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Article

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China's audit market competition and the competitive strategies of the international Big 4 audit firms

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ABSTRACT

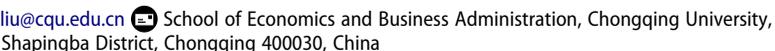
This study investigates the competitive strategies of the international Big 4 audit firms when faced with regional competition from the local Big 6 audit firms. We find that for the Big 4, competition reduces their audit fee premiums and forces them to recruit high-risk clients, while does not affect their audit quality. In further analyses, we find that competition led to greater changes for the Big 4 after the CICPA's proposal in 2007 and when the local Big 6 are in leading positions. We also find that the local Big 6 compromise on audit quality in addition to audit fee premiums and client criteria when faced with competition from small local audit firms. Overall, this study reveals the competitive strategies of the Big 4 under competitive pressure from the local Big 6, which suggests that local audit firms can compete with international audit firms for audit services by scale development.

KEYWORDS

Market competition; Big 4; audit fees; client risk; audit quality

1. Introduction

Audit market competition has been widely concerned by policy makers, regulators, and academic researchers in the past decades due to its importance in promoting high-quality audits. Compared to the highly concentrated audit market in developed economies where the markets are dominated by the Big 4 audit firms (Big 4 hereafter), China's audit market is characterised by low concentration and numerous small local audit firms, resulting in low-quality competition (M. L. DeFond et al., 1999; Wang et al., 2008).¹ Policy makers have proposed several mechanisms to prevent disorderly competition, with the aim of enhancing competitiveness and audit quality through increasing local audit firm size.² A prominent phenomenon is that in 2002, the Big 4 earned approximately 37% of income of the top 100 audit firms in China, compared with the

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¹We use the term 'firm' to refer to the audit firm and the terms 'company' and 'client' interchangeably to refer to publicly listed companies.

²For example, the Chinese Institute of Certified Public Accountants (CICPA) released a proposal in 2007 to enhance the competitive power of local large audit firms. The Ministry of Finance (MOF) released a provision which required local audit firms that are qualified to audit listed companies must transform from a limited legal liability to a special partnership by 2012.

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approximately 10% earned by the local Big 6 audit firms (local Big 6 hereafter). However, in 2014, the income shares of the Big 4 and local Big 6 were 30% and 32%, respectively. In the interim period, China's audit market experienced a substantial change in its structure with the rise of several large local audit firms that can compete with the Big 4 (Lennox & Wu, 2021). Therefore, the objective of this study is to investigate the effect of the competition from the local Big 6 on the competitive strategies of the Big 4 in a setting with thriving competition between these two groups of audit services suppliers.

In both emerging and developed economies, audit market competition determines the development of audit firms. However, the literature provides mixed evidence on the consequences of audit market competition. On the one hand, competition among audit firms increases client's choice of audit service suppliers, which leads audit firms to compete for clients by providing fee discounts (C. J. Chen et al., 2007; Eshleman & Lawson, 2017; T. C. Huang et al., 2016). On the other hand, competition in the market implies a low economy of scale for audit firms, resulting in higher audit fees (Numan & Willekens, 2012; Pearson & Trompeter, 1994). Based on these studies, the literature provides empirical evidence that market competition affects audit firms' competitive strategies from the perspectives of market deregulation, audit firm collapses, mergers, and start-ups (Carson et al., 2012; Jensen & Payne, 2005; Wu et al., 2018).

The Big 4 have long been regarded as providers of high-quality audits, and the literature documents that the Big 4 adjust their competitive strategies to compete among each other (Bills & Stephens, 2016; Keune et al., 2016). However, the market position of the Big 4 is being challenged by other large audit firms, which, in turn, affects their audit fee premiums, client criteria and audit quality has been largely unexplored. China provides an ideal setting for examining this issue for two reasons. First, in the last two decades, the Chinese audit market has seen the rise of several large local audit firms, especially the local Big 6. As noted by Lennox and Wu (2021), although the Big 4 are among the large audit firms in China, they are not much larger than the local Big 6. As a result, the Big 4 face fierce competition from the local Big 6. In contrast, it is difficult to observe a competitive relationship between the Big 4 and other large audit firms in developed economies, such as the U.S., where the Big 4 dominance is greater. Second, there is a significant market segmentation among regions in China. Due to local protectionism, the audit market is regional with no single audit firm that can develop a generally dominant position across regions. In this context, the regional competition for audit services signifies that the local Big 6, with their extensive local offices network, have a greater effect on the competitive strategies of the Big 4.

Spatial competition theory is derived from the market space location choices made by competitors regarding how they compete by positioning themselves in the market (Hotelling, 1990). Numan and Willekens (2012) applies this theory to the audit market and documents that competitive pressures on audit firms come from competitors that are closer in market shares in the same local market. Therefore, we argue that the competitive strategies of the Big 4 vary with their relative market shares to the local Big 6 at the regional level. First, competition places pressure on the Big 4's audit fee premiums. The literature finds the Big 4 charge fee premiums due to their market dominance (C. J. Chen et al., 2007). However, as the difference between the local Big 6 and Big 4 narrows, the local Big 6 could also meet the needs of clients with lower audit fees. The availability of adequate choice among audit firms decreases the Big 4's market power in recruiting and

retaining clients, resulting in decreased audit fee premiums. Second, competition places pressure on the client criteria of the Big 4. When there is fierce competition, maintaining strict client criteria and taking on low-risk clients limits the profits earned by the Big 4. To match their more lenient competitors, the Big 4 need to stretch their client criteria and take on higher-risk clients. Third, competition places pressure on the audit quality of the Big 4, which are international audit firms with a global reputation for providing high-quality audits (Lennox & Pittman, 2008). However, fierce competition increases the Big 4's fear of losing clients, resulting in lower audit quality.

To investigate whether the Big 4 adjust their competitive strategies due to regional competition from the local Big 6, we use a sample of Chinese publicly listed companies audited by the Big 4 and local Big 6 from 2003 to 2019. We find that competition from the local Big 6 reduces the audit fee premiums of the Big 4 and forces them to recruit high-risk clients, while audit quality remains unchanged. The results are economically significant: an interquartile increase in competitive pressure from the local Big 6 is associated with an 8.7% decrease in audit fees and a 7.5% increase in client risk for the Big 4.

We conduct cross-sectional tests to examine whether the effect of competition on the competitive strategies of the Big 4 is heterogeneous across the different periods of time and competitive positions. We find that the competition effect increased after 2007 when a proposal (also known as 'larger and stronger') was released by the Chinese Institute of Certified Public Accountants (CICPA) to improve the competitive power of the large local audit firms. We also find that market competition leads to greater changes in the Big 4's audit fee premiums and client criteria when the local Big 6 are in a leading position. The results are consistent with the notion that the Big 4 increasingly compromise in a competitive audit market and support the Chinese government's attempts to promote the competitiveness of local audit firms through scale development.

Finally, we compare the competitive strategies adopted by the local Big 6 when their market position is challenged by local small audit firms. We find that under regional competitive pressure from local small audit firms, the local Big 6 compromise on audit quality in addition to audit fees and client criteria.

This study contributes to the literature in two ways. First, it extends the literature by examining whether market competition affects the competitive strategies of audit firms. Prior research has investigated the competitive strategies of new entrants in the audit market and the average effect of market competition on the behaviour of existing audit firms (Pan et al., 2022; Wu et al., 2018).³ In contrast, our study focuses on the rise of large local audit firms (i.e. the local Big 6) and the competitive strategies adopted by audit firms that have held the dominant market position for a long time (i.e. the Big 4). We find that when faced with competitive pressure from the local Big 6, the Big 4 reduce their audit fees and accept high-risk clients but do not compromise on audit quality. Moreover, when faced with competitive pressure from small local audit firms, the local Big 6 reduces their audit quality in addition to lowering audit fees and taking on high-risk clients. Taken together, our results shed light on the consequences of audit market competition by exploring the competitive strategies used by different types of audit firms.

³More specifically, Wu et al. (2018) find that the entry of new branch offices triggers defensive discount pricing strategies among existing competitors in the local audit market, while their audit quality remains unchanged. Pan et al. (2022) document that bullet train connectivity is associated with lower audit quality. As these findings are based on the average effect of existing audit firms, it is still unclear whether the Big 4 behave differently from local audit firms.

Second, our study enriches the literature on the Big 4's audit fee premiums. The literature documents that the Big 4 enjoy a premium on audit fees compared with other small- and large-sized audit firms (Basioudis & Francis, 2007; Carson et al., 2012; Choi et al., 2008). However, there is no consensus on whether the Big 4's audit fee premiums stem from their reputation or dominant market position. Using a binary market setting in China, C. J. Chen et al. (2007) supports the notion that the audit fee premiums are partially attributable to the Big 4's market dominance rather than their reputation. The findings of our study suggest that audit fee premiums decrease when the local Big 6 challenge the dominance of the Big 4, further supporting the view that the Big 4's audit fee premiums are related to their dominant market position.

Our findings should be of interest to regulators attempting to enhance the competitiveness of local audit firms in developing countries. The Chinese government has adopted a series of policy measures to cultivate large local audit firms to compete with international audit firms. Focusing on audit market competition, we find that the Big 4 are forced to make compromises due to competitive pressure from the local Big 6. These findings suggest that local audit firms constitute a powerful competitive relationship with international audit firms through scaling up and help to clarify the effect of policies intended to enhance the competitiveness of large local audit firms.

The rest of this paper proceeds as follows. Section 2 discusses the institutional background and develops our hypothesis. Section 3 describes the research design, construction of the variables, and model specification. Section 4 reports the main empirical results, and Section 5 presents the results of additional tests. Finally, Section 6 concludes this paper.

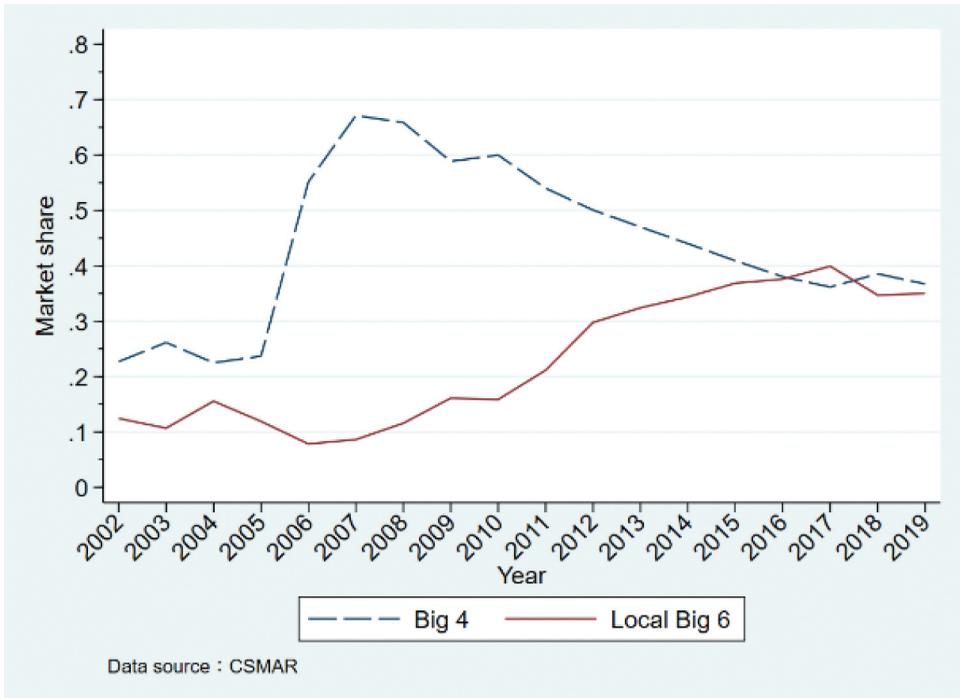
2. Institutional background and hypothesis development

2.1. Competition in the Chinese audit market

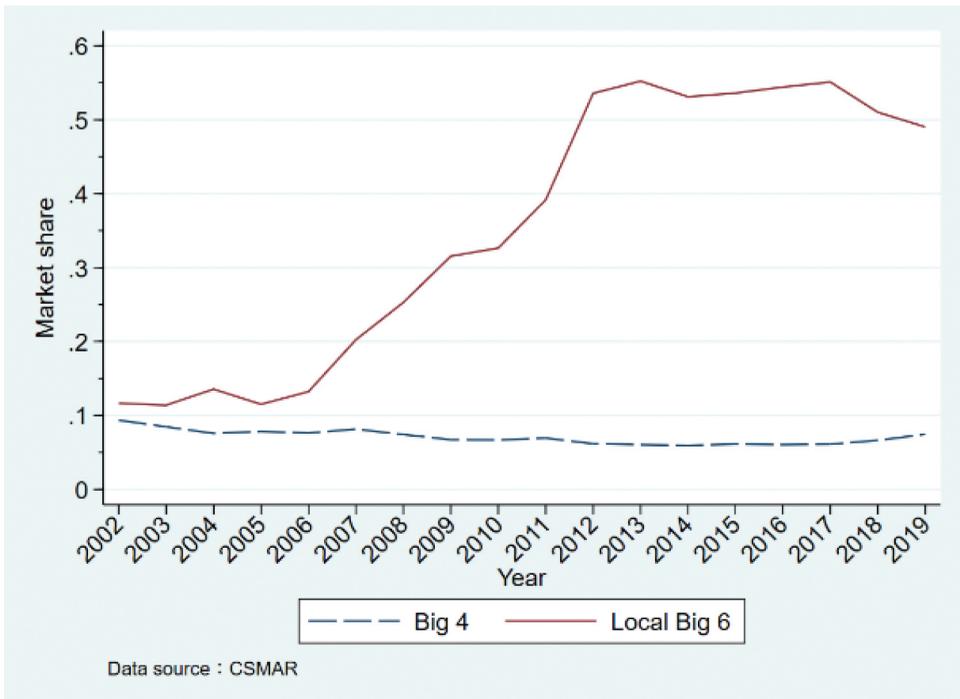
China's audit market began in the 1920s and has witnessed the development of the old China and the abolition of the new China (Liu & Lin, 2000). With the development of economic sociality, the audit market was restored in the late 1980s. However, compared with the audit markets in developed economies, the audit market in China is subject to stronger government regulations and restrictions. Due to the government's strict control over market access, local audit firms were initially established as affiliates of the local governments and public institutions. Between 1997 and 1999, the Chinese regulators implemented a disaffiliation program, leading to a significant increase in auditor independence (Chang et al., 2019).

With the rapid expansion in China's capital market after 2000, the competitive environment of the audit market has changed drastically. Taking advantage of this situation, international audit firms took the lead in increasing their investments in China, leading to rapid increases in market shares.⁴ Figure 1 illustrates the market shares of the Big 4 and local Big 6 for the audit services of publicly listed companies in China. In Panel A, from 2002 to 2007, the total market shares of the Big 4 rose from 23% to 67%. However, the total market shares of the local Big 6 fell from 12% to 9%. Thus, the Big 4 have a strong

⁴For example, in 2004, Deloitte announced a 150-million-dollar investment in China as a part of its five-year plan. In 2005, PwC announced plans to recruit more than 1000 employees annually over the next five years (Gong et al., 2016).



Panel A: Market share based on audit fees



Panel B: Market share based on the number of clients

Figure 1. Market shares of the Big 4 and local Big 6 for publicly listed companies in China.

dominant position in the audit market in contrast to the local Big 6 during this period (Hung Chan & Wu, 2011).

The dominance of the Big 4 in China's audit market hinders the healthy development of local audit firms. In 2007, the CICPA released a proposal to enhance the competitiveness of large local audit firms. Since then, large local audit firms have expanded their market shares rapidly through government-induced mergers and made significant improvements in audit quality (Gong et al., 2016). As shown in Panel A of Figure 1, the local Big 6 began to catch up with the Big 4 in terms of market shares from 2007 and eventually surpassed the Big 4 in 2016. As for 2019, the market shares of the Big 4 and local Big 6 are 37% and 35%, respectively. However, their client number shares are 7% and 49%, respectively. These results indicate that although the Big 4 still enjoy audit fee premiums, the market share based on the audit fees is almost indistinguishable between the Big 4 and local Big 6. Therefore, the local Big 6 formed a direct competitive relationship with the Big 4 in China's audit market.

2.2. Market competition and competitive strategies of the Big 4

Spatial competition theory, beginning with Hotelling (1990), describes how competitive pressures are greater and equilibrium prices become closer to marginal costs when competitors are closer in their market space. The market segmentation generated by spatial distance leads market participants to focus on locational advantages and choose to operate in areas with low transaction costs to obtain excess profits. As the number of new entrants increases, the existing participants must compete for clients by providing fee discounts, which eventually moves the equilibrium prices closer to marginal costs. The spatial competition theory has inspired research on the market for audit services, which measures competition as the relative market shares of audit firms (Bills & Stephens, 2016; Numan & Willekens, 2012). As noted by Francis et al. (2013), the Big 4 hold over 90% of the market share in the U.S., which suggests that other audit firms find it difficult to compete directly with the Big 4. In China, however, the rapid growth in market share of the local Big 6 makes the Big 4's dominance in the audit market is lower than that in developed economies, suggesting that the rise of the local Big 6 should have a critical impact on the competitive strategies of the Big 4.

For clients, the audit fee is an important factor when choosing an audit firm due to the substitutability of audit services (DeAngelo, 1981). On the supply side, the Big 4 use their multinational audit network and high-quality audit services to gain a large market share in the early years. Accordingly, this dominant market position allows them to charge audit fee premiums (C. J. Chen et al., 2007). However, on the demand side, as the local Big 6 have expanded their audit services and improved audit capabilities, clients who choose a firm among the local Big 6 can get similar economic consequences as from the Big 4 at a lower cost. Therefore, increased choice among audit firms decreases the Big 4's market power and forces them to compete for clients by reducing their audit fees. In addition to this, the regional network of the local Big 6 gives them an advantage in China's audit market, where relationship-based transactions are a common phenomenon (M. Defond et al., 2020; Wong, 2016). Especially, in the wave of mergers among local audit firms, the local Big 6 achieved a broader association with regional economic resources by merging with small local audit firms

in different regions. Consequently, the local Big 6 compete for clients through audit fee discounts with regional advantages, and the Big 4 are more likely to reduce their audit fee premiums when faced with competitive pressure from the local Big 6. Given the reasons above, we propose our first hypothesis as follows:

H1: *The audit fee premiums of the Big 4 audit firms are negatively associated with competitive pressure from the local Big 6 audit firms.*

As audit services are a two-way selection process between audit firms and clients (Brown & Knechel, 2016), the effect of market competition on the competitive strategies of the Big 4 is also reflected in their client criteria. Shu (2000) demonstrates that audit firms adjust their target client groups according to income structure and business objectives. Hence, audit firms take on clients as a trade-off between returns and risks. Specifically, the Big 4 operate a global network with high reputations and more aggressive quasi rents at stake (Hung Chan & Wu, 2011), and their risk criteria for taking on clients are usually stricter than the local Big 6's client criteria. Due to competitive pressure from the local Big 6, the market share of the Big 4 has shrunk, and maintaining strict client criteria would result in a greater loss of clients. In such cases, competitive pressure incentivises the Big 4 to relax their client criteria to match that of their more lenient competitors. Moreover, China's audit market is generally perceived to have a weak institutional environment with a low level of investor protection, and class-action suits against audit firms are rare, which increases the risk-taking propensity of the Big 4 (Ke et al., 2015; Wong, 2016). Therefore, to increase business in a highly competitive market, the Big 4 should adopt stringent client criteria and accept high-risk clients. We propose our second hypothesis as follows:

H2: *The level of client risk of the Big 4 audit firms is positively associated with competitive pressure from the local Big 6 audit firms.*

Apart from audit fee premiums and client criteria, audit firms also use audit quality to stay ahead of the market competition (Francis et al., 2013; Lennox & Pittman, 2008). Prior studies suggest that the relationship between market competition and high-quality audits depends on whether market competition decreases audit firms' bargaining power and increases the cost of telling the truth (Chaney & Philipich, 2002). As for clients, when an audit market is more competitive, they have greater bargaining power as there is a greater choice among audit firms. If the Big 4 adhere to strict audit procedures, clients are more likely to choose the local Big 6, who tend to be lenient with clients. As for audit firms, on the one hand, the Big 4 may be forced to reduce their audit efforts to minimise audit costs under fierce competition, leading to a decline in audit quality (Newton et al., 2016). On the other hand, competition increases the likelihood that the Big 4 would cater to clients' preferences and be tolerant of potential finance misstatements to avoid losing clients. Hence, we expect the Big 4 to reduce audit quality in response to competitive pressure from the local Big 6. We propose our third hypothesis as follows:

H3: *The audit quality provided by the Big 4 audit firms is negatively associated with competitive pressure from the local Big 6 audit firms.*

Nevertheless, there are other reasons to argue that competition may not affect the competitive strategies of the Big 4 despite their market position being challenged by the local Big 6. For example, the Big 4 have a relatively stable client base that includes large multinational companies, whose purpose is to be recognised by international investors and compliant with foreign regulations (H. W. Huang et al., 2015). Even in a competitive audit market, these clients would be more inclined to choose the Big 4 because it is difficult for the local Big 6 to meet their needs. Furthermore, high-risk clients and low-quality audits could increase the risk of audit. The Big 4, with their high quasi rents, have an incentive to retain strict client criteria and supply high-quality audits because they stand to lose much more than the local Big 6 in the event of an audit failure (S. Chen et al., 2010). Besides, the growth in non-audit activities of the Big 4 in recent years signifies that these audit firms are compensating for the loss of audit services through business diversification. Overall, it remains unclear whether the Big 4 change their competitive strategies under the competitive pressure from the local Big 6.

3. Research design

3.1. Sample and data

Our sample consists of all publicly listed companies in mainland China that are audited by the Big 4 and local Big 6 from 2003 to 2019. The CICPA has been collecting annual statistics on the business of audit firms in China since 2002 and has published the 'Comprehensive Evaluation of Top 100 Audit Firms'. We collect the information of the Big 4 and local Big 6 from these statistics. As there is a lagged effect of market competition on the competitive strategies of audit firms, our sample begins in 2003. The audit data and financial information are extracted from the China Stock Market and Accounting Research (CSMAR) database. We manually collect the missing audit fee data from clients' annual reports and auditor engagement disclosures. The corporate governance data is collected from the WIND database. After excluding observations from companies in the financial industry, ST companies, and other observations with missing data to calculate variables, we obtain a final sample of 16,261 client-year observations from 2,886 listed companies.

3.2. Measures of audit market competition

The literature uses various methods to measure audit market competition, such as market concentration (Francis et al., 2013; T. C. Huang et al., 2016), mergers and collapses of audit firms (Carson et al., 2012; Wu et al., 2018), and the CICPA's proposal in 2007 (Chang et al., 2019). Whereas the above methods have shortcomings. For example, market concentration assumes that all audit firms face the same level of competition and does not measure the competitive pressures faced by different audit firms (Dedman & Lennox, 2009). Mergers and collapses of audit firms only occur in certain years and the CICPA's proposal in 2007 may not have a strong policy enforcement power. To objectively reflect the competitive relationship between the Big 4 and local Big 6, following Numan and Willekens (2012) and Bills and Stephens (2016), we use a spatial competition theory-based approach to measure market competition. In this analysis, the variable *Comp_af*

(*Comp_ta*) is the negative value of the absolute average market share difference between the Big 4 and local Big 6 at the provincial level, where market share is calculated using the clients' domestic audit fees (total assets).⁵ *Comp_af* (*Comp_ta*) increases as the Big 4 are faced with higher levels of competitive pressure from the local Big 6.

3.3. Model specification

To test H1, we estimate the following ordinary least squares (OLS) regression model:

$$Fee_{i,t} = \beta_0 + \beta_1 Big4_{i,t} + \beta_2 Big4_{i,t} * Competition_{i,t-1} + \beta_3 Competition_{i,t-1} + \gamma CONTROLS_{i,t} + \sum Year + \sum Industry + \sum Province + \varepsilon_{i,t} \quad (1)$$

where the dependent variable *Fee* is the natural logarithm of the client's annual domestic audit fees. The independent variable *Big4* is an indicator variable which equals 1 if the audit firm is a Big 4, and 0 otherwise. *Competition* are two measures of market competition (*Comp_af* and *Comp_ta*) as defined above. We draw on the literature to identify and control for a wide range of factors that may influence audit fees (Bills & Stephens, 2016; Carson et al., 2012), such as an indicator for companies that change their audit firms (*Switch*), an indicator for companies that receive modified audit opinion (*Opinion*), auditor expertise at the industry and provincial levels (*Indexpert* and *Proexpert*), the logarithm of the number of subsidiaries (*Lnsb*), number of years a company has been listed (*Age*), an indicator for a company's CEO and chairman of the board are the same person (*Dual*), an indicator for companies that are ultimately controlled by the government (*SOE*), company size (*Size*), financial leverage (*Lev*), company profitability (*ROI*), An indicator for companies with negative net income (*Loss*), current assets divided by total assets. (*Cata*), quick ratio (*Quick*), Long-term debt divided by total assets (*DE*), Inventory divided by total assets (*Inventory*), intangible assets divided by total assets (*Intangible*), GDP per capita (*GDP_per capita*), and marketisation index (*Marketisation*). All variables are defined in Appendix A.

To test H2, we estimate the following ordinary least squares (OLS) regression model:

$$ZScore_{i,t} = \beta_0 + \beta_1 Big4_{i,t} + \beta_2 Big4_{i,t} * Competition_{i,t-1} + \beta_3 Competition_{i,t-1} + \gamma CONTROLS_{i,t} + \sum Year + \sum Industry + \sum Province + \varepsilon_{i,t} \quad (2)$$

where the dependent variable *ZScore* is Altman Z-Score (Altman, 1968). The independent variables of interests are defined the same as in Eq. (1). Following Li and Han (2019), the control variables in Eq. (2) include *Indexpert*, *Proexpert*, *Age*, *Dual*, *SOE*, *Size*, *Lev*, *ROI*, *GDP_per capita*, *Marketization*. We also include *Growth* which is measured as the growth rate of sales incomes. All variables are defined in Appendix A.⁶

⁵The Big 4 and local Big 6 do not have audit engagements in all provinces. Thus, we define the market share as 0 for the Big 4 or local Big 6 without engagements in each province-year grouping. Additionally, prior studies use audit fees to measure the market shares of audit firms without considering the potential endogeneity in audit fee model (e.g. Bills & Stephens, 2016; T. C. Huang et al., 2016). Following Dekeyser et al. (2019), we also use clients' total assets to measure the market shares of audit firms to ensure the robustness of our findings.

⁶To test H1 and H2, we also use alternative definitions to measure audit fees and client risk. First, following Aobdia et al. (2016), we measure audit fee as client's annual domestic audit fees divided by the square root of total assets. Second, following John et al. (2008), we define client risk as the standard deviation of the client's industry-adjusted stock return over five years. Our untabulated results are all consistent with the main results.

To test H3, we estimate the following regression model:

$$AuditQuality_{i,t} = \beta_0 + \beta_1 Big4_{i,t} + \beta_2 Big4_{i,t} * Competition_{i,t-1} + \beta_3 Competition_{i,t-1} + \gamma CONTROLS_{i,t} + \sum Year + \sum Industry + \sum Province + \varepsilon_{i,t} \quad (3)$$

where *Audit Quality* are two measures of audit quality (*Restatement* and $|DA|$). In prior research, audits are assumed to be of higher quality when there is less likelihood of financial restatement, and when accruals are smaller (M. DeFond & Zhang, 2014). Therefore, following M. Defond et al. (2020), we use financial restatement (*Restatement*) as the first variable to proxy for audit quality.⁷ Following Duh et al. (2020) and Kothari et al. (2005), we use absolute abnormal accruals ($|DA|$) as the second variable to proxy for audit quality. The control variables remain the same as in Eq. (1), except *Switch*, *Opinion*, and *Lnsb*.

In Eqs. (1) - (3), We also include year, industry and province fixed effects to control for unobservable factors that affect the competitive strategies. We winsorise all continuous variables at the 1st and 99th percentiles to mitigate the influence of outliers. In addition, we use robust standard errors clustered by listed companies for all our analyses to mitigate concerns about heteroscedasticity and serial correlation in the error term.

4. Main empirical results

4.1. Descriptive statistics

Table 1 presents the sample distribution by year and the yearly mean value of audit market competition (*Comp_af* and *Comp_ta*). The mean value of *Comp_af* exhibits a decrease before 2009 and an increase thereafter. The mean value of *Comp_ta* is found to exhibit a similar trend. These results indicate that the competitive pressure faced by the Big 4 first declined and then increased during our sample period.

Table 2 provide descriptive statistics of the variables in our main tests. For the dependent variables, the mean value of *Fee* is 13.717, which is equivalent to about RMB 0.91 million. The mean value of *ZScore* is 4.331. In terms of the standard deviation of *ZScore*, client risk has a wide range of variability. About 4% of observations have financial restatements and the mean value of $|DA|$ is 0.05. For independent variables, the value of *Big4* is 0.121 on average, which indicates that about 12.1% of observations are audited by the Big 4. The mean value of *Comp_af* (*Comp_ta*) is -0.078 (-0.058), indicating that the average market share difference between the Big 4 and local Big 6 is 7.8% (5.8%). The statistics of the control variables are consistent with previous studies of the audit market in China (Chang et al., 2019; T. C. Huang et al., 2016).

4.2. Market competition and audit fee premiums of the Big 4

Table 3 reports the results of multivariate regression of Eq. (1) on the effect of regional market competition on the Big 4's audit fee premiums. In column (1), the coefficient on *Big4* is positive and statistically significant, suggesting that the Big 4 charge audit fee

⁷We use logistic regression model in Eq. (3) when the dependent variable is *Restatement*. Financial restatements occur in subsequent years after the misstatements, thus we delete the observations in 2019 in the restatement model.

Table 1. Sample distribution by year.

Year	N	Percentage	Mean <i>Comp_af</i>	Mean <i>Comp_ta</i>
2003	220	1.35%	−.07	−.04
2004	241	1.48%	−.14	−.09
2005	225	1.38%	−.10	−.05
2006	219	1.35%	−.06	−.04
2007	288	1.77%	−.11	−.05
2008	415	2.55%	−.09	−.05
2009	529	3.25%	−.12	−.08
2010	586	3.60%	−.10	−.07
2011	825	5.07%	−.09	−.06
2012	1,332	8.19%	−.09	−.05
2013	1,460	8.98%	−.07	−.06
2014	1,433	8.81%	−.08	−.06
2015	1,509	9.28%	−.08	−.06
2016	1,564	9.62%	−.07	−.06
2017	1,718	1.57%	−.07	−.06
2018	1,851	11.38%	−.07	−.06
2019	1,846	11.35%	−.06	−.05

This table presents the sample distribution by year. Our sample includes 16,261 firm-year observations.

Table 2. Descriptive statistics.

Variable	N	Mean	S.D.	Min	Q1	Median	Q3	Max
<i>Fee</i>	16,261	13.72	0.78	9.21	13.22	13.59	14.08	19.40
<i>ZScore</i>	16,261	4.33	5.18	−2.76	1.52	2.74	4.96	31.97
<i>Restatement</i>	14,401	0.04	0.181	0.00	0.00	0.00	0.00	1.00
<i> DA </i>	16,261	0.05	0.06	0.00	0.02	0.04	0.07	0.56
<i>Big4</i>	16,261	0.12	0.33	0.00	0.00	0.00	0.00	1.00
<i>Comp_af</i>	16,261	−0.08	0.07	−0.26	−0.12	−0.06	−0.03	0.00
<i>Comp_ta</i>	16,261	−0.06	0.05	−0.19	−0.09	−0.04	−0.03	0.00
<i>Switch</i>	16,261	0.10	0.30	0.00	0.00	0.00	0.00	1.00
<i>Opinion</i>	16,261	0.04	0.20	0.00	0.00	0.00	0.00	1.00
<i>Indexpert</i>	16,261	5.96	2.84	1.00	4.00	6.00	9.00	10.00
<i>Proexpert</i>	16,261	5.55	2.75	1.00	3.00	6.00	8.00	10.00
<i>Lnsub</i>	16,261	2.44	1.04	0.69	1.79	2.44	3.14	4.88
<i>Age</i>	16,261	10.89	6.80	1.00	5.00	10.00	16.00	30.00
<i>Dual</i>	16,261	0.24	0.43	0.00	0.00	0.00	0.00	1.00
<i>SOE</i>	16,261	0.42	0.49	0.00	0.00	0.00	1.00	1.00
<i>Size</i>	16,261	22.24	1.40	18.95	21.23	22.03	23.04	26.56
<i>Lev</i>	16,261	0.45	0.22	0.05	0.29	0.45	0.61	0.96
<i>ROI</i>	16,261	0.04	0.08	−0.46	0.01	0.04	0.08	0.24
<i>Loss</i>	16,261	0.10	0.30	0.00	0.00	0.00	0.00	1.00
<i>Cata</i>	16,261	0.55	0.21	0.07	0.41	0.57	0.71	0.96
<i>Quick</i>	16,261	1.73	2.11	0.13	0.66	1.09	1.86	14.56
<i>De</i>	16,261	0.09	0.11	0.00	0.01	0.05	0.14	0.49
<i>Inventory</i>	16,261	0.15	0.14	0.00	0.06	0.12	0.19	0.73
<i>Intangible</i>	16,261	0.05	0.05	0.00	0.02	0.03	0.06	0.33
<i>Growth</i>	16,261	0.19	0.51	−0.71	−0.02	0.11	0.28	3.94
<i>GDP_per capita</i>	16,261	6.83	3.23	1.10	4.28	6.35	9.10	15.73
<i>Marketization</i>	16,261	8.26	1.89	3.10	6.94	8.70	9.77	10.80

This table presents the descriptive statistics for the variables used in our main analysis. All variables are defined in [Appendix A](#).

premiums from their clients. We then include the interaction term in column (2) and obtain a coefficient on *Big4*Comp_af* of -2.157 , which is statistically significant at the 1% level. When we use *Comp_ta* to substitute for *Comp_af* in columns (3) and (4), the

Table 3. Market competition and audit fee premiums of the Big 4.

Variable	Fee		Fee	
	(1)	(2)	(3)	(4)
<i>Big 4</i>	0.626*** (16.16)	0.449*** (8.82)	0.627*** (16.07)	0.527*** (9.56)
<i>Big 4*Comp_af</i>		-2.157*** (-3.98)		
<i>Comp_af</i>	-0.515*** (-3.99)	-0.182 (-1.62)		
<i>Big 4*Comp_ta</i>				-2.019** (-2.12)
<i>Comp_ta</i>			-0.448*** (-2.64)	-0.250* (-1.67)
<i>Switch</i>	-0.053*** (-4.57)	-0.055*** (-4.76)	-0.053*** (-4.56)	-0.055*** (-4.69)
<i>Opinion</i>	0.164*** (5.92)	0.162*** (5.86)	0.167*** (6.03)	0.167*** (6.04)
<i>Indexpert</i>	-0.001 (-0.55)	-0.001 (-0.22)	-0.001 (-0.47)	-0.001 (-0.42)
<i>Proexpert</i>	0.001 (0.45)	0.001 (0.50)	0.001 (0.46)	0.002 (0.66)
<i>Lnsb</i>	0.137*** (13.21)	0.139*** (13.46)	0.137*** (13.16)	0.137*** (13.17)
<i>Age</i>	-0.005*** (-3.37)	-0.004*** (-2.95)	-0.005*** (-3.45)	-0.005*** (-3.25)
<i>Dual</i>	0.002 (0.13)	-0.000 (-0.02)	0.001 (0.04)	0.000 (0.03)
<i>SOE</i>	-0.081*** (-4.33)	-0.087*** (-4.65)	-0.079*** (-4.18)	-0.082*** (-4.33)
<i>Size</i>	0.325*** (22.94)	0.320*** (23.70)	0.326*** (22.87)	0.324*** (23.45)
<i>Lev</i>	0.072 (1.34)	0.075 (1.43)	0.067 (1.25)	0.067 (1.26)
<i>ROI</i>	-0.245** (-2.57)	-0.225** (-2.39)	-0.244** (-2.56)	-0.237** (-2.50)
<i>Loss</i>	0.036** (1.96)	0.036* (1.96)	0.036** (1.98)	0.035* (1.93)
<i>Cata</i>	-0.007 (-0.12)	-0.003 (-0.05)	-0.006 (-0.09)	-0.003 (-0.06)
<i>Quick</i>	-0.004 (-1.11)	-0.004 (-1.19)	-0.004 (-1.10)	-0.004 (-1.19)
<i>De</i>	-0.035 (-0.33)	-0.041 (-0.39)	-0.034 (-0.33)	-0.037 (-0.35)
<i>Inventory</i>	-0.109 (-1.43)	-0.112 (-1.47)	-0.111 (-1.47)	-0.112 (-1.48)
<i>Intangible</i>	0.003 (0.02)	0.025 (0.15)	0.004 (0.02)	0.011 (0.06)
<i>GDP_percapita</i>	0.010** (2.19)	0.010** (2.17)	0.017*** (3.80)	0.017*** (3.76)
<i>Marketization</i>	0.028*** (3.49)	0.027*** (3.37)	0.020** (2.46)	0.020** (2.47)
Constant	5.706*** (20.01)	5.841*** (21.64)	5.748*** (20.22)	5.810*** (21.24)
Year	YES	YES	YES	YES
Industry	YES	YES	YES	YES
Province	YES	YES	YES	YES
N	16,261	16,261	16,261	16,261
R ²	0.707	0.711	0.706	0.707

The *t*-statistics based on robust standard errors clustered by firms are presented in parentheses beneath each estimate. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

regression results are consistent with the results in columns (1) and (2). The effect of competition on the Big 4's fee premiums is not only statistically significant but also economically substantial. For example, in columns (2) and (4), an interquartile increase in *Comp_af* and *Comp_ta* are associated with an 8.7% and a 5.8% decrease in the Big 4's audit fees, respectively. These results support H1, indicating that the Big 4 reduce their fee premiums when faced with competitive pressure from the local Big 6.

4.3. Market competition and client risk of the Big 4

Table 4 demonstrates the estimates of Eq. (2) regarding the effect of market competition on the client risk assumed by the Big 4. In column (1), the coefficient on *Big4* is positive and statistically significant at the 10% level, which suggests that compared with the local Big 6, the Big 4 have stricter client criteria, and their audit clients are less risky. When we include the interaction term in column (2), the coefficient on *Big4*Comp_af* is negative and statistically significant at the 5% level. In columns (3) and (4), we use *Comp_ta* to substitute for *Comp_af*. The results of columns (3) and (4) are similar to the results in columns (1) and (2). As for economic implication, an interquartile increase in *Comp_af* and *Comp_ta* are associated with a 7.5% and a 10.0% decrease in the client risk of the Big 4 in columns (2) and (4), respectively. Hence, these results support H2, which suggest that the Big 4 are increasingly likely to take on high-risk clients when there is competitive pressure from the local Big 6.

4.4. Market competition and audit quality of the Big 4

Table 5 presents the estimates of Eq. (3) regarding the effect of market competition on the audit quality of the Big 4. Columns (1) - (4) report the regression results using *Restatement* as the dependent variable. As shown in column (1), the coefficient on *Big4* is significant and negative, which suggests that the Big 4 have a lower probability of financial restatement than the local Big 6. However, in column (2), the coefficient on the interaction term *Big4*Comp_af* is not significant. We find similar results when we substitute *Comp_ta* for *Comp_af* in columns (3) and (4). Columns (5) - (8) report the regression results using $|DA|$ as the dependent variable. The estimated coefficients on *Big4*Comp_af* and *Big4*Comp_ta* are still not statistically significant. Thus, we find no evidence supporting H3.

In summary, we find that the Big 4 reduce their audit fee premiums and take on high-risk clients when faced with regional competitive pressure from the local Big 6. However, the audit quality of the Big 4 remains unchanged. Our findings suggest that the challenge of the local Big 6 to the market position of the Big 4 leads to the changes in Big 4's pricing and client criteria strategies.

4.5. Robustness tests

4.5.1. Reducing endogeneity concerns

We use the difference-in-difference approach and the instrumental variable method to mitigate potential endogeneity concerns in our study.⁸ Audit market competition, as

⁸As H3 is not supported, the robustness tests and further analyses only focuses on H1 and H2.

Table 4. Market competition and client risk of the Big 4.

Variable	ZScore		ZScore	
	(1)	(2)	(3)	(4)
<i>Big 4</i>	0.295* (1.72)	0.001 (0.00)	0.285* (1.65)	-0.174 (-0.83)
<i>Big 4*Comp_af</i>		-3.583** (-2.02)		
<i>Comp_af</i>	-0.334 (-0.39)	0.220 (0.23)		
<i>Big 4*Comp_ta</i>				-9.306*** (-2.62)
<i>Comp_ta</i>			1.121 (0.91)	2.032 (1.58)
<i>Indexpert</i>	-0.011 (-0.47)	-0.009 (-0.40)	-0.010 (-0.41)	-0.009 (-0.38)
<i>Proexpert</i>	-0.018 (-0.81)	-0.018 (-0.81)	-0.017 (-0.76)	-0.014 (-0.66)
<i>Age</i>	0.080*** (7.01)	0.081*** (7.08)	0.080*** (6.95)	0.081*** (7.09)
<i>Dual</i>	0.199 (1.44)	0.196 (1.41)	0.197 (1.42)	0.196 (1.42)
<i>SOE</i>	-0.004 (-0.03)	-0.014 (-0.10)	-0.008 (-0.06)	-0.022 (-0.16)
<i>Size</i>	-0.744*** (-10.16)	-0.752*** (-10.22)	-0.743*** (-10.15)	-0.752*** (-10.24)
<i>Lev</i>	-11.767*** (-24.24)	-11.761*** (-24.26)	-11.789*** (-24.32)	-11.781*** (-24.34)
<i>ROI</i>	8.794*** (10.28)	8.832*** (10.32)	8.776*** (10.27)	8.826*** (10.31)
<i>Growth</i>	-0.201*** (-3.38)	-0.200*** (-3.36)	-0.203*** (-3.41)	-0.203*** (-3.40)
<i>GDP_per capita</i>	0.026 (0.73)	0.025 (0.72)	0.031 (0.92)	0.029 (0.85)
<i>Marketization</i>	-0.156** (-2.21)	-0.158** (-2.23)	-0.160** (-2.23)	-0.159** (-2.24)
Constant	23.525*** (15.31)	23.744*** (15.34)	23.598*** (15.32)	23.884*** (15.41)
Year	YES	YES	YES	YES
Industry	YES	YES	YES	YES
Province	YES	YES	YES	YES
N	16,261	16,261	16,261	16,261
R ²	0.464	0.464	0.464	0.464

The *t*-statistics based on robust standard errors clustered by firms are presented in parentheses beneath each estimate. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

a macro variable, is also affected by audit firms' behaviour, which results in reverse causality. Previous studies find that mergers among audit firms improve audit quality and reduce audit fees (Gong et al., 2016; Hung Chan & Wu, 2011; Jiang et al., 2019). Moreover, mergers are also an important way for enhancing the scale development and competitiveness of local audit firms in China. Following the literature (e.g. Gong et al., 2016), we use the local Big 6 mergers and construct the difference-in-difference regression model as follows:

$$\begin{aligned}
 Fee_{i,t}/ZScore_{i,t} = & \beta_0 + \beta_1 Big4_{i,t} + \beta_2 Big4_{i,t} * Post_{i,t} + \beta_3 Post_{i,t} + \gamma Controls_{i,t} + \sum Year \\
 & + \sum Industry + \sum Province + \varepsilon_{i,t}
 \end{aligned}
 \quad (4)$$

where we introduce an indicator variable (*Post*) to proxy for mergers involving the local Big 6. *Post* takes the value of 1 for provinces in the post-merger period (years *t* + 1, *t* + 2 and



Table 5. Market competition and audit quality of the Big 4.

Variable	Restatement							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Big 4	-0.684*** (-3.03)	-0.601* (-1.96)	-0.681*** (-3.01)	-0.841*** (-3.13)	0.001 (0.41)	0.002 (0.63)	0.001 (0.45)	0.001 (0.42)
Big 4*Comp_af		0.948 (0.40)			0.002 (0.09)			
Comp_af	-0.223 (-0.26)	-0.336 (-0.37)			0.002 (0.23)		0.003 (0.28)	
Big 4* Comp_ta				-3.012 (-0.88)		0.016 (0.48)		
Comp_ta			-0.398 (-0.34)	-0.186 (-0.15)		0.006 (0.46)		0.008 (0.61)
Indexpert	-0.006 (-0.22)	-0.006 (-0.24)	-0.006 (-0.22)	-0.006 (-0.22)	-0.000 (-0.20)	-0.000 (-0.19)	-0.000 (-0.20)	-0.000 (-0.18)
Proexpert	-0.077*** (-2.91)	-0.077*** (-2.91)	-0.077*** (-2.91)	-0.076*** (-2.88)	-0.000 (-1.40)	-0.000 (-1.40)	-0.000 (-1.40)	-0.000 (-1.38)
Age	0.008 (0.71)	0.008 (0.69)	0.008 (0.70)	0.009 (0.74)	0.000*** (3.01)	0.000*** (2.98)	0.000*** (3.02)	0.000*** (3.02)
Dual	0.102 (0.75)	0.103 (0.76)	0.102 (0.75)	0.101 (0.75)	0.002* (1.73)	0.002* (1.73)	0.002* (1.73)	0.002* (1.73)
SOE	-0.180 (-1.34)	-0.178 (-1.32)	-0.178 (-1.31)	-0.181 (-1.34)	-0.004*** (-2.69)	-0.004*** (-2.69)	-0.004*** (-2.70)	-0.004*** (-2.72)
Size	0.120* (1.76)	0.122* (1.78)	0.120* (1.76)	0.118* (1.73)	-0.004*** (-5.03)	-0.004*** (-5.02)	-0.004*** (-5.04)	-0.004*** (-5.04)
Lev	1.130*** (2.92)	1.130*** (2.92)	1.135*** (2.94)	1.132*** (2.93)	0.034*** (6.97)	0.033*** (6.97)	0.034*** (6.97)	0.033*** (6.97)
ROI	-1.599** (-2.14)	-1.601** (-2.14)	-1.596** (-2.13)	-1.601** (-2.14)	0.070*** (6.43)	0.070*** (6.42)	0.071*** (6.43)	0.070*** (6.43)
Loss	0.562*** (3.11)	0.563*** (3.11)	0.562*** (3.10)	0.558*** (3.09)	0.018*** (9.20)	0.018*** (9.21)	0.018*** (9.20)	0.018*** (9.21)
Catta	-0.375 (-0.99)	-0.375 (-0.99)	-0.376 (-0.99)	-0.374 (-0.99)	0.041*** (9.77)	0.041*** (9.76)	0.041*** (9.77)	0.041*** (9.77)
Quick	0.066* (1.85)	0.066* (1.85)	0.067* (1.86)	0.066* (1.85)	-0.001** (-2.38)	-0.001** (-2.39)	-0.001** (-2.38)	-0.001** (-2.40)
De	-0.353 (-0.56)	-0.355 (-0.56)	-0.357 (-0.56)	-0.356 (-0.56)	-0.002 (-0.30)	-0.002 (-0.29)	-0.002 (-0.30)	-0.002 (-0.29)
Growth	0.051	0.050	0.051	0.052	0.026***	0.026***	0.026***	0.026***

(Continued)

Table 5. (Continued).

Variable	Restatement							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>GDP_per capita</i>	(0.64) -0.070 (-1.52)	(0.63) -0.070 (-1.53)	(0.64) -0.067 (-1.54)	(0.65) -0.068 (-1.56)	(13.54) 0.000 (0.76)	(13.53) 0.000 (0.71)	(13.54) 0.000 (0.76)	(13.53) 0.000 (0.69)
<i>Marketization</i>	0.048 (0.71)	0.049 (0.73)	0.045 (0.68)	0.045 (0.67)	-0.001** (-2.12)	-0.001** (-2.08)	-0.001** (-2.12)	-0.001** (-2.08)
Constant	-3.560** (-2.35)	-3.611** (-2.36)	-3.555** (-2.35)	-3.478** (-2.29)	0.103*** (6.64)	0.102*** (6.62)	0.103*** (6.67)	0.103*** (6.66)
Year	YES	YES	YES	YES	YES	YES	YES	YES
Industry	YES	YES	YES	YES	YES	YES	YES	YES
Province	YES	YES	YES	YES	YES	YES	YES	YES
N	14,401	14,401	14,401	14,401	16,261	16,261	16,261	16,261
R ² /Pseudo R ²	0.097	0.097	0.096	0.097	0.131	0.131	0.131	0.131

The *t* (*z*)-statistics based on robust standard errors clustered by firms are presented in parentheses beneath each estimate. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

$t + 3$), and 0 in the pre-merger period (years $t-3$, $t-2$ and $t-1$). To eliminate the effect of shock in the distribution of merger year, we remove the observations in the year of the merger (year $t + 0$).⁹ Columns (1) and (2) of Table 6 show the results. The coefficients on $Big4*Post$ are both negative and significant at the 1% level, which indicates that the Big 4's audit fee premiums decrease, and client risk increases in provinces after the mergers of the local Big 6.

We also use mergers (*Merger*) involving the local Big 6 as an instrumental variable for market competition. *Merger* is an indicator variable that takes the value of 1 for provinces in the first year after the merger (year $t + 1$), and 0 otherwise. Mergers involving the local Big 6 change the market competition environment; however, the mergers are the result of decisions made by the local Big 6 and do not directly affect the behaviour of the Big 4. Therefore, this instrumental variable is correlated with the dependent variable and uncorrelated with the error term. Columns (3) - (6) present the results of the regressions using instrumental variables.¹⁰ We find that the instrumented versions of $Big4*Comp_af$ have significant and negative coefficients in all of the regressions, consistent with our main findings.

Table 6. DID approach and IV regressions.

Variable	<i>Fee</i>	<i>ZScore</i>	<i>Comp_af</i>	<i>Fee</i>	<i>Comp_af</i>	<i>ZScore</i>
	DID		First-stage	Second-stage	First-stage	Second-stage
Variable	(1)	(2)	(3)	(4)	(5)	(6)
<i>Post</i>	0.002 (0.08)	0.074 (0.54)				
$Big4*Post$	-0.097*** (-2.64)	-0.547*** (-2.76)				
<i>Merger</i>			0.025*** (13.69)		0.025*** (13.68)	
$Merger*Big4$			0.018*** (5.12)		0.018*** (5.11)	
<i>Comp_af</i>				-2.085*** (-2.81)		-19.341*** (-2.82)
$Big4*Comp_af$				-7.139** (-2.30)		-6.433** (-2.06)
<i>Big4</i>	0.725*** (13.91)	0.427* (1.80)	0.008** (2.44)	0.054 (0.21)	0.007** (2.25)	0.131 (0.11)
Controls	YES	YES	YES	YES	YES	YES
Constant	6.281*** (15.04)	25.667*** (11.03)	-0.097*** (-3.87)	5.886*** (16.56)	-0.115*** (-5.14)	21.923*** (13.74)
Year	YES	YES	YES	YES	YES	YES
Industry	YES	YES	YES	YES	YES	YES
Province	YES	YES	YES	YES	YES	YES
N	8,970	8,970	16,261	16,261	16,261	16,261
R ²	0.703	0.477	0.255	0.705	0.253	0.462
Cragg-Donald Wald F statistic			22.974		22.862	

The t -statistics based on robust standard errors clustered by firms are presented in parentheses beneath each estimate. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

⁹As we need to observe the competitive strategies of audit firms three years before and after the mergers, we limit the sample period from 2006 to 2016. In some province, a local Big 6 mergers may occur several times during this period; therefore, *Post* only denotes the first merger.

¹⁰The Cragg-Donald Wald tests for weak instruments in each test yields F-statistics of 22.974 and 22.862, respectively, rejecting the null hypothesis of weak instruments.

4.5.2. Results using the sample of new clients

In practice, audit firms strive to retain their existing clients and recruit new clients to sustain firm growth. As documented by Wu et al. (2018), the pricing strategies of audit firms when accepting new clients are more aggressive, as they have lower bargaining power compared with existing audit firms. Consistent with this conjecture, we use an alternative sample consisting of new client observations of the Big 4 and local Big 6. The original sample size is thus reduced from 16,261 to 3,711 observations. The regression results are presented in Table 7 and are consistent with our primary findings.

4.5.3. Other robustness tests

To eliminate measurement errors in market competition ($Comp_af$ and $Comp_ta$), we remove under-competitive samples from our study. The relatively small sizes of the Big 4 and local Big 6 in provinces may lead to a lack of competition in the audit market. Therefore, we exclude observations in province-year groupings with fewer than 15 clients audited by the Big 4 and local Big 6 and re-estimate Eqs. (1) and (2). Columns (1) - (2) of Table 8 report the regression results, in which the coefficients on $Big4*Comp_af$ and $Big4*Comp_ta$ are both negative and statistically significant. Therefore, our results are not likely to be driven by a measurement error in market competition.

We also employ a change-on-change regression specification in which we regress changes in the competitive strategies in an audit market competition. This approach removes the influence of possible time-invariant firm-specific factors. We define the change in audit fees (ΔFee) and client risk ($\Delta ZScore$) in year t as the value of Fee and $ZScore$ in year t minus the value of Fee and $ZScore$ in year $t-1$. Accordingly, $\Delta Comp_af$ ($\Delta Comp_ta$) is defined as the value of competition in year t minus the value of competition

Table 7. Results using the sample of new clients.

Variable	<i>Fee</i>		<i>ZScore</i>	
	(1)	(2)	(3)	(4)
<i>Big 4</i>	0.296*** (4.61)	0.308*** (4.62)	0.039 (0.15)	0.114 (0.39)
<i>Big 4*Comp_af</i>	-3.401*** (-4.23)		-3.942* (-1.79)	
<i>Comp_af</i>	0.169 (1.17)		-0.866 (-0.72)	
<i>Big 4*Comp_ta</i>		-5.169*** (-4.03)		-7.698* (-1.75)
<i>Comp_ta</i>		0.053 (0.30)		-0.466 (-0.27)
Controls	YES	YES	YES	YES
Constant	6.419*** (22.72)	6.425*** (22.91)	23.295*** (11.81)	23.413*** (11.80)
Year	YES	YES	YES	YES
Industry	YES	YES	YES	YES
Province	YES	YES	YES	YES
N	3,711	3,711	3,711	3,711
R ²	0.653	0.652	0.437	0.458

The t -statistics based on robust standard errors clustered by firms are presented in parentheses beneath each estimate. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.



Table 8. Other robustness tests.

Variable	Fee			ZScore			ΔFee			ΔZScore		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	
	Excluding the under-competitive samples											
Big 4	0.437*** (7.66)	0.469*** (7.91)	0.035 (0.145)	0.134 (0.56)	0.007 (1.10)	0.008 (1.27)	0.004 (0.10)	0.015 (0.35)				
Big 4*	-1.978***		-4.157*									
Comp_af	(-2.99)		(-1.91)									
Comp_af	-0.375*** (-2.88)		0.038 (0.03)									
Big 4*Comp_ta		-2.579** (-2.40)		-9.924** (-2.41)								
Comp_ta		-0.578*** (-3.27)		1.682 (1.04)								
Big 4*ΔComp_af					-0.618** (-2.21)							
ΔComp_af					0.076 (1.18)							
Big 4*ΔComp_ta						-0.544** (-2.35)						
ΔComp_ta						0.056 (0.57)						
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
Constant	5.841*** (21.19)	5.863*** (21.17)	24.324*** (14.57)	24.426*** (14.56)	0.058* (1.65)	0.054 (1.47)	0.584*** (2.88)	0.491** (2.57)				
Year	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
Industry	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
Province	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
N	14,801	14,801	14,801	14,801	11,911	11,911	11,911	11,911				
R ²	0.708	0.706	0.464	0.464	0.162	0.161	0.260	0.260				

The *t*-statistics based on robust standard errors clustered by firms are presented in parentheses beneath each estimate. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

in year $t-1$.¹¹ In columns (5) - (8) of Table 8, we find the coefficients on $\Delta Comp_af*Big4$ and $\Delta Comp_ta*Big4$ are negative and statistically significant, indicating that an increase in audit market competition can lead to a reduction in audit fee premiums and an increase in client risk for the Big 4.

5. Further analyses

5.1. The CICPA's proposal in 2007 and the competitive strategies of the Big 4

In 2007, the CICPA issued a proposal to enhance the competitive power of large local audit firms, which led to a wave of mergers among local audit firms (Hung Chan & Wu, 2011). Additionally, the Chinese regulatory authorities also tightened the securities qualification approval for audit firms, leading to an increased concentration in the audit market. The competitive power of the local Big 6 increased rapidly with the expansion in their market share. Hence, we expect that competitive pressure from the local Big 6 has a greater impact on the competitive strategies of the Big 4.

Following Chang et al. (2019), we estimate Eqs. (1) and (2) separately before (pre-proposal period) and after 2007 (post-proposal period). Panel A of Table 9 presents the regression results when the dependent variable is *Fee*. The coefficients on $Big4*Comp_af$ ($Big4*Comp_ta$) are negative and statistically significant in the pre- and post-proposal periods. The p-value for testing the equality of coefficients between the two subsamples suggests that the coefficients are significantly different between the two periods. Panel B of Table 9 reports the estimate when the dependent variable is *ZScore*. The coefficient on $Big4*Comp_af$ ($Big4*Comp_ta$) is negatively significant in the post-proposal period but not significant in the pre-proposal period. The coefficients are also significantly different between the two periods. These results suggest that there is increased competitive pressure from the local Big 6 in the post-proposal period, leading the Big 4 to decrease their audit fee premiums and increase acceptance of risky clients.

5.2. Market position and the competitive strategies of the Big 4

For a long time, the Big 4 dominated the audit market while the local Big 6 had a small market share. However, in the process of scale development of the local Big 6, their market share surpasses the market share of the Big 4. Due to this, China's audit market exhibits two types of competitive position: the Big 4 leading and the local Big 6 leading. The literature suggests that the Big 4 charge audit fee premiums primarily because of their dominant position in the audit market (C. J. Chen et al., 2007). Thus, the Big 4 are more likely to change their competitive strategies after losing their market dominance. We expect that when the local Big 6 take the leading position, the Big 4 charge lower audit fees and recruit high-risk clients due to competitive pressure.

We partition our full sample into two groups: the Big 4 leading the market (Big 4 > local Big 6) and the local Big 6 leading the market (Big 4 > local Big 6). Panel A of Table 10 reports the regression results of Eq. (1) for the subsample analysis. The coefficients on

¹¹The independent variable, *Big4*, remains the value in year t . Moreover, we exclude the control variable, *Age*, from our change-on-change regressions because its change value equals 1 in each year.

Table 9. The CICPA's proposal in 2007 and the competitive strategies of the Big 4.

Panel A: Audit fee				
Variable	Fee		Fee	
	Year ≤2007 (1)	Year >2007 (2)	Year ≤2007 (3)	Year >2007 (4)
<i>Big 4</i>	0.373*** (5.24)	0.442*** (7.12)	0.624*** (7.87)	0.471*** (7.24)
<i>Big 4*Comp_af</i>	-1.434** (-2.32)	-2.576*** (-3.53)		
<i>Comp_af</i>	0.221 (1.09)	-0.238* (-1.91)		
<i>Big 4*Comp_ta</i>			-1.973** (-2.32)	-3.795*** (-2.99)
<i>Comp_ta</i>			0.293 (0.85)	-0.249 (-1.51)
Controls	YES	YES	YES	YES
Constant	5.871*** (8.63)	6.097*** (22.35)	5.723*** (8.39)	6.062*** (21.90)
Year	YES	YES	YES	YES
Industry	YES	YES	YES	YES
Province	YES	YES	YES	YES
N	1,193	15,068	1,193	15,068
R ²	0.649	0.717	0.648	0.715
Diff (P-Value)		1.142* (0.08)		1.822** (0.04)

Panel B: Client risk				
Variable	ZScore		ZScore	
	Year ≤2007 (1)	Year >2007 (2)	Year ≤2007 (3)	Year >2007 (4)
<i>Big 4</i>	0.463 (1.56)	0.035 (0.15)	0.625** (2.13)	0.122 (0.50)
<i>Big 4*Comp_af</i>	-0.514 (-0.29)	-5.238** (-2.28)		
<i>Comp_af</i>	0.556 (0.64)	0.590 (0.56)		
<i>Big 4*Comp_ta</i>			-4.118 (-0.98)	-11.489*** (-2.63)
<i>Comp_ta</i>			1.933 (1.50)	2.232 (1.63)
Controls	YES	YES	YES	YES
Constant	8.116*** (4.94)	25.644*** (15.35)	8.313*** (5.08)	25.689*** (15.39)
Year	YES	YES	YES	YES
Industry	YES	YES	YES	YES
Province	YES	YES	YES	YES
N	1,193	15,068	1,193	15,068
R ²	0.420	0.465	0.421	0.466
Diff (P-Value)		4.724* (0.09)		7.371* (0.06)

The *t*-statistics based on robust standard errors clustered by firms are presented in parentheses beneath each estimate. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

*Big4*Comp_af* (*Big4*Comp_ta*) are negative and significant regardless of who is in the leading position, and the difference between the coefficients is significant. Panel B of Table 10 reports the regression results of Eq. (2). Similarly, the coefficients on *Big4*Comp_af* (*Big4*Comp_ta*) are all negative and statistically significant. The difference between the coefficients in columns (1) and (2) is significant, but the difference between

Table 10. Market position and the competitive strategies of the Big 4.

Panel A: Audit fee				
Variable	Fee		Fee	
	Big 4>local Big6 (1)	Big 4< local Big6 (2)	Big 4> local Big6 (3)	Big 4< local Big6 (4)
<i>Big 4</i>	0.597*** (9.85)	0.419*** (6.77)	0.536*** (8.06)	0.488*** (7.18)
<i>Big 4*Comp_af</i>	-1.296* (-1.82)	-2.813*** (-4.75)		
<i>Comp_af</i>	0.208*** (3.46)	0.119 (0.67)		
<i>Big 4*Comp_ta</i>			-0.744** (2.15)	-4.198*** (-3.29)
<i>Comp_ta</i>			-0.143 (-0.78)	0.182 (0.55)
Controls	YES	YES	YES	YES
Constant	6.441*** (21.61)	5.469*** (14.16)	6.396*** (20.98)	5.546*** (14.68)
Year	YES	YES	YES	YES
Industry	YES	YES	YES	YES
Province	YES	YES	YES	YES
N	8,390	7,871	7,438	8,823
R ²	0.658	0.751	0.660	0.739
Diff (P-Value)		1.517* (0.07)		3.454** (0.01)

Panel B: Client risk				
Variable	ZScore		ZScore	
	Big 4>local Big6 (1)	Big 4< local Big6 (2)	Big 4> local Big6 (3)	Big 4< local Big6 (4)
<i>Big 4</i>	0.008 (0.06)	0.003 (0.01)	0.131 (0.98)	0.111 (0.42)
<i>Big 4*Comp_af</i>	-0.590 (-0.53)	-6.118* (-1.96)		
<i>Comp_af</i>	-2.717*** (-2.97)	2.790*** (3.25)		
<i>Big 4*Comp_ta</i>			-4.950** (-2.17)	-8.863** (-1.97)
<i>Comp_ta</i>			-2.423 (-1.46)	3.023*** (3.00)
Controls	YES	YES	YES	YES
Constant	20.379*** (14.61)	27.436*** (18.99)	20.990*** (15.37)	27.355*** (18.09)
Year	YES	YES	YES	YES
Industry	YES	YES	YES	YES
Province	YES	YES	YES	YES
N	8,390	7,871	7,438	8,823
R ²	0.473	0.470	0.472	0.469
Diff (P-Value)		5.528*** (<0.01)		3.913 (0.14)

The *t*-statistics based on robust standard errors clustered by firms are presented in parentheses beneath each estimate. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

the coefficients in columns (3) and (4) is not significant. Collectively, the results in Table 10 suggest that the leading position of the local Big 6 places greater competitive pressure on the Big 4, leading to a larger decrease in audit fees and an increase in client risk of the Big 4.



Table 11. Market competition and the competitive strategies of the local Big 6.

Variable	Fee			ZScore			Restatement			DA
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		
<i>Lbig 6</i>	0.028** (2.17)	0.044*** (3.18)	0.407*** (3.57)	0.451*** (3.76)	0.022 (0.32)	0.016 (0.22)	0.001 (0.90)	0.001 (0.62)		
<i>Lbig 6*Comp_afs</i>	-0.699*** (-4.05)		-3.359*** (-2.25)		2.282** (2.47)		0.056*** (3.07)			
<i>Comp_afs</i>	0.098 (0.72)		-0.830 (-0.81)		-0.735 (-1.25)		-0.017 (-1.21)			
<i>Lbig 6*Comp_tas</i>		-0.386** (-2.10)		-4.118*** (-2.62)		2.188** (2.25)		0.059*** (2.81)		
<i>Comp_tas</i>		-0.023 (-0.16)		-0.134 (-0.13)		-1.159* (-1.95)		-0.022 (-1.38)		
Controls	YES	YES	YES	YES	YES	YES	YES	YES		
Constant	7.239*** (45.21)	7.228*** (44.96)	28.795*** (21.06)	28.703*** (20.96)	-1.928*** (-3.39)	-1.988*** (-3.49)	0.130*** (10.69)	0.129*** (10.57)		
Year	YES	YES	YES	YES	YES	YES	YES	YES		
Industry	YES	YES	YES	YES	YES	YES	YES	YES		
Province	YES	YES	YES	YES	YES	YES	YES	YES		
N	33,553	33,553	33,553	33,553	30,246	30,246	33,553	33,553		
R ²	0.62	0.62	0.47	0.47	0.05	0.05	0.117	0.117		

The *t* (*z*)-statistics based on robust standard errors clustered by firms are presented in parentheses beneath each estimate. ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% levels, respectively.

5.3. Market competition and the competitive strategies of the local Big 6

For comparison, we further investigate the competitive strategies of the local Big 6 when faced with competition from small local audit firms whose competitive power is lower than that of the local Big 6. To conduct this analysis, we introduce an indicator variable, *LBig6*, which takes the value of 1 if an audit firm is from a local Big 6, and 0 otherwise. We also use *Comp_afs* (*Comp_tas*) to proxy for competition between the local Big 6 and small local audit firms; the variable *Comp_afs* (*Comp_tas*) is measured as the negative value of the absolute average market share difference between the local Big 6 and small local audit firms at the provincial level, where market share is calculated using the clients' domestic audit fees (total assets). The dependent and control variables remain the same as in Eqs. (1) - (3). The sample in this subsection consists of listed companies that are audited by the local Big 6 and small local audit firms. After excluding observations from companies in the financial industry, ST companies, and other observations with missing data, we obtain a sample of 33,553 client-year observations.

The regression results are presented in Table 11. Columns (1) and (2) report the results when the dependent variable is *Fee*. The coefficients on *LBig6*Comp_afs* (*LBig6*Comp_tas*) are negative and statistically significant, indicating that the local Big 6 decrease their fee premiums when faced with competition from small local audit firms. Columns (1) and (2) report the results when the dependent variable is *ZScore*. The coefficients on *LBig6*Comp_afs* (*LBig6*Comp_tas*) are negative and significant, suggesting that the local Big 6 recruit higher-risk clients as the level of competitive pressure from small local audit firms increases. In columns (5) and (6), the dependent variable is *Restatement*. The coefficients on *LBig6*Comp_afs* (*LBig6*Comp_tas*) are positive, and statistically significant at the 5% level. Next, we use $|DA|$ as the dependent variable in columns (7) and (8) and find that the coefficients on *LBig6*Comp_afs* (*LBig6*Comp_tas*) are still positive and significant. The results in columns (5) - (8) indicate that the local Big 4 reduce their audit quality when faced with competition from small local audit firms. Taken together, the evidence suggests that when under competitive pressure from small local audit firms, the local Big 6 adjust their audit quality in addition to audit fees and client criteria as their competitive strategies.

6. Conclusion

This paper examines the competitive strategies of the Big 4 when faced with the regional competition from the local Big 6. Based on the data of Chinese listed companies from 2003 to 2019, we find that competition from the local Big 6 reduces the audit fee premiums of the Big 4 and forces them to recruit higher-risk clients, while audit quality is not affected. In further analyses, we find that market competition led to greater changes for the Big 4 in the post-proposal period and when the local Big 6 are in a leading position. We also find that the local Big 6 compromise on audit quality in addition to reducing audit fees and recruiting high-risk clients when faced with competition from the small local audit firms. Overall, China's institutional background fills the gap in the unobservable competitive environments of the Big 4 in developed economies, providing us with an opportunity to investigate the competitive strategies adopted by the Big 4 when their market dominance is challenged by the

local Big 6. Our findings provide evidence for the local Big 6 to compete with the Big 4 through scaling up and are useful in understanding the effects of policies to enhance local audit firms' competitiveness in China.

One limitation of this research is that the Big 4 and local Big 6 have many competitive areas in addition to the audit services of publicly listed companies, such as consulting and taxation. Although audit services of publicly listed companies are an important part of audit firms' income, they may compete in more dimensions around their business objectives. Therefore, the competitive strategies of the Big 4 and local Big 6 in areas other than the audit services of publicly listed companies may be worthy for future studies.

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References

- Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, 23(4), 589–609. <https://doi.org/10.1111/j.1540-6261.1968.tb00843.x>
- Aobdia, D., Enache, L., & Srivastava, A. (2016). Will the auditing industry become a tighter or looser oligopoly? *Tuck School of Business Working Paper*.
- Basioudis, I. G., & Francis, J. R. (2007). Big 4 audit fee premiums for national and office-level industry leadership in the United Kingdom. *Auditing: A Journal of Practice & Theory*, 26(2), 143–166. <https://doi.org/10.2308/aud.2007.26.2.143>
- Bills, K. L., & Stephens, N. M. (2016). Spatial competition at the intersection of the large and small audit firm markets. *Auditing: A Journal of Practice & Theory*, 35(1), 23–45. <https://doi.org/10.2308/ajpt-51159>
- Brown, S. V., & Knechel, W. R. (2016). Auditor–client compatibility and audit firm selection. *Journal of Accounting Research*, 54(3), 725–775. <https://doi.org/10.1111/1475-679X.12105>
- Carson, E., Simnett, R., Soo, B. S., & Wright, A. M. (2012). Changes in audit market competition and the Big N premium. *Auditing: A Journal of Practice & Theory*, 31(3), 47–73. <https://doi.org/10.2308/ajpt-10295>
- Chaney, P. K., & Philipich, K. L. (2002). Shredded reputation: The cost of audit failure. *Journal of Accounting Research*, 40(4), 1221–1245. <https://doi.org/10.1111/1475-679X.00087>
- Chang, H., Guo, Y., & Mo, P. L. L. (2019). Market competition, audit fee stickiness, and audit quality: Evidence from China. *Auditing: A Journal of Practice & Theory*, 38(2), 79–99. <https://doi.org/10.2308/ajpt-52173>

- Chen, S., Sun, S. Y., & Wu, D. (2010). Client importance, institutional improvements, and audit quality in China: An office and individual auditor level analysis. *The Accounting Review*, 85(1), 127–158. <https://doi.org/10.2308/accr.2010.85.1.127>
- Chen, C. J., Su, X., & Wu, X. (2007). Market competitiveness and Big 5 pricing: Evidence from China's binary market. *The International Journal of Accounting*, 42(1), 1–24. <https://doi.org/10.1016/j.intacc.2006.12.001>
- Choi, J. H., Kim, J. B., Liu, X., & Simunic, D. A. (2008). Audit pricing, legal liability regimes, and Big 4 premiums: Theory and cross-country evidence. *Contemporary Accounting Research*, 25(1), 55–99. <https://doi.org/10.1506/car.25.1.2>
- DeAngelo, L. E. (1981). Auditor size and audit quality. *Journal of Accounting and Economics*, 3(3), 183–199. [https://doi.org/10.1016/0165-4101\(81\)90002-1](https://doi.org/10.1016/0165-4101(81)90002-1)
- Dedman, E., & Lennox, C. (2009). Perceived competition, profitability and the withholding of information about sales and the cost of sales. *Journal of Accounting and Economics*, 48(2–3), 210–230. <https://doi.org/10.1016/j.jacceco.2009.07.003>
- Defond, M., Li, Z., Wong, T. J., & Wu, K. (2020). Competence vs. independence: Auditor locality specialization in a relational economy. *Working Paper*.
- DeFond, M. L., Wong, T. J., & Li, S. (1999). The impact of improved auditor independence on audit market concentration in China. *Journal of Accounting and Economics*, 28(3), 269–305. [https://doi.org/10.1016/S0165-4101\(00\)00005-7](https://doi.org/10.1016/S0165-4101(00)00005-7)
- DeFond, M., & Zhang, J. (2014). A review of archival auditing research. *Journal of Accounting and Economics*, 58(2–3), 275–326. <https://doi.org/10.1016/j.jacceco.2014.09.002>
- Dekeyser, S., Gaeremynck, A., & Willekens, M. (2019). Evidence of industry scale effects on audit hours, billing rates, and pricing. *Contemporary Accounting Research*, 36(2), 666–693. <https://doi.org/10.1111/1911-3846.12460>
- Duh, R. R., Knechel, W. R., & Lin, C. C. (2020). The effects of audit firms' knowledge sharing on audit quality and efficiency. *Auditing: A Journal of Practice & Theory*, 39(2), 51–79. <https://doi.org/10.2308/ajpt-52597>
- Eshleman, J. D., & Lawson, B. P. (2017). Audit market structure and audit pricing. *Accounting Horizons*, 31(1), 57–81. <https://doi.org/10.2308/acch-51603>
- Francis, J. R., Michas, P. N., & Seavey, S. E. (2013). Does audit market concentration harm the quality of audited earnings? Evidence from audit markets in 42 countries. *Contemporary Accounting Research*, 30(1), 325–355. <https://doi.org/10.1111/j.1911-3846.2012.01156.x>
- Gong, Q., Li, O. Z., Lin, Y., & Wu, L. (2016). On the benefits of audit market consolidation: Evidence from merged audit firms. *The Accounting Review*, 91(2), 463–488. <https://doi.org/10.2308/accr-51236>
- Hotelling, H. (1990). Stability in competition. In *The collected economics articles of Harold Hotelling* (pp. 50–63). Springer New York. https://doi.org/10.1007/978-1-4613-8905-7_4
- Huang, T. C., Chang, H., & Chiou, J. R. (2016). Audit market concentration, audit fees, and audit quality: Evidence from China. *Auditing: A Journal of Practice & Theory*, 35(2), 121–145. <https://doi.org/10.2308/ajpt-51299>
- Huang, H. W., Raghunandan, K., Huang, T. C., & Chiou, J. R. (2015). Fee discounting and audit quality following audit firm and audit partner changes: Chinese evidence. *The Accounting Review*, 90(4), 1517–1546. <https://doi.org/10.2308/accr-50958>
- Hung Chan, K., & Wu, D. (2011). Aggregate quasi rents and auditor independence: Evidence from audit firm mergers in China. *Contemporary Accounting Research*, 28(1), 175–213. <https://doi.org/10.1111/j.1911-3846.2010.01046.x>
- Jensen, K. L., & Payne, J. L. (2005). The introduction of price competition in a municipal audit market. *Auditing: A Journal of Practice & Theory*, 24(2), 137–152. <https://doi.org/10.2308/aud.2005.24.2.137>
- Jiang, J., Wang, I. Y., & Wang, K. P. (2019). Big N auditors and audit quality: New evidence from quasi-experiments. *The Accounting Review*, 94(1), 205–227. <https://doi.org/10.2308/accr-52106>
- John, K., Litov, L., & Yeung, B. (2008). Corporate governance and risk-taking. *The Journal of Finance*, 63(4), 1679–1728. <https://doi.org/10.1111/j.1540-6261.2008.01372.x>
- Ke, B., Lennox, C. S., & Xin, Q. (2015). The effect of China's weak institutional environment on the quality of Big 4 audits. *The Accounting Review*, 90(4), 1591–1619. <https://doi.org/10.2308/accr-50943>

- Keune, M. B., Mayhew, B. W., & Schmidt, J. J. (2016). Non-Big 4 local market leadership and its effect on competition. *The Accounting Review*, 91(3), 907–931. <https://doi.org/10.2308/accr-51198>
- Kothari, S. P., Leone, A. J., & Wasley, C. E. (2005). Performance matched discretionary accrual measures. *Journal of Accounting and Economics*, 39(1), 163–197. <https://doi.org/10.1016/j.jaccec.2004.11.002>
- Lennox, C. S., & Pittman, J. (2008). Big five audits and accounting fraud. *SSRN Electronic Journal*. Available at SSRN 1137829. <https://doi.org/10.2139/ssrn.1137829>
- Lennox, C. S., & Wu, J. (2021). A review of China-related accounting research in the past 25 years. *Working paper*.
- Li, J., & Han, X. (2019). Non-financial enterprises' shadow banking business and operating risk. *Economic Research Journal*, 54(8), 21–35. in Chinese.
- Liu, F., & Lin, B. (2000). Audit firm decoupling and government choice. *Accounting Research*, 2(2), 9–15. in Chinese.
- Newton, N. J., Persellin, J. S., Wang, D., & Wilkins, M. S. (2016). Internal control opinion shopping and audit market competition. *The Accounting Review*, 91(2), 603–623. <https://doi.org/10.2308/accr-51149>
- Numan, W., & Willekens, M. (2012). An empirical test of spatial competition in the audit market. *Journal of Accounting and Economics*, 53(1–2), 450–465. <https://doi.org/10.1016/j.jaccec.2011.10.002>
- Pan, Y., Shroff, N., & Zhang, P. (2022). The dark side of audit market competition. *Journal of Accounting and Economics*, 75(1), 101520. <https://doi.org/10.1016/j.jaccec.2022.101520>
- Pearson, T., & Trompeter, G. (1994). Competition in the market for audit services: The effect of supplier concentration on audit fees. *Contemporary Accounting Research*, 11(1), 115–135. <https://doi.org/10.1111/j.1911-3846.1994.tb00439.x>
- Shu, S. Z. (2000). Auditor resignations: Clientele effects and legal liability. *Journal of Accounting and Economics*, 29(2), 173–205. [https://doi.org/10.1016/S0165-4101\(00\)00019-7](https://doi.org/10.1016/S0165-4101(00)00019-7)
- Wang, X., Hu, L., & Fan, G. (2021). Report on market index by province in China. Social Sciences Academic Press.
- Wang, Q., Wong, T. J., & Xia, L. (2008). State ownership, the institutional environment, and auditor choice: Evidence from China. *Journal of Accounting and Economics*, 46(1), 112–134. <https://doi.org/10.1016/j.jaccec.2008.04.001>
- Wong, T. J. (2016). Corporate governance research on listed firms in China: Institutions, governance and accountability. *Foundations & Trends® in Accounting*, 9(4), 259–326. <https://doi.org/10.1561/14000000039>
- Wu, X., Wang, C., & Li, B. (2018). Competition in China's public accounting service market: Evidence from newly-established branch offices. *China Journal of Accounting Studies*, 6(4), 421–447. <https://doi.org/10.1080/21697213.2019.1612191>

Appendix A. Variable definitions

Variable	Definition
Dependent variables	
<i>Fee</i>	The natural logarithm of the client's annual domestic audit fees.
<i>ZScore</i>	$1.2 * (\text{current assets} - \text{current liabilities}) / \text{total assets} + 1.4 * \text{retained earnings} / \text{total assets} + 3.3 * \text{EBIT} / \text{total assets} + 0.6 * \text{market value of equity} / \text{total liabilities} + 0.999 * \text{sales income} / \text{total assets}$.
<i>Restatement</i>	An indicator variable which equals 1 if the client's financial statement in year t is restated in a subsequent year, and 0 otherwise.
$ DA $	The absolute value of discretionary accruals, which is estimated from the Jones model as modified in Kothari et al. (2005).
<i>Fee_sqra</i>	Client's annual domestic audit fees divided by the square root of total assets.
<i>Std_return</i>	The standard deviation of the client's industry-adjusted stock return over five years.
Independent variables	
<i>Big4</i>	An indicator variable which equals 1 if the audit firm is an international Big 4, and 0 otherwise.
<i>Comp_af</i>	The negative value of the absolute average market share difference between the Big 4 and local Big 6 at the provincial level. Market share is calculated using the clients' domestic audit fees.
<i>Comp_tas</i>	The negative value of the absolute average market share difference between the Big 4 and local Big 6 at the provincial level. Market share is calculated using the clients' total assets.
<i>LBig6</i>	An indicator variable which equals 1 if the audit firm is a local Big 6, and 0 otherwise.
<i>Comp_afs</i>	The negative value of the absolute average market share difference between the local Big 6 and local small audit firms at the provincial level. Market share is calculated using the clients' domestic audit fees.
<i>Comp_tas</i>	The negative value of the absolute average market share difference between the local Big 6 and local small audit firms at the provincial level. Market share is calculated using the clients' total assets.
<i>Post</i>	An indicator variable which equals 1 for the province after the mergers involving the local Big 6 (years $t + 1$, $t + 2$ and $t + 3$), and 0 before the mergers (years $t - 1$, $t - 2$, $t - 3$).
<i>Merger</i>	An indicator variable which equals 1 for the province in the first year after local Big 6 mergers (year $t + 1$), and 0 otherwise.
Control variables	
<i>Switch</i>	An indicator variable which equals 1 if the company changes its audit firm in year t , and 0 otherwise.
<i>Indexpert</i>	The second signing auditor's industry expertise, based on a decile ranking of the clients' domestic audit fees.
<i>Proexpert</i>	The second signing auditor's provincial expertise, based on a decile ranking of the clients' domestic audit fees.
<i>Lnsb</i>	The natural logarithm of the number of subsidiaries.
<i>Age</i>	The number of years that the company has been listed on a stock exchange.
<i>Dual</i>	An indicator variable which equals 1 if the company's CEO and chairman of the board are the same person, and 0 otherwise.
<i>SOE</i>	An indicator variable which equals 1 if the company is ultimately controlled by the Chinese government, and 0 otherwise.
<i>Size</i>	The natural logarithm of total assets.
<i>Lev</i>	Total liabilities divided by total assets.
<i>ROI</i>	EBIT divided by total assets.
<i>Loss</i>	An indicator variable which equals 1 if the net income is negative, and 0 otherwise.
<i>Cata</i>	Current assets divided by total assets.
<i>Quick</i>	Quick assets divided by current liabilities.
<i>De</i>	Long-term debt divided by total assets.
<i>Inventory</i>	Inventory divided by total assets.
<i>Intangible</i>	Intangible assets divided by total assets.
<i>Growth</i>	The growth rate of sales incomes.
<i>GDP_per capita</i>	Provincial GDP per capita.
<i>Marketization</i>	Provincial marketisation index as measured by Wang et al. (2021).