Government accounting supervision and corporate productivity: Evidence from market-oriented regulatory reform

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Highlights

- Governmental accounting supervision significantly enhances firms' TFP.
- The productivity-enhancing effects manifest more substantially in state-owned firms.
- Our findings extend the theoretical understanding of the accounting information quality-real economy nexus.

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Abstract

Leveraging China's nationwide unscheduled audit program as a quasi-natural experiment, this study examines the impact of government accounting supervision on corporate total factor productivity (TFP). Our results demonstrate significant TFP improvement, indicating the influence of such supervision on advancing market-oriented regulatory reform. Mechanism analyses reveal that these gains operate through enhanced internal governance and resource allocation efficiency. Heterogeneity tests indicate that the TFP-enhancing effects are stronger among state-owned enterprises and firms in nonlabor-intensive industries. These findings deepen our theoretical understanding of the nexus between accounting information quality and real economic performance, while underscoring how market-oriented regulatory interventions such as strengthened accounting supervision can simultaneously foster tangible economic outcomes and the information efficiency of capital markets.

Keywords: Government accounting supervision; total factor productivity; market-oriented regulatory reform; capital market information efficiency

1 Introduction

In modern corporate governance and economic operations, accounting information is a fundamental tool for firms' strategic planning, resource allocation, and risk control (Bushman & Smith, 2001). It is also a crucial pillar for maintaining trust in capital markets and improving information efficiency (Chen & Chen, 2024; Pan et al., 2023). Superior financial disclosure can reduce principal–agent information gaps (Zhang et al., 2023), lower firms' capital acquisition barriers (McInnis, 2010), and optimize economy-wide resource flow through enhanced investment choice calibration (Francis et al., 2005). Despite continuous accounting standard refinements and advanced technological tools, financial fraud and earnings manipulation remain persistent challenges (Biddle et al., 2009; Zhang et al., 2023). High-profile cases such as Kangmei Pharmaceutical in 2019, which overstated revenue and reported losses exceeding RMB 88 billion, underscore the severe consequences of accounting misconduct. Such incidents disrupt market order, undermine investor confidence, and damage the real economy. Amid ongoing institutional development and market-oriented regulatory reform, improving accounting information quality through effective regulatory supervision is a central concern for scholars and policymakers worldwide (Barakat & Hussainey, 2013; Lyu, 2025).

As a crucial institutional safeguard for enhancing accounting information quality, government accounting supervision takes various forms across countries (Zhang et al., 2023). In China, as the central authority for national accounting affairs, the Ministry of Finance introduced the Random Inspection of Accounting Information Quality system in 2006 (Liu et al., 2024). This system is characterized by a dual-random and one-public approach using random inspection target and inspector selection, followed by public disclosure of results (Firth et al., 2009; Pan et al., 2023). This framework was intended to reduce the risk of administrative interference and increase the scope and transparency of regulatory enforcement, reflecting a broader shift toward market-oriented regulatory reform. Notably, the inherent exogeneity of this mechanism provides a quasi-natural experimental setting for evaluating the effectiveness of government supervision. While extensive research has examined financial auditing (DeFond & Zhang, 2014) and securities regulation (Chen et al., 2005), empirical evidence on Ministry of Finance accounting supervision remains limited. In particular, previous research has largely focused on institutional design and procedural implementation, with relatively little attention paid to assessing the role of such regulatory interventions in corporate economic efficiency and their spillover effects on the information efficiency of capital markets.

Total factor productivity (TFP) is widely considered to be a valid indicator of firm-level production efficiency and technological progress (Cheng et al., 2023; Melitz, 2003; Syverson, 2011). Unlike partial productivity measures that focus on a single input, TFP effectively captures a firm's overall ability to use multiple inputs such as capital and labor (Wen et al., 2022), reflecting a combination of internal management capabilities, absorptive capacity, and innovation potential. Numerous studies have explored the determinants of TFP from various perspectives, including corporate governance structures (Gugler et al., 2003), financial transparency (Chen et al., 2011), and the broader financial environment (Aghion et al., 2005; Song et al., 2022). However, the influence of government regulation, particularly accounting supervision, in shaping TFP has received relatively limited attention. Government accounting supervision theoretically boosts firms' TFP by elevating financial reporting integrity and internal controls, refining capital deployment precision and investment efficacy, which subsequently supports the capital market's information efficiency. However, scant empirical verification exists regarding this microlevel transmission mechanism, particularly in emerging economies undergoing market-oriented regulatory reform.

To address this research gap, we construct a firm-level panel dataset by manually compiling accounting quality inspection records released by China's Ministry of Finance from 2010 to 2022 and matching them with Chinese listed firms' financial data. Employing a multiperiod difference-in-differences (DID) approach, we demonstrate that government accounting supervision significantly enhances regulated firms' TFP. This improvement is primarily driven by enhanced capital market information efficiency, which is manifested in increased internal governance and resource allocation efficiency. Furthermore, the positive impact is stronger for state-owned enterprises (SOEs) and in nonlabor-intensive industries, indicating substantial heterogeneity in

regulatory effectiveness across different organizational and industry contexts. Our findings contribute to the literature on the correlation between government regulation and firm TFP with practical policy implications for optimizing supervisory frameworks within the context of market-oriented regulatory reform and promoting high-quality corporate development.

2 Related literature and hypotheses development

TFP, a key indicator of firms' production efficiency and technological progress, has been extensively examined with respect to its antecedents across various dimensions including corporate governance, financial transparency, financial environment, and technological innovation. Previous research has demonstrated that sound corporate governance structure enhances supervisory and incentive mechanisms, mitigates agency conflicts, and improves resource allocation efficiency and innovation capacity (Gugler et al., 2003). Sufficient credit supply and effective capital markets also alleviate financing constraints and promote resource flow toward more efficient firms (Aghion et al., 2005; Bushman & Smith, 2001; Chen et al., 2011). Furthermore, technological innovation and human capital accumulation directly drive TFP growth, and firms' research and development (R&D) investment, technology absorption capabilities, and employee skills have been positively correlated with productivity (Jin et al., 2023; Suo et al., 2024). Institutional environment also significantly shapes firm efficiency. Factors such as property rights protection, market development, and regulatory quality influence firms' operational expectations and transaction costs, shaping microlevel resource allocation and management efficiency (Jing et al., 2024; Lin & Zhang, 2023).

However, despite extensive research exploring the determinants of TFP, studies examining the influence of government regulation—particularly government accounting supervision—on firm-level TFP remain relatively scarce. As a key institutional mechanism through which government financial authorities oversee corporate accounting information quality, the effectiveness and underlying channels of government accounting supervision require further investigation. This study draws on agency theory to explain the impact pathway of government accounting supervision on TFP. Agency theory emphasizes that corporate governance involves information asymmetry and conflicting interests between principals (owners) and agents (managers), wherein agents may exploit their information advantages to engage in self-serving practices, resulting in inefficient resource allocation and impaired firm performance (Dong et al., 2021; Geng et al., 2025; Jensen & Meckling, 1976). The agency problem is widespread in real-world business operations and tends to be exacerbated in contexts with weak internal governance and inadequate information disclosure (Hung et al., 2023; Pieringer & Totzek, 2022). Government accounting supervision mitigates information manipulation and financial fraud, improving information accuracy and transparency and narrowing the information gap between management and investors (DeFond & Zhang, 2014; Pan et al., 2023).

According to agency theory, conflicts between firm owners and managers can arise due to information asymmetry and divergent interests, resulting in resource misallocation and efficiency losses (Jensen & Meckling, 1976). As an external governance mechanism, government accounting supervision can mitigate these agency problems by enhancing information transparency and strengthening managerial accountability. First, stringent accounting supervision reinforces external constraints on management behavior, increasing the perceived consequences of opportunistic actions and reducing incentives for short-termism and earnings manipulation (Chen & Chen, 2024). Second, transparent and reliable financial information enables boards of directors and external investors to monitor managerial decisions more effectively, encouraging a strategic focus on long-term performance and value creation (Zhang et al., 2023). As agency costs decline, internal governance efficiency can improve, laying a solid institutional foundation for more effective resource allocation and innovation, ultimately contributing to sustained TFP improvement.

Building on this assumption, government accounting supervision can also promote TFP by enhancing resource allocation efficiency. First, high-quality accounting information reduces investors' risk perceptions, improves firms' credibility in capital markets, and lowers financing costs. This facilitates capital flow toward more productive and innovation-driven projects (Barakat

& Hussainey, 2013; Francis et al., 2005). Second, enhanced information transparency fosters more efficient internal resource allocation such as investments in R&D, human capital, and technology upgrades, strengthening firms' innovation capacity and organizational resilience (Syverson, 2011). Furthermore, standardized accounting oversight reduces operational uncertainty and bolsters market confidence, cultivating a competitive, stable, and sustainable business environment. In summary, government accounting supervision improves governance by addressing agency issues and drives systematic firm-level TFP improvement through more efficient resource allocation.

In summary, we posit that government accounting supervision promotes firms' TFP by optimizing internal governance and resource allocation. Therefore, referencing existing literature and theoretical analysis, we propose three hypotheses.

H1: *Government accounting supervision is positively associated with firms' TFP.*

H2: *Government accounting supervision enhances TFP by improving internal corporate governance efficiency.*

H3: *Government accounting supervision promotes TFP by optimizing resource allocation efficiency.*

3 Methodology

3.1 Sample selection

This study uses Chinese listed firms that were subjected to Ministry of Finance randomized accounting inspections as its sample, with financial data extracted from China Stock Market & Accounting Research and WIND databases and regulatory announcements sourced directly from the Ministry of Finance website. To ensure data accuracy and research rigor, we implemented a sample selection process. First, financial companies were excluded to avoid industry-specific effects that could bias the results, as such firms' regulatory environment, capital structure, and accounting practices substantially differ from nonfinancial firms (Geng et al., 2025). Second, observations wherein the inspection year preceded the company's listing year were excluded to maintain temporal consistency of the supervision events. For firms inspected multiple times, we only retained the record from the first inspection to prevent duplication bias. We also winsorized all continuous financial variables at 1% and 99% to reduce the influence of extreme outliers while maintaining data integrity. Following this protocol, the final unbalanced panel includes 21,290 firm–year observations across the 2010–2022 period.

3.2 *Measurement*

3.2.1 Dependent variable

From previous empirical literature on firm-level TFP measurement, semiparametric estimation techniques pioneered by Olley and Pakes (1996) and Levinsohn and Petrin (2003) emerged as methodological standards. The Olley–Pakes (OP) procedure addresses the simultaneity bias that plagues conventional ordinary least squares production function estimations. This endogeneity arises because unobserved TFP shocks simultaneously influence input selection decisions and output levels. However, a key limitation of the OP method is that it requires strictly positive investment values for estimation. To overcome this issue, Levinsohn and Petrin (2003) proposed an enhanced estimator to mitigate the OP framework's sample selection bias that arises from missing investment data. By substituting intermediate inputs (e.g., materials expenditure) as alternative productivity proxies, the LP method circumvents OP's reliance on investment variables while preserving its capacity to address simultaneity bias in production function estimation, making it empirically preferable for datasets with sparse investment records (Ackerberg et al., 2015). Furthermore, the LP approach better controls for unobservable productivity shocks and is more adaptable to diverse industry and firm production characteristics, which is more suitable for empirical application. Based on this analysis, we employ the LP method to estimate firms' TFP.

3.2.2 Independent variable

This study conducts a quasi-natural experiment using the Ministry of Finance's Double Random, One Public random inspection of accounting information quality (Chen & Chen, 2024; Pan et al., 2023). To do so, we manually collected inspection announcement data from 2010 to 2022 to construct the research data, employing a DID approach. As a crucial component of China's accounting supervision system, this inspection mechanism has had a key influence since its 1999 implementation to regulate firms' compliance with accounting standards and improve accounting information quality. Specifically, we define a postinspection dummy variable (post) that takes a value of 1 for the inspection year and all subsequent years for a given listed company and 0 for years prior to inspection. The treatment group dummy (Treat) indicates firms that were found to have issues during inspection is assigned a value of 1, and uninspected firms serve as the control group with a value of 0. The core explanatory variable is the interaction term DID (post × Treat), which captures the effect of the Ministry of Finance's accounting inspections on firms' TFP.

3.2.3 Control variables

This study introduces a series of firm-level control variables to account for factors that may influence the results. Firm age is calculated as the logarithm of the number of years since the firm was established, reflecting the firms' development stage and accumulated experience. Firm size is measured as the logarithm of total assets, which captures the scale of firms' operations and resources. Growth rate represents the annual percentage change in operating revenue, indicating firms' recent expansion or contraction. Leverage is defined as the ratio of total liabilities to total assets. Fixed assets ratio is the proportion of net fixed assets to total assets. Intangible assets ratio is calculated as the share of net intangible assets in total assets. Shareholding concentration refers to the percentage of the largest shareholder's equity, which may affect firm control and decision-making. Managerial shareholding measures the proportion of total shares owned by executives. Board size is expressed as the logarithm of the number of directors on the board, indicating boards' capacity for oversight and decision-making. Board independence is measured as the proportion of independent directors on the board. Duality is a dummy variable coded as 1 when the chairperson also serves as CEO, capturing the potential concentration of power in one individual. Financial background is a binary indicator that equals 1 if the CEO or chairperson has previous experience in the financial sector. Overseas background is assigned a value of 1 if the CEO or chairperson has studied or worked abroad. All variables are defined in Table 1.

[Insert Table 1 here]

3.3 Empirical model

As noted, this study employs a DID model to analyze the impact of government accounting supervision on firms' TFP, which is specified as follows:

$$TFP_{it} = \alpha_1 + \beta_1 DID_{it} + \sum rControls_{it} + \mu_i + \theta_t + \varepsilon_{it} \quad (1)$$

To test H2, we construct the following models based on formula (1):

$$Governance_{it} = \alpha_2 + \beta_2 DID_{it} + \sum rControls_{it} + \mu_i + \theta_t + \varepsilon_{it} \quad (2)$$

$$TFP_{it} = \alpha_3 + \beta_3 Governance_{it} + \sum rControls_{it} + \mu_i + \theta_t + \varepsilon_{it} \quad (3)$$

$$TFP_{it} = \alpha_4 + \beta_4 DID_{it} + \beta_5 Governance_{it} + \sum rControls_{it} + \mu_i + \theta_t + \varepsilon_{it} \quad (4)$$

To test H3, we construct the following models based on formula (1):

$$Resource_{it} = \alpha_5 + \beta_6 DID_{it} + \sum rControls_{it} + \mu_i + \theta_t + \varepsilon_{it} \quad (5)$$

$$TFP_{it} = \alpha_6 + \beta_7 Resource_{it} + \sum rControls_{it} + \mu_i + \theta_t + \varepsilon_{it} \quad (6)$$

$$TFP_{it} = \alpha_7 + \beta_8 DID_{it} + \beta_9 Resource_{it} + \sum rControls_{it} + \mu_i + \theta_t + \varepsilon_{it} \quad (7)$$

The DID variable is constructed as the interaction between the treatment group dummy (assigned a value of 1 if firms' parent group was subject to Ministry of Finance random accounting information quality inspection and 0 otherwise) and the postinspection time dummy (taking a value of 1 for the inspection year and subsequent years and 0 for previous years). This interaction captures the net effect of government accounting supervision. The dependent variable (TFP_{it}), is measured using the LP method, and the model controls for firm-specific heterogeneity (μ_i) and year-specific macroeconomic effects (θ_t), and ε_{it} represents the random error term. Leveraging the exogeneity of the Double Random inspection system, this DID framework isolates the causal impact of supervision policies on TFP. A statistically significant positive coefficient β indicates that government accounting supervision improves TFP, whereas a negative coefficient suggests an inhibitory effect on firms' TFP growth.

4 Results

4.1 Descriptive statistics

Table 2 presents the descriptive statistics. Firms' average TFP is 8.653, with a standard deviation (SD) of 1.042, indicating substantial variation in production efficiency across the sample. The government accounting supervision variable has a mean of 0.054, revealing that only 5.4% of firms were subjected to accounting supervision, reflecting a suitable policy shock for quasi-natural experimental analysis. Regarding firm characteristics, the average leverage ratio is 40.9%, fixed assets account for 34.2% of total assets, and intangible assets constitute a relatively low proportion of 4.6%, indicating that firms generally exhibit capital-intensive traits. In terms of governance structure, dual chairperson–CEO positions are highly prevalent, occurring in 95.5% of firms, and independent directors account for 37.7%, indicating that room remains for improving internal supervisory mechanisms. Concerning executive backgrounds, 59.7% of firms' top management have financial expertise, and 51.3% possess overseas experience, reflecting a relatively high degree of professionalization and internationalization within the management teams. Overall, the variable distributions are reasonable, providing a solid foundation for our empirical analysis.

[Insert Table 2 here]

4.2 Baseline regression results

Table 3 presents the baseline results for government accounting supervision's impact on firms' TFP. Column (1) includes year and industry fixed effects (FEs), Column (2) introduces firm-level control variables. Government accounting supervision exhibits positive, statistically significant coefficients across both specifications. Without controlling for other variables, firms subjected to government accounting supervision exhibit an average TFP increase of 0.123. After adding firm characteristics, the coefficient slightly decreases to 0.092, which corresponds to a 1% increase in TFP SD, indicating modest but practically meaningful improvement in firm TFP following government supervision.

Firm size is also significantly negatively correlated with TFP, indicating that a larger scale may increase management costs or resource misallocation issues that hinder efficiency improvement. Leverage ratio also has a significant negative effect, indicating that excessive financial leverage might increase financial burdens and reduce resource use efficiency. Fixed and intangible assets ratios are positively and significantly correlated with TFP, and intangible assets show the strongest positive effect, indicating that knowledge capital and technological accumulation are critical drivers of efficiency improvement. Additionally, firm growth rate positively affects TFP, implying that high-growth firms generally possess stronger vitality and innovation capabilities. Governance and executive characteristics, including shareholding concentration, managerial shareholding, board structure, and executive backgrounds, are predominantly statistically insignificant,

indicating that these governance variables have limited direct impact on TFP after controlling for other key factors, or their effects may operate through indirect channels or in specific contexts. Overall, the results support the conclusion that government accounting supervision significantly promotes firms' production efficiency and highlight the significance of asset structure, financial conditions, and growth prospects as key determinants of TFP. The R-squared (R^2) increases from 0.316 to 0.559 after adding controls, indicating that the inclusion of control variables substantially improves the model's explanatory power and enhances the robustness of our findings.

[Insert Table 3 here]

To examine whether the government's random accounting information quality inspections constitute a valid exogenous shock, we conduct a rigorous parallel trend test. Using an event study approach based on the exact year when firms were inspected, we divide the sample period into nine key intervals covering four years before inspection (pre_4), three years before (pre_3), two years before (pre_2), one year before (pre_1), the inspection year (current), one year after (post_1), two years after (post_2), three years after (post_3), and four years after (post_4). These nine time dummy variables enable us to precisely capture the dynamic effects and persistent impact of the policy intervention. Table 4 and Figure 1 present the parallel trend test results. First, in the four preinspection periods (pre_4–pre_1), the estimated coefficients are all close to zero and statistically insignificant, with 95% confidence intervals encompassing zero. This finding satisfies the parallel trend assumption and demonstrates a high degree of homogeneity in TFP trends between treated and control firms, effectively mitigating selection bias. Second, the dynamic effect analysis reveals that accounting inspections' policy impact exhibits a distinct time lag and persistence, whereas no significant effect is evident in the inspection year (current) and statistically significant positive effects emerge in the subsequent three years (post_1–post_3). Notably, by the fourth year postinspection (post_4), the policy effect remains significant but has a lower magnitude, indicating a potential attenuation boundary for the policy's sustained influence.

[Insert Table 4 here]

[Insert Figure 1 here]

4.3 Robustness tests

We next conduct several robustness tests. First, we employ the system generalized method of moments (GMM) approach to address the dynamic nature of TFP and potential endogeneity concerns. Second, to mitigate sample imbalance caused by the relatively small proportion of supervised firms, we apply propensity score matching (PSM) to achieve sample balance. Third, we use the FE method as an alternative approach for measuring TFP to confirm that the results are not sensitive to the TFP estimation method. Finally, we introduce additional policy control variables such as tax reforms and accounting firm random inspections into the model to ensure that the findings are not confounded by external policy shocks.

Given the pronounced dynamic characteristics of TFP, wherein current productivity is often influenced by past productivity, and the possibility that government supervision may be endogenously determined by firm characteristics, system GMM is an appropriate robustness test. This method introduces lagged dependent variables as instruments to control for the dynamic evolution of TFP while mitigating endogeneity and omitted variable bias (Sun & Chen, 2022). Specifically, system GMM uses lagged TFP as an explanatory variable and employs instruments for potentially endogenous regressors. As shown in Table 5, the coefficient on government accounting supervision remains positive and significant at 10% and 5% levels (0.048 and 0.049), respectively. This demonstrates that government supervision continues to enhance firm TFP after accounting for dynamics and endogeneity. The Hansen test confirms the overall validity of the instruments ($p > 0.10$), and the AR(2) test indicates no second-order autocorrelation in the residuals ($p > 0.10$). Additionally, the lagged TFP coefficients (L.TFP) are highly significant at the 1% level (0.650 and 0.488), further validating the persistence of TFP. Overall, the system GMM results provide robust causal evidence supporting the positive influence of government accounting supervision on boosting firms' TFP.

As only about 5.4% of firms in the sample underwent government accounting supervision, the sample distribution is notably unbalanced, raising selection bias concerns that could undermine causal inference. To address this, we employ PSM to construct a matched control group of firms with similar observable characteristics such as firm size, financial structure, and governance features to those under supervision, enabling a more credible estimation of the treatment effect. Using one-to-one matching based on propensity scores, we balance the baseline differences between the treated and control groups. The postmatching regression results in Table 5 demonstrate that government accounting supervision's effect on TFP remains statistically positive, consistent with the main regressions in direction and significance. This confirms that government accounting supervision significantly improves firms' TFP after controlling for differing sample characteristics.

[Insert Table 5 here]

To verify the robustness of TFP measurement methods, we employ an alternative TFP calculation approach for validation. In our baseline model, TFP is estimated using the LP method, which addresses endogeneity issues in production function estimation by using firms' intermediate inputs as control variables and has been widely adopted in the literature. However, different estimation methods may introduce measurement errors or lead to varying results. Therefore, we use the FE method as an alternative TFP measure (Pan et al., 2024). When the FE-estimated TFP variable is substituted into the regression model, the results in Table 6 reveal that the positive effect of government accounting supervision on firms' TFP remains significant, with coefficients of 0.109 and 0.086, which are both statistically significant. Therefore, regardless of whether TFP is measured using LP or FE methods, the conclusion that government accounting supervision enhances firms' TFP remains robust. This finding strengthens the reliability of our baseline results and indicates that the influence of government accounting supervision on improving TFP are robust.

We also acknowledge the potential effect of changes in domestic and international economic environments and related policies during the research period, focusing on the implementation of the Golden Tax Phase III reform and the China Securities Regulatory Commission's (CSRC) random accounting firm inspections. These policies may also influence firms' financial disclosure practices and tax avoidance incentives, potentially confounding the relationship between government accounting supervision and firms' TFP. To address this, we introduce two dummy variables into the baseline regression model (Tax Reform, indicating whether the firm's region implemented the Golden Tax Phase III reform, and Accounting Check, indicating whether the firm's accounting firm was subjected to CSRC random inspection). By including these controls, the model accounts for the external policy environment more comprehensively, reducing the risk of omitted variable bias. Table 6 reveals that the positive impact of government accounting supervision on firms' TFP remains significant after controlling for the effects of tax reform and regulatory inspections. This demonstrates that the TFP-enhancing effect of government accounting supervision is independent of other policy interventions, further validating the study's findings.

[Insert Table 6 here]

5 Additional analysis

5.1 Mechanism analysis

Table 7 presents regression results examining the mediating influence of internal governance efficiency on the relationship between government accounting supervision and firms' TFP. We quantify internal governance efficiency using the widely recognized Dibo Internal Control Disclosure Index (Cheng, 2025). First, Model (1) reveals that government accounting supervision has a significant positive effect on internal governance efficiency. This indicates that government accounting supervision not only functions at the institutional level but also enhances firms' internal governance effectiveness and transparency, promoting corporate governance structure optimization and improvement. Second, Models (2) and (3) demonstrate the positive impact of internal governance efficiency on firms' TFP. The coefficient on internal governance efficiency is

0.002 and significant at the 1% level, demonstrating that improvements in internal governance efficiency can effectively promote firms' TFP. This highlights the significant influence of robust governance mechanisms on enhancing firms' resource allocation efficiency and innovation capabilities. Model (3) reveals that the direct effect of government accounting supervision on firms' TFP remains significant, with a coefficient of 0.087 at the 5% significance level, although the magnitude of the effect is somewhat reduced. This indicates that the influence of government accounting supervision on boosting TFP is partially mediated through improved internal governance efficiency. In other words, government accounting supervision indirectly enhances firms' TFP by optimizing the internal governance environment.

In summary, these results strongly support the partial mediating role of internal governance efficiency in the pathway through which government accounting supervision promotes firms' TFP, highlighting the critical function of internal governance mechanisms in transmitting the effects of supervisory policies.

[Insert Table 7 here]

Table 8 illustrates the mediating influence of resource allocation efficiency, which refers to a firm's ability to optimally allocate production factors such as capital and labor to maximize output. To quantify this efficiency, we reference Krmac et al. (2023) and Liu et al. (2024), employing data envelopment analysis to comprehensively consider multiple input–output factors to evaluate the effectiveness and optimality of firms' resource allocation efficiency. This approach provides an objective reflection of resource allocation efficiency and its contribution to production efficiency.

Model (1) reveals a significant positive effect of government accounting supervision on resource allocation efficiency ($\beta = 0.007$; $p < 0.010$). This indicates that government accounting supervision promotes firms' effective resource allocation, enhancing resource utilization efficiency. Models (2) and (3) reveal that resource allocation efficiency has a strong and significant positive impact on firms' TFP, with respective coefficients of 0.773 and 0.758 ($p < 0.010$). This confirms that resource allocation efficiency improvement significantly improves overall production efficiency. Moreover, in Model (3), the direct effect of government accounting supervision on TFP remains significant with a coefficient of 0.087 ($p < 0.050$), although this effect is somewhat diminished compared with the model that does not control for resource allocation efficiency. This indicates that resource allocation efficiency partially mediates the effect of government accounting supervision on enhancing firms' TFP. In other words, a proportion of the positive impact of government accounting supervision is realized through optimized resource allocation.

In summary, these findings demonstrate that resource allocation efficiency is a key transmission mechanism through which government accounting supervision improves firms' TFP. By strengthening regulation and standardization, government accounting supervision facilitates optimized allocation of capital and other resources, resulting in improved TFP. This not only enriches the understanding of the economic effects of government accounting supervision but also has practical implications for corporate managers and policymakers, demonstrating that enhanced resource allocation efficiency is a significant pathway for boosting firms' TFP.

[Insert Table 8 here]

5.2 Heterogeneity analysis

5.2.1 SOEs vs. Non-SOEs

Table 9 reveals that government accounting supervision has a significant positive effect on SOEs' TFP, with a coefficient of 0.084 ($p < 0.050$). In contrast, although the effect is also positive for non-SOEs, it is statistically insignificant. This indicates that government accounting supervision is more effective in enhancing SOEs' TFP. Furthermore, the control variables exhibit different patterns across ownership types. For example, leverage has a significantly negative impact on non-SOEs' TFP but is insignificant for SOEs, reflecting the distinct influence of ownership structure

on driving firm TFP. This disparity may be attributable to SOEs' the close government ties and unique institutional context. As entities directly or indirectly controlled by the government, SOEs are subject to stricter policy guidance and accounting regulations, where government accounting supervision is a crucial incentive and constraint mechanism. Specifically, such supervision improves SOEs' internal governance, enhances financial transparency, and optimizes resource allocation efficiency, promoting technological progress and managerial innovation that boost TFP. In contrast, non-SOEs typically feature more diverse ownership structures and greater managerial autonomy but also face stronger market competition and more complex internal governance challenges. Consequently, the direct effect of government accounting supervision on non-SOEs is weakened and does not significantly improve their TFP. Therefore, ownership differences exhibit significant heterogeneity in the impact of government accounting supervision on firms' TFP.

5.2.2 Labor-intensive vs. Nonlabor-intensive firms

At the industry level, government accounting supervision notably enhances TFP for nonlabor-intensive sectors, revealing a coefficient of 0.071 ($p < 0.050$), and although the effect is positive, it is statistically insignificant for labor-intensive industries. Additionally, intangible assets contribute more substantially to nonlabor-intensive industries' TFP, and leverage has significant effects across the two industry types, indicating that industry characteristics influence the mechanisms affecting TFP. This is primarily attributable to differing technological dependence and capital structure across industries. Nonlabor-intensive industries typically rely more heavily on technological innovation and capital investment, with more complex operations that demand stricter accounting supervision and higher transparency. Government accounting supervision enhances the accuracy and completeness of financial information, facilitating the efficient capital flow and allocation, which supports R&D and innovation activities that improve production efficiency and TFP. Conversely, labor-intensive industries depend on low-cost labor and employ standardized, simplified production processes. Financial supervision has a limited influence on enhancing their core competitiveness and rendering government accounting supervision less effective in generating productivity gains in these sectors. Therefore, differing production factor structure and operational characteristics across industries generate heterogeneous impacts from government accounting supervision on TFP.

[Insert Table 9 here]

6 Conclusion and discussion

Employing quasi-experimental variations in China's nationwide unscheduled audit program as exogenous shocks, this study examines governmental accounting supervision's effect on TFP within the broader context of market-oriented regulatory reform. We demonstrate that government accounting supervision significantly enhances regulated firms' TFP. This improvement is primarily driven by improved capital market information efficiency, which is manifested in increased internal governance efficiency and more effective resource allocation. Furthermore, the positive impact is stronger for SOEs and in nonlabor-intensive industries, indicating substantial heterogeneity in regulatory effectiveness across different organizational and industry contexts.

Our findings contribute to the literature in three ways. First, by revealing the positive impact of government accounting supervision on firms' TFP, this study addresses a critical gap in the existing literature that has largely focused on regulatory effects in terms of financial compliance, while neglecting the implications for capital markets' economic and information efficiency. Previous research has predominantly examined how accounting supervision influences earnings management (Sadiq & Abbas, 2023) or audit quality (DeFond & Zhang, 2014). In contrast, this study employs a quasi-natural experiment based on China's Ministry of Finance's Double Random, One Disclosure inspection mechanism, which is an integral part of the nation's ongoing market-oriented regulatory reform, providing the first empirical evidence that government accounting supervision enhances TFP by improving internal governance and resource allocation efficiency. These results extend the literature on the economic consequences of accounting regulation from the information quality dimension to TFP, echoing Syverson's (2011) argument that institutional

environments shape TFP differences. As such, we offer new insights into the relationship between institutional innovations and firm efficiency in emerging markets.

Second, our findings open the black box behind how accounting supervision affects TFP by identifying its underlying mechanisms. Unlike previous work that has primarily focused on the direct association between regulation and performance (Chen et al., 2011), this study demonstrates the dual mediating roles of internal governance and resource allocation efficiency. Specifically, government accounting supervision enhances the transparency of financial disclosure (Bushman & Smith, 2001) and restrains managerial opportunism (Jensen & Meckling, 1976), improving corporate governance and supporting market-oriented regulatory reform. Furthermore, regulatory pressure improves the information environment, reduces capital misallocation (Aghion et al., 2005), and facilitates resource reallocation toward more productive projects, enhancing capital markets' information efficiency. These findings enrich the regulation–behavior–efficiency theoretical chain and provide microlevel support for the applicability of agency theory in transitional economies undergoing market-oriented regulatory reforms.

Third, the heterogeneity analysis reveals the moderating influence of institutional context and industry characteristics, demonstrating that the positive effects of accounting supervision on TFP are more pronounced for SOEs and nonlabor-intensive industries. This is consistent with earlier findings on the influence of ownership structure on firms' responsiveness to regulation (Gugler et al., 2003) and the impact of technological intensity on regulatory effectiveness (Aghion et al., 2005). Furthermore, this study reveals that SOEs are more susceptible to regulatory pressure under market-oriented regulatory reform, due to their higher political sensitivity, while firms in nonlabor-intensive industries are more dependent on accounting transparency due to their complex operations, which improves capital markets' information efficiency. These insights contribute new boundary conditions for the contextual understanding of regulatory effectiveness.

This study offers several practical insights. For regulatory authorities, the first priority should be to enhance the targeting efficiency of the Double Random, One Public accounting inspection mechanism as part of the broader market-oriented regulatory reform agenda. As the positive impact of government accounting supervision is more pronounced for SOEs and firms in capital-intensive industries, regulatory resources should be prioritized for these segments to maximize capital markets' information efficiency improvement. In addition, differentiated, incentive-compatible mechanisms such as connecting inspection outcomes and credit ratings should be designed to encourage privately owned enterprises' compliance. Second, regulatory coordination must be strengthened, and a more integrated framework should be established by promoting information sharing between the Ministry of Finance and other relevant authorities such as tax and securities regulators. This would establish a comprehensive regulatory loop that connects accounting information quality, tax compliance, and capital market disclosures, amplifying the multiplier effect of government supervision and advancing market-oriented regulatory reform objectives.

For firms, external accounting supervision should be proactively leveraged to drive internal governance improvement within the evolving landscape of market-oriented regulatory reform. Management can respond by implementing rectification tracking systems, adopting intelligent accounting technologies, and converting compliance obligations into opportunities for operational upgrading. This is particularly relevant for labor-intensive and private-sector firms, which often perceive transparency initiatives as cost-increasing in the short term. However, enhanced accounting transparency can alleviate long-term financing constraints (Francis et al., 2005) and improve resource allocation efficiency, ultimately positioning firms more competitively during industrial transformation and upgrading while contributing to improving capital markets' information efficiency.

This study has several limitations. First, the LP method does not fully account for external environmental factors that may influence firm TFP such as digital infrastructure and regional policy differences. Future research could adopt spatial econometric models or stochastic frontier analysis to better capture the influence of institutional and contextual factors. Second, mechanism variables are measured through financial ratios, which may not fully reflect the complexity of institutional changes and firm responses. Incorporating managerial behavior data, text analysis,

and/or survey-based microdata may enhance the depth and precision of mechanism identification. Third, as regulatory technology continues to evolve, government supervision is increasingly shifting toward digital and intelligent models. Future studies could explore how emerging technologies such as automated auditing systems enhance regulatory precision and efficiency. Finally, this study is subject to data-availability constraints, as the Ministry of Finance inspection list is only publicly available up to 2022, which limits the temporal coverage of the analysis. In addition, potential survivorship bias may arise if firms that exit the sample differ systematically from continuing firms, which could affect the generalizability of our findings.

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Table 1. Variables and definitions

Variables	Measures
Total factor productivity	Calculated using the Levinsohn and Petrin (2003) method.
Government accounting supervision	Equals 1 if the listed firm's parent group is subject to Ministry of Finance accounting inspections in the current or subsequent years and 0 otherwise.
Firm age	Natural logarithm of the number of years since the firm's establishment.
Firm size	Natural logarithm of total assets.
Leverage	Total liabilities divided by total assets.
Fixed assets	Net fixed assets divided by total assets.
Intangible assets	Net intangible assets divided by total assets.
Growth rate	(Current period's revenue minus previous period's revenue) divided by previous period's revenue.
Shareholding concentration	Largest shareholder's shareholding ratio.
Managerial shareholding	Total shares held by executives divided by total shares.
Board size	Natural logarithm of the total number of board members.
Board independence	Number of independent directors divided by total board members.
Financial background	Equals 1 if the CEO or chairperson has a financial background (e.g., former CFO, accountant) and 0 otherwise.
Overseas background	Equals 1 if the CEO or chairperson has overseas experience (studying, working, etc.) and 0 otherwise.

Duality	Equals 1 if the chairperson also serves as the CEO and 0 otherwise.

Table 2. Descriptive statistics

Variables	Obs	Mean	SD	Min	Max
Total factor productivity	21,290	8.653	1.042	3.894	12.387
Government accounting supervision	21,290	0.054	0.226	0	1
Firm age	21,290	2.049	0.791	0	3.497
Firm size	21,290	22.216	1.284	17.757	28.636
Leverage	21,290	0.409	0.198	0.008	0.998
Fixed assets	21,290	0.342	0.167	0	0.975
Intangible assets	21,290	0.046	0.054	0	0.890
Growth rate	21,290	0.151	0.278	−0.391	2.172
Shareholding concentration	21,290	0.324	0.142	0.080	0.758
Managerial shareholding	21,290	0.163	0.202	0	0.706
Board size	21,290	2.114	0.194	1.609	2.708
Board independence	21,290	0.377	0.053	0.250	0.600
Financial background	21,290	0.597	0.490	0	1
Overseas background	21,290	0.513	0.500	0	1
Duality	21,290	0.955	0.207	0	1

Table 3. Baseline regression results

Variables	(1) Total factor productivity	(2) Total factor productivity
Government accounting supervision	0.123**	0.092**
	(0.055)	(0.041)
Firm age		−0.029
		(0.021)
Firm size		−0.588***
		(0.018)
Leverage		−0.191***
		(0.057)
Fixed assets		0.497***
		(0.068)
Intangible assets		1.073***
		(0.168)
Growth rate		0.053***
		(0.014)
Shareholding concentration		−0.113
		(0.094)

Managerial shareholding		0.009
		(0.054)
Board size		−0.023
		(0.045)
Board independence		−0.038
		(0.122)
Financial background		−0.005
		(0.008)
Overseas background		0.005
		(0.010)
Duality		0.012
		(0.019)
Constant	9.090***	21.587***
	(0.207)	(0.443)
Obs	21,290	21,290
R^2	0.316	0.559
Year FE	Included	Included
Industry FE	Included	Included

Note: * $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$. Standard errors are in parentheses.

Table 4 Robustness test: Equilibrium trend test

Variables	Equilibrium trend test	
Pre_4	0.027	−0.067
	(0.098)	(0.079)
Pre_3	0.095	−0.040
	(0.088)	(0.071)
Pre_2	0.094	0.083
	(0.084)	(0.067)
Pre_1	−0.049	0.046
	(0.058)	(0.047)
Current	0.029	0.043
	(0.048)	(0.039)
Post_1	0.200***	0.142***
	(0.031)	(0.025)
Post_2	0.061	0.061*
	(0.043)	(0.034)
Post_3	0.067	0.057*
	(0.043)	(0.034)

Post_4	0.049	0.042
	(0.044)	(0.036)
Firm age		−0.025**
		(0.013)
Firm size		−0.588***
		(0.007)
Leverage		−0.190***
		(0.026)
Fixed assets		0.496***
		(0.029)
Intangible assets		1.073***
		(0.085)
Growth rate		0.052***
		(0.004)
Shareholding concentration		−0.113**
		(0.045)
Managerial shareholding		0.007
		(0.032)

Board size		−0.021
		(0.028)
Board independence		−0.040
		(0.084)
Financial background		−0.005
		(0.007)
Overseas background		0.005
		(0.007)
Duality		0.012
		(0.015)
Constant	9.079***	21.580***
	(0.183)	(0.218)
Obs	21290	21290
R^2	0.317	0.560
Year FE	Included	Included
Industry FE	Included	Included

Note: * $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$. Standard errors are in parentheses.

Table 5 Robustness tests: GMM and PSM

Variables	GMM		PSM	
Government accounting supervision	0.048*	0.049**	0.144***	0.100***
	(0.027)	(0.025)	(0.048)	(0.038)
Firm age		−0.056***		−0.053**
		(0.015)		(0.024)
Firm size		−0.338***		−0.562***
		(0.007)		(0.018)
Leverage		−0.133***		−0.261***
		(0.024)		(0.062)
Fixed assets		0.336***		0.621***
		(0.027)		(0.070)
Intangible assets		0.730***		0.985***
		(0.077)		(0.207)
Growth rate		−0.013***		0.058***
		(0.004)		(0.017)
Shareholding concentration		−0.190***		−0.125
		(0.040)		(0.101)

Managerial shareholding		−0.011		−0.049
		(0.031)		(0.060)
Board size		−0.014		−0.069
		(0.025)		(0.051)
Board independence		0.006		−0.087
		(0.075)		(0.138)
Financial background		−0.007		−0.003
		(0.006)		(0.009)
Overseas background		0.007		0.002
		(0.006)		(0.012)
Duality		0.008		−0.004
		(0.014)		(0.021)
L.TFP	0.650***	0.488***		
	(0.006)	(0.006)		
Constant	3.115***	11.910***	8.979***	21.129***
	(0.157)	(0.236)	(0.207)	(0.430)
Obs	18,986	18,986	15,509	15,509
R^2	0.606	0.676	0.321	0.557

Year FE	Included	Included	Included	Included
Industry FE	Included	Included	Included	Included

Note: * $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$. Standard errors are in parentheses.

Table 6 Robustness tests: Alternative measurement and additional controls

Variables	Alternative measurement		Additional controls	
Government accounting supervision	0.109*	0.086**	0.132**	0.097**
	(0.063)	(0.041)	(0.058)	(0.042)
Firm age		−0.054***		−0.032
		(0.020)		(0.021)
Firm size		−0.774***		−0.584***
		(0.016)		(0.018)
Leverage		−0.144***		−0.191***
		(0.054)		(0.058)
Fixed assets		−0.125**		0.493***
		(0.063)		(0.068)
Intangible assets		0.863***		1.083***
		(0.158)		(0.169)
Growth rate		0.057***		0.052***
		(0.015)		(0.014)
Shareholding concentration		−0.129		−0.116
		(0.089)		(0.094)

Managerial shareholding		0.012		0.011
		(0.050)		(0.054)
Board size		−0.028		−0.025
		(0.043)		(0.045)
Board independence		−0.054		−0.052
		(0.115)		(0.122)
Financial background		−0.000		−0.004
		(0.008)		(0.008)
Overseas background		0.003		0.005
		(0.009)		(0.010)
Duality		0.012		0.012
		(0.018)		(0.019)
Tax reform			−0.265***	−0.078*
			(0.070)	(0.045)
Accounting check			−0.043*	−0.013
			(0.025)	(0.019)
Constant	10.923***	27.743***	9.163***	21.551***
	(0.250)	(0.438)	(0.214)	(0.449)

Obs	21,290	21,290	21,196	21,196
R^2	0.387	0.693	0.318	0.558
Year FE	Included	Included	Included	Included
Industry FE	Included	Included	Included	Included

Note: * $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$. Standard errors are in parentheses.

Table 7. Mediating effect of internal governance efficiency

Variables	(1) Internal governance efficiency	(2) Total factor productivity	(3) Total factor productivity
Government accounting supervision	3.157***		0.087**
	(1.157)		(0.041)
Internal governance efficiency		0.002***	0.002***
		(0.000)	(0.000)
Firm age	4.478***	−0.037*	−0.037*
	(0.548)	(0.021)	(0.021)
Firm size	−4.668***	−0.581***	−0.581***
	(0.387)	(0.018)	(0.018)
Leverage	8.480***	−0.203***	−0.204***
	(1.164)	(0.058)	(0.057)
Fixed assets	3.557***	0.488***	0.487***
	(1.292)	(0.068)	(0.068)
Intangible assets	−1.712	1.083***	1.081***
	(3.893)	(0.169)	(0.169)
Growth rate	−1.149***	0.055***	0.055***

	(0.353)	(0.014)	(0.014)
Shareholding concentration	−51.903***	−0.031	−0.036
	(2.784)	(0.096)	(0.096)
Managerial shareholding	39.603***	−0.058	−0.058
	(2.124)	(0.052)	(0.052)
Board size	−4.544***	−0.017	−0.016
	(1.283)	(0.045)	(0.045)
Board independence	5.203	−0.047	−0.046
	(3.963)	(0.123)	(0.123)
Financial background	−1.034***	−0.003	−0.003
	(0.223)	(0.008)	(0.008)
Overseas background	−0.827***	0.006	0.006
	(0.253)	(0.010)	(0.010)
Duality	−0.787	0.013	0.013
	(0.604)	(0.019)	(0.019)
Constant	159.300***	21.346***	21.353***
	(9.839)	(0.449)	(0.448)
Obs	21,258	21,258	21,258

R^2	0.280	0.559	0.559
Year FE	Included	Included	Included
Industry FE	Included	Included	Included

Note: * $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$. Standard errors are in parentheses.

Table 8. Mediating effect of resource allocation efficiency

Variables	(1) Resource allocation efficiency	(2) Total factor productivity	(3) Total factor productivity
Government accounting supervision	0.007***		0.087**
	(0.002)		(0.041)
Resource allocation efficiency		0.773***	0.758***
		(0.235)	(0.234)
Firm age	0.009***	−0.037*	−0.036*
	(0.001)	(0.021)	(0.021)
Firm size	−0.009***	−0.581***	−0.581***
	(0.001)	(0.018)	(0.018)
Leverage	0.017***	−0.203***	−0.204***
	(0.002)	(0.058)	(0.057)
Fixed assets	0.007***	0.488***	0.487***
	(0.003)	(0.068)	(0.068)
Intangible assets	−0.003	1.083***	1.081***
	(0.008)	(0.169)	(0.169)
Growth rate	−0.002***	0.055***	0.055***

	(0.001)	(0.014)	(0.014)
Shareholding concentration	−0.104***	−0.032	−0.037
	(0.006)	(0.096)	(0.096)
Managerial shareholding	0.079***	−0.057	−0.057
	(0.004)	(0.052)	(0.052)
Board size	−0.009***	−0.017	−0.017
	(0.003)	(0.045)	(0.045)
Board independence	0.011	−0.047	−0.046
	(0.008)	(0.123)	(0.123)
Financial background	−0.002***	−0.003	−0.003
	(0.000)	(0.008)	(0.008)
Overseas background	−0.002***	0.006	0.006
	(0.001)	(0.010)	(0.010)
Duality	−0.002	0.013	0.013
	(0.001)	(0.019)	(0.019)
Constant	0.417***	21.273***	21.282***
	(0.020)	(0.453)	(0.453)
Obs	21,258	21,258	21,258

R^2	0.279	0.559	0.559
Year FE	Included	Included	Included
Industry FE	Included	Included	Included

Note: * $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$. Standard errors are in parentheses.

Table 9. Heterogeneity analysis

Variables	Ownership heterogeneity		Industry heterogeneity	
	SOEs	Non-SOEs	Labor-intensive	Nonlabor-intensive
Government accounting supervision	0.084**	0.054	0.076	0.071**
	(0.042)	(0.037)	(0.055)	(0.031)
Firm age	−0.035	−0.002	−0.009	−0.044***
	(0.032)	(0.015)	(0.028)	(0.014)
Firm size	−0.571***	−0.581***	−0.501***	−0.606***
	(0.014)	(0.008)	(0.015)	(0.008)
Leverage	0.001	−0.210***	0.373***	−0.327***
	(0.055)	(0.030)	(0.053)	(0.030)
Fixed assets	0.458***	0.537***	0.364***	0.529***
	(0.055)	(0.035)	(0.054)	(0.034)
Intangible assets	0.810***	1.047***	0.362*	1.189***
	(0.168)	(0.100)	(0.217)	(0.091)
Growth rate	0.106***	0.046***	0.035***	0.059***
	(0.014)	(0.005)	(0.008)	(0.005)
Shareholding concentration	−0.334***	0.011	−0.054	−0.153***

	(0.085)	(0.055)	(0.088)	(0.051)
Managerial shareholding	0.268	−0.004	0.017	0.019
	(0.267)	(0.033)	(0.073)	(0.035)
Board size	−0.075	−0.022	0.104*	−0.051
	(0.051)	(0.033)	(0.055)	(0.031)
Board independence	0.039	−0.084	0.084	−0.053
	(0.145)	(0.103)	(0.175)	(0.093)
Financial background	−0.015	−0.002	−0.021	−0.002
	(0.013)	(0.007)	(0.013)	(0.007)
Overseas background	−0.007	0.010	0.031**	0.002
	(0.013)	(0.008)	(0.014)	(0.008)
Duality	−0.014	0.018	0.001	0.012
	(0.027)	(0.018)	(0.030)	(0.017)
Constant	21.703***	21.547***	19.266***	22.136***
	(0.371)	(0.296)	(0.373)	(0.233)
Obs	5,747	15,543	3,689	17,601
R^2	0.532	0.580	0.566	0.556
Year FE	Included	Included	Included	Included

Industry FE	Included	Included	Included	Included

Note: * $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$. Standard errors are in parentheses.

Figure 1. Parallel trend test