	0.871	1.000	0.335	4630	0.419	0.000	0.486	0.452***	1.000***
BIG10	4630	0.296	0.000	0.381	4630	0.281	0.000	0.373	0.015	0.000

The final matched sample consists of 9260 firm-year observations associated with Chinese group affiliated firms representing years 2003 through 2012. The sample consists of 4630 observations audited by the same network auditors and 4630 observations audited by unaffiliated auditors. *SAMEAUD* equals 1 for two or more group affiliated firms that share the same auditor, and 0 otherwise. See Appendix A for variable definitions. ***, **, and * indicate, respectively, statistical significance at the 0.01, 0.05, and 0.10 levels (two-tails).

to be associated with auditor composition. Prior research finds that auditors are more likely to specialize in more homogeneous industries with similar operations and investment (Cairney and Young, 2006; Cahan et al., 2008). Greater commonality across affiliated firms creates a potential for knowledge overlap that can be leveraged by auditors to plan and execute audits more efficiently. We also include *GHOMO*, measured by the mean value of the Pearson correlation coefficients of the annual percentage in operating expenses for all firms in a group affiliated firm over the years 2003 to 2012. Higher values of *GHOMO* indicate greater group homogeneity.

Next, we consider the geographical distance between a parent's headquarters and its subsidiaries as a likely determinant of auditor composition. Parent companies are likely to have less influence over subsidiaries when there is greater geographical distance between the entities. We include *GEODIS*, measured by the standard deviation of the geographic distance between a parent company and its subsidiaries, to capture the geographic distance between a parent company and its subsidiaries as a likely driver of auditor composition. Higher values of *GEODIS* indicate greater geographical distance between a parent and its subsidiaries (Kang and Kim, 2008). Finally, we include an indicator variable for Top 10 audit firms following Fang et al. (2017). Thus, we estimate the following model:

$$\begin{aligned}
 \text{SAMEAUD} = & \beta_0 + \beta_1 \text{GEODIS} + \beta_2 \text{GHOMO} + \beta_3 \text{CONTROL} + \beta_4 \text{SIZE} + \beta_5 \text{AGE} + \beta_6 \text{INV} + \beta_7 \text{LEV} + \beta_8 \text{GROWTH} + \\
 & \beta_9 \text{MTB} + \beta_{10} \text{CFO} + \beta_{11} \text{SALES} + \beta_{12} \text{SALESVAR} + \beta_{13} \text{CFOVAR} + \beta_{14} \text{ZSCORE} + \beta_{15} \text{LOSS} + \beta_{16} \text{M\&A} + \beta_{17} \text{SOE} + \\
 & \beta_{18} \text{BIG10} + \sum \text{IND} + \sum \text{YR} + \sum \text{AU} + \varepsilon
 \end{aligned}
 \tag{2}$$

In the second stage, we re-estimate model (1) after replacing *SAMEAUD* with the predicted values of *SAMEAUD* (*PSAMEAUD*) obtained from the first-stage model; the results are presented in Table 4. We find that the coefficient on *GEODIS* is negative and significant at the 0.10 level, indicating that the likelihood of sharing network auditors decreases as the geographic distance increases between the parent and the subsidiary. The coefficient on *GHOMO* is positive and significant at the 0.05 level, indicating that group affiliated firms operating in homogenous industries are likely to share a network auditor. We also find that the likelihood of sharing the same network auditor increases with increasing firm size (*SIZE*), level of cash flows (*CFO*), bankruptcy risk (*ZSCORE*), mergers or acquisitions (*M&A*), and state ownership (*SOE*). Finally, the likelihood of sharing the same network auditor is higher for Top 10 auditors (*BIG10*), consistent with the notion that gains from audit efficiency due to knowledge spillover are higher for Top 10 auditors relative to non Top 10 auditors. Turning to the second-stage model, the coefficient of *PSAMEAUD* is positive and significant for *VIOLATE*, *ABSDA*, *STDWCA*, and *RESTATE* and negative for *MAO*. These results are consistent with the results in Table 3 and mostly alleviate endogeneity-related concerns.

4.3. The influence of the extent of sharing the same network auditor on audit quality

Previous research indicates that the amount of work conducted (rather than the simple use of the same network auditor) is associated with audit quality (Burke et al., 2019). In this section, we test for the influence of the extent of sharing the same

Table 3

The relation between sharing the same network auditor and audit quality.

Variables	Matched sample				
	<i>VIOLATE</i>	<i>ABSDA</i>	<i>STDWCA</i>	<i>MAO</i>	<i>RESTATE</i>
<i>SAMEAUD</i>	0.117*** (10.80)	0.009*** (3.01)	0.007** (2.51)	-0.075** (4.69)	0.181** (4.28)
<i>CONTROL</i>	0.041** (4.52)	0.020** (1.96)	0.016* (1.85)	-0.069** (4.51)	0.058** (4.68)
<i>SIZE</i>	-0.009*** (13.08)	-0.002*** (-3.13)	-0.002*** (-2.95)	0.672*** (24.29)	0.183*** (21.30)
<i>AGE</i>	0.005 (1.64)	0.006*** (3.95)	0.008*** (4.25)	-0.248*** (11.60)	-0.202*** (10.66)
<i>INV</i>	0.085*** (7.69)	0.092*** (9.85)	0.081*** (9.04)	2.032*** (39.84)	0.230 (0.91)
<i>LEV</i>	0.027*** (7.58)	0.020*** (2.84)	0.023*** (3.02)	-3.094*** (69.57)	-0.943*** (18.09)
<i>GROWTH</i>	0.008** (5.25)	0.004** (2.12)	0.005** (2.17)	-0.001** (5.34)	-0.002 (0.82)
<i>MTB</i>	-0.003 (1.54)	0.001 (0.78)	0.001 (0.69)	-0.009 (1.62)	0.202*** (18.14)
<i>CFO</i>	-0.131** (4.34)	-0.215* (-1.83)	-0.202* (-1.77)	-1.852*** (12.10)	0.006 (1.37)
<i>CFOVAR</i>	0.046** (4.24)	0.035*** (2.75)	0.019* (1.88)	1.081*** (15.90)	0.048 (1.36)
<i>SALES</i>	-0.007 (1.19)	-0.002 (-1.58)	-0.003* (-1.89)	0.375*** (9.15)	-0.007 (1.00)
<i>SALESVAR</i>	0.019*** (9.42)	0.008*** (3.42)	0.009*** (3.01)	0.716*** (12.04)	0.041 (1.72)
<i>ZSCORE</i>	-0.007** (4.96)	-0.002** (-2.33)	-0.002** (-2.25)	-0.232*** (8.29)	-0.238*** (11.69)
<i>LOSS</i>	0.034*** (9.61)	0.011*** (3.45)	0.009*** (3.01)	-0.487*** (11.85)	-0.568*** (33.85)
<i>M&A</i>	0.018*** (8.99)	0.004*** (2.96)	0.005*** (3.08)	0.138*** (10.14)	-0.030 (1.02)
<i>SOE</i>	-0.022*** (7.39)	-0.017*** (-6.03)	-0.014*** (-4.31)	0.205** (4.54)	-0.097 (1.48)
<i>BIG10</i>	-0.087** (5.93)	-0.017** (-2.04)	-0.011* (-1.86)	0.176** (4.94)	-0.238*** (7.57)
<i>Industry fixed effect</i>	Yes	Yes	Yes	Yes	Yes
<i>Year fixed effect</i>	Yes	Yes	Yes	Yes	Yes
<i>Audit firm fixed effect</i>	Yes	Yes	Yes	Yes	Yes
<i>R²</i>	18.57%	7.57%	7.10%	29.09%	22.74%
<i>Observations</i>	9260	9260	7690	9260	9260

This table presents the results of model (1) on the relation between use of the same network auditor and audit quality. The sample consists of 4630 observations audited by the same network auditors and 4630 observations audited by unaffiliated auditors. The observations are matched based on business group, total assets, and ROA. The dependent variable is one of the five measures of audit quality: *VIOLATE* which equals 1 if a firm is identified by the CSRC as having conducted fraudulent or misleading financial reporting, and 0 otherwise; *ABSDA*, the absolute value of performance-adjusted abnormal accruals; *STDWCA*, the standard deviation of abnormal working capital accruals; *MAO* which equals 1 when a firm receives a modified audit opinion, and 0 otherwise; and *RESTATE* which equals 1 when a firm restates its audited earnings downward in the year of the error, and 0 otherwise. *SAMEAUD* equals 1 for two or more group affiliated firms that share the same network auditor, and 0 otherwise. See Appendix A for variable definitions. ***, **, and * indicate, respectively, statistical significance at the 0.01, 0.05, and 0.10 levels (two-tails). Reported t-statistics are based on standard errors that are clustered by firm and year.

auditor (*SAMEAUD_RATIO*) on audit quality. *SAMEAUD_RATIO* is measured by the number of clients who share the same network auditor divided by the total number of listed components in one group affiliated audit. Our relevant variable is the interaction of *SAMEAUD* with *SAMEAUD_RATIO* (*SAMEAUD * SAMEAUD_RATIO*).

The results are shown in Table 5. We find that the coefficient of the extent of network audit (*SAMEAUD_RATIO*) is significant and positive for fraudulent financial reporting (*VIOLATE*), abnormal accruals (*ABSDA*), the standard deviation of abnormal working capital accruals (*STDWCA*), and restatements (*RESTATE*), and negative for modified opinions (*MAO*) at the 0.05 and 0.10 levels of significance. Similar results are obtained for the interaction term (*SAMEAUD * SAMEAUD_RATIO*) for fraudulent financial reporting (*VIOLATE*), abnormal accruals (*ABSDA*), the standard deviation of abnormal working capital accruals (*STDWCA*), and restatements (*RESTATE*), and modified opinions (*MAO*), being significant at the 0.01 and 0.05 level or better. This confirms that the extent of sharing the same audit firm contributes to lower audit quality.

Table 4
Two-stage analysis of auditor sharing and audit quality.

	Dependent variable					
	First stage	Second stage				
	<i>SAMEAUD</i>	<i>VIOLATE</i>	<i>ABSDA</i>	<i>STDWCA</i>	<i>MAO</i>	<i>RESTATE</i>
<i>GEODIS</i>	−0.030* (3.12)					
<i>GHOMO</i>	0.046** (5.38)					
<i>PSAMEAUD</i>		0.091*** (8.24)	0.008** (2.52)	0.006** (2.24)	−0.060* (3.27)	0.102** (5.13)
<i>CONTROL</i>	0.015 (1.62)	0.036** (4.01)	0.017* (1.81)	0.019* (1.92)	−0.065** (4.47)	0.053** (4.95)
<i>SIZE</i>	0.028*** (9.82)	−0.008*** (11.25)	−0.002*** (−3.24)	−0.002*** (−2.96)	0.602*** (19.71)	0.168*** (17.59)
<i>AGE</i>	0.011 (0.81)	0.005 (1.51)	0.004*** (3.21)	0.005*** (3.56)	−0.235*** (9.58)	−0.181*** (9.72)
<i>INV</i>	−0.025 (1.92)	0.082*** (7.27)	0.080*** (8.43)	0.074*** (7.92)	1.803*** (33.51)	0.216 (1.02)
<i>LEV</i>	−0.010 (1.36)	0.025*** (7.44)	0.018** (2.43)	0.023*** (2.97)	−2.640*** (62.76)	−0.895*** (15.28)
<i>GROWTH</i>	−0.062* (3.20)	0.007** (4.93)	0.006** (2.37)	0.005** (2.24)	−0.001** (5.19)	−0.003 (1.18)
<i>MTB</i>	0.017 (1.69)	−0.003 (1.38)	0.001 (0.75)	0.001 (0.68)	−0.011 (1.81)	0.179*** (14.56)
<i>CFO</i>	0.045** (4.30)	−0.122** (3.97)	−0.208* (−1.86)	−0.193* (−1.74)	−1.782*** (10.83)	0.008 (1.35)
<i>SALES</i>	0.021 (1.40)	0.041** (4.15)	−0.003* (−1.83)	−0.005** (−2.20)	0.347*** (8.28)	−0.005 (0.87)
<i>SALESVAR</i>	0.005 (0.91)	−0.006 (1.03)	0.008*** (3.25)	0.011*** (3.31)	0.716*** (12.03)	0.044 (1.69)
<i>CFOVAR</i>	−0.011 (1.59)	0.017*** (8.94)	0.029** (2.27)	0.017 (1.61)	0.912*** (12.63)	0.051 (1.83)
<i>ZSCORE</i>	0.022** (4.62)	−0.007** (4.87)	−0.003** (−2.44)	−0.003** (−2.39)	−0.213*** (7.85)	−0.221*** (10.08)
<i>LOSS</i>	−0.007 (1.65)	0.031*** (9.48)	0.013*** (4.16)	0.011*** (3.25)	−0.457*** (9.38)	−0.526*** (28.94)
<i>M&A</i>	0.017* (3.32)	0.016*** (8.26)	0.006*** (3.47)	0.005*** (2.81)	0.129*** (9.43)	−0.028 (0.92)
<i>SOE</i>	0.102*** (12.69)	−0.023*** (7.58)	−0.016*** (−5.29)	−0.014*** (−4.06)	0.189** (4.87)	−0.093 (1.05)
<i>BIG10</i>	0.039** (2.16)	−0.082** (5.51)	−0.016** (−1.96)	−0.013* (−1.81)	0.163** (4.68)	−0.231*** (7.84)
<i>Industry fixed effect</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year fixed effect</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Audit firm fixed effect</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>R²/Pseudo R²</i>	11.67%	17.64%	6.73%	6.89%	28.07%	21.98%
<i>Observations</i>	9260	9260	9260	7690	9260	9260

In column 1, the dependent variable *SAMEAUD* equals 1 for two or more group affiliated firms that share the same network auditor, and 0 otherwise. In columns 2 through 6, the dependent variables are one of the five measures of audit quality: *VIOLATE* which equals 1 if a firm is identified by the CSRC as having conducted fraudulent or misleading financial reporting, and 0 otherwise; *ABSDA*, the absolute value of performance-adjusted abnormal accruals; *STDWCA*, the standard deviation of abnormal working capital accruals; *MAO* which equals 1 when a firm receives a modified audit opinion, and 0 otherwise; and *RESTATE* which equals 1 when a firm restates its audited earnings downward in the year of the error, and 0 otherwise. *PSAMEAUD* is the predicted value of *SAMEAUD* obtained from the first-stage model (column 1). See Appendix A for variable definitions. ***, **, and * indicate, respectively, statistical significance at the 0.01, 0.05, and 0.10 levels (two-tails). Reported *t*-statistics are based on standard errors that are clustered by firm and year.

4.4. Does it matter if the shared network auditor is the parent client firm's auditor?

We run two separate regressions to test whether our results are consistent when the shared network auditor audits the parent firm in the group affiliated firm. In the first regression, we use a dummy variable *PAR_SAMEAUD* to substitute *SAMEAUD* in the original regression. *PAR_SAMEAUD* equals 1 if the shared auditor audits the parent firm in the group affiliated firm, and 0 otherwise. In the second regression, we use dummy variable *PAR_DIFFAUD* to substitute *SAMEAUD* in the original regression. *PAR_DIFFAUD* equals 1 if the shared auditor does not audit the parent firm in the group affiliated firm, and 0 otherwise. The results are presented in Table 6. We find that *PAR_SAMEAUD* and *PAR_DIFFAUD* are significantly ($p = 0.01$ and 0.05) associated with lower audit quality. However, the Vuong test indicates that negative quality is increased when subsidiaries share the same network auditor with the parent.

Table 5

The influence of the extent of sharing the same network auditor on audit quality.

Variables	VIOLATE	ABSDA	STDWCA	MAO	RESTATE
SAMEAUD	0.084*** (10.51)	0.007*** (2.92)	0.005** (2.47)	-0.058** (4.02)	0.157** (4.14)
SAME_RATIO	0.039** (4.36)	0.003** (1.97)	0.002* (1.84)	-0.021* (3.18)	0.084* (3.29)
SAMEAUD*SAME_RATIO	0.106*** (8.54)	0.015*** (7.91)	0.010** (5.80)	-0.073** (4.99)	0.217** (5.25)
Control variables	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
Audit firm fixed effect	Yes	Yes	Yes	Yes	Yes
R ²	14.95%	7.29%	7.16%	26.98%	21.06%
Observations	9260	9260	7690	9260	9260

The dependent variable is one of the five measures of audit quality: *VIOLATE* which equals 1 if a firm is identified by the CSRC as having conducted fraudulent or misleading financial reporting, and 0 otherwise; *ABSDA*, the absolute value of performance-adjusted abnormal accruals; *STDWCA*, the standard deviation of abnormal working capital accruals; *MAO* which equals 1 when a firm receives a modified audit opinion, and 0 otherwise; and *RESTATE* which equals 1 when a firm restates its audited earnings downward in the year of the error, and 0 otherwise. *SAMEAUD* equals 1 for two or more group affiliated firms that share the same network auditor, and 0 otherwise. *SAMEAUD_RATIO* equals the number of clients who share the network auditor divided by the total number of listed components in one audit group. ***, **, and * indicate, respectively, statistical significance at the 0.01, 0.05, and 0.10 levels (two-tails). Reported t-statistics are based on standard errors that are clustered by firm and year.

Table 6

Sensitivity of results to the network auditor being the parent.

Panel A: Auditor being shared is the parent client firm's auditor					
Variables	VIOLATE	ABSDA	STDWCA	MAO	RESTATE
PAR_SAMEAUD	0.139*** (16.84)	0.016*** (4.75)	0.011*** (2.93)	-0.091*** (7.28)	0.228** (5.64)
Control variables	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
Audit firm fixed effect	Yes	Yes	Yes	Yes	Yes
R ²	14.87%	7.26%	7.03%	26.41%	20.69%
Observations	4398	4398	3504	4398	4398
Panel B: Auditor being shared is not the parent client firm's auditor					
Variables	VIOLATE	ABSDA	STDWCA	MAO	RESTATE
PAR_DIFFEAUD	0.078*** (9.15)	0.007*** (2.83)	0.005** (2.02)	-0.059** (4.07)	0.129** (3.97)
Control variables	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
Audit firm fixed effect	Yes	Yes	Yes	Yes	Yes
R ²	12.97%	7.48%	7.07%	27.13%	21.26%
Observations	4862	4862	4186	4862	4862
Panel C: Vuong tests for the coefficient differences					
Coefficient Difference	VIOLATE	ABSDA	STDWCA	MAO	RESTATE
	0.061*** (9.17)	0.009*** (5.28)	0.006*** (3.95)	-0.032** (2.60)	0.099*** (7.19)

The dependent variable is one of the five measures of audit quality: *VIOLATE* which equals 1 if a firm is identified by the CSRC as having conducted fraudulent or misleading financial reporting, and 0 otherwise; *ABSDA*, the absolute value of performance-adjusted abnormal accruals; *STDWCA*, the standard deviation of abnormal working capital accruals; *MAO* which equals 1 when a firm receives a modified audit opinion, and 0 otherwise; and *RESTATE* which equals 1 when a firm restates its audited earnings downward in the year of the error, and 0 otherwise. *SAMEAUD* equals 1 for two or more group affiliated firms that share the same network auditor, and 0 otherwise. *PAR_SAMEAUD* equals 1 if the shared network auditor audits the parent firm in the affiliated group, and 0 otherwise. *PAR_DIFFEAUD* equals 1 if the shared network auditor does not audit the parent firm in the affiliated group, and 0 otherwise. See Appendix A for variable definitions. ***, **, and * indicate, respectively, statistical significance at the 0.01, 0.05, and 0.10 levels (two-tails). Reported t-statistics are based on standard errors that are clustered by firm and year.

4.5. Auditor switch analysis

An issue arises as to the persistence of our tests, as the potential exists for audit quality to change when firms change (switch) auditors. We examine group affiliated firms that switch from having unaffiliated auditors to sharing the same network auditor. The idea is that sharing the same network auditor decreases audit quality of group affiliated firms that

previously used unaffiliated auditors. We identify a subsample of group affiliated firms that switched from having unaffiliated auditors to sharing the same network auditor. There are 585 firm-year observations that switch from having unaffiliated auditors to sharing the same network auditor. We match these 585 firm-year observations with those who did not switch by firm size and performance. We construct a matched sample that includes 1170 (585 * 2) firm-year observations in year t - 1 and 1170 firm-year observations in year t. Then, we conduct a difference in differences test by estimating the following regression:

$$AQ = \beta_0 + \beta_1 SAME_SWITCH + \beta_2 POST + \beta_3 SAME_SWITCH * POST + CONTROLS + \sum IND + \sum YR + \sum AU + \varepsilon \quad (3)$$

SAME_SWITCH is a dummy variable that equals one when affiliated group firms audited by unaffiliated auditors in year t - 1 switch to sharing the same network auditor in year t, and zero otherwise. *POST* equals one if the year is after the switch, and zero if the year is prior to the switch. *SAME_SWITCH*POST* is the variable we are interested in. Control variables are similar to those in Eq. (1).

Table 7, Panel A shows the regression results. The coefficient of *SAME_SWITCH* is not statistically significant, indicating that the audit quality of group affiliated firms is not significantly different prior to the switch. The coefficients of *SAME_SWITCH*POST* are positive for *VIOLATE*, *ABSDA*, *STDWCA*, and *RESTATE* and negative for *MAO* and significant at the 0.05 level. These results suggest that switching to sharing the same network auditor is related to lower audit quality of group affiliated firms that previously had unaffiliated auditors.

Similarly, we identify a subsample of group affiliated firms that switched from sharing the same network auditor to having unaffiliated auditors. There are 447 firm-year observations that switch from sharing the same network auditor to having unaffiliated auditors. We match these 447 firm-year observations with those who did not switch by firm size and

Table 7
Switch analysis.

Panel A: Switch to being audited by the same network auditor					
Variables	VIOLATE	ABSDA	STDWCA	MAO	RESTATE
SAME_SWITCH	0.021	0.009	0.005	0.037	0.059
	(1.53)	(0.84)	(0.73)	(2.02)	(1.78)
<i>POST</i>	0.035**	0.017*	0.020*	-0.075**	0.063**
	(4.20)	(1.81)	(1.92)	(3.99)	(4.18)
SAME_SWITCH*POST	0.054**	0.026**	0.034**	-0.061**	0.042**
	(5.18)	(1.98)	(2.25)	(4.27)	(5.04)
Control variables	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
Audit firm fixed effect	Yes	Yes	Yes	Yes	Yes
R ²	9.62%	8.64%	9.02%	23.82%	20.57%
Observations	2340	2340	2340	2340	2340
Panel B: Switch to being audited by unaffiliated auditors					
Variables	VIOLATE	ABSDA	STDWCA	MAO	RESTATE
DIF_SWITCH	0.015	0.007	0.004	-0.032	0.092
	(0.91)	(0.61)	(0.29)	(1.76)	(2.34)
<i>POST</i>	-0.023	-0.011*	-0.009	0.071	-0.048
	(1.95)	(-1.78)	(-1.25)	(0.99)	(2.57)
DIF_SWITCH*POST	-0.041*	-0.030*	-0.018*	0.024	-0.050*
	(3.29)	(-1.89)	(-1.90)	(1.54)	(3.48)
Control variables	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
Audit firm fixed effect	Yes	Yes	Yes	Yes	Yes
R ²	8.44%	7.95%	7.62%	21.28%	20.17%
Observations	1788	1788	1788	1788	1788

This table shows the results from switch analysis. Panel A presents the results of switching from being audited by unaffiliated auditors to being audited by the same network auditor. Panel B displays the results of switching from being audited by the same network auditor to being audited by unaffiliated auditors. *SAME_SWITCH* is a dummy variable which equals one when group affiliated firms being audited by unaffiliated auditors in year t - 1 change to being audited by the same network auditor in year t, and zero otherwise. *DIF_SWITCH* is a dummy variable which equals one when group affiliated firms audited by the auditor in year t - 1 change to being audited by unaffiliated auditors in year t, and zero otherwise. *POST* equals one if the year is after the switch, and zero for the year prior to the switch. There are 585 firm-year observations representing a switch from being audited by unaffiliated auditors to being audited by the same network auditor. We match these 585 firm-year observations with those who did not switch by firm size and performance. There are 1170 (585 * 2) firm-year observations in year t - 1, and 1170 firm-year observations in year t. In Panel A, we have 2340 firm-year observations. There are 447 firm-year observations representing a switch from being audited by the same network auditor to being audited by unaffiliated auditors. We match these 447 firm-year observations with those who did not switch by firm size and performance. There are 894 (447 * 2) firm-year observations in year t - 1, and 894 firm-year observations in year t. In Panel B, we have 1788 firm-year observations.

***, **, and * indicate, respectively, statistical significance at the 0.01, 0.05, and 0.10 levels (two-tails). Reported *t*-statistics are based on standard errors that are clustered by firm and year.

performance. We construct a matched sample that includes 894 (447 * 2) firm-year observations in year $t - 1$ and 894 (447 * 2) firm-year observations in year t . Then, we conduct a difference in differences test by estimating the following regression:

$$AQ = \beta_0 + \beta_1 DIF_SWITCH + \beta_2 POST + \beta_3 DIF_SWITCH * POST + CONTROLS + \sum IND + \sum YR + \sum AU + \varepsilon \quad (4)$$

DIF_SWITCH is a dummy variable that equals one when affiliated group firms sharing the same network auditor in year $t - 1$ switch to having unaffiliated auditors in year t , and zero otherwise. *POST* equals one if the year is after the switch, and zero if the year is prior to the switch. *DIF_SWITCH*POST* is the variable we are interested in. Control variables are similar to those in Eq. (1) but are not tabulated due to space constraints.

Table 7, Panel B shows the regression results. The coefficients of *SAME_SWITCH*POST* are negative for *VIOLATE*, *ABSDA*, *STDWCA*, and *RESTATE* and significant at the 0.10 level. These results suggest that switching to having unaffiliated auditors increases the audit quality of group affiliated firms that previously shared the same network auditor. This confirms that sharing the same network auditor for components of the audit is associated with lower audit quality in non-context specific circumstances.

4.6. Context specific analyses and audit quality

4.6.1. Audit tenure

Results showing the influence of audit firm tenure are detailed in Table 8. Model (1) is estimated using *SHORT* for audit firm tenure less than two years and *LONG* for audit firm tenure longer than five years, and their interactions with *SAMEAUD*. We find that the coefficient of *SAMEAUD* continues to be significant and the signs are consistent with the results in Table 3. The coefficient of *SHORT* is not significant but the coefficient of *LONG* is positive for fraudulent financial reporting (*VIOLATE*), abnormal accruals (*ABSDA*), the standard deviation of abnormal working capital accruals (*STDWCA*), and restatements (*RESTATE*), and negative for modified opinions (*MAO*) (all are significant at the 0.05 level). These results indicate that while short tenure is not associated with audit quality, long tenure observations are associated with lower audit quality. More importantly, the coefficient of the variable of interest, *SAMEAUD*LONG*, is positive for fraudulent financial reporting (*VIOLATE*), abnormal accruals (*ABSDA*), the standard deviation of abnormal working capital accruals (*STDWCA*), and restatements (*RESTATE*), and negative for modified opinions (*MAO*) (all are significant at the 0.05 level or better). The coefficient of *SAMEAUD*SHORT* is not significant. These results indicate that long auditor tenure moderates the adverse influence of sharing the same network auditor on audit quality.

4.6.2. Industry specialists

We test for the influence of industry specialists by including *INDSPE* and the interaction of *INDSPE* with *SAMEAUD* in model (1), with the results reported in Table 9. We find that the coefficient of *SAMEAUD* is positive for fraudulent financial reporting (*VIOLATE*), abnormal accruals (*ABSDA*), the standard deviation of abnormal working capital accruals (*STDWCA*), and restatements (*RESTATE*), and negative for modified opinions (*MAO*). It is significant at the 0.05 level or better for all five measures of audit quality, similar to results in Table 3. The coefficient of industry specialist (*INDSPE*) is highly significant ($p = 0.01$)

Table 8

The moderating influence of auditor tenure on sharing network auditors.

Variables	<i>VIOLATE</i>	<i>ABSDA</i>	<i>STDWCA</i>	<i>MAO</i>	<i>RESTATE</i>
<i>SAMEAUD</i>	0.094*** (8.47)	0.009*** (3.64)	0.007** (2.49)	-0.082** (5.86)	0.159** (5.12)
<i>SHORT</i>	0.011 (0.78)	0.006 (1.04)	0.004 (0.92)	-0.015 (1.83)	0.021 (1.37)
<i>LONG</i>	0.024** (3.59)	0.015** (2.24)	0.012** (2.06)	-0.033** (4.67)	0.041** (4.06)
<i>SAMEAUD*SHORT</i>	0.006 (0.48)	0.003 (0.69)	0.002 (0.54)	-0.009 (0.87)	0.012 (1.14)
<i>SAMEAUD*LONG</i>	0.037*** (7.14)	0.023*** (2.85)	0.019** (2.48)	-0.053** (6.01)	0.079** (5.87)
Control variables	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
Audit firm fixed effect	Yes	Yes	Yes	Yes	Yes
R ²	12.59%	9.96%	11.05%	28.61%	21.57%
Observations	9260	9260	7690	9260	9260

The dependent variable is one of the five measures of audit quality: *VIOLATE* which equals 1 if a firm is identified by the CSRC as having conducted fraudulent or misleading financial reporting, and 0 otherwise; *ABSDA*, the absolute value of performance-adjusted abnormal accruals; *STDWCA*, the standard deviation of abnormal working capital accruals; *MAO* which equals 1 when a firm receives a modified audit opinion, and 0 otherwise; and *RESTATE* which equals 1 when a firm restates its audited earnings downward in the year of the error, and 0 otherwise. *SAMEAUD* equals 1 for two or more group affiliated firms that share the same network auditor, and 0 otherwise. *SHORT* equals 1 if the audit firm tenure is within two years, and 0 otherwise. *LONG* equals 1 if the audit firm tenure is longer than five years, and 0 otherwise. See Appendix A for variable definitions. ***, **, and * indicate, respectively, statistical significance at the 0.01, 0.05, and 0.10 levels (two-tails). Reported *t*-statistics are based on standard errors that are clustered by firm and year.

Table 9

The moderating influence of industry specialists on sharing network auditors.

Variables	<i>VIOLATE</i>	<i>ABSDA</i>	<i>STDWCA</i>	<i>MAO</i>	<i>RESTATE</i>
<i>SAMEAUD</i>	0.078*** (11.94)	0.014*** (4.02)	0.011*** (3.25)	-0.070** (4.82)	0.178** (4.69)
<i>INDSPE</i>	-0.042*** (12.37)	-0.015*** (-4.54)	-0.011*** (-2.95)	0.127*** (8.94)	-0.099*** (8.12)
<i>SAMEAUD*INDSPE</i>	-0.134*** (15.68)	-0.025*** (-5.46)	-0.021*** (-4.51)	0.042** (4.48)	-0.032** (4.95)
<i>Control variables</i>	Yes	Yes	Yes	Yes	Yes
<i>Industry fixed effect</i>	Yes	Yes	Yes	Yes	Yes
<i>Year fixed effect</i>	Yes	Yes	Yes	Yes	Yes
<i>Audit firm fixed effect</i>	Yes	Yes	Yes	Yes	Yes
<i>R</i> ²	13.18%	10.12%	10.81%	29.95%	23.67%
<i>Observations</i>	9260	9260	7690	9260	9260

The dependent variable is one of the five measures of audit quality: *VIOLATE* which equals 1 if a firm is identified by the CSRC as having conducted fraudulent or misleading financial reporting, and 0 otherwise; *ABSDA*, the absolute value of performance-adjusted abnormal accruals; *STDWCA*, the standard deviation of abnormal working capital accruals; *MAO* which equals 1 when a firm receives a modified audit opinion, and 0 otherwise; and *RESTATE* which equals 1 when a firm restates its audited earnings downward in the year of the error, and 0 otherwise. *SAMEAUD* equals 1 for two or more group affiliated firms that share the same network auditor, and 0 otherwise. *INDSPE* equals 1 if the auditor is an industry specialist, and 0 otherwise. See Appendix A for variable definitions. ***, **, and * indicate, respectively, statistical significance at the 0.01, 0.05, and 0.10 levels (two-tails). Reported t-statistics are based on standard errors that are clustered by firm and year.

and negative for fraudulent financial reporting (*VIOLATE*), abnormal accruals (*ABSDA*), the standard deviation of abnormal working capital accruals (*STDWCA*), and restatements (*RESTATE*), and positive for modified opinions (*MAO*). These findings are consistent with the notion that an auditor's industry expertise enhances audit quality. The coefficient of the variable of interest, *SAMEAUD*INDSPE*, is negative for fraudulent financial reporting (*VIOLATE*), abnormal accruals (*ABSDA*), the standard deviation of abnormal working capital accruals (*STDWCA*), and restatements (*RESTATE*), and positive for modified opinions (*MAO*) and significant at the 0.05 level or better. These results suggest that the use of industry experts is associated with the demand for a higher quality audit and that sharing the same network auditor enables the achievement of this higher quality.

4.6.3. Group homogeneity

Group homogeneity (*GHOMO*) is another context variable expected to moderate audit quality. We include *GHOMO* and the interaction of *GHOMO* with *SAMEAUD* in model (1) and the results are reported in Table 10. The coefficient of *GHOMO* is negative and significant for fraudulent financial reporting (*VIOLATE*), abnormal accruals (*ABSDA*), the standard deviation of abnormal working capital accruals (*STDWCA*), and restatements (*RESTATE*), and positive for modified opinions (*MAO*) and significant at the 0.05 level or better, indicating that group homogeneity by itself has a favorable influence on audit quality. Turning to the variable of interest, the coefficient of *SAMEAUD*GHOMO* is negative and significant for four of the five audit quality proxies (fraudulent financial reporting (*VIOLATE*), abnormal accruals (*ABSDA*), the standard deviation of abnormal working capital accruals (*STDWCA*), and restatements (*RESTATE*)). These results suggest that the adverse influence of sharing the same network auditor on audit quality is reduced when group affiliated firms operate in homogeneous industries.

4.6.4. Geographical dispersion between parent and subsidiaries

Table 11 reports the results for the moderating role of geographical dispersion (*GEODIS*) between the parent and subsidiaries. The coefficient is positive and significant for fraudulent financial reporting (*VIOLATE*), abnormal accruals (*ABSDA*), the standard deviation of abnormal working capital accruals (*STDWCA*), and restatements (*RESTATE*), indicating that audit quality is lower when there is greater geographic dispersion between a parent and its subsidiaries. Turning to the variable of interest, the coefficient of *SAMEAUD*GEODIS* is positive and significant for four of the five audit quality proxies (fraudulent financial reporting (*VIOLATE*), abnormal accruals (*ABSDA*), the standard deviation of abnormal working capital accruals (*STDWCA*), and restatements (*RESTATE*)). These results suggest that any adverse influence of sharing the same network auditor on audit quality is associated with a parent and its subsidiaries being geographically dispersed.

4.6.5. Control intensity

To test the impact of control intensity (*CONTROL*), we estimate model (1) by including *CONTROL* and the interaction of *CONTROL* with *SAMEAUD*. The results are presented in Table 12. We find that the coefficient of *SAMEAUD* is positive for fraudulent financial reporting (*VIOLATE*), abnormal accruals (*ABSDA*), the standard deviation of abnormal working capital accruals (*STDWCA*), and restatements (*RESTATE*), and negative for modified opinions (*MAO*) and significant at the 0.05 level or better for all five measures of audit quality. These findings are consistent with the results in Table 3. More importantly, the coefficient of *SAMEAUD*CONTROL* is positive for fraudulent financial reporting (*VIOLATE*), abnormal accruals (*ABSDA*), the standard deviation of abnormal working capital accruals (*STDWCA*), and restatements (*RESTATE*), and negative for modified opinions (*MAO*) and significant at the 0.05 level, except for *STDWCA* which is significant at the 0.10 level (two-tailed). These results suggest that sharing the same network auditor is associated with lower audit quality as a parent company increases its control over its subsidiaries.

Table 10

The moderating influence of group homogeneity on sharing network auditors.

Variables	<i>VIOLATE</i>	<i>ABSDA</i>	<i>STDWCA</i>	<i>MAO</i>	<i>RESTATE</i>
<i>SAMEAUD</i>	0.054*** (4.63)	0.012*** (3.87)	0.010*** (2.96)	-0.068** (5.76)	0.170** (5.08)
<i>GHOMO</i>	-0.102*** (8.95)	-0.009** (-2.52)	-0.008** (-2.35)	0.085** (6.04)	-0.065** (5.62)
<i>SAMEAUD*GHOMO</i>	-0.071*** (7.07)	-0.025** (-2.31)	-0.030** (-2.44)	0.032 (1.70)	-0.032** (4.69)
Control variables	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
Audit firm fixed effect	Yes	Yes	Yes	Yes	Yes
R ²	11.83%	9.57%	10.21%	28.83%	22.97%
Observations	9260	9260	7690	9260	9260

The dependent variable is one of the five measures of audit quality: *VIOLATE* which equals 1 if a firm is identified by the CSRC as having conducted fraudulent or misleading financial reporting, and 0 otherwise; *ABSDA*, the absolute value of performance-adjusted abnormal accruals; *STDWCA*, the standard deviation of abnormal working capital accruals; *MAO* which equals 1 when a firm receives a modified audit opinion, and 0 otherwise; and *RESTATE* which equals 1 when a firm restates its audited earnings downward in the year of the error, and 0 otherwise. *SAMEAUD* equals 1 for two or more group affiliated firms that share the same network auditor, and 0 otherwise. *GHOMO* is the mean Pearson correlation coefficients of the annual percentage of operating expenses for all firms in a business group. Higher values of *GHOMO* indicate greater group homogeneity. See Appendix A for variable definitions. ***, **, and * indicate, respectively, statistical significance at the 0.01, 0.05, and 0.10 levels (two-tails). Reported *t*-statistics are based on standard errors that are clustered by firm and year.

Table 11

The moderating influence of parent-subsidiary distance on sharing network auditors.

Variables	<i>VIOLATE</i>	<i>ABSDA</i>	<i>STDWCA</i>	<i>MAO</i>	<i>RESTATE</i>
<i>SAMEAUD</i>	0.114*** (10.19)	0.013*** (4.54)	0.011*** (3.25)	-0.089** (6.58)	0.187** (6.33)
<i>GEODIS</i>	0.015 (1.47)	0.007* (1.82)	0.005* (1.71)	-0.012 (1.68)	0.055** (4.67)
<i>SAMEAUD*GEODIS</i>	0.043** (5.18)	0.005** (1.97)	0.004* (1.82)	-0.009 (0.92)	0.029** (5.03)
Control variables	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
Audit firm fixed effect	Yes	Yes	Yes	Yes	Yes
R ²	11.09%	9.85%	10.71%	27.96%	21.09%
Observations	9260	9260	7690	9260	9260

The dependent variable is one of the five measures of audit quality: *VIOLATE* which equals 1 if a firm is identified by the CSRC as having conducted fraudulent or misleading financial reporting, and 0 otherwise; *ABSDA*, the absolute value of performance-adjusted abnormal accruals; *STDWCA*, the standard deviation of abnormal working capital accruals; *MAO* which equals 1 when a firm receives a modified audit opinion, and 0 otherwise; and *RESTATE* which equals 1 when a firm restates its audited earnings downward in the year of the error, and 0 otherwise. *SAMEAUD* equals 1 for two or more group affiliated firms that share the same network auditor, and 0 otherwise. *GEODIS* is the standard deviation of the geographic distance between a parent company and its subsidiaries. See Appendix B for variable definitions. ***, **, and * indicate, respectively, statistical significance at the 0.01, 0.05, and 0.10 levels (two-tails). Reported *t*-statistics are based on standard errors that are clustered by firm and year.

4.6.6. Clients of Top 10 audit firms

Fang et al. (2017) find that group affiliated firms are likely to choose a Top 10 audit firm. Therefore, we include *BIG10*, an indicator variable for Top 10 audit firms. Our final context analysis consists of estimating model (1) using only those clients audited by a Top 10 audit firm. This analysis is motivated by the widely accepted notion that Top 10 auditors provide higher quality audits than non Top 10 auditors. Therefore, we examine whether our primary findings in Table 3 hold when we restrict the sample only to those clients audited by a Top 10 auditor. The number of observations available for this analysis range from 4518 for modified opinions to 5236 for the other proxies. Untabulated results indicate that the coefficients of *SAMEAUD* are 0.087 (significant at the 0.01 level), 0.006 (significant at the 0.05 level), 0.005 (significant at the 0.05 level), -0.073 (significant at the 0.10 level), and 0.152 (significant at the 0.10 level) for fraudulent financial reporting (*VIOLATE*), abnormal accruals (*ABSDA*), the standard deviation of abnormal working capital accruals (*STDWCA*), modified opinions (*MAO*), and restatements (*RESTATE*), respectively. These results are consistent with the results in Table 3 and indicate that sharing the same network auditor impairs audit quality even when the auditor is a Top 10 auditor.

5. Conclusion

Evidence on the relation between sharing the same network auditor among Chinese affiliated group firms and audit quality is useful for US regulators because US requirements for identifying the lead and component auditors are relatively recent. Further, insufficient time has passed for researchers to collect longitudinal data on the influence of unaffiliated component

Table 12
The moderating influence of parent's control intensity on sharing network auditors.

Variables	<i>VIOLATE</i>	<i>ABSDA</i>	<i>STDWCA</i>	<i>MAO</i>	<i>RESTATE</i>
<i>SAMEAUD</i>	0.090*** (7.43)	0.012*** (4.08)	0.010*** (2.96)	-0.079** (6.01)	0.181** (5.86)
<i>CONTROL</i>	0.052** (4.19)	0.025** (2.47)	0.019** (2.42)	-0.074** (5.18)	0.069** (5.17)
<i>SAMEAUD</i> × <i>CONTROL</i>	0.025** (5.28)	0.017** (1.99)	0.013* (1.82)	-0.047** (4.39)	0.041** (4.75)
<i>Control variables</i>	Yes	Yes	Yes	Yes	Yes
<i>Industry fixed effect</i>	Yes	Yes	Yes	Yes	Yes
<i>Year fixed effect</i>	Yes	Yes	Yes	Yes	Yes
<i>Audit firm fixed effect</i>	Yes	Yes	Yes	Yes	Yes
<i>R</i> ²	11.53%	9.64%	10.58%	27.63%	20.57%
<i>Observations</i>	9260	9260	7690	9260	9260

The dependent variable is one of the five measures of audit quality: *VIOLATE* which equals 1 if a firm is identified by the CSRC as having conducted fraudulent or misleading financial reporting, and 0 otherwise; the absolute value of performance-adjusted abnormal accruals (*ABSDA*), the standard deviation of abnormal working capital accruals (*STDWCA*), likelihood of receiving a modified audit opinion (*MAO*), and likelihood of a restatement that results in downward earnings (*RESTATE*). *SAMEAUD* equals 1 for two or more group affiliated firms that share the same auditor, and 0 otherwise. *CONTROL* is the percentage of subsidiaries' total shares held by the parent company. See Appendix A for variable definitions. ***, **, and * indicate, respectively, statistical significance at the 0.01, 0.05, and 0.10 levels (two-tails). Reported *t*-statistics are based on standard errors that are clustered by firm and year.

auditors on audit quality. China provides an interesting case study because of the economic significance of the Chinese economy and because China does not allow PCAOB inspections. Our study provides longitudinal data regarding the influence on audit quality from using component auditors not currently available in the US. We find that firms that share the same network auditor are more likely to be sanctioned by regulators for misleading or fraudulent financial reporting. They also have higher abnormal accruals, larger standard deviation of abnormal accruals, higher likelihood of a downward restatement in earnings, and lower likelihood of receiving a modified opinion relative to group affiliated firms that choose unaffiliated auditors.

We find that the likelihood of using the same auditor is related to higher group homogeneity (group-affiliated firms operating in homogeneous industries), firm size, level of cash flows, state ownership, and the auditor being a Top 10 auditor. We also use a two-stage model to address potential endogeneity in the auditor choice decision. Overall, our results consistently support the notion that lower audit quality is associated with clients that share the same network auditor relative to clients that do not.

Our study is one of the earlier studies to examine the composition of auditors in a group affiliated firms' context using longitudinal data. Our findings have implications for regulators, investors, auditors, and boards of directors. First, for minority shareholders, auditors' economic dependence (risk of losing multiple clients associated with a group affiliated firm) appears to dominate the benefits of using the same auditor. Second, Chinese regulators need to devote more attention to reviewing audits of group affiliated firms with the same auditors. Our evidence confirms that the PCAOB's unease regarding the influence on audit quality when component auditors are appointed is justified and further US research is required to confirm conflicting results. A further implication of our results is that hiring a specialist auditor is a signal of demand for higher audit quality.

Future research should consider whether the composition of component auditors is a demand or supply phenomena. We expect that the decision to share the same network auditor in our setting is demanded by the clients, given that reporting concessions appear to be provided to affiliated clients.⁶ Managers and boards of directors of group affiliated firms that are interested in enhancing audit quality to assure minority shareholders and potential investors should carefully consider the costs and benefits of sharing the same network auditor for components of the audit. Further research is required in alternative countries to confirm the association between audit quality and identity of component auditors. Regulators should consider mandating the use of unaffiliated auditors for components of the audit. An additional opening for further research includes analyzing the composition of the audit team in jurisdictions such as Japan that require companies to disclose details about professional qualifications and the number of audit team members involved in components of the audit.

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⁶ Informal interviews with Big 4 audit partners (July 2019) indicate that the decision to use unaffiliated audit firms is determined by group affiliated clients. Previous research indicates that audit fees are lower when the client has higher bargaining power, measured by size of the client and their relative contribution to the auditors' client fees (Casterella et al., 2004; Huang et al., 2007). The bargaining power of clients is also expected to influence the choice of component auditors.

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Appendix A

Variable	Definition
Dependent variables:	
<i>VIOLATE</i>	= Equals 1 if a firm is identified by the CSRC as having conducted fraudulent or misleading financial reporting, and 0 otherwise;
<i>ABSDA</i>	= The absolute value of performance-adjusted abnormal accruals (see Appendix B);
<i>STDWCA</i>	= The standard deviation of abnormal working capital accruals (see Appendix B);
<i>MAO</i>	= Equals 1 when a firm receives a modified audit opinion, and 0 otherwise;
<i>RESTATE</i>	= Equals 1 when a firm restates its audited earnings downward in the year of the error, and 0 otherwise;
<i>SAMEAUD</i>	= Equals 1 for firms that share the same network auditor for the parent and a component or a minimum of two components of the group, and 0 otherwise;
Control variables:	
<i>CONTROL</i>	= The percentage of subsidiaries' total shares held by the parent company;
<i>SIZE</i>	= The natural logarithm of total assets of the listed entity;
<i>AGE</i>	= The number of years for firm <i>i</i> since being publicly listed;
<i>INV</i>	= Inventory intensity calculated as total inventories divided by total assets;
<i>LEV</i>	= Leverage ratio calculated as total liabilities divided by total assets;
<i>GROWTH</i>	= The sales growth for firm <i>i</i> from year <i>t</i> – 1 to year <i>t</i> ;
<i>MTB</i>	= Market value of equity divided by book value of equity;
<i>CFO</i>	= Cash from operations divided by total assets in year <i>t</i> – 1;
<i>CFOVAR</i>	= The standard deviation of cash flow from operations over three years;
<i>SALES</i>	= Sales divided by total assets in year <i>t</i> – 1;
<i>SALESVAR</i>	= The standard deviation of sales over three years;
<i>ZSCORE</i>	= A firm's Altman-Z score in year <i>t</i> , calculated as $[(0.717 \times \text{net working capital} + 0.847 \times \text{retained earnings} + 3.107 \times \text{earnings before interest and taxes} + 0.998 \times \text{sales}) / \text{total assets} + 0.42 \times \text{book value of equity} / \text{liabilities}]$. Higher values of <i>ZSCOR</i> indicate lower financial distress risk;
<i>LOSS</i>	= Equals 1 if a firm records net income below zero in the current year, and 0 otherwise;
<i>M&A</i>	= Equals 1 if a firm is involved in a merger or acquisition during the current year, and 0 otherwise;
<i>SOE</i>	= Equals 1 if a firm is controlled by the central government of China, and 0 otherwise;
<i>INDSPE</i>	= Equals 1 if the auditor is an industry specialist, defined as the audit firm that has the largest market share in an industry in year <i>t</i> , and 0 otherwise;
<i>LONG</i>	= Equals 1 if the audit firm tenure is longer than five years, and 0 otherwise.
<i>GEODIS</i>	= The standard deviation of the geographic distance between a parent company and its subsidiary. Higher values of <i>GEODIS</i> indicate greater geographical dispersion between a parent and its subsidiaries;
<i>GHOMO</i>	= Group homogeneity defined as the mean value of the Pearson correlation coefficients of the annual percentage of operating expenses for all firms in a group affiliated firm over the years 2003 through 2012. Higher values of <i>GHOMO</i> indicate greater group homogeneity; and 0 otherwise.
<i>BIG10</i>	= Equals 1 if a firm is audited by an audit firm ranked among the Top 10 audit firms in China, and 0 otherwise.

Appendix B

This appendix describes the estimation of two audit quality measures, *ABSDA* and *STDWCA*.

(1) Firm performance adjusted absolute discretionary accruals (*ABSDA*):

We calculate abnormal accruals using a modified Jones model, and then use the performance adjusted absolute abnormal accruals suggested by Kothari et al. (2005) as the measure of audit quality, as follows:

$$TACC_t/TA_{t-1} = \alpha_0 + \alpha_1(1/TA_{t-1}) + \alpha_2(\Delta SALES_t - \Delta AR_t)/TA_{t-1} + \alpha_3PPE_t/TA_{t-1} + \alpha_4ROA_t + \varepsilon_t \quad (2)$$

where $TACC_t$ is total accruals in year t , calculated as a company's net income before extraordinary items less operating cash flow. TA_{t-1} is a company's total assets at the end of year $t - 1$. $\Delta SALES_t$ is the growth in sales from year $t - 1$ to t . ΔAR_t is the growth in net total receivables from year $t - 1$ to t . PPE_t is a company's net property, plant, and equipment at the end of year t . ROA_t is a company's net income in year t scaled by lagged total assets. We use the absolute value of the residual in Eq. (2) as the measure of audit quality.

(2) Standard deviation of abnormal working capital accruals (STDWCA):

We use a modified version of the Dechow and Dichev model suggested by McNichols (2002) to estimate abnormal accruals. The model in Eq. (3) measures the degree to which accruals fail to map into past, current, and future cash flows, and sales growth and the level of a company's net property, plant, and equipment, as follows:

$$STDWCA_t = \beta_0 + \beta_1CFO_{t-1} + \beta_2CFO_t + \beta_3CFO_{t+1} + \beta_4\Delta SALES_t + \beta_5PPE_t + \varepsilon_t \quad (3)$$

$STDWCA_t$ is working capital accruals in year t , calculated as net income before extraordinary items plus depreciation, amortization, and financial expenses, minus cash flows from operations. CFO_{t-1} , CFO_t , and CFO_{t+1} are cash flows from operations in year $t - 1$, t , and $t + 1$, respectively. All the variables in Eq. (3) are scaled by a company's total assets at the end of year $t - 1$. We use the three years standard deviation of the residual in Eq. (3) as the measure of audit quality.

Appendix C

Example of coding of SAMEAUD

Stock code	Year	Group affiliation	Audit firm	SAMEAUD
430570	2006	CHEMCHINA	Baker Tilly	1
000953	2006	CHEMCHINA	Baker Tilly	1
600230	2006	CHEMCHINA	Baker Tilly	1
600179	2006	CHEMCHINA	Baker Tilly	1
600579	2006	CHEMCHINA	Shine Wing	0
002092	2006	CHEMCHINA	BDO	0
000838	2006	CHEMCHINA	CAICPA	0

The example illustrated in the above table is from China National Chemical Corporation (CHEMCHINA). In 2006, there are seven publicly traded firms affiliated to CHEMCHINA. The same audit firm (Baker Tilly) audits four firms, while three firms are audited separately by different audit firms. We code firms audited by the same audit firm as 1 in year 2006, and 0 otherwise. The variable *SAMEAUD* could capture two different auditors within a set of group affiliated firms. To illustrate, if BDO had been the auditor for 600579, 002092, and 0000838, all 7 firms are coded as *SAMEAUD* (1) for CHEMCHINA. This is a limitation of the coding process, so we delete these observations and reanalyze the results. Our results still hold if we delete these special observations.

Appendix D. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jaccpubpol.2019.106711>.

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