

Auditor Type and Audit Quality in China: The Role of State Ownership

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ABSTRACT

This study examines the resource-based view (RBV) against the institution-based view (IBV) using China's state-engineered audit market, where a decade of policy-driven consolidation created a Top 6 group of local audit firms intended to rival the Big 4. The RBV suggests that the Big 4's accumulated, firm-specific resources should sustain a quality advantage regardless of policy support. The IBV suggests that state-conferred institutional capital, reinforced by state ownership (SOE) on the client side, should narrow or eliminate that advantage. Using a sample of 4,525 listed companies and 17,047 firm-year observations covering 2019–2023, audit quality is proxied by audit fees, discretionary accruals, modified audit opinions, and financial solvency (the Altman Z-score), with a Heckman two-stage model addressing auditor-choice selection bias. Because Hausman tests reject random effects in favour of fixed effects for all four proxies ($p < 0.01$), the models are estimated with firm and year fixed effects and standard errors clustered at the firm level; variance inflation factors remain below 3.1 throughout, and the current ratio and leverage are excluded from the financial-solvency equations because both are direct arithmetic components of the Altman Z-score used to construct that measure. Under this firm-level test, only the Big 4's audit-fee premium proves robust, persisting after the Heckman correction and consistent with the RBV. The Big 4's advantage does not extend to the other three proxies once time-invariant firm heterogeneity is controlled for: discretionary accruals are statistically indistinguishable across auditor tiers, the Top 6 rather than the Big 4 are significantly associated with a higher incidence of modified opinions, and the Top 6 show only a marginal association with stronger financial solvency ($p < 0.10$) with no corresponding Big 4 effect. State ownership does not significantly moderate the relationship between auditor type and any of the four audit-quality proxies once firm heterogeneity is controlled for. These findings indicate that the Big 4's resource-based advantage in China is concentrated in fee-setting rather than distributed evenly across audit-quality dimensions, and that associations reported under less conservative panel specifications, including an apparent state-ownership link to financial solvency, do not survive controlling for firm-level heterogeneity. The focus on Chinese listed firms limits generalizability to other emerging markets, though the RBV-IBV framework itself is transportable to settings where governments have sponsored domestic professional-service champions. Policy aimed at closing audit quality gaps through consolidation or institutional protection should be paired with direct investment in the technical and human-capital resources that continue to distinguish the Big 4 on the one dimension of audit quality, pricing power, where their advantage remains demonstrable.

Keywords: Auditor type, audit quality, resource-based view, institution-based view, state ownership

INTRODUCTION

Over the past few decades, the Chinese government has undertaken a deliberate and state-led transformation of its local audit market to reduce reliance on global audit networks and cultivate internationally competitive

indigenous firms. To accomplish this aspiration, the government introduced a localization policy. Since then, the Chinese audit market has undergone significant evolution with the rapid expansion of local audit firms (Wu et al., 2018). The localization policy involves regulatory changes that compel international audit firms, especially the Big 4, to reorganize by establishing local partnerships, adopting Chinese names, and appointing Chinese nationals in leadership roles. This localization allows local audit firms to capture a larger market share and enhance their competitiveness (Gong et al., 2015). However, the Chinese government's ultimate aim is to develop a domestic audit firm capable of operating globally.

A primary driver behind China's ambition to become a leader in auditing stems from the crucial need to safeguard national economic data (Zhan et al., 2020). The Big 4 were viewed as being subject to "foreign" control (Gillis, 2011) that could compromise national interests, especially concerning sensitive economic data from state-owned enterprises (SOE) (Chen et al., 2022). The government demonstrates an intense desire to control financial information by making it mandatory for all audit adjustments and unadjusted items to be reported to the Chinese Institute of Public Accountants (Deng & Macve, 2018). Regulations such as the Measures for Security Assessment of Outbound Data and the more recent regulations on Promoting and Regulating Cross-Border Data Flow have been implemented in March 2024 to control data outflow. These regulations could implicitly affect the operational flexibility and data-sharing capabilities of foreign auditing firms operating in China. Consequently, the Chinese government actively promotes the utilization of local audit firms to safeguard sensitive economic information, particularly for state-owned enterprises (Houque et al. 2012).

Despite the Chinese government's significant policy interventions, the question of comparative audit quality between these two distinct tiers of audit firms remains unresolved. Previous research has often broadly categorized non-Big 4 firms as local ones (Chen et al., 2022; Feng et al., 2020; Nguyen et al., 2019). However, Lento and Yeung (2021) refined this categorization by distinguishing between the five largest second-tier (STIN) firms and the top ten largest local Chinese firms that are purely locally owned. Using data from 2000-2014, they found that the audit quality provided by the Big 4 was relatively high. Building on Lento and Yeung (2021), this study focuses on scaling up indigenous local audit firms by examining the top six purely locally owned Chinese audit firms. Compared to Lento and Yeung (2021), this study offers more recent findings, which are crucial for demonstrating the progress of government policy interventions.

This question connects to an ongoing debate in the broader accounting literature about why audit market concentration persists and whether it can be engineered rather than earned. Using four decades of Australian data, Ferguson, Pinnuck, and Skinner (2025) show that Big N dominance reflects sustained, firm-specific sunk-cost investment in technology, industry specialization, and reputational capital, rather than any single structural barrier to entry. This implies that scale alone should not be sufficient to close a quality gap grounded in accumulated resources. Consistent with this, Kitto (2024) finds that mergers among non-Big 4 firms in the United States raise audit efficiency and sharpen competition but do not fully eliminate the quality differential with the Big 4, because consolidation compresses cost structures faster than it builds the specialized capabilities that sustain audit quality. China's local-firm consolidation program, which produced the Top 6 accounting groups examined here, is effectively a policy-driven test of this same proposition, with an additional twist: unlike the organically evolved markets studied by Ferguson et al. (2025) and Kitto (2024), scale among China's Top 6 was substantially conferred by the state rather than accumulated through competitive success, and a large share of their client base is itself state-owned (Xin, Liu, & Tang, 2023). Whether state-conferred scale and state-owned clientele can substitute for the resource base that underpins Big 4 audit quality is the specific gap this study addresses.

As audit quality is connected to firm-specific human capital, technological infrastructure, global methodological integration, and reputational capital, firms that make substantial investments in these areas offer more reliable audit opinions. While the Big 4 offer competent resources, local audit firms may develop good auditor-client relationships through their understanding of local customs and practices (Chen et al., 2022). Strong auditor-client relationships, cultivated through understanding local cultural nuances such as 'guanxi', can mitigate information asymmetry and impact audit outcomes (Liu et al., 2011). As most Chinese companies are state-controlled (SOE), guanxi plays a significant role in determining audit quality (Liu et al.,

2011). However, the discussion on resource superiority remains debated. The impact of guanxi on audit quality in China is complex, as it either enhances quality by improving information flow or impairs it through undue influence (Gillis, 2011). Therefore, understanding the effect of SOE ownership on audit quality is important. This study examines the role of SOEs in moderating the relationship between audit firm tier and audit quality. Specifically, this study asks: Do the Top 6 local audit firms in China deliver higher audit quality than the Big 4, and how does state ownership influence audit quality delivered by both the Big 4 and Top 6 local audit firms?

Using a sample of 4,525 Chinese listed companies (17,047 firm-year observations) from 2019 to 2023, and applying firm and year fixed-effects models justified by Hausman specification tests, this study finds that despite significant government support and market expansion, local Top 6 audit firms have not closed the fee-setting gap with the Big 4: the Big 4's fee premium is the only audit-quality differential that is robust to controlling for firm-level heterogeneity. On the remaining proxies, however, the evidence does not support a uniform Big 4 advantage; discretionary accruals show no significant difference between auditor tiers, and the Top 6 are, if anything, associated with a higher incidence of modified opinions and marginally stronger client solvency. State ownership does not significantly moderate the auditor-type/audit-quality relationship on any of the four proxies once firm heterogeneity is controlled for, suggesting that political affiliation neither compensates for nor materially alters the underlying, and largely fee-based, capability differences. These results are directionally consistent with Lento and Yeung's (2021) finding that the Big 4 command a premium over second-tier international networks, while showing that the premium narrows to fee-setting once more conservative panel methods are applied. Therefore, the findings contribute to ongoing debates regarding local audit firm professionalization, institutional development in emerging markets, and the limits of industrial policy in building globally competitive professional service firms.

This study's contribution is theoretical before contextual. Rather than treating China as novel, we use its state-engineered audit market to compare two established, juxtaposed logics with opposing predictions: the resource-based view (RBV), which holds that audit quality reflects firm-specific resources accumulated, and the institution-based view (IBV; Peng, Wang, & Jiang, 2008), which holds that institutional capital, such as state backing, regulatory protection, and political alignment, can substitute for resources a firm has not built. China-audit studies invoke one or the other implicitly; we test them directly across four audit quality proxies in a setting suited to comparison because both audit firms and many clients are state-influenced by design. Second, research treats non-Big 4 firms as homogeneous, obscuring heterogeneity among large, state-consolidated local firms; distinguishing the Big 4 from the Top 6 isolates where resource advantages persist and where institutional capital narrows them. Third, by adding SOE status as a moderator we extend Zheng and Rahmat (2023) to ask whether this logic affects audit outcomes and where in the quality construct it does or does not. Finally, this framework is transportable to emerging markets and informs policymakers deciding whether consolidation and state sponsorship substitute for organic capability-building.

The remainder of this paper is structured as follows: Section 2 reviews the relevant literature and develops the hypotheses. Section 3 describes the research design and methodology, Section 4 presents the empirical results, and Section 5 concludes the paper.

Past Literature on Auditor Type, Soe and Audit Quality

Past studies often discuss the audit quality provided by Big 4 and non-Big 4 firms, focusing on how institutional settings and enforcement mechanisms influence the differences. For example, Zhan et al. (2020) and Chen et al. (2020) suggest that the Big 4 are often associated with higher audit quality because of their greater resources and reputational incentives. This advantage may be less pronounced in less litigious audit environments, such as China. However, other perspectives propose that the intense competition within the Chinese audit market may incentivize both Big 4 and non-Big 4 firms to achieve comparable audit quality levels, thereby potentially minimizing any inherent differences (Lento & Yeung, 2020). A substantial portion of the literature in China has focused on comparing the audit quality provided by the Big 4 firms with that of non-Big 4 firms. Past studies indicate that the Big 4 generally achieve higher audit quality, as evidenced by lower abnormal accruals (Lento & Yeung, 2021) and fewer financial restatements (Chen et al., 2022). This

perceived advantage is often attributed to the Big 4's advanced methodologies, specialized industry knowledge (Zhan et al., 2020), global networks (Lento & Yeung, 2021), and reputation (Chen et al., 2022). However, these studies frequently group all non-Big 4 firms together, overlooking the significant variations in audit quality among leading local audit firms with substantial market shares.

Previous research suggests that SOEs face greater public scrutiny and political oversight (Chen et al., 2020), which could incentivize auditors to deliver higher-quality audits. Conversely, SOEs might also diminish monitoring effectiveness due to political affiliations (Zheng & Rahmat, 2023). Furthermore, government-controlled companies may secure more favorable audit opinions from local auditors, particularly when facing equity financing needs or delisting threats, suggesting potential compromises in audit independence (Chan et al., 2012).

In China, the prominent role of local audit firms in auditing SOEs is further shaped by political considerations (Chen et al., 2022). Historically, the government has expressed concerns regarding the potential for sensitive or confidential information to be disclosed to international auditors, leading to a greater reliance on local audit firms. This geopolitical sensitivity frequently obliges SOEs to favor local audit firms, irrespective of potential differences in audit quality or global expertise (Karim et al., 2013). Furthermore, cultural elements, such as the principle of 'guanxi' – which underscores personal relationships, trust, and mutual benefit – may enable local audit firms to cultivate more effective collaborations with state-owned clients compared to their international counterparts. This interaction creates a complex dynamic among political directives, cultural norms, and the objective assessment of audit quality, especially for publicly traded SOEs that must adhere to stringent disclosure mandates.

This review highlights several such gaps. First, there is a scarcity of direct comparisons of audit quality between the Big 4 and the Top 6 local audit firms, as most research broadly groups all non-Big 4 firms. Second, empirical data from China are limited, and institutional dynamics can significantly influence quality disparities. Third, the moderating impact of state ownership on the auditor-audit quality relationship remains inadequately explored, with prior studies often overlooking its capacity to enhance or diminish the Big 4 audit firms' advantage. This study aims to address this gap.

The resource-based view

The resource-based view (RBV) posits that a firm's competitive advantage and superior performance are derived from its valuable, rare, inimitable, and non-substitutable resources and capabilities (Zheng & Rahmat, 2023). For audit firms, this perspective suggests that audit quality is determined by the unique resources embedded within an audit firm. These resources can be tangible, such as cutting-edge technology and extensive human capital, or intangible, such as brand reputation and specialized expertise (Wang, 2022).

One of the pivotal resources for audit firms is their auditors. Human capital plays a pivotal role in audit quality, as auditor skills, education, and experience directly influence the thoroughness and accuracy of audit procedures (Lento & Yeung, 2021). Specialized industry expertise enhances credibility and reduces earnings management (Mao et al., 2017). Conversely, the absence of robust human capital, particularly in specialized areas such as forensic accounting or IT auditing, can significantly compromise audit quality, leading to increased audit risk and a greater likelihood of financial misstatements (Shen et al., 2024). Knowledge and methodological resources play a central role. Firms with advanced proprietary audit methodologies, comprehensive databases of industry practices, and sophisticated analytical tools are better equipped to identify and assess risks, thereby improving audit effectiveness (Hrazdil et al., 2020). Simultaneously, technological advances such as artificial intelligence and blockchain are transforming audit processes, enabling greater efficiency, accuracy, and depth of audit analysis (Alharasis et al., 2022). Moreover, the integration of these technologies can lead to significant cost efficiencies, allowing firms to allocate resources more effectively towards complex judgmental areas of the audit. Consistent with this logic, Ferguson, Pinnuck, and Skinner (2025) show that Big N firms in Australia grew large primarily by reinvesting in exactly these resources over decades, which is the RBV mechanism this study tests in a setting where a rival group of firms was given scale by policy rather than by earning it through the market. As Chinese regulators have a strong

commitment to strengthening local audit firms, it is crucial to analyze whether the Top 6 local audit firms possess the requisite resources to deliver audit quality comparable to that of the Big 4. The RBV theory is essential for understanding audit quality in China because it provides a robust framework for evaluating the diverse and unique resources of both the Big 4 and local audit firms, and it generates a clear baseline prediction: absent a comparable depth of accumulated resources, the Top 6 should continue to trail the Big 4 across audit quality proxies even after a decade of consolidation and government support.

The institution-based view

Where the RBV explains audit quality as a function of resources internal to the firm, the institution-based view (IBV) argues that firm strategy and performance are also shaped by the formal and informal rules of the game within which a firm operates (Peng, Wang, & Jiang, 2008). In economies where market-supporting institutions are still maturing, firms can substitute institutional capital, such as political ties, regulatory protection, and state endorsement, for resources they have not yet accumulated internally. Applied to China's audit market, the IBV implies that the Top 6 local firms need not match the Big 4's technological and human-capital base to compete effectively, provided the state confers sufficient institutional advantages: preferential access to SOE audit mandates, data-localisation rules that constrain the Big 4's cross-border operations, and the legitimacy that comes with being designated a national champion (Xin, Liu, & Tang, 2023). State ownership on the client side compounds this logic, because SOEs are themselves products of the same institutional order and may weight political alignment above the resource-based signals, industry expertise, technology, and brand, that ostensibly separate the Big 4 from local firms.

The RBV and IBV therefore generate competing, testable predictions rather than a single confirmatory expectation. The RBV predicts that the Big 4's accumulated resource advantage persists regardless of policy support, so audit quality differentials should remain despite consolidation. The IBV predicts that institutional backing, particularly for SOE clients, should narrow or eliminate this differential, since institutional capital substitutes for resource capital in a state-influenced market. Because audit quality is not a single construct, these two logics need not dominate uniformly: resource advantages may matter more where technical judgement and reputational risk are priced directly, such as fee-setting and earnings-management containment, while institutional capital may matter more where local relational knowledge and political insulation carry weight, such as opinion issuance and solvency signalling. Testing which logic dominates, and where, across audit fees, discretionary accruals, modified opinions, and financial solvency is the theoretical objective of the hypotheses developed below, rather than a restatement that the Big 4 outperform local competitors in the abstract.

Hypotheses Development

The first set of hypotheses (H1a-H1d) operationalises the RBV baseline: if audit quality tracks accumulated, firm-specific resources, the Big 4's advantage over the Top 6 should hold across pricing, reporting, and opinion-issuance outcomes, largely undisturbed by a decade of state-sponsored consolidation. Audit procedures are generally governed by stringent legal and professional standards to ensure that fundamental objectives are achieved, regardless of whether the client is audited by the Big 4 or a local firm. However, variations in audit quality are often perceived because of the differing resources available to these firms. The Big 4 firms benefit from a reputational edge, technological advancements, and extensive international experience, which collectively result in higher audit fees (Che et al., 2020). Previous studies have consistently demonstrated that the Big 4 are linked to higher audit fees (Feng et al., 2020) because they conduct more thorough audits for complex clients and adhere to conservative auditing practices (Chen et al., 2022). However, local audit firms may charge higher fees if they are part of international accounting networks (Mao et al., 2017). Despite these perceptions, recent evidence points to a more nuanced landscape where the "New Big" audit firms, formed through significant mergers within China's audit industry, have shown an increase in audit fees and quality, sometimes outperforming the Big 4 after these consolidations (Cahan et al., 2020), a pattern consistent with Kitto's (2024) finding that non-Big 4 consolidation can raise efficiency and narrow, without eliminating, the resource gap with larger rivals. This shift indicates a growing capacity among local firms to compete effectively with the Big 4, particularly in China's unique regulatory and economic

environment (Lento & Yeung, 2021). However, given that the local audit firm sector is still in its early stages (Tran & Tran, 2023) and is striving to establish comparable audit quality, the RBV predicts that this capacity gap should still be detectable, and this study proposes the following hypotheses.

In China, the pervasive concept of “guanxi” influences audit outcomes. This intricate network of relationships may enhance communication and understanding between auditors and clients, potentially leading to a more comprehensive audit if ethical boundaries are maintained. This unique feature of the Chinese landscape gives local audit firms an advantage because of their proximity to local regulatory bodies and a deeper understanding of regional business practices (Fang, 2019). Conversely, although local Chinese audit firms may leverage strong “guanxi” for client engagement, this relational web could also jeopardize their independence, making them less inclined to issue modified opinions, even when merited. Meanwhile, Big 4 firms are less susceptible to these risks because of their stringent internal quality control systems, which often prioritize auditor independence and skepticism. Therefore, this study proposes the following hypothesis:

H1a: The positive relationship between the Big 4 and audit fees is significantly stronger than that of the Top 6 local audit firms.

H1b: The negative relationship between the Big 4 and discretionary accruals is significantly stronger than that of the Top 6 firms.

H1c: The positive relationship between the Big 4 and MAO is significantly stronger than that of the Top 6 local audit firms.

H1d: The positive relationship between the Big 4 and financial solvency is significantly stronger than that of the Top 6 local audit firms.

The second set of hypotheses (H2a-H2d) operationalises the competing IBV prediction: if institutional capital substitutes for accumulated resources, state ownership on the client side should narrow the Big 4-Top 6 gap identified in H1, because SOEs sit inside the same institutional order as the Top 6 firms and may weight political alignment over the resource-based signals that separate the two auditor tiers. China's stringent data localization laws mandate that sensitive economic data from state-owned enterprises be stored locally (Zhang, 2024). These regulations create hurdles for global Big 4 firms that rely on international data transfers. Local audit firms, structured within this environment, have an advantage in navigating these complexities, making them more appealing to SOEs prioritizing data security concerns (Gul et al., 2010). This relationship enables smoother interactions if ethical boundaries are observed. Consequently, SOEs often prefer local auditors because of their local knowledge and relationships.

Local audit firms have a deeper understanding of regional institutions and client-specific political nuances that foreign Big 4 firms may overlook (Gul et al., 2010). In China, “guanxi” influences business relationships, allowing local firms to leverage networks with state-owned clients that might be less accessible to international firms (Gul et al., 2010). While state ownership might enhance audit quality, it could also complicate it through political interference, and the prioritization of relationships with local auditors could lead to less critical examination of financials, potentially undermining the independence of audits. Under the IBV, this institutional substitution need not operate uniformly across audit quality proxies: it should be most detectable where local relational knowledge and political insulation matter most for the outcome being audited, and weakest where the outcome is priced or verified against harder, less politically malleable benchmarks.

Therefore, this study proposes the following hypotheses:

H2a: SOE moderates the relationship between audit firm type (Big 4 and Top 6) and audit fees.

H2b: SOE moderates the relationship between audit firm type (Big 4 and Top 6) and discretionary accruals.

H2c: SOE moderates the relationship between audit firm type (Big 4 and Top 6) and MAO.

H2d: SOE moderates the relationship between audit firm type (Big 4 and Top 6) and financial solvency.

RESEARCH METHODOLOGY

Sample and data

This study examines non-financial companies listed in China's A-share market from 2019 to 2023. This period was chosen due to significant developments in China's capital market, including accounting standard internationalization, market opening, and the impact of the COVID-19 pandemic on business operations and auditing. The data were obtained from the China Securities Market and Accounting Research Database (CSMAR), focusing on firms' financial, audit-related, and corporate governance information, along with external environmental data. To ensure data quality, the following processing was performed: excluding ST or *ST companies with delisting risk, removing samples with missing main variables, and applying 1% winsorization for continuous variables to reduce the impact of extreme values. The final sample includes 17,047 observations from 4,525 firms covering the manufacturing, service, and real estate industries, excluding the financial industry due to its special regulatory environment and characteristics.

Measurement and definition of variables

The definitions and measurements of all variables used in this study are presented in Table 1.

Table 1: Definitions and Measurements of All Variables Used in This Study

Variable name	Symbol	Measurement
Dependent Variables	Dependent Variables	Dependent Variables
Audit Fees	AF	Natural logarithm of audit fees paid by the firm
Discretionary accruals	DACC	Total accruals (TA) – Non-Discretionary accruals (NA)
Modified Audit Opinion	MOA	1, if the audit report is modified (qualified, adverse, or disclaimer); 0, if the audit report is unqualified
Financially distressed firms	FSOL	The Altman Z-Score model
Independent Variables	Independent Variables	Independent Variables
Audit Firm – Big 4	BIG4	1 if audited by Big 4, 0 if otherwise
Audit Firm – Top 6	TOP6	1 if audited by Top 6, 0 if otherwise
Moderating Variable	Moderating Variable	Moderating Variable
State ownership	SOE	1 if owned by state ownership, 0 if otherwise
Control Variables	Control Variables	Control Variables
Current ratio	CR	Ratio of current assets to current liabilities
Leverage	LEV	Ratio of total liabilities to total asset
Return on asset	ROA	Ratio of net income divided to total asset
Firm size	SIZE	Natural logarithm of total asset
Cash flow ratio	CASHFLOW	Ratio of cash flow from operating activities to total assets
Firm age	FIRMAGE	The difference between the reporting year and the firm's

		listing year
Fixed Asset ratio	FIXED	Ratio of net fixed asset to total asset
Board independence	INDEP	Ratio of independent directors to the total number of directors
Tobin's Q	TOBINQ	Ratio of market value to book value

Discretionary accruals (DACC) are used as a measure of the manipulated component of a firm's accounting surplus, reflecting the impact of management on profits through accounting adjustments. High-quality accrued profits indicate the truthfulness and reliability of financial reports (Cahan et al., 2021). This study uses the modified Jones model (Dechow et al., 1995) to calculate DACC and measure the extent of firms' surplus management. This is done by estimating non-discretionary accruals (NA) through a regression model and then using the difference between total accruals (TA) and NA to calculate discretionary accruals (DA). The formula is as follows.

Financially distressed firms (FSOL) reflect the overall financial health of firms, typically measured through indicators like the gearing ratio and current ratio (Chen, Dong, Li, & Zhang, 2018). In this study, financial solvency is measured using the Altman Z-score model, which is a commonly used method for predicting financial distress. The formula is expressed as follows.

A higher Z-score indicates better financial health, whereas a lower score suggests higher financial risk. According to Altman (1968), a score below 1.81 suggests a high risk of bankruptcy (distress zone), a score above 2.99 indicates financial stability (safe zone), and scores between these thresholds fall into the gray zone.

To ensure the robustness of the regression results, the model includes control variables such as the current ratio (CR), leverage (LEV), return on assets (ROA), firm size (SIZE), cash flow ratio (CASHFLOW), firm age (FIRMAGE), fixed asset ratio (FIXED), the proportion of independent directors (INDEP), and Tobin's Q. These variables control for the potential impact of firm characteristics, financial position, and governance structure on audit quality (Che, Hope, & Langli, 2020). CR and LEV are retained as controls in the audit fee, discretionary accruals, and modified opinion equations, but are excluded from the financial solvency (FSOL) equations, because both are direct arithmetic components of the Altman Z-score formula used to construct FSOL; including them there would create mechanical, definitional collinearity between a control variable and the dependent variable rather than a substantive control relationship.

Regression model

The main baseline regression model in this study analyzes the effect of audit firm type (Big4 and Top6) on audit quality by constructing a panel regression model with audit fees (AF), discretionary accruals (DACC), modified audit opinion (MAO), and financial solvency (FSOL) as dependent variables. The primary specification incorporates firm fixed effects and year fixed effects rather than the industry-and-year specification used in earlier exploratory analysis, because firm fixed effects subsume industry effects in this sample (industry classification is time-invariant for more than 98% of sample firms) and additionally absorb unobserved, time-invariant firm-level heterogeneity that an industry-and-year specification cannot. Standard errors in all fixed-effects models are clustered at the firm level to account for serial correlation in residuals within firms over the five-year panel, rather than at the auditor level, because the identifying source of variation in the auditor-type variables is firm-level auditor choice rather than auditor-level clustering of clients.

This study adopts panel data regression methods to analyze the determinants of audit quality and the moderating effects of state ownership, and formally compares pooled OLS, random-effects (RE), and firm fixed-effects (FE) specifications for each of the four audit-quality proxies (Table 4). Hausman specification tests reject the random-effects model in favour of the fixed-effects model for all four proxies (AF: $\chi^2(11) = 100.09$, $p < 0.001$; DACC: $\chi^2(11) = 58.95$, $p < 0.001$; MAO: $\chi^2(11) = 70.83$, $p < 0.001$; FSOL: $\chi^2(9) = 27.80$, $p = 0.001$), confirming that unobserved firm-specific heterogeneity is correlated with the regressors and that the

fixed-effects model is the appropriate, and primary, specification for this analysis. Variance inflation factors for every regressor in every specification remain below 3.1 (Table 5), indicating that multicollinearity does not materially threaten the coefficient estimates; CR and LEV, which are correlated with each other ($r = -0.688$, Table 3), are nonetheless excluded from the FSOL equations specifically because both are direct arithmetic components of the Altman Z-score formula used to construct FSOL, which would otherwise create mechanical, definitional collinearity with the dependent variable rather than a statistical multicollinearity problem that VIF alone would detect.

The direct relationship between audit quality and the type of audit firm is represented in Equation (1), and the moderating effect is illustrated in Equation (2). In both models, audit fees (AF) serve as the primary dependent variable to proxy for audit quality. To further examine audit quality from different perspectives, the dependent variable in subsequent analyses is replaced with alternative proxies, namely discretionary accruals (DACC), modified audit opinions (MAO), and financially distressed firms (FSOL). For the FSOL variant of both equations, CR and LEV are dropped from the control-variable vector for the reason given above; the remaining specification, including the firm and year fixed effects denoted by δ , is otherwise identical across all four dependent variables.

$$AF_{it} = \beta_0 + \beta_1 BIG4_{it} + \beta_2 TOP6_{it} + \beta_3 CR_{it} + \beta_4 LEV_{it} + \beta_5 ROA_{it} + \beta_6 SIZE_{it} + \beta_7 CASHFLOW_{it} + \beta_8 FIRMAGE_{it} + \beta_9 FIXED_{it} + \beta_{10} INDEP_{it} + \beta_{11} TOBINQ_{it} + \delta_{1-n} \text{ Fixed effects} + \varepsilon_{it} \quad (1)$$

$$AF_{it} = \beta_0 + \beta_1 BIG4_{it} + \beta_2 TOP6_{it} + \beta_3 SOE_{it} + \beta_4 BIG4 * SOE_{it} + \beta_5 TOP6 * SOE_{it} + \beta_6 CR_{it} + \beta_7 LEV_{it} + \beta_8 ROA_{it} + \beta_9 SIZE_{it} + \beta_{10} CASHFLOW_{it} + \beta_{11} FIRMAGE_{it} + \beta_{12} FIXED_{it} + \beta_{13} INDEP_{it} + \beta_{14} TOBINQ_{it} + \delta_{1-n} \text{ Fixed effects} + \varepsilon_{it} \quad (2)$$

Data analysis

Data analysis was completed using STATA and Python (linearmodels) statistical software and proceeded in five steps. First, descriptive statistics were computed for all variables to characterize the sample distribution (mean, median, standard deviation, minimum, and maximum) and to identify outliers. Second, correlation tests were conducted to examine the linear relationships between variables and to flag potential multicollinearity ahead of formal VIF diagnostics. Third, variance inflation factors were computed for every regressor in every model specification to formally assess multicollinearity, rather than relying on pairwise correlations alone.

Fourth, this study estimates pooled OLS, random-effects, and firm fixed-effects panel models for each audit-quality proxy, and uses Hausman specification tests to select between the random-effects and fixed-effects estimators. Firm and year dummy variables in the preferred fixed-effects specification absorb unobserved, time-invariant firm characteristics and year-to-year macroeconomic and policy shocks, respectively; because industry classification is time-invariant for the large majority of sample firms, firm fixed effects also subsume the industry effects used in earlier exploratory specifications. Standard errors are clustered at the firm level throughout to address serial correlation in the panel.

Finally, the regression results of the preferred fixed-effects model are analyzed in depth, including assessing the significance (p-value) of the regression coefficients and their direction (positive and negative signs) to verify that the roles of the main variables are consistent with theoretical expectations. Pooled OLS and random-effects estimates, together with the Hausman test statistics, are reported as formal model-selection diagnostics (Table 4) rather than as competing substantive results, and the Heckman two-stage model reported in Section 4.4 provides an additional, independent robustness check against auditor-choice selection bias.

EMPIRICAL RESULTS

Table 2 presents the results of the descriptive analysis and Table 3 presents the correlation analysis. The distributional characteristics of audit fees (AF), discretionary accruals (DACC), modified audit opinions (MAO), and financially distressed firms (FSOL) are key indicators. Audit Fee (AF) has a mean of 0.6271 and a standard deviation of 0.024, showing relatively small variation in audit fees among companies, reflecting

market stability. Discretionary Accruals (DACC) have a mean of 0.0551 and a standard deviation of 0.055, indicating variability in surplus management among firms, suggesting the need to explore audit firms' inhibiting effects. The mean Modified Audit Opinion (MAO) of 0.0249 indicates that most firms received unqualified opinions, implying high financial reporting quality and auditor prudence. Financial solvency (FSOL) has a mean of 4.8031 and a standard deviation of 5.208, ranging from -0.0321 to 32.8680, reflecting diverse financial conditions. Regarding audit firm selection, 5.66% of companies use Big4 firms, while Top6 coverage reaches 61.26%, indicating that Big4 firms serve larger companies, while local firms have higher market coverage.

Table 2: Descriptive Statistics

Variables	Mean	SD	Min	Median	Max
AF	0.6271	0.024	0.5667	0.6278	0.6851
DACC	0.0551	0.055	0.0007	0.0385	0.2995
MAO	0.0249	0.156	0	0	1
FSOL	4.8031	5.208	-0.0321	3.1527	32.868
BIG4	0.0566	0.231	0	0	1
TOP6	0.6126	0.487	0	1	1
SOE	0.2853	0.452	0	0	1
CR	2.5169	2.29	0.385	1.7585	14.2013
LEV	0.4131	0.195	0.0611	0.4067	0.88
ROA	0.0358	0.068	-0.225	0.0371	0.2237
SIZE	22.3323	1.276	20.0151	22.1263	26.3245
CASHFLOW	0.053	0.065	-0.1341	0.051	0.2338
FIRMAGE	3.0758	0.273	2.3026	3.091	3.6376
FIXED	0.1974	0.144	0.0024	0.1695	0.6292
INDEP	0.379	0.053	0.3333	0.3636	0.5714
TOBINQ	1.9809	1.201	0.8222	1.5991	7.2759

Table 3: Correlation Analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
(1) BIG4	1.000												
(2) TOP6	0.195 *	1.000											
(3) SOE	0.095 *	-0.030 *	1.000										
(4) CR	-0.050 *	0.036 *	-0.177 *	1.000									
(5) LEV	0.081	-0.035	0.243	-0.688	1.000								

	*	*	*	*									
(6) ROA	0.046 *	0.102 *	- 0.055 *	0.210 *	- 0.332 *	1.000							
(7) SIZE	0.293 *	0.086 *	0.372 *	- 0.340 *	0.472 *	0.068 *	1.000						
(8) CASHFLO W	0.069 *	0.070 *	- 0.025 *	0.044 *	- 0.162 *	0.489 *	0.095 *	1.000					
(9) FIRMAGE	0.021 *	- 0.088 *	0.266 *	- 0.153 *	0.171 *	- 0.078 *	0.203 *	-0.011	1.000				
(10) FIXED	0.012	-0.007	0.120 *	- 0.247 *	0.073 *	- 0.025 *	0.112 *	0.184 *	0.054 *	1.000			
(11) INDEP	0.024 *	0.013	- 0.084 *	0.034 *	- 0.025 *	-0.004	- 0.047 *	-0.003	- 0.045 *	- 0.033 *	1.000		
(12) TOBINQ	- 0.037 *	-0.003	- 0.168 *	0.206 *	- 0.250 *	0.202 *	- 0.332 *	0.120 *	- 0.106 *	- 0.104 *	0.049 *	1.000	
*** p<0.01, ** p<0.05, * p<0.1	*** p<0.01, ** p<0.05, * p<0.1	*** p<0.01, ** p<0.05, * p<0.1	*** p<0.01, ** p<0.05, * p<0.1	*** p<0.01, ** p<0.05, * p<0.1	*** p<0.01, ** p<0.05, * p<0.1	*** p<0.01, ** p<0.05, * p<0.1	*** p<0.01, ** p<0.05, * p<0.1	*** p<0.01, ** p<0.05, * p<0.1	*** p<0.01, ** p<0.05, * p<0.1	*** p<0.01, ** p<0.05, * p<0.1	*** p<0.01, ** p<0.05, * p<0.1	*** p<0.01, ** p<0.05, * p<0.1	*** p<0.01, ** p<0.05, * p<0.1

Model specification and diagnostic tests

Table 4 reports the results of formally comparing pooled OLS, random-effects (RE), and firm fixed-effects (FE) specifications for each audit-quality proxy. The Hausman test rejects the random-effects model in favour of the fixed-effects model for all four proxies ($p \leq 0.001$), so all subsequent regression tables (Tables 6 and 7) report firm and year fixed-effects estimates with standard errors clustered at the firm level, rather than the industry-and-year specification used in earlier exploratory analysis. Table 5 reports variance inflation factors for every regressor in the fixed-effects specifications; all VIFs remain below 3.1, well under the conventional threshold of 10 (and the more conservative threshold of 5), indicating that multicollinearity is not a material concern for any retained control. Consistent with this, the current ratio (CR) and leverage (LEV) are retained as controls in the audit fee, discretionary accruals, and modified opinion equations, but are excluded from the financial solvency (FSOL) equations, because both are direct arithmetic components of the Altman Z-score formula used to construct FSOL (Section 3.2); their inclusion there would create mechanical, definitional collinearity with the dependent variable rather than the kind of statistical multicollinearity that VIF alone would detect.

Table 4: Model Specification Tests (Pooled OLS, Random Effects, and Firm Fixed Effects)

Audit Quality Proxy	Pooled OLS R ²	RE (overall) R ²	FE (within) R ²	Hausman χ^2 (df)	p-value	Preferred Model
AF	0.4805	0.4265	0.2924	100.094 (11)	<0.001	Firm FE
DACC	0.0918	0.0765	0.0541	58.952 (11)	<0.001	Firm FE
MAO	0.0607	0.0524	0.0157	70.832 (11)	<0.001	Firm FE

FSOL	0.5348	0.5189	0.4654	27.800 (9)	0.001	Firm FE
Pooled OLS includes industry and year dummy variables (the specification used in earlier exploratory analysis). Random Effects and Firm Fixed Effects both include year fixed effects; Firm Fixed Effects additionally absorbs firm-level heterogeneity. The Hausman test compares the Random Effects and Firm Fixed Effects estimators; a significant statistic ($p < 0.05$) indicates that unobserved firm-specific effects are correlated with the regressors, favouring the Firm Fixed Effects estimator used in Tables 6 and 7. All models are estimated with standard errors clustered at the firm level. The FSOL specification excludes CR and LEV (Section 3.2), so its Hausman test has 9, rather than 11, degrees of freedom.						

Table 5: Variance Inflation Factor (VIF) Diagnostics

Variable	AF / DACC / MAO Model	FSOL Model
BIG4	1.14	1.14
TOP6	1.06	1.06
CR	2.06	—
LEV	2.53	—
ROA	1.57	1.40
SIZE	1.72	1.32
CASHFLOW	1.40	1.40
FIRMAGE	1.07	1.07
FIXED	1.15	1.07
INDEP	1.01	1.01
TOBINQ	1.21	1.21
Mean VIF	1.45	1.19
VIF = Variance Inflation Factor, computed on the pooled sample for each control-variable vector. All values are well below the conventional threshold of 10 and the more conservative threshold of 5, indicating that multicollinearity does not materially affect the coefficient estimates in either specification. CR and LEV are excluded from the FSOL model because both are direct arithmetic components of the Altman Z-score used to construct FSOL (Section 3.2) — a definitional, rather than purely statistical, form of collinearity that VIF alone would not fully flag (VIF for CR = 2.06 and LEV = 2.53 in the model that retains them, both below 5).		

Regression results and discussion

Table 6 presents the firm and year fixed-effects regression results for Model 1, the direct relationship between audit firm type and each audit-quality proxy, using the model selected by the specification tests reported in Table 4 and the control variables retained per the VIF diagnostics in Table 5. The audit fee model retains substantial within-firm explanatory power (R^2 within = 0.2924); the DACC and MAO models are considerably weaker (R^2 within = 0.0541 and 0.0157, respectively), as is typical once time-invariant firm characteristics are absorbed by the fixed effects; the FSOL model retains a high R^2 within of 0.4654.

Table 6: Regression Results – Model 1 (Firm and Year Fixed Effects)

	Model 1 (Firm & Year FE)	Model 1 (Firm & Year FE)	Model 1 (Firm & Year FE)	Model 1 (Firm & Year FE)
	AF	DACC	MAO	FSOL
Intercept	0.9887***	-0.0808	-0.1985	18.0954***

	(47.765)	(-0.755)	(-0.559)	(3.442)
BIG4	0.0165***	-0.0025	0.0300	0.3065
	(7.062)	(-0.311)	(1.074)	(0.968)
TOP6	-0.0002	-0.0012	0.0130**	0.1500*
	(-0.772)	(-0.635)	(2.097)	(1.935)
CR	-0.0000	0.0001	0.0017	—
	(-0.365)	(0.082)	(0.996)	—
LEV	0.0023	0.0371***	0.0687	—
	(1.190)	(3.296)	(1.570)	—
ROA	-0.0085***	-0.2357***	-0.3043***	7.7387***
	(-4.199)	(-9.858)	(-5.433)	(12.639)
SIZE	-0.0177***	0.0135***	0.0161	-0.6027***
	(-23.842)	(3.913)	(1.325)	(-3.770)
CASHFLOW	0.0053***	0.0265	0.0729**	0.6879
	(3.902)	(1.438)	(2.513)	(1.405)
FIRMAGE	0.0105**	-0.0553**	-0.0463	-1.5800
	(2.067)	(-1.973)	(-0.500)	(-1.188)
FIXED	0.0036*	-0.0367***	0.0047	-1.6575***
	(1.770)	(-3.112)	(0.133)	(-3.029)
INDEP	-0.0022	-0.0209	-0.0707	0.3806
	(-0.775)	(-1.053)	(-1.172)	(0.461)
TOBINQ	0.0002	0.0056***	-0.0013	2.4169***
	(1.498)	(5.725)	(-0.629)	(31.203)
R ² (within)	0.2924	0.0541	0.0157	0.4654
R ² (overall)	0.3105	0.0544	0.0168	0.4509
N	17047	17047	17047	17047
F-stat	511.926	65.400	19.405	1141.316
Prob>F	0.0000	0.0000	0.0000	0.0000
All models include firm and year fixed effects with standard errors clustered at the firm level (in parentheses). CR and LEV are excluded from the FSOL equation because both are direct components	All models include firm and year fixed effects with standard errors clustered at the firm level (in parentheses). CR and LEV are excluded from the FSOL equation because both are direct components	All models include firm and year fixed effects with standard errors clustered at the firm level (in parentheses). CR and LEV are excluded from the FSOL equation because both are direct components	All models include firm and year fixed effects with standard errors clustered at the firm level (in parentheses). CR and LEV are excluded from the FSOL equation because both are direct components	All models include firm and year fixed effects with standard errors clustered at the firm level (in parentheses). CR and LEV are excluded from the FSOL equation because both are direct components

of the Altman Z-score used to construct FSOL (— = not included). * p<0.10, ** p<0.05, *** p<0.01	of the Altman Z-score used to construct FSOL (— = not included). * p<0.10, ** p<0.05, *** p<0.01	of the Altman Z-score used to construct FSOL (— = not included). * p<0.10, ** p<0.05, *** p<0.01	of the Altman Z-score used to construct FSOL (— = not included). * p<0.10, ** p<0.05, *** p<0.01	of the Altman Z-score used to construct FSOL (— = not included). * p<0.10, ** p<0.05, *** p<0.01
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The results show that BIG4 firms charge significantly higher audit fees, with a coefficient of 0.0165 ($t = 7.062$, $p < 0.01$), once firm and year fixed effects are applied and standard errors are clustered by firm. TOP6 firms show no significant association with audit fees under this specification (coefficient -0.0002, $t = -0.772$, $p = 0.440$). Because the Big 4's fee association survives the firm fixed-effects test while the Top 6's does not, the Big 4's positive relationship with audit fees is significantly stronger than that of the Top 6, supporting the RBV baseline prediction that the Big 4's accumulated resources continue to command a fee premium net of firm-specific selection effects. Hypothesis H1a is supported.

For the discretionary accruals model, neither BIG4 (coefficient -0.0025, $t = -0.311$, $p = 0.756$) nor TOP6 (coefficient -0.0012, $t = -0.635$, $p = 0.526$) is significantly associated with DACC once firm and year fixed effects are applied. This contrasts with specifications that omit firm fixed effects, in which both auditor tiers appear to suppress accruals; the firm fixed-effects result indicates that this apparent accrual-suppression advantage is largely attributable to persistent, time-invariant differences between firms that retain Big4/Top6 auditors and those that do not, rather than to a within-firm auditor effect. This reading is corroborated by the Heckman two-stage model reported in Section 4.4, where BIG4 is likewise not significantly associated with DACC once non-random auditor selection is addressed. Hypothesis H1b, which predicts a significantly stronger negative Big4-DACC relationship relative to Top6, is not supported.

The coefficient for BIG4 on modified audit opinions is positive but statistically insignificant (0.0300, $t = 1.074$, $p = 0.283$). TOP6, by contrast, shows a significant positive association with modified opinions (0.0130, $t = 2.097$, $p < 0.05$), indicating that Top6-audited firms are more likely to receive a modified opinion once firm heterogeneity is controlled for — the opposite of the pattern implied by a simple resource-based prediction that the Big 4 would be more likely to issue modified opinions. One plausible reading is that, within firms that switch to a Top6 auditor, the switch itself coincides with, or is prompted by, deteriorating reporting quality that the incoming Top6 auditor is then more willing to flag; an alternative reading is that Top6 auditors exercise comparatively greater caution once local reputational stakes are considered. The present firm-fixed-effects design cannot adjudicate between these explanations, and we report this reversal, relative to the non-fixed-effects specification, as a substantive finding rather than a robustness footnote. Hypothesis H1c, which predicts a significantly stronger positive Big4-MAO relationship relative to Top6, is not supported; if anything, the pattern runs in the opposite direction.

With respect to financial solvency (FSOL), where a higher Z-score indicates stronger financial health and lower bankruptcy risk, BIG4 shows a positive but statistically insignificant coefficient (0.3065, $t = 0.968$, $p = 0.333$), and TOP6 shows a positive coefficient that is marginally significant at the 10% level (0.1500, $t = 1.935$, $p = 0.053$). Because CR and LEV, which are themselves components of the Altman Z-score, are excluded from this specification, the coefficients reported here are not subject to the mechanical collinearity that would otherwise confound the interpretation of BIG4 and TOP6. The marginal TOP6 association is consistent with two distinct explanations that this firm fixed-effects design cannot fully separate: client self-selection, in which firms that are already becoming more solvent are more likely to switch toward a Top6 auditor as their governance and reporting needs evolve, and auditor-driven conservative accounting enforcement, in which the auditor switch itself prompts more conservative working-capital and leverage management that mechanically raises the Z-score. Distinguishing these two channels would require an auditor-switch event-study design with a plausible instrument for the timing of the switch, which is beyond the scope of the present specification; we flag it as a direction for future research. Hypothesis H1d, restated here in the positive direction consistent with the Z-score's interpretation, predicts that the Big 4's positive relationship with financial solvency is significantly stronger than the Top 6's. Because BIG4 is not statistically significant while TOP6 is only marginally significant, the data do not support H1d.

Taken together, the firm and year fixed-effects results narrow the Big 4's demonstrated advantage in this sample to a single dimension: audit fees. Once time-invariant firm heterogeneity is controlled for, discretionary accruals show no significant difference between auditor tiers, and the Top 6, not the Big 4, show a significantly higher incidence of modified opinions along with a marginally stronger association with financial solvency. This pattern qualifies, rather than reverses, the RBV prediction: the Big 4's resource-based advantage remains detectable where audit quality is priced directly, in audit fees, but is not detectable in this more conservative specification where quality must be inferred from client-reported outcomes that are also shaped by unobserved, time-invariant firm characteristics.

Among the control variables, profitability (ROA) is associated with lower audit fees, lower discretionary accruals, and a lower likelihood of modified opinions, but higher financial solvency, consistent with theoretical expectations. Firm size (SIZE) is associated with lower audit fees and lower solvency scores but higher discretionary accruals, while showing no significant association with modified opinions once firm heterogeneity is controlled for. Cash flow (CASHFLOW) is positively associated with audit fees and modified opinions but shows no significant association with accruals or solvency in the fixed-effects specification. Firm age (FIRMAGE) is positively associated with audit fees but negatively associated with accruals, with no significant association with modified opinions or solvency. Asset structure (FIXED) is negatively associated with accruals and solvency and marginally positively associated with fees. Board independence (INDEP) shows no significant association with any of the four proxies once firm fixed effects are applied, in contrast to the non-fixed-effects specification, consistent with a substantial share of the apparent governance effect reflecting persistent, unobserved differences between firms rather than within-firm variation in board composition. Tobin's Q is positively associated with accruals and solvency. Leverage (LEV) is positively associated with discretionary accruals; the current ratio (CR) shows no significant association with any retained outcome once firm and year fixed effects are applied.

Moderation effect

Table 7: Regression Results – Model 2 (Moderating Effect of SOE, Firm and Year Fixed Effects)

	Model 2 (Firm & Year FE)	Model 2 (Firm & Year FE)	Model 2 (Firm & Year FE)	Model 2 (Firm & Year FE)
	AF	DACC	MAO	FSOL
Intercept	0.9896*** (48.081)	-0.0725 (-0.676)	-0.1707 (-0.482)	18.2532*** (3.458)
BIG4	0.0173*** (5.786)	0.0008 (0.068)	0.0391 (0.842)	0.4250 (1.213)
TOP6	-0.0003 (-0.768)	-0.0027 (-1.050)	0.0106 (1.234)	0.2182* (1.956)
SOE	-0.0005 (-0.578)	-0.0132** (-2.404)	-0.0368 (-1.390)	0.1792 (0.728)
BIG4*SOE	-0.0019 (-0.486)	-0.0073 (-0.448)	-0.0197 (-0.398)	-0.2852 (-0.509)
TOP6*SOE	0.0002 (0.253)	0.0043 (1.170)	0.0073 (0.614)	-0.1980 (-1.493)
CR	-0.0000 (-0.368)	0.0001 (0.080)	0.0017 (1.002)	—

LEV	0.0023	0.0369***	0.0684	—
	(1.196)	(3.286)	(1.563)	—
ROA	-0.0085***	-0.2350***	-0.3023***	7.7288***
	(-4.186)	(-9.842)	(-5.389)	(12.593)
SIZE	-0.0178***	0.0133***	0.0153	-0.6086***
	(-23.950)	(3.852)	(1.267)	(-3.763)
CASHFLOW	0.0053***	0.0262	0.0720**	0.6920
	(3.899)	(1.421)	(2.483)	(1.413)
FIRMAGE	0.0105**	-0.0548*	-0.0452	-1.6123
	(2.063)	(-1.958)	(-0.488)	(-1.215)
FIXED	0.0036*	-0.0367***	0.0048	-1.6547***
	(1.768)	(-3.112)	(0.135)	(-3.025)
INDEP	-0.0023	-0.0245	-0.0810	0.4198
	(-0.824)	(-1.225)	(-1.334)	(0.510)
TOBINQ	0.0002	0.0056***	-0.0013	2.4168***
	(1.495)	(5.721)	(-0.636)	(31.195)
R ² (within)	0.2922	0.0551	0.0168	0.4655
R ² (overall)	0.3106	0.0551	0.0176	0.4511
N	17047	17047	17047	17047
F-stat	402.461	52.091	16.039	856.315
Prob>F	0.0000	0.0000	0.0000	0.0000
All models include firm and year fixed effects with standard errors clustered at the firm level (in parentheses). CR and LEV are excluded from the FSOL equation for the reason given in Table 6 (— = not included). * p<0.10, ** p<0.05, *** p<0.01	All models include firm and year fixed effects with standard errors clustered at the firm level (in parentheses). CR and LEV are excluded from the FSOL equation for the reason given in Table 6 (— = not included). * p<0.10, ** p<0.05, *** p<0.01	All models include firm and year fixed effects with standard errors clustered at the firm level (in parentheses). CR and LEV are excluded from the FSOL equation for the reason given in Table 6 (— = not included). * p<0.10, ** p<0.05, *** p<0.01	All models include firm and year fixed effects with standard errors clustered at the firm level (in parentheses). CR and LEV are excluded from the FSOL equation for the reason given in Table 6 (— = not included). * p<0.10, ** p<0.05, *** p<0.01	All models include firm and year fixed effects with standard errors clustered at the firm level (in parentheses). CR and LEV are excluded from the FSOL equation for the reason given in Table 6 (— = not included). * p<0.10, ** p<0.05, *** p<0.01

Table 7 reports the firm and year fixed-effects estimates of Model 2, which adds state ownership (SOE) and its interactions with BIG4 and TOP6. Across all four audit-quality proxies, neither interaction term is statistically significant: audit fees (BIG4*SOE = -0.0019, p = 0.627; TOP6*SOE = 0.0002, p = 0.800), discretionary accruals (BIG4*SOE = -0.0073, p = 0.654; TOP6*SOE = 0.0043, p = 0.242), modified opinions (BIG4*SOE = -0.0197, p = 0.690; TOP6*SOE = 0.0073, p = 0.539), and financial solvency (BIG4*SOE = -0.2852, p = 0.610; TOP6*SOE = -0.1980, p = 0.136). Hypotheses H2a, H2b, H2c, and H2d are therefore not supported: once firm-level heterogeneity is controlled for, state ownership does not significantly moderate the relationship between auditor type and any of the four audit-quality proxies. This includes financial solvency, where an

industry-and-year fixed-effects specification without firm fixed effects had suggested a significant moderating effect; that association does not survive the more conservative, reviewer-requested firm fixed-effects test, and we interpret it as an artifact of persistent, unobserved differences between SOE and non-SOE firms that firm fixed effects, but not industry-and-year fixed effects, are able to absorb. One exploratory result outside the pre-registered hypotheses is worth noting: the SOE main effect is significantly negative in the discretionary accruals model (-0.0132 , $p < 0.05$), suggesting that state-owned firms report lower discretionary accruals on average regardless of auditor tier; because this is not the object of H2b, which concerns the SOE interaction rather than the SOE main effect, we report it descriptively rather than as confirmatory evidence.

Endogeneity bias

Given that auditor choice is not random, self-selection bias may affect the relationship between auditor type and audit quality. Firms with characteristics such as size, governance, or financial performance may be more likely to engage Big 4 auditors. If these characteristics influence audit quality outcomes, the regression estimates may suffer from endogeneity bias. To address this issue, this study uses Heckman's (1979) two-stage selection model. The first stage estimates a probit model predicting Big 4 auditor hiring based on firm characteristics, including size, leverage, profitability, growth, board independence, age, and cash flow. The Inverse Mills Ratio (IMR) is computed to capture selection effects and incorporated into the audit quality OLS model. A significant IMR indicates selection bias. This analysis is conducted as an additional, independent robustness check against auditor-choice selection bias and is estimated as a pooled cross-sectional Heckman model, consistent with prior applications of this method in the audit literature; it complements, rather than replaces, the firm and year fixed-effects specification reported in Tables 6 and 7.

Table 8: Heckman Two-Stage Selection Model (Endogeneity Test)

First stage: Probit Model (Auditor Choice – Big 4)

Variables	Coefficient	z-stat
SIZE	0.482***	30.473
LEV	-0.6588***	-5.671
ROA	-0.6494*	-1.795
TOBINQ	0.0711***	4.506
FIRMAGE	-0.2344***	-3.654
INDEP	0.7306**	2.326
CASHFLOW	1.2795***	3.983
Pseudo R ²	0.183	
Significance level:***p<0.01, **p<0.05, *p<0.10	Significance level:***p<0.01, **p<0.05, *p<0.10	Significance level:***p<0.01, **p<0.05, *p<0.10

Second stage: OLS (DACC as Audit Quality Proxy)

Variables	Coefficient	t-stat
BIG4	-0.0029	-1.556
SIZE	-0.0033***	-3.851
LEV	0.0261***	9.517
ROA	-0.1523***	-20.164
TOBINQ	0.0070***	17.730

FIRMAGE	-0.0069***	-4.411
INDEP	0.0170**	2.162
CASHFLOW	-0.0045	-0.610
Inverse Mills Ratio (IMR)	-0.0249	-1.230
R ²	0.069	
Significance level:***p<0.01, **p<0.05, *p<0.10	Significance level:***p<0.01, **p<0.05, *p<0.10	Significance level:***p<0.01, **p<0.05, *p<0.10

Table 8 presents the Heckman two-stage estimation results. The first-stage probit model shows that firm size, leverage, Tobin's Q, board independence, and cash flow influence Big4 auditor selection, confirming that auditor choice is related to observable firm characteristics. In the second stage, the insignificant Inverse Mills Ratio (coefficient -0.0249, $p > 0.10$) suggests minimal residual selection bias from non-random auditor choice conditional on the included firm characteristics. The BIG4 coefficient in the second-stage DACC model is small and statistically insignificant (-0.0029, $t = -1.556$, $p = 0.120$), consistent with, rather than contradicting, the firm and year fixed-effects result in Table 6, where BIG4 is likewise not significantly associated with discretionary accruals. Read together, the Heckman correction and the firm fixed-effects specification converge on the same conclusion through different identification strategies: once either non-random auditor selection on observables or persistent firm-level heterogeneity is accounted for, the Big 4 do not show a robust accrual-suppression advantage over other auditors in this sample.

Theoretical and practical contributions

The pattern of results across H1 and H2, estimated under the firm and year fixed-effects specification recommended in peer review, narrows rather than eliminates support for the RBV-IBV framework developed above. Consistent with the RBV baseline, the Big 4's advantage is detectable, and robust to both firm fixed effects and the Heckman correction, exactly where audit quality is priced directly: audit fees. This is the outcome the RBV would predict for a resource advantage built over decades of reputational and technological investment of the kind documented by Ferguson et al. (2025), and it is not closed by a decade of state-directed consolidation, echoing Kitto's (2024) finding that non-Big 4 mergers narrow but do not eliminate resource-based quality gaps in fee-setting power. Where the results depart from the RBV baseline, and from the pattern reported in less conservative specifications, is discretionary accruals, modified opinions, and financial solvency: none of these three proxies shows a robust Big 4 advantage once firm-level heterogeneity is controlled for, and on modified opinions the Top 6 show a significantly higher, not lower, incidence than the Big 4's own (statistically insignificant) coefficient. Because H2a-H2d are uniformly unsupported under firm fixed effects, including the previously apparent SOE-solvency link, the results do not support the IBV prediction that state-conferred institutional capital substitutes for auditor-conferred credibility in this sample; instead, the SOE-solvency association detected in the industry-and-year fixed-effects specification is best read as reflecting persistent, unobserved differences between SOE and non-SOE firms rather than a genuine institutional-substitution effect.

This selective, and more conservative, pattern is the study's principal contribution. Methodologically, the study demonstrates that panel associations between auditor tier and audit-quality proxies commonly reported in the China-audit literature, including apparent accrual-suppression and opinion effects and an apparent SOE-conferred solvency advantage, can be substantially attenuated, or reversed, once firm fixed effects are used to control for time-invariant firm heterogeneity. Because only a small share of sample firms switch auditor tier over the five-year panel (1.8% switch Big4 status, 22.4% switch Top6 status, and 3.3% switch SOE status), the firm fixed-effects estimates are identified from a comparatively thin and potentially unrepresentative subsample of switching firms, which is itself an important scope condition for interpreting the results and a caution for the wider literature's reliance on cross-sectional or industry-year specifications. Theoretically, the study shows that RBV and IBV are not to be adjudicated wholesale in this setting: the evidence that survives rigorous testing supports a narrow, fee-based RBV advantage for the Big 4, while the IBV prediction that

institutional capital substitutes for auditor-conferred credibility does not survive the same test on any of the four proxies examined. Practically, the findings suggest that policies aimed at closing the audit-quality gap between the Big 4 and the Top 6 by building scale, through mergers, market-share mandates, or preferential SOE assignments, are unlikely to close the one gap that survives rigorous testing: the resource-based credibility embedded in audit fees. Regulators seeking parity with the Big 4 would, on this evidence, do better to invest directly in the human capital, methodology, and technology base that the RBV identifies as the source of the Big 4's fee-setting advantage, rather than in consolidation or institutional protection alone; the weaker case that could previously be made for institutional substitution via SOE status does not, on the present, more rigorous evidence, provide as reliable an alternative policy lever.

CONCLUSION

This study set the resource-based view against the institution-based view to explain a question that a decade of Chinese industrial policy has not settled: whether local audit firms elevated to national-champion status by the state can deliver audit quality comparable to the Big 4. Using firm and year fixed-effects models, justified by Hausman specification tests and estimated with standard errors clustered at the firm level, the findings favour a narrower version of the RBV than the associational evidence alone would suggest. The Big 4 audit firms command a significantly higher audit fee than the Top 6, a result that is robust to firm fixed effects and to the Heckman two-stage correction for auditor-choice selection bias, consistent with a resource-based advantage that is priced directly by the market. On discretionary accruals, modified opinions, and financial solvency, however, the Big 4's advantage does not survive controlling for time-invariant firm heterogeneity: accrual suppression is statistically indistinguishable between the Big 4 and Top 6, the Top 6 show a significantly higher incidence of modified opinions than the Big 4, and the Top 6 show a marginally stronger, not weaker, association with financial solvency. State ownership does not significantly moderate the relationship between auditor type and any of the four audit-quality proxies once firm fixed effects are applied, including financial solvency, where a less conservative specification had suggested a significant moderating effect. Control variables such as profitability and firm size behave broadly as theory would predict. Read together, the results show that the Big 4's resource-based advantage in this market is real but concentrated in fee-setting, and that several associations reported in less conservative panel specifications, most notably an apparent state-ownership link to financial solvency, do not survive a within-firm test with limited auditor-switching. These findings have implications for policymakers, auditors, and managers seeking to enhance audit practices and improve the financial integrity of Chinese enterprises, and for researchers testing similar resource-versus-institution tensions in other emerging markets where the state has sponsored domestic professional-service champions; they also illustrate, methodologically, the value of subjecting panel associations in this literature to firm fixed-effects and Hausman-test-based model selection before treating them as evidence of a genuine auditor effect.

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Conflict Of Interest

The authors declare no conflict of interest.

Data Availability Statement

The data supporting the findings of this study were obtained from the China Securities Market and Accounting Research (CSMAR) database under a paid institutional licence. Restrictions apply to the availability of these data, which were used under licence for this study. Data are available from the corresponding author upon reasonable request and with permission from CSMAR.

Ethical Approval

This study relies on secondary, publicly listed company data and does not involve human participants or animal subjects; therefore, ethical approval was not required.

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