# *Expert from headquarters office, geographical constraints, and audit quality: Evidence from co-signed audit reports*

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## *Abstract*

Exploiting the unique feature of the China audit market where we can identify whether the two signing auditors of a firm's audit report are from different audit offices (co-signed audit reports), we investigate how geographical constraints influence the probability of co-signed audit engagements between practice offices and headquarters offices – a specific and important collaboration between practice offices and headquarters offices and the causal effect on audit quality. Our findings reveal that geographical constraints significantly reduce the likelihood of co-signed audit engagements. The negative effect is more pronounced when practice office audit high-risk clients and when headquarters (practice) offices are more (less) resource constrained. Utilizing the establishment of high-speed rail (HSR) connections between practice office cities and headquarters office cities as an exogenous shock to the impact of geographical constraints, we show that co-signed audit engagements have a positive effect on audit quality.

**Keywords:** Geographical constraints; Co-signed audit reports; Audit quality

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## 1. Introduction

Large accounting firms are organized as a network of decentralized individual practice offices located in different geographical areas (e.g., Reynolds and Francis 2000; Beck et al. 2019). A geographically dispersed structure is beneficial for accounting firms to attract and serve audit clients at different locations. Geographical proximity to clients is advantageous not only because it reduces transportation costs during audit engagements but also because it enables auditors to develop critical local knowledge about their clients. This knowledge, which includes an understanding of the local market environment, is vital for ensuring high audit quality. A recent study by DeFond et al. (2024) shows that auditors with strong local business and government connections tend to deliver higher-quality audits, as evidenced by fewer financial irregularities among their clients. However, because of the imbalanced resource distribution among different offices – large offices enjoy a larger and better talent pool, the decentralized structure also brings a cost by impeding collaboration among offices and potentially having a negative effect on audit quality. Beck, Gunn, and Hallman (2019) argue that large regional offices can better monitor, transfer knowledge, and share resources to geographically close small offices and provide evidence that proximity to a large office contributes to small offices' audit quality. Despite these insights, data limitations have hindered our understanding of the specific forms of inter-office collaboration.[5] Our study addresses this gap by examining how geographical distance influences a specific and important form of

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[5] Beck et al. (2019) provide strong evidence on the audit-quality effect of being close to a large office. However, researchers do not observe direct evidence of the interaction and collaboration between small and large audit offices. Using the survey method, Aghazadeh et al. (2023) provide evidence that the national office facilitates the process of knowledge creation and transfer to practice offices.

collaboration between headquarters and practice offices: co-signed audit engagements.

A unique feature of the China audit regulation is that audit reports must be signed by two registered auditors, which allows us to observe cases where one auditor is from a practice office and the other is from a headquarters office. In contrast, in the U.S., it wasn't until January 2017 that audit firms were required to disclose only the lead engagement audit partner information through Form AP (Auditor Reporting of Certain Audit Participants).[6] Building on recent studies highlighting the critical role of headquarters offices in creating and transferring knowledge (Aghazadeh et al. 2023; Amin et al. 2023), our study focuses on co-signed engagements where the audit report of a practice office's client is signed by one auditor from the practice office and one auditor from the corresponding headquarters office.

Our empirical analysis is based on 16,084 audit engagements by 513 unique practice offices of 62 audit firms from 2007 to 2021, including 2,239 co-signed audit engagements between practice offices and headquarters offices. The median audit firm has 14 practice offices, showcasing the geographically dispersed organization structure of audit firms. The median distance between a practice office and its headquarters office is 1,126 kilometers (700 miles), highlighting the geographically dispersed structure of audit firms.

We begin our analysis by examining how the geographical distance between a practice office and its headquarters influences the likelihood of the practice office conducting co-signed audit engagements with the headquarters for its clients. Our findings show that greater geographical distance significantly reduces the probability of a practice office conducting co-

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[6] Before 2017, audit reports in the U.S. included the name of the audit firm (e.g., Deloitte, PwC) but not the name of the individual signing auditor responsible for the audit.

signed audit engagements with its headquarters office. Specifically, one standard deviation increase of the geographic distance between practice offices and headquarters offices reduces the probability of conducting co-signed audit engagements by 20.72% relative to the sample mean. While our study focuses on practice offices receiving support from headquarters offices through co-signed audit engagements, additional analysis shows that the results also hold for collaborations between two practice offices.

To investigate the mechanisms through which geographical distance affects the probability of practice offices conducting co-signed audit engagements with headquarters offices, we carry out the following set of cross-sectional tests. First, since practice offices likely have enough audit expertise and resources to effectively conduct the audit of clients of low audit risk and do not need to collaborate with their headquarters office (Beck et al. 2019; Amin et al. 2023), the negative effect of geographical distance should be more pronounced for clients of high audit risk. We constructed two measures to proxy for client firms' audit risk–whether a client firm had recently experienced a restatement and the degree to which a client engages in related-party transactions (e.g., Francis & Michas 2013; Christensen et al. 2016; Fang et al. 2018). Consistent with our expectations, we find that the negative effect of geographical distance is more pronounced for clients that have recently experienced financial restatements or engage in a higher volume of related-party transactions.

In our second set of cross-sectional tests, we investigate how the characteristics of practice offices and headquarters offices influence the negative impact of geographical distance on the likelihood of co-signed audit engagements. Small practice offices face significant resource limitations—both in terms of audit staff and expertise (e.g., Lee et al. 2022; Beck et al. 2018).

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These constraints necessitate greater involvement from the headquarters office to ensure the effectiveness and quality of co-signed engagements, which amplifies the logistical and financial challenges imposed by geographical distance. As a result, the marginal cost of geographical distance is significantly higher for co-signed engagements involving small practice offices compared to their larger counterparts. Using total audit fees as a proxy for practice office size, our findings support this expectation, demonstrating that geographical distance poses a greater barrier for small practice offices.

Similarly, when headquarters offices are heavily occupied with their own clients, the costs and challenges of conducting co-signed engagements with practice offices increase substantially. Prior studies have shown that during high-growth periods, audit quality declines because limited resources—such as skilled auditors and managerial oversight—are stretched thin across a larger client base (e.g., Bill et al. 2016; Beck et al. 2019). These challenges are further magnified when headquarters offices must support remote practice offices, as the additional resources required for effective collaboration divert attention from their core responsibilities. To examine this, we use the average number of clients handled by signing auditors as a proxy for resource constraints at headquarters offices. Our findings consistently support the argument that the negative effect of geographical distance is more pronounced when headquarters offices face greater resource constraints, underscoring the critical role of resource availability in mitigating the challenges of co-signed audit engagements.

Next, we examine the effect of co-signed audit engagements with the headquarters office on practice offices' audit quality. A key empirical challenge is the endogeneity of the decision to engage in co-signed audits. To address this, we use the establishment of high-speed rail (HSR)

connections between the practice office city and the headquarters office city as an instrumental variable. HSR reduces travel costs and time, effectively mitigating the negative impact of geographical distance. Supporting this, Chen et al. (2022) show that analysts are more likely to conduct site visits to firms they cover when HSR improves accessibility. Consistent with this evidence, we find that practice offices are more likely to engage in co-signed audit engagements when HSR connects their city to the headquarters office city. Using two widely accepted proxies for audit quality—client firms' financial misconduct and discretionary accruals—we find that co-signed audit engagements have a negative and statistically significant effect on practice offices' audit quality. These results extend the findings of Beck et al. (2019) by identifying a specific mechanism through which headquarters offices enhance practice offices' audit quality, highlighting the role of reduced geographical barriers in fostering collaboration and improving audit outcomes.

Lastly, we conduct several additional tests to strengthen the robustness of our main findings. First, we demonstrate that our results remain robust after controlling for audit firm fixed effects, even though this significantly reduces the variation in geographical distance between practice offices and headquarters offices that we can exploit. Second, we confirm that our findings hold in an office-level analysis (rather than client-level). Specifically, practice offices located closer to their headquarters exhibit higher collaboration intensity, measured as the proportion of co-signed audit engagements relative to the total number of audit engagements in a year. Third, we test our results on a subsample of relatively large audit firms to address the possibility that practice offices of large firms may have sufficient resources and thus less need to collaborate with headquarters. The results remain robust, indicating that even

large audit firms face challenges associated with geographical decentralization.

Our study makes the following key contributions to the auditing literature. First, it builds on and extends research exploring how headquarters offices organize and facilitate knowledge transfer across audit offices (Salterio and Denham 1997; Aghazadeh et al. 2023). Due to data limitations, research in this area remains relatively scarce. Aghazadeh et al. (2023) conducted a survey of 22 engagement audit partners to examine knowledge creation and transfer processes during national office consultations. Their findings reveal that headquarters offices invest significant effort in facilitating tacit-to-tacit knowledge creation and transfer between headquarters partners and engagement partners. Our study leverages a unique feature of the Chinese audit market—where audit reports must be signed by two auditors—to provide large-sample empirical evidence on a specific mechanism for knowledge creation and transfer from headquarters office to practice office: co-signed audit engagements between practice offices and headquarters offices.

Second, our study contributes to the literature examining how geographical proximity influences monitoring and knowledge transfer in auditing. Early studies in this stream focus on the geographical proximity between auditors and external parties, such as clients and regulators (e.g., Kedia and Rajgopal 2011; Choi et al. 2012; Hanes 2013). In contrast, Beck et al. (2019) are the first to investigate how geographical proximity between practice audit offices affects audit quality. They argue that large regional offices can better monitor, transfer knowledge, and share resources with geographically close small offices, providing evidence that proximity to a large office enhances small offices' audit quality. Our study extends Beck et al. (2019) by investigating how geographical distance affects a specific mechanism through which audit

firms can strengthen the knowledge transfer and monitoring role of headquarters offices.

Finally, our study offers practical insights for audit firms and regulators. Our findings highlight the importance of governance policies that foster collaboration between practice offices and headquarters offices, aligning with practices adopted by leading audit firms. For instance, KPMG's national office employs a "Department of Professional Practice" to provide auditing and technical accounting support (KPMG 2023). Our results also support the 2010 guidance from China's Ministry of Finance, which emphasizes that audit firms should enhance quality control over practice offices' audit engagements through measures such as delegating quality control and engagement managers to practice offices. In the U.S., both the Public Company Accounting Oversight Board (PCAOB 2015) and the Center for Audit Quality (CAQ 2014) include national office consultation metrics as key audit quality indicators.

The remainder of the paper is organized as follows. Section 2 reviews the relevant literature, followed by Section 3, which develops the hypotheses. Section 4 describes the data and research design, while Section 5 presents the main empirical results and cross-sectional analysis. Section 6 examines the effects of co-signed audit engagements on practice offices' audit quality, and Section 7 discusses additional analyses. Finally, Section 8 concludes the paper.

## 2. Institutional background and literature review
## 2.1 Institutional background

In China, the rapid expansion of accounting firms, particularly through the establishment of practice offices, has introduced significant integration challenges, especially in managing human resources and maintaining consistent audit quality across offices (e.g., Wang et al. 2015). As the number of practice offices grows, coordinating operations between headquarters and practice offices has become a critical concern for both practitioners and regulators. In response,

the Ministry of Finance (MOF) introduced the *Administration of Branch Offices of Accounting Firms (Interim Measures)* in 2010, mandating that practice offices operate on equal terms with headquarters and adhere to uniform standards in areas such as recruitment, training, performance evaluation, quality control, and exit procedures.[7] In 2022, the MOF further required accounting firms with practice offices to centrally appoint, supervise, and evaluate key management personnel, including practice office leaders, quality control managers, and financial managers. Additionally, audit firms must implement unified human resource allocation across their organizations.

To gain practitioners' insights into the motivations for co-signed audit engagements between practice offices and headquarters offices, we interviewed ten audit partners or senior audit managers from audit firms: seven from Big 4 firms and three from top domestic firms. Five participants were from headquarters offices, while the other five were from practice offices. Four interviewees had direct experience with co-signed engagements. Consistent with prior studies and our expectations (Beck et al. 2019), 80% of respondents identified meeting client demands—such as ensuring regional coverage or accessing industry-specific expertise— as the primary reason for co-signed engagements between practice offices and headquarters offices. Other motivations included improving audit quality at practice offices, complying with regulatory requirements, and enhancing the market competitiveness and reputation of practice offices. One respondent emphasized the critical role of headquarters in resolving complex audit issues, stating, "*In practice, audit problems are first addressed by professionals within the*

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[7] Notably, Article 16 emphasizes enhanced quality control within the audit firm, including the appointment of engagement and review auditors, regular rotations, and project classification management. These provisions aim to ensure both formal and substantive alignment between headquarters and practice offices.

*practice office. If unresolved, they are escalated to the relevant experts at headquarters.*" While

70% of respondents expressed strong support for co-signed audit engagements between

practice offices and headquarters offices, they also acknowledged challenges related to

coordination and communication between headquarters and practice offices.

## *2.2 The economic effect of geographic proximity*

Previous studies consistently demonstrate that geographical proximity enhances

information flow and decision-making accuracy across various settings. For instance, analysts

located closer to the firms they cover produce more accurate forecasts due to improved

information access and quality (Malloy 2005). Similarly, investors tend to retain holdings in

geographically nearer portfolio firms because of more frequent and in-depth interactions

(Bodnaruk 2009), regulators are more likely to investigate firms located closer to them, as

reduced distance lowers investigation costs and communication barriers (Kedia and Rajgopal

2011), while inventors who are close to firm headquarters are more productive in innovation

as proximity improves managerial guidance and information exchange (Glaeser et al. 2023). In

the auditing context, Choi et al. (2012) and Francis et al. (2022) show that auditors

geographically closer to their clients deliver higher-quality audits, suggesting better access to

client-specific information. Geographical proximity also strengthens internal monitoring

within firms, as reduced distance minimizes communication barriers and monitoring costs (e.g.,

Giroud 2013; Ma et al. 2020; Glaeser et al. 2023). However, a key challenge in this research

stream is the lack of direct evidence on how geographical distance influences information flows

or monitoring activities, as most studies infer these effects through observed outcomes. This

limitation stems from data constraints, as researchers have been unable to precisely observe the

pathways through which geographical proximity facilitates information flows, communication, and monitoring.

Given the decentralized structure of accounting firms, with offices spread across different regions, geographical distance likely plays a critical role in shaping information flows and operations among audit offices. Beck et al. (2019) find that small audit offices located closer to large network offices exhibit higher audit quality, suggesting that geographical proximity facilitates knowledge transfer from larger to smaller offices. Similarly, Amin et al. (2023) show that reduced travel time between headquarters and practice offices improves practice offices' audit quality and market share. Our study builds on Beck et al. (2019) and Amin et al. (2023) by leveraging the unique context of the China audit market, where audit reports must be signed by two auditors. This requirement enables us to observe actual collaboration between audit offices, as evidenced by the two signing auditors from different offices, offering direct insights into how geographical distance affects the likelihood of practice offices engaging in co-signed audit engagements with headquarters offices.

### 2.3 Human capital management within audit firms

*"At Grant Thornton, we take pride in our national office, which not only provides exceptional advice and counsel to our teams, but also **gets involved directly with our clients** to help think through issues. We average providing one national office professional for roughly every 18 direct client-serving audit professionals, and one national office partner or managing director (MD) for every four audit partners or managing directors."*

*-----Grant Thornton 2020*

The success of audit firms hinges on their ability to manage and develop high-quality human capital across geographically dispersed offices. A growing body of literature on auditing and labor has explored the role of human capital in driving audit quality and firm performance

(e.g., Francis 2004; Beck et al. 2018; Seavey et al. 2018; Ham et al. 2024). For instance, Aobdia et al. (2024) highlight the importance of human capital for audit quality, finding that audit firms increase the recruitment of high-quality auditors following client restatements. However, there is limited evidence on how audit firms internally mobilize and allocate human resources across offices.

Internal transfers of human capital often prove more efficient than external recruitment, as they reduce the need for additional training and minimize operational uncertainty (Beck et al. 2019). Recognizing the importance of internal human capital management, China's Ministry of Finance (MOF) mandates that audit firms centrally organize human capital within their office networks. Headquarters offices typically possess a greater quantity and higher quality of human capital to support the entire organization (e.g., Deloitte 2021; EY 2020; KPMG 2021; PwC 2021; Grant Thornton 2020). For example, in 2023, PwC China reported that 104 certified public accountants (CPAs) from its headquarters signed securities service reports, compared to only 161 CPAs across 23 practice offices combined. This disparity highlights the concentration of superior human capital at headquarters relative to practice offices.

In practice, headquarters offices serve as consultation hubs for audit teams addressing complex accounting and auditing issues. Initiatives such as Ernst & Young's National Quality Network (EY 2022) and Grant Thornton's Senior Leadership Team (Grant Thornton 2020) exemplify this role. Aghazadeh et al. (2023) conducted in-depth interviews with 22 audit partners to examine how knowledge creation and transfer occur between national offices and engagement teams. They propose that one key mechanism for knowledge transfer is deploying national office partners to local field offices, where they collaborate with engagement partners

to facilitate the consultation process. Our study contributes to this stream of research by investigating a specific mechanism for knowledge transfer: collaboration between practice offices and headquarters offices through co-signed audit engagements.

## *3. Hypothesis development*

As discussed earlier, audit firms' headquarters offices play a significant role in enhancing practice offices' audit quality through knowledge sharing and monitoring (e.g., Beck et al. 2019; Aghazadeh et al. 2023; Amin et al. 2023). One key mechanism through which headquarters offices contribute to practice offices' audit quality is by directly participating in practice offices' audit engagements and issuing co-signed audit reports. However, such collaboration incurs costs, which increase as the geographical distance between a practice office and its headquarters office grows.

First, and most importantly, geographical distance raises the costs of knowledge transfer and monitoring from headquarters to practice offices. For instance, shorter geographical distances between multinational headquarters and subsidiaries enhance communication channels and facilitate knowledge transfer (Faems et al. 2020). In auditing, where knowledge and expertise are often tacit, effective knowledge sharing is particularly critical (e.g., Johnstone et al. 2014; Beck et al. 2019; Aghazadeh et al. 2023; Ham et al. 2024). The most effective way to transfer tacit knowledge is through face-to-face interactions, as they enable clearer communication of complex, experience-based insights that are difficult to convey through other means (Gertler 2002; Bennett and Hatfield 2018). Consequently, for co-signed audit engagements, headquarters office teams must travel and work onsite with practice office teams. As geographical distance increases, the costs of travel and collaboration for headquarters teams

rise significantly.

Second, effective monitoring is essential for the success of co-signed audit engagements. This is particularly critical when audit teams from different offices collaborate, as network audit offices often operate with relative independence in terms of economic concerns. Misaligned incentives between practice offices and headquarters offices can undermine collaboration (e.g., Wu et al. 2018; Gong et al. 2023). For example, audit team members may shirk responsibilities, anticipating that the other team could be blamed for potential audit failures—a behavior consistent with the concept of social loafing (Latané et al. 1979; Kerr and Bruun 1983). Therefore, headquarters offices must ensure effective monitoring of co-signed audit engagements. However, as geographical distance increases, the costs of monitoring also escalate.

Lastly, cultural differences between geographically distant practice offices and headquarters offices may further hinder effective knowledge transfer and monitoring. Research in sociology demonstrates that cultural proximity fosters trust and strengthens interpersonal relationships, leading to more efficient and effective communication (e.g., Guiso et al. 2004; Geldes et al. 2015; Nilsson and Mattes 2015). Practice offices located closer to headquarters are more likely to share a similar culture, facilitating higher levels of trust and collaboration between teams. In contrast, greater geographical distance may exacerbate cultural differences, making collaboration less efficient.

In sum, we argue that geographical distance negatively affects the likelihood of co-signed audit engagements between practice offices and headquarters offices. Formally, we present our main hypothesis as follows:

***H1: Ceteris paribus, geographical distance has a negative effect on the probability of a practice office conducting co-signed audit engagements with its headquarters office.***

High-risk audit clients—those facing strict regulatory scrutiny or with complex operations—carry a relatively higher risk of audit failure, which can have significant reputational consequences for both the engaging audit practice office and the entire audit firm (e.g., Chaney and Philipich 2002; Lyon et al. 2005).[8] Risk-oriented auditing standards require audit firms to allocate additional resources to high-risk engagements (e.g., Hackenbrack and Knechel 1997; Bell et al. 2008). Prior studies have shown that complex, high-risk audits often demand various audit inputs, such as national risk specialists, senior leadership involvement, and enhanced monitoring efforts (e.g., Dodgson et al. 2020; Francis et al. 2022). Consequently, practice offices are more likely to seek support from the headquarters office for clients with high audit risk. In contrast, practice offices can confidently manage low-risk audit engagements independently, without requiring input from the headquarters. Based on this reasoning, we propose our second hypothesis as follows.

***H2: Ceteris paribus, the negative effect of geographical distance on the probability of a practice office conducting co-signed audit engagements with its headquarters office is more pronounced for high-risk audit clients.***

Small practice offices are resource-constrained compared to large practice offices, both at the extensive margin (the number of audit professionals) and the intensive margin (the accumulation of audit expertise) (e.g., Francis and Yu 2009; Beck et al. 2019). Even within Big 4 accounting firms, larger audit offices demonstrate higher audit quality than smaller ones

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[8] The collapse of Arthur Andersen following the Enron scandal was largely attributed to an audit failure at its Houston office. Similarly, the Evergrande Real Estate incident involving PwC's Guangzhou practice office significantly damaged PwC's reputation across China.

(Francis and Yu 2009). Consequently, a headquarters office must allocate additional resources—such as deploying a larger audit team—to ensure the effectiveness of co-signed audit engagements with small practice offices. This need for greater resource allocation exacerbates the negative effect of geographical distance on the likelihood of co-signed audit engagements. Based on this reasoning, we propose the following hypothesis.

***H3: Ceteris paribus, the negative effect of geographical distance on a practice office's probability of conducting co-signed audit engagements with its headquarters office is more pronounced for small practice offices.***

Lastly, we argue that the negative effect of geographical distance is more pronounced when headquarters offices face greater resource constraints. When a headquarters office is already heavily occupied with its own clients, the costs of conducting co-signed audit engagements with a practice office increase significantly, particularly when the practice office is located farther away. Prior studies have demonstrated that an audit office's audit quality declines during high-growth periods, as limited resources must be distributed across a larger number of clients (e.g., Bill et al. 2016; Beck et al. 2019). Based on this reasoning, we propose our final hypothesis as follows.

***H4: Ceteris paribus, the negative effect of geographical distance on the probability of a practice office conducting co-signed audit engagements with its headquarters office is more pronounced when the headquarters office has greater resource constraints.***

***4. Data and research design***

***4.1 Institutional background***

On July 2, 2001, the Ministry of Finance issued the *Notice on Issues Related to CPAs Signing and Sealing Audit Reports*, clarifying that audit reports must include the signatures and

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seals of at least two CPAs with the required professional qualifications.[9] These two auditors are referred to as the lead engagement auditor, who is more senior and oversees the audit, and the junior engagement auditor, who is responsible for supervising day-to-day fieldwork. Despite their distinct roles, both auditors share equal legal liability and are extensively involved in audit engagements (e.g., Lennox et al. 2020).[10]

## 4.2 Identification of co-signed engagements between practice offices and headquarters offices

To identify the office affiliation of the signing auditors, we start with the CSMAR-Audit Opinion database, which provides the names and CPA certificate numbers of the signing auditors for all Chinese-listed companies. Using their names and unique certificate numbers, we search the CSMAR-practice office database and the CICPA database for registered CPA to locate the signing auditors' office affiliations.[11] The CSMAR-practice office database has recorded signing auditor's office affiliation information since 2017. For signing auditors on audit reports from 2007 to 2016, we manually collected their office affiliation data from the CICPA database, which records each CPA's name, certificate number, and affiliated office over time. Specifically, we use auditors' CPA license number to locate signing auditor's affiliated office in the CICPA database. For our sample period 2007 to 2021, we identify 6,090 co-signed audit engagements with one signing auditor from a practice office and one signing auditor from

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[9]  While the legal framework mandates a minimum of two CPA signatures on audit reports, in practice, most audit reports are signed by two auditors. Very rarely, approximately 4% of audit reports (as indicated by the listed firm data from CSMAR 2007-2021, which, after excluding special treatment companies, show that around 4% of the listed companies in the total sample are signed by three auditors, consistent with findings in previous literature) involve three signing auditors (Tang et al. 2021).

[10]  Prior studies refer to the lead engagement auditor as the reviewer because they oversee the audit (e.g., Lennox, Wu, and Zhang 2014). However, as noted by Lennox et al. (2020), the lead engagement auditor differs from the engagement quality reviewer (EQ reviewer) or concurring audit partner in U.S., as the former is part of the audit team, while the latter must remain independent and is prohibited from being involved in the audit team's activities.

[11]  https://cmis.cicpa.org.cn

a headquarters office.

Because our analysis focuses on practice offices obtaining human capital support from the headquarters office for their audit engagements, we further screen out the audit engagements where the primary audit office is a practice office rather than a headquarters office. To determine the primary office, we apply the following rule: the office that shares the same location (city or province) with the client is considered the primary office responsible for the audit engagement (e.g., Yan et al., 2023).[12] After this screening step, we have 2,239 co-signed audit engagements with one signing auditor from a practice office and one signing auditor from a headquarters office, and the practice office is the primary office responsible for the engagement.[13]

### 4.3 Other data sources

Audit clients' financial data is obtained from CSMAR. Following prior literature (e.g., Defond et al.2024), we use whether a client experienced accounting-related restatements or received accounting-related regulatory sanctions to proxy for audit quality. Restatement data is manually collected from the material accounting errors section of firms' financial statement footnotes. As required by the China Securities Regulatory Commission (CSRC), public firms in China have to disclose restatement information in their annual reports (2006 ASBE). We exclude restatements triggered by changes in accounting standards or tax regulations, mergers and acquisitions, or other factors unrelated to accounting irregularities (e.g., Gul et al. 2013,

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[12] This method is suggested by the practitioners we consulted with. For cases where it is not clear which office is the primary office, we do not include them in our sample. Among the remaining sample with clear affiliations, 51.4% (20,673 out of 40,241) are audited by the headquarters office.

[13] In our sample, we identify 1,056 audit engagements where the audit reports are co-signed by two different practice offices, representing 6.57% of the total observations. This proportion is notably smaller when compared to the collaboration between the headquarters office and practice offices.

He et al. 2022, DeFond et al. 2024). We obtain regulatory sanction data from the accounting-related regulatory sanction section of CSMAR.[14] High-speed rail (HSR) route data are manually collected from China Railway Yearbooks.[15]

We start our sample from 2007 to coincide with the implementation of the new Chinese Accounting Standards (CAS) on January 1 2007 and end our sample in 2021 to allow sufficient time for observing subsequent restatements.[16] Our final sample consists of 16,084 audit engagements where a practice office is the primary office, of which 2,239 are co-signed audit engagements with one signing auditor from a practice office and one signing auditor from a headquarters office. Table 1 reports our data screening process.

*<Insert* Table *1>*

## 5. Empirical results

### 5.1 Summary statistics

Table 2 presents descriptive statistics on the distribution of audit offices across different cities. Panel A shows that most headquarters offices are in Beijing and Shanghai, representing about 70% of the total. Beijing and Shanghai offer a large pool of skilled labor that meets the

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[14] The sanctions imposed by the CSRC include oral warnings, fines, and temporary or permanent suspensions (Chen et al. 2022). CSMAR classifies each sanction based on whether it pertains to misstatements of assets, liabilities, owners' equity, cash flows, revenues, expenses, or earnings, as well as inadequate or misleading disclosures in financial statement notes. To focus on sanctions directly related to auditors' responsibility, we retain only those penalties that are directly related to financial misrepresentation, excluding violations such as delayed disclosures, insider trading, and unauthorized changes in the use of funds, which are not directly associated with auditors' responsibility (e.g., Wu, 2007; Qian et al., 2018).

[15] According to the official guidelines issued by the Ministry of Railways of China, high-speed rail (HSR) lines are newly constructed railway lines designated for passenger travel, operating at speeds of 250 km/h or higher. HSR trains are classified into three types: G, D, and C. G trains refer to high-speed electric multiple unit (EMU) trains, D trains correspond to general EMU trains, and C trains are designated for intercity travel. In this study, we do not distinguish among these categories, as they are collectively referred to as high-speed rail trains due to their comparable travel speeds.

[16] The sample period begins in 2007 to coincide with the implementation of the new Chinese Accounting Standards (CAS) on January 1, 2007, which played a pivotal role in reshaping accounting practices in China. By aligning more closely with International Financial Reporting Standards (IFRS), the new CAS introduced a standardized framework for financial reporting, resulting in significant changes to accounting practices and disclosures.

operational demands of headquarters offices and provides essential human capital support to practice offices as needed. In contrast, Table 2, Panel B, shows that practice offices are primarily in the East (47.37%) and Central (27.49%) regions, likely due to the relatively favorable economic conditions and more potential clients in these areas.

Figure A1 shows BDO China's geographic distribution in 2021, with its headquarters in Shanghai (blue star) and practice offices in 33 cities (blue nodes). Similarly, Figure A2 illustrates MOORE's distribution, with its headquarters in Beijing (red star) and practice offices in 30 cities (red nodes). Both maps highlight the widespread networks of practice offices, spanning economically developed eastern coastal regions and key cities in central and western China, reflecting efforts to meet national audit market demands and extend headquarters' reach.

Figure 2 provides an example of a co-signed audit report for Xiangtan Electric Manufacturing Co., Ltd. (Stock Code: 600416) for the fiscal year 2019. Cross-referencing this with the *Announcement on the Renewal of the Engagement of the Accounting Firm* suggests that the audit engagement was conducted by WUYIGE's Changsha practice office, with the signing auditors affiliated with both the Changsha practice office (Shuping Liu) and the Beijing headquarters office (Rong Lu) of WUYIGE.

Panel C of Table 2 summarizes collaborations between headquarters and practice offices across four distance ranges, based on 16,084 client-year observations. Overall, 13.92% of clients were jointly audited by both offices and the collaboration rate drops with distance: 17% for clients audited by practice offices located 800–1,500 km away from headquarters,14.16% for those located 800–1,500 km away, 10.76% for those 1,500–2,000 km away, and 10.56% for those over 2,000 km away. This indicates that collaboration frequency decreases as distance

increases.

Table 2, Panel D presents the summary statistics for all variables in the main analysis. A mean *Distance* value of 1.126, with a standard deviation of 0.576, suggests that, on average, practice offices are located at a considerable distance from their corresponding headquarters office. In terms of the dependent variable, *Collaboration* has a mean of 0.139 and a standard deviation of 0.346, indicating that collaboration between head audit offices and practice offices is not uncommon in the sample. The variation of this variable underscores the necessity of investigating the underlying factors driving inter-office collaborations. Descriptive statistics for the other control variables in Panel B are consistent with existing literature.

In untabulated results, we find that headquarters offices, on average, serve 26.71 clients, exhibit an office size of 15.57 (measured as the natural logarithm of audit fees), and employ 39 signing certified public accountants (CPAs). In contrast, practice offices serve an average of 6.73 clients, have an office size of 14.74, and employ an average of 8 signing CPAs. These findings highlight the substantially larger pool of human capital maintained by headquarters offices compared to practice offices, underscoring their capacity to provide significant human capital support to practice operations.

<center>*<Insert Table 2>*</center>

### 5.2. Hypotheses tests
### 5.2.1 Test of H1: proximity and co-signed reports

Table 3 presents the baseline results. In Columns (1) and (2), the coefficients for *Distance* are both -0.050, statistically significant at the 1% level. Economically, a one-standard-deviation increase in geographic distance (0.576 from Panel D, Table 2) corresponds to a 2.88% decrease

<center>20</center>

in collaboration (=-0.05*0.576), accounting for 20.72% (=0.0288/0.139) of the sample's average collaboration level (0.139 from Panel D, Table 2). This underscores the significant hindering effect of geographic distance on the co-signed engagements between practice and headquarters offices. In Column (3), *Distance* is re-specified into deciles, and the results remain consistent.

Additionally, the coefficients for key control variables such as *Growth*, and *Loss* align with expectations. The coefficient for *Loss* (0.018) is positive and significant, indicating that financially distressed clients necessitate increased collaboration to ensure risk control. The coefficient for *Growth* (-0.014) is negative and statistically significant at the 5% level, suggesting that high-growth clients, often viewed as stable, may require less inter-office collaboration (Garg et al. 2003). Other control variables—*Size, Lev, CFO, AR, INV, Indboard, RPT and Dual*—do not show significant relationships with *Collaboration*.

<*Insert Table 3*>

### 5.2.2 Test of H2-H4: cross-sectional analysis

In this section, we conduct cross-sectional analyses to validate the specific mechanisms proposed in the hypothesis development. First, we investigate whether the role of geographical distance in reducing co-signed engagements is more salient for high-risk clients. High-risk audit clients, characterized by regulatory scrutiny or complex operations, pose a greater risk of audit failure, with significant reputational consequences for both the local practice office and the audit firm (Chaney and Philipich 2002; Lyon et al. 2005). Risk-oriented auditing standards require firms to allocate additional resources, such as specialists and enhanced monitoring, to these engagements (Hackenbrack and Knechel 1997; Bell et al. 2008). Since practice offices

typically depend on headquarters support for high-risk audits, we hypothesize that geographical distance has a more pronounced impact on such engagements (H2).

To test this, we conduct cross-sectional analyses on two indicators of heightened client risk: financial restatements and related party transactions (RPTs). In Panel A of Table 4, *Post Restate* serves as a proxy for client risk, equal to 1 for years following a client's restatement if the client remains with the same office, and 0 otherwise. Restatements may reflect the office's limited expertise in handling complex clients, increasing audit risk (Francis and Michas 2013; Christensen et al. 2016). The coefficients on the interaction terms (*Distance×Post Restate/Distance_Decile×Post Restate*) are negative and significant at the 1% level. In Panel B, we examine RPTs, measured as related party sales divided by total assets, another indicator of client risk. Prior research highlights that RPTs heighten audit complexity and risk due to potential manipulation or bias (Fang et al. 2018). For such clients, additional oversight and expertise are often required. Consistent with this, the interaction terms (*Distance×RPT/Distance_Decile×RPT*) are also negative and significant at the 1% level. These results underscore the amplified effect of geographical distance for high-risk clients.

<center>*<Insert Table 4>*</center>

We also investigate how resource constraints at both practice offices and headquarters affect the impact of geographic distance. For smaller practice offices with limited talent and expertise (Francis and Yu 2009; Beck et al. 2019), headquarters must allocate additional resources to collaborate, which amplifies the negative effect of distance on co-signed audit engagements (H3). Similarly, resource-constrained headquarters, preoccupied with their own projects, incur higher costs when deploying human capital to serve distant clients (H4).

<center>22</center>

To test this, in Panel A of Table 5, we use *Small Practice Office* (measured as the log of aggregated audit fees) as a proxy for human capital constraints at practice offices. Consistent with H3, the interaction term of *Distance* (*Distance_Decile*) and *Small Practice Office* loads negatively, indicating that geographic distance has a greater negative impact on smaller practice offices. In Panel B, we use *Headquarters Office Busyness* (the average number of engagements per signing auditor) to measure resource constraints at headquarters. Consistent with H4, the negative interaction term of *Distance* (*Distance_Decile*) and *Headquarters Office Busyness* confirms that the adverse effects of geographic distance on the cosigning practice are amplified when headquarters offices are more resource-constrained.

*<Insert Table 5>*

## 6. Effect on practice offices' audit quality

In this analysis, we further investigate how cosigning reports with headquarters auditors shapes the audit performance of practice offices. Positive interactions among team members can effectively enhance audit quality (Cameran et al. 2018). In the audit context, the co-signed engagements between auditors of headquarters office and practice offices enables practice offices to achieve competitive advantages through knowledge acquisition and integration, efficient monitoring from headquarters office and abundant human capital support (Berry, 2014). Thus, we expect higher audit quality associated with greater intensity of the collaboration between headquarters offices and practice offices.

One important concern when empirically analyzing this prediction is that the co-signed engagements may not be an exogenous decision. For instance, branches experiencing audit

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failures may seek help from the headquarters to improve their audit outcomes. In such cases, it is not the co-signed engagement enhancing audit quality but poor audit quality prompting increased co-signed engagements, potentially biasing against our expectations. To address this endogeneity problem, we employ the introduction of high-speed rail (*HSR*) connections between headquarters and branches as an instrumental variable (*IV*) for collaboration. As discussed in the previous section, the openings of HSR lines can facilitate collaboration by reducing travel time, and meanwhile, they are unlikely to be influenced by the audit quality of practice offices (Pan et al. 2023). Therefore, HSR serves as a perfect *IV* for internal collaboration.

In this test, we incorporate stringent fixed effects in our analysis following Chen et al. (2022), including client fixed effects, headquarter-office-city-year fixed effects, practice-office-city-year fixed effects, and practice office fixed effects. By including these fixed effects, we aim to control time-invariant client characteristics, time-variant headquarter-office city and practice-office city factors that could confound our findings. We gauge audit quality with the incidence of accounting-related violations or restatements (*Misconduct*) (DeFond et al. 2024) and the absolute value of discretionary accruals (*DAC*) (Ball and Shivakumar 2005, 2006).

Table 6 reports the results. In the first-stage regression, reported in Column (1), we find that *HSR* connection is significantly positively associated with collaboration between headquarters and practice offices at the 1% level, suggesting that the introduction of HSR lines facilitates collaborations. In the second-stage regression, we use the predicted values of collaboration from the first stage as the independent variable to assess its impact on audit

quality. The coefficient on the *Collaboration* is significantly negative at less than the 10% level, indicating that collaboration with the headquarters office contributes to practice offices' audit quality. These results are consistent with the evidence by Beck et al. (2019), but differ and extend their results in that our studies focus on a specific and important mechanism through which headquarters offices could contribute to practice offices' audit quality – collaborating on audit engagements and co-signing audit reports.

<*Insert Table 6*>

### 7. Additional analysis

### 7.1 Collaboration between practice offices

The impact of distance may also apply to interactions among practice offices. While vertical collaboration between the headquarters and practice offices ensures alignment and oversight, horizontal collaboration among practice offices serves a complementary role, facilitating peer-to-peer support and resource sharing. In times of increased workload or staffing shortages, nearby practice offices can provide immediate personnel support, allowing the organization to respond swiftly to market changes, client demands, and internal challenges.

Based on interviews with partner at MOORE's headquarters office, inter-branch co-signed engagements was also confirmed. The partner highlighted that when additional human capital is needed, branches also tend to seek assistance from geographically proximate practice offices to ensure timely resource allocation. For instance, the practice office in *Zhuhai* may request support from the nearby *Shenzhen* practice office when facing personnel shortages. This pattern of co-signed engagements is further substantiated by the data. In our sample, we observe 1,056 audit engagements where the audit reports are co-signed by two practice offices,

representing 6.57% of the full firm-year sample. This number is significantly smaller when compared to 2,239 co-signed audit engagements between practice offices and their headquarters. We define *Distance_Ave* as the average distance (in terms of kilometers) between a given practice office and all other practice offices, scaled by 1000. *Collaboration_PP* is an indicator variable which takes the value of 1 if an audit report is co-signed by two practice offices, otherwise 0. As reported in Table 7, we find that geographical distance between practice offices also restrict inter-collaboration, with coefficients of -0.017 and -0.005—negative and statistically significant at the 1% level, indicating that closer geographical proximity also facilitating collaboration between practice offices.

*<Insert Table 7>*

### 7.2 Robustness results

We conduct the following tests to strengthen the robustness of our main results. First, we also include audit firm fixed effects to rule out the potential confounding effects caused by time-invariant audit firm characteristics. Our results remain robust to this specification, as demonstrated in Panel A of Table 8. Second, we conduct an analysis at the office level. *Collaboration_Intensity* is defined as the proportion of audit engagements of a practice office for which the audit reports are co-signed with its headquarters office in a year. We regress *Collaboration_Intensity* on the geographical distance between the practice office and its headquarters offices (*Distance and Distance_Decile*). Correspondingly, all the control variables are taken the average value among all the clients of a practice office in a year. We control for year fixed effects. The standard errors are clustered at the practice office level. Table 8 Panel B reports the results. The coefficients on *Distance* are negative and statistically

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significant at the 1% level, consistent with our client-level analysis.

Third, we limit our sample to the largest audit firms—the Big 4 international firms and Chinese domestic Top 10 firms. Offices in these large audit firms typically have the advantages in both the quality and quantity of human capital resources (Beck et al. 2018). Consequently, practice offices in these firms may have less need to seek assistance from their headquarters office. This robustness test aims to assess whether the influence of geographic proximity on the collaboration between practice offices and headquarters offices also holds for these large audit firms. The regression results, shown in Table 8, Panel C, indicate that *Distance* remains negatively associated with collaboration at the 1% level. This finding supports that geographical distance affects inter-office collaborations even for large audit firms where practice offices are more likely to operate independently.

*<Insert Table 8>*

## 8. Conclusion

This study provides large sample empirical evidence on the role of geographical distance in restricting practice offices conducting co-signed audit engagements with headquarters offices and the impact on practice offices' audit quality. Our findings demonstrate that geographical distance negatively affects practice offices' likelihood of conducting co-signed audit engagements with headquarters offices. This adverse effect is most pronounced for high-risk clients, small practice offices, and headquarters offices facing more resource constraints. Using the High-Speed Rail (HSR) connection between practice office cities and headquarters office cities as an exogenous shock that mitigates the negative effect of geographical distance,

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we find that the introduction of HSR has a positive effect on practice offices' probability of conducting co-signed audit engagements with headquarters offices. More importantly, we show that collaborating with headquarters offices has a causal and positive effect on practice offices' audit quality.

Due to data limitations, researchers know little about the internal operation of audit firms. Lennox and Wu (2018) call for more exploration of the internal dynamics of audit firms. Beck et al. (2019) are the first to shed light on how audit firms' geographically dispersed structure affects knowledge transfer, resource sharing, and monitoring from large offices to small offices and the corresponding effect on small offices' audit quality. Our study adds to and extends their results by utilizing the specific setting of the China audit market, where two auditors are required to sign the audit report, to shed light on a specific and important quality control mechanism – co-signed audit engagements between practice offices and headquarters offices. Our findings underscore the significance of geographical distance in audit firms' operations and provide valuable implications for both policymakers and audit firm management regarding the importance of inter-office collaboration to audit quality.

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**Appendix A. Variable definition**

| Variable | Definition |
|---|---|
| ***Dependent variable*** | |
| *Collaboration* | An indicator variable equal to 1 if a practice office co-signs a client's audit report with its headquarters office, and 0 otherwise. |
| *Misconduct* | An indicator variable equal to 1 if a client's current year's financial reports are subsequently restated or subject to regulatory sanctions for accounting misconduct. |
| *DAC* | The absolute value of abnormal accruals following Ball and Shivakumar (2005, 2006). |
| *Collaboration_PP* | An indicator variable equal to 1 if a practice office co-signs a client's audit report with another practice office within the same audit firm, and 0 otherwise. |
| *Collaboration_Intensity* | The proportion of practice offices' engagements co-signed with the headquarters office within a given year. |
| ***Independent variables*** | |
| *Distance* | The distance (in kilometers) between the city of a practice office and the city of its headquarters office, divided by 1000. |
| *Distance_Decile* | The decile rank of *Distance*. |
| *Distance_Ave* | The average distance (in kilometers) between the city of a given practice office and the cities of all other practice offices within the same audit firm, scaled by 1000. |
| *Distance_Ave_Decile* | The decile rank of *Distance_Ave*. |
| *Small Practice Office* | An indicator variable equal to 1 if a practice office's size, measured by total audit fees, is below the median value of all the practice offices in the year, 0 otherwise. |
| *Headquarters Office Busyness* | The number of clients divided by the number of signatory auditors in a headquarters office in the year. |
| *Post Restate* | An indicator variable equal to 1 for a given client year if the client was found to have accounting-related misstatement in prior years, and 0 otherwise. |
| *HSR connect* | An indicator variable which takes the value of 1 if the city of a practice office is connected to the city of its headquarters office by HSR, otherwise takes the value of 0. |
| ***Control variables*** | |
| *Size* | The natural logarithm of a client's total assets at the end of a given year. |
| *Lev* | A client's year-end total liabilities divided by year-end total assets. |
| *CFO* | A client's operating cash flows scaled by year-end total assets. |
| *Growth* | A client's sales growth rate in a year. |
| *AR* | A client's accounts receivable divided by total assets at the end of a year. |
| *Loss* | An indicator variable equal to 1 if a client reports a loss in a year, and 0 otherwise. |
| *INV* | A client's inventory scaled by total assets at the end of a year. |
| *Indboard* | The number of independent directors of a client divided by its total number of directors in a year. |

| | |
|---|---|
| *RPT* | The total value of related party sales of a client divided by its total assets at the end of a year. |
| *Dual* | An indicator equal to 1 if CEO chairs the board of directors and 0 otherwise. |

**Figure 1: The dispersed structure of audit firm**

Figures 1-A and 1-B show the geographic distributions of all the offices for BDO China and MOORE, respectively. BDO China's headquarters is in Shanghai, with practice offices in 33 cities, while MOORE's headquarters is in Beijing, with practice offices in 30 cities.

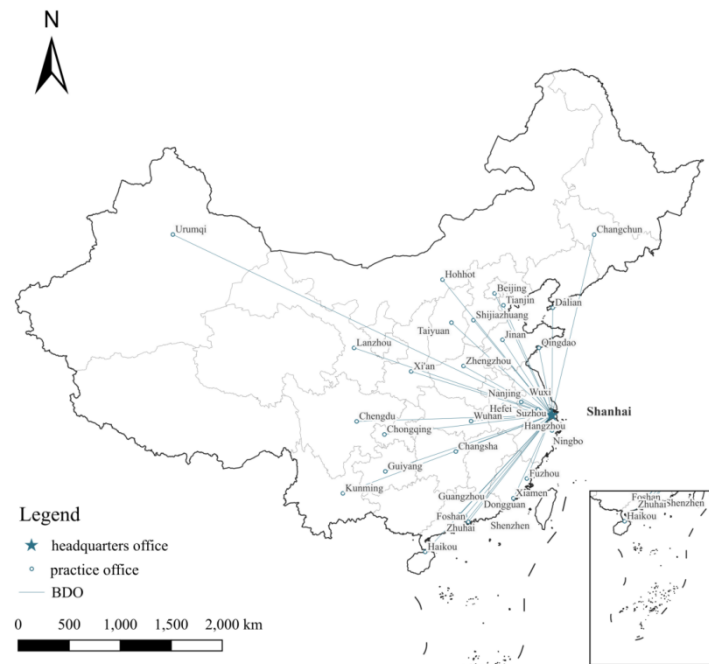*Figure 1-A: The geographic distribution of BDO China offices*



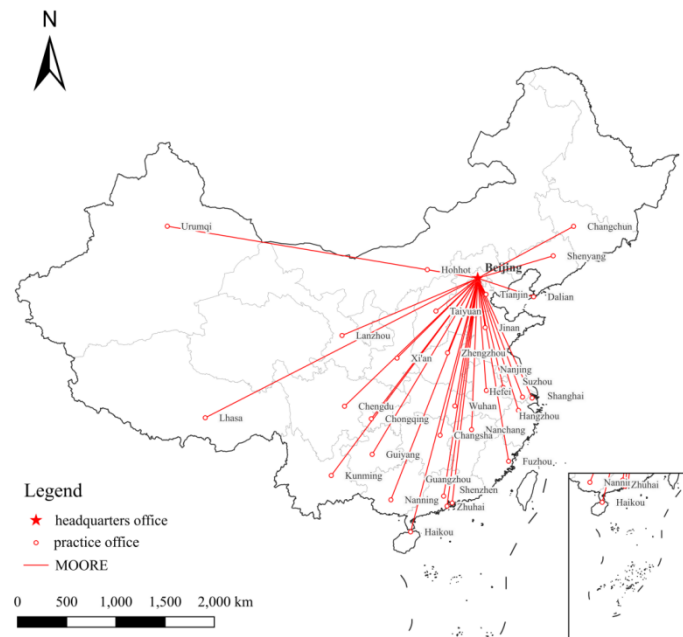*Figure 1-B: The geographic distribution of MOORE offices*

**Figure 2: An example of a co-signed audit report**

Figure 2 presents an example of the co-signed audit reports for Xiangtan Electric Manufacturing Co., Ltd. (stock number: 600416) in 2019 (*Source:* [http://static.cninfo.com.cn/finalpage/2020-03-31/1207430432.PDF](http://static.cninfo.com.cn/finalpage/2020-03-31/1207430432.PDF)). Cross-referencing this with the *Announcement on the Renewal of the Engagement of the Accounting Firm* (*Source: http://static.cninfo.com.cn/finalpage/2020-03-31/1207430442.PDF*) indicates that the co-signed audit engagement was conducted by WUYIGE's Changsha practice office, with signatory auditors Shuping Liu and Rong Lu from the Changsha office and Beijing headquarters, respectively.

**Table 1. Sample selection**

This table shows the sample selection process.

| Selection process | Obs. No. |
|---|---|
| All listed firm-year observations from 2007 to 2021 | 40,241 |
| Less: firms not audited by a practice audit office | (20,673) |
| Less: firms with negative total assets, total revenue, and book value of equity | (135) |
| Less: Firms in the financial industry or with "special treated" status | (934) |
| Less: Firms with missing control variables | (2,415) |
| Final sample | 16,084 |

**Table 2. Descriptive statistics**

Panel A presents the geographical distribution of all headquarters offices in our sample. Panel B presents the geographical distribution of all practice offices in our sample. Panel C reports the intensity of practice offices collaborating with their headquarters office by distance range. Panel D reports the descriptive statistics of the variables used in our main analysis. Please see Appendix A for variable definitions.

*Panel A: Geographical distribution of headquarters offices*

| Headquarters office location | Number | Percent |
|---|---|---|
| Beijing | 36 | 58.06% |
| East China | 16 | 25.81% |
| Shanghai | 7 | 11.29% |
| West China | 2 | 3.23% |
| Central China | 1 | 1.61% |
| **Total** | **62** | 100.00% |

*Panel B: Geographical distribution of practice offices*

| Practice office location | Number | Percent |
|---|---|---|
| East China | 243 | 47.37% |
| Central China | 141 | 27.49% |
| West China | 92 | 17.93% |
| Shanghai | 24 | 4.68% |
| Beijing | 13 | 2.53% |
| Total | 513 | 100.00% |

*Panel C: Collaboration frequency by distance range*

| Distance range | # of Collaborations | # of Audit engagement | Percent |
|---|---|---|---|
| Less than 800km | 721 | 4,252 | 17.00% |
| 800km to 1,500km | 1,026 | 7,248 | 14.16% |
| 1,500km to 2,000km | 437 | 4,063 | 10.76% |
| Greater than 2000km | 55 | 521 | 10.56% |
| Total | 2,239 | 16,084 | 13.92% |

***Panel D: Summary statistics***

| Variable | N | mean | sd | p25 | p50 | p75 |
|---|---|---|---|---|---|---|
| *Collaboration* | 16,084 | 0.139 | 0.346 | 0.000 | 0.000 | 0.000 |
| *Distance* | 16,084 | 1.126 | 0.576 | 0.741 | 1.066 | 1.525 |
| *Size* | 16,084 | 22.189 | 1.277 | 21.284 | 22.024 | 22.900 |
| *Lev* | 16,084 | 0.437 | 0.204 | 0.277 | 0.434 | 0.588 |
| *CFO* | 16,084 | 0.046 | 0.068 | 0.008 | 0.045 | 0.086 |
| *Growth* | 16,084 | 0.179 | 0.393 | -0.015 | 0.119 | 0.281 |
| *INV* | 16,084 | 0.147 | 0.134 | 0.060 | 0.114 | 0.187 |
| *AR* | 16,084 | 0.121 | 0.104 | 0.036 | 0.099 | 0.180 |
| *Loss* | 16,084 | 0.107 | 0.309 | 0.000 | 0.000 | 0.000 |
| *RPT* | 16,084 | 0.038 | 0.109 | 0.000 | 0.002 | 0.021 |
| *Dual* | 16,084 | 0.279 | 0.448 | 0.000 | 0.000 | 1.000 |
| *Indboard* | 16,084 | 0.376 | 0.053 | 0.333 | 0.364 | 0.429 |

**Table 3. Baseline results**

This table reports the effect of geographic distance on the probability of practice offices conducting co-signed engagements with headquarters office. *Distance* is defined as the geographical distance (in kilometers) between the city of a practice audit office and the city of its headquarters office, divided by 1000. *Distance_Decile* is the decile rank of *Distance*. *Collaboration* is equal to 1 if a practice audit office co-signs a client's audit report with its headquarters office, and 0 otherwise. All other variables are defined in Appendix A. Standard errors are clustered at the client level. The t-statistics are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively, according to a two-tailed t-test.

| | (1) | (2) | (3) |
|---|---|---|---|
| | *Collaboration* | *Collaboration* | *Collaboration* |
| ***Distance*** | -0.050*** | -0.050*** | |
| | (-7.10) | (-7.13) | |
| ***Distance_Decile*** | | | -0.012*** |
| | | | (-8.03) |
| *Size* | | 0.005 | 0.005 |
| | | (1.27) | (1.25) |
| *Lev* | | -0.011 | -0.011 |
| | | (-0.49) | (-0.48) |
| *CFO* | | 0.002 | 0.005 |
| | | (0.03) | (0.09) |
| *Growth* | | -0.014** | -0.014** |
| | | (-2.10) | (-2.09) |
| *INV* | | -0.005 | -0.007 |
| | | (-0.14) | (-0.20) |
| *AR* | | -0.024 | -0.026 |
| | | (-0.61) | (-0.65) |
| *Loss* | | 0.018* | 0.018* |
| | | (1.68) | (1.69) |
| *RPT* | | 0.012 | 0.012 |
| | | (0.30) | (0.31) |
| *Dual* | | 0.003 | 0.003 |
| | | (0.44) | (0.38) |
| *Indboard* | | 0.023 | 0.022 |
| | | (0.33) | (0.32) |
| *Constant* | 0.195*** | 0.083 | 0.090 |
| | (20.36) | (0.95) | (1.03) |
| Industry | YES | YES | YES |
| Year | YES | YES | YES |
| Observations | 16,084 | 16,084 | 16,084 |
| Adjusted $R^2$ | 0.064 | 0.064 | 0.066 |

**Table 4. Test of *H2*: client audit risk**

This table examines whether the impact of geographical distance is more salient for high-risk clients. *Distance* is defined as the geographical distance (in kilometers) between the city of a practice audit office and the city of its headquarters office, divided by 1000. *Distance_Decile* is the decile rank of Distance. *Collaboration* is equal to 1 if a practice audit office co-signs a client's audit report with its headquarters office, and 0 otherwise. Panel A presents the results using historical financial restatements (*Post Restate*) as a proxy for audit risk. *Post Restate* is an indicator variable equal to 1 if a practice office's client experienced accounting-related restatements in prior years, and equal to 0 otherwise. Panel B reports the results using related party transactions (*RPT*) as a proxy for audit risk. *RPT* is measured as the total value of a client's related party sales divided by its total assets at the end of a year. Standard errors are clustered at the client level, and t-statistics are shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively, based on two-tailed t-tests.

*Panel A: Financial restatements*

|  | (1) | (2) |
|---|---|---|
|  | *Collaboration* | *Collaboration* |
| **Distance×Post Restate** | **-0.050***** |  |
|  | **(-2.68)** |  |
| *Distance* | -0.044*** |  |
|  | (-5.97) |  |
| **Distance_Decile×Post Restate** |  | **-0.013***** |
|  |  | **(-3.19)** |
| *Distance_Decile* |  | -0.010*** |
|  |  | (-6.71) |
| *Post Restate* | 0.009 | 0.078** |
|  | (0.64) | (2.46) |
| Controls | YES | YES |
| Industry | YES | YES |
| Year | YES | YES |
| Observations | 16,084 | 16,084 |
| Adjusted_R$^2$ | 0.065 | 0.067 |

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***Panel B: Related party transactions***

| | (1) | (2) |
|---|---|---|
| | *Collaboration* | *Collaboration* |
| ***Distance×RPT*** | **-0.174*** ** | |
| | **(-2.64)** | |
| *Distance* | -0.051*** | |
| | (-7.27) | |
| ***Distance_Decile×RPT*** | | **-0.035*** ** |
| | | **(-2.62)** |
| *Distance_Decile* | | -0.012*** |
| | | (-8.14) |
| *RPT* | 0.004 | 0.190** |
| | (0.11) | (2.21) |
| Controls | YES | YES |
| Industry | YES | YES |
| Year | YES | YES |
| Observations | 16,084 | 16,084 |
| Adjusted $R^2$ | 0.065 | 0.067 |

**Table 5. Test of *H3* and *H4*: Resource constraints**

This table examines whether the impact of geographical distance is affected by the resource constraints of the practice office and the headquarters office. *Distance* is defined as the geographical distance (in kilometers) between the city of a practice audit office and the city of its headquarters office, divided by 1000. *Distance_Decile* is the decile rank of Distance. *Collaboration* is equal to 1 if a practice audit office co-signs a client's audit report with its headquarters office, and 0 otherwise. *Small Practice Office* equals 1 if a practice office's size, measured by total audit fees, is below the median value of all the practice offices in a year; otherwise, it equals 0. *Headquarters Office Busyness* is measured by the number of clients divided by the number of signatory auditors in a headquarters office in a year. Standard errors are clustered at the client level, and t-statistics are shown in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively, based on two-tailed t-tests.

*Panel A: Practice office resource constraints*

|  | (1) | (2) |
|---|---|---|
|  | Collaboration | Collaboration |
| **Distance×Small Practice Office** | **-0.023*** |  |
|  | **(-1.86)** |  |
| *Distance* | -0.033*** |  |
|  | (-4.11) |  |
| **Distance_Decile×Small Practice Office** |  | **-0.007*** |
|  |  | **(-2.59)** |
| *Distance_Decile* |  | -0.007*** |
|  |  | (-4.08) |
| *Small Practice Office* | 0.039*** | 0.074*** |
|  | (5.23) | (4.36) |
| Controls | YES | YES |
| Industry | YES | YES |
| Year | YES | YES |
| Observations | 16,084 | 16,084 |
| Adjusted_$R^2$ | 0.067 | 0.069 |

*Panel B: Headquarters office resource constraints*

|  | (1) | (2) |
|---|---|---|
|  | *Collaboration* | *Collaboration* |
| **Distance× Headquarters Office Busyness** | **-0.080***** |  |
|  | **(-4.13)** |  |
| *Distance* | -0.062*** |  |
|  | (-9.12) |  |
| **Distance_Decile×Headquarters Office Busyness** |  | **-0.011***** |
|  |  | **(-2.80)** |
| *Distance_Decile* |  | -0.014*** |
|  |  | (-9.89) |
| *Headquarters Office Busyness* | -0.198*** | -0.136*** |
|  | (-21.45) | (-6.25) |
| Controls | YES | YES |
| Industry | YES | YES |
| Year | YES | YES |
| Observations | 16,084 | 16,084 |
| Adjusted_$R^2$ | 0.102 | 0.102 |

**Table 6. Co-signed audit engagements and audit quality**

This table examines the impact of co-signed engagements with the headquarters office on the audit quality of practice offices. We employ the introduction of high-speed rail (*HSR*) connections between the headquarters office city and the practice office city as an instrument for *Collaboration*. We use two measures of audit quality: *Misconduct* is the incidence of accounting-related violations or restatements; *DAC* is the absolute value of discretionary accruals. Standard errors are clustered at the level of city pairs between practice offices and headquarters offices. The t-statistics are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively, according to a two-tailed t-test.

|  | (1) | (2) | (3) |
|---|---|---|---|
|  | *Collaboration* | *Misconduct* | *DAC* |
| **HSRconnect** | **0.071***** |  |  |
|  | **(2.71)** |  |  |
| **Collaboration_hat** |  | **-1.072**** | **-0.094*** |
|  |  | **(-2.186)** | **(-1.733)** |
| *Size* | -0.002 | 0.048*** | -0.005*** |
|  | (-0.17) | (2.709) | (-2.936) |
| *Lev* | -0.034 | 0.020 | 0.028*** |
|  | (-1.08) | (0.446) | (3.620) |
| *CFO* | 0.019 | 0.017 | 0.031** |
|  | (0.36) | (0.266) | (2.579) |
| *Growth* | -0.011* | -0.026** | 0.015*** |
|  | (-1.69) | (-2.105) | (7.140) |
| *INV* | 0.101** | -0.101 | 0.001 |
|  | (2.11) | (-1.151) | (0.108) |
| *AR* | 0.007 | 0.089 | 0.028* |
|  | (0.09) | (0.891) | (1.954) |
| *Loss* | 0.022* | 0.071*** | 0.060*** |
|  | (1.71) | (4.113) | (22.509) |
| *RPT* | 0.039 | 0.112 | 0.018 |
|  | (0.48) | (1.050) | (1.398) |
| *Dual* | -0.000 | -0.013 | -0.002 |
|  | (-0.03) | (-0.784) | (-0.998) |
| *Indboard* | 0.050 | 0.059 | 0.015 |
|  | (0.62) | (0.459) | (0.933) |
| Client | YES | YES | YES |
| Year*Headquarters Office City | YES | YES | YES |
| Year*Practice Office City | YES | YES | YES |
| Practice Office | YES | YES | YES |
| Observations | 15,460 | 15,460 | 15,205 |

**Table 7. Co-signed engagements between practice offices**

This table reports the regression results of the impact of the geographical distance on the co-signed engagements between two practice offices. The dependent variable *Collaboration_PP* is an indicator variable equal to 1 if a practice audit office co-signs a client's audit report with another practice office, and 0 otherwise. *Distance_Ave* is the average distance (in kilometers) between the city of a given practice office and the cities of all other practice offices, scaled by 1000. *Distance_Ave_Decile* is the decile rank of *Distance_Ave*. Standard errors are clustered at the client level. The t-statistics are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively, according to a two-tailed t-test.

|  | (1) | (2) |
|---|---|---|
|  | *Collaboration_PP* | *Collaboration_PP* |
| *Distance_Ave* | -0.017*** |  |
|  | (-3.26) |  |
| *Distance_Ave_Decile* |  | -0.005*** |
|  |  | (-5.29) |
| Controls | YES | YES |
| Industry | YES | YES |
| Year | YES | YES |
| Observations | 16,084 | 16,084 |
| Adjusted_$R^2$ | 0.020 | 0.022 |

**Table 8: Robustness tests**

Panel A reports the results of the modified Equation (1) with controlling for audit firm fixed effects. Panel B reports the regression results where we examine the effect of geographical distance on the collaboration between practice offices and headquarters offices at the office level. *Collaboration_Intensity* is defined as the proportion of practice offices' engagements co-signed with the headquarters office within a given year. Standard errors are clustered at the office level. Panel C reports the regression results of Equation (1) with the alternative sample consisting only large audit firms. Standard errors are clustered at the client level. The t-statistics are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively, according to a two-tailed t-test.

*Panel A: Control for audit firm fixed effects*

|  | (1) | (2) |
|---|---|---|
|  | *Collaboration* | *Collaboration* |
| *Distance* | **-0.019*** | |
|  | **(-2.60)** | |
| *Distance_Decile* | | **-0.004*** |
|  | | **(-3.02)** |
| Controls | YES | YES |
| Industry | YES | YES |
| Year | YES | YES |
| Audit firm | YES | YES |
| Observations | 16,083 | 16,083 |
| Adjusted_$R^2$ | 0.156 | 0.156 |

*Panel B: Office-level collaboration intensity*

|  | (1) | (2) |
|---|---|---|
|  | *Collaboration_Intensity* | *Collaboration_Intensity* |
| *Distance* | **-0.047*** | |
|  | **(-2.79)** | |
| *Distance_Decile* | | **-0.011*** |
|  | | **(-3.26)** |
| Controls | YES | YES |
| Year | YES | YES |
| Observations | 3,023 | 3,023 |
| Adjusted_$R^2$ | 0.095 | 0.097 |

***Panel C: Alternative sample–only keep large audit firms***

|  | (1) | (2) |
|---|---|---|
|  | *Collaboration* | *Collaboration* |
| *Distance* | **-0.017**\*\*\* |  |
|  | **(-2.67)** |  |
| *Distance_Decile* |  | **-0.004**\*\*\* |
|  |  | **(-3.18)** |
| Controls | YES | YES |
| Industry | YES | YES |
| Year | YES | YES |
| Observations | 12,307 | 12,307 |
| Adjusted $R^2$ | 0.075 | 0.075 |