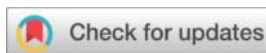




Does National Audit Announcement Improve Analysts'

Earnings Forecasts?



Evidence from Chinese Central State-Owned Listed Companies

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Abstract

Purpose — This paper investigates the impact of national audit announcements on analysts' earnings forecasts in China. We also explore how this effect is influenced by the content and tone of the announcements, the professional abilities of analysts, the information environment of the target enterprises, and media coverage.

Design/methodology/approach — We employed a difference-in-differences (DID) approach, leveraging the quasi-natural experiment of national audits conducted on Chinese central state-owned conglomerates. To assess the tone of national audit announcements, we utilized textual analysis and implemented a dynamic DID strategy. Additionally, we used Heckman methods, propensity score matching, and various placebo tests to address potential endogeneity concerns. We further conducted heterogeneous analyses through grouped regressions.

Findings — Our results indicate that national audit announcements not only curb analysts' optimism by threatening their reputations and career advancement, but also by correcting their upward cognitive biases from firms' positive voluntary disclosures. Furthermore, these announcements enhance forecast accuracy by providing detailed risk information about central state-owned enterprises (CSOEs) and improving corporate information environments. Analysts are particularly responsive to the negative sentiment of announcements, especially regarding policy implementation and issues of ethics and integrity. The effect is more pronounced among non-star analysts and in firms with significant information asymmetry. Media coverage also amplifies the effect. Overall, national audits play a crucial role in refining analysts' forecasts and increasing market transparency.

Originality/value — This research contributes to the literature on national audits by emphasizing the role of national audit announcements as mandatory monitoring mechanisms in the capital market, particularly for analysts. The study's focus on the sentiment of announcements underscores the need for ongoing optimization of national audit announcements to enhance the public information environment.

Keywords: National audit announcement, Analysts' earnings forecasts, Professional abilities of

1. Introduction

National audit serves as a cornerstone of the mandatory supervision and governance system in numerous countries, distinguished by its institutional independence and statutory authority (Normanton, 1966; Funnell, 1994; Craswell *et al.*, 2002; Liu, 2012). Unlike social audits and internal audits of state-owned enterprises (SOEs), national audits operate with greater autonomy from governmental departments and corporate entities, positioning them as a uniquely powerful mechanism for enhancing information quality and transparency. While prior research has predominantly examined the direct effects of national audit announcements on information quality and investor behavior (Li and Wu, 2013; Chen *et al.*, 2014), the influence of these audits on capital market information intermediaries remains underexplored.

Financial analysts play a pivotal role in bridging information gaps between firms and investors, with financial reports serving as their primary information source for forecasting (Knutson, 1993; Hu *et al.*, 2003). Despite the growing availability of alternative information channels, such as management earnings forecasts, conference calls, and corporate social responsibility disclosures (Matsumoto *et al.*, 2011; Bowen *et al.*, 2002; Dhaliwal *et al.*, 2012; Cen *et al.*, 2020), the quality of financial reporting remains a critical determinant of analysts' forecast accuracy. Earnings management practices can distort this information (Abarbanell and Lehavy, 2003), while high-quality audits, which are conducted by reputable firms, experienced auditors, or those with longer tenures, tend to improve forecast precision (Ghosh and Moon, 2005; Behn *et al.*, 2008; Lawrence *et al.*, 2011; He *et al.*, 2019). However, the literature has largely focused on social audits or third-party audits, with limited attention to how national audits, given their distinctive institutional features, shape analysts' forecasting behavior.

This study addresses this gap by investigating the following research question: How do national audit announcements affect analysts' earnings forecast accuracy and bias? By examining this question, we aim to elucidate the broader role of national audits in the capital market's information ecosystem and their implications for market efficiency.

Existing literature suggests that analysts often display an optimistic bias in their earnings forecasts and investment recommendations due to factors such as catering to management and the market (Hayes, 1998; Jansen *et al.*, 2022), herd behaviour (Clement and Tse, 2005; De Franco *et al.*, 2015; Do and Zhang, 2020), and optimistic voluntary disclosures by target companies (Easterwood and Nutt, 1999; Sedor, 2002; Drake and Mayers, 2011; Merkley *et al.*, 2013). Given the public concerns and potential economic repercussions of independently and authoritatively revealing detailed issues within audited firms, we hypothesize that the mandatory public release of national audit findings could act as a deterrent for analysts who are motivated by self-interest, particularly

in terms of protecting their professional reputation and career advancement. This deterrent effect could reduce analysts' optimism in their forecasts, leading to more caution and the incorporation of additional information about negative risks.

Furthermore, some research argues that analysts' forecast accuracy may decline due to information asymmetry resulting from firms' selective disclosures and a deteriorating information environment (Byard and Shaw, 2003; Harford *et al.*, 2019). In contrast, we hypothesize that national audit announcements will enhance the accuracy of analysts' forecasts by improving the information environment within audited firms through mandatory public disclosure. These announcements may also provide analysts with incremental information that is typically beyond their reach, particularly regarding issues such as policy implementation, ethics, and integrity within the firms, and even economic crimes.

To examine the effect of national audit announcements on analyst forecasts, we collected a sample of A-share listed companies in China that are owned by the central government or central state-owned conglomerates (referred to as "listed CSOEs"). Some of the central state-owned conglomerates to which these listed CSOEs belong received national audit announcements between 2008 and 2019. On September 1, 2010, the National Audit Office of the People's Republic of China (CNAO) mandated the public disclosure of national audit findings through compulsory announcements.

Compared to the U.S. Government Accountability Office (GAO), the CNAO has a broader scope, evaluating not only government efficiency, budget expenditures, and service quality but also financial revenues and expenditures, asset profitability, and losses of CSOEs. Analysts have limited opportunities to issue optimistic forecasts in response to negative national audit announcements because national audit institutions primarily rely on objective, accurate, and reliable information about operations, transactions, finances, and other activities.^[1] These institutions rely less on information voluntarily disclosed by enterprises or their stakeholders, such as analysts. Furthermore, central state-owned conglomerates selected for national audits are informed only three days before the audit begins, and surprise audits are common, reducing the possibility of collusion with analysts to issue more optimistic forecasts. This makes national audit announcements exogenous shocks to the audited enterprises.

Additionally, according to a public statement by the CNAO's official leader,^[2] two rounds of national audits have been conducted on all central state-owned conglomerates, covering various industries such as manufacturing, energy, and electric power. This suggests that each central state-owned conglomerate has a similar probability of being selected for a national audit. Based on this quasi-experiment, we designed a staggered difference-in-differences model. The treatment group

consists of listed CSOEs whose parent conglomerates received national audit announcements during the sample period, while the control group comprises those whose parent conglomerates were not affected by national audit announcements.

The results from the DID regressions indicate a significant improvement in the quality of analysts' earnings forecasts following the public release of national audit reports. Specifically, there is a noticeable decline in analyst optimism and an increase in forecast accuracy after the announcement of audit findings. To address potential endogeneity concerns in the regressions, we employed a variety of models and analyses, including dynamic DID methods, PSM-DID methods, Heckman methods, and placebo tests. The results remain robust across these different approaches.

Moreover, we identified two key mechanisms at work: the deterrence effect and the information effect. First, by using textual analysis to assess the tone of the announcements, we examined their differential impact on analysts' forecasts. Announcements containing a higher proportion of negative words have a stronger positive effect on improving forecast quality, consistent with the deterrence effect hypothesis. Second, we measured the number of issues identified in the audited enterprises across four areas: accounting and finance, operations and management, implementation of macro policies, and ethics and integrity. Analysts are particularly responsive to the public disclosure of problems related to the implementation of macro policies and issues of ethics and integrity. Third, we found that forecasts made by less-experienced analysts or those targeting firms with greater information asymmetry show heightened sensitivity to national audit announcements. This suggests that national audit announcements provide analysts with richer, more detailed information, helping to reduce cognitive biases. Additionally, our analysis revealed that media coverage enhances the effectiveness of national audit announcements by facilitating information dissemination. Overall, our findings strongly support the role of national audit announcements as external, independent monitors within firms' information environments.

This paper contributes to the existing literature in three significant ways. First, we explore the role of national audits as a governing force in economic operations. Signaling and monitoring are viewed as the primary mechanisms which have been invoked to explain how auditing influences the functioning of capital markets (Zimmerman, 1977). These studies suggest that audit reports supply accounting information that can be cross-referenced with the self-disclosed ones from audited entities. Studies on national audits largely follow these established mechanisms (Li and Wu, 2013; Chen et al., 2014). We extend the issue by investigating how national audit announcements improve the effectiveness of information intermediaries. Our findings reveal two additional pathways for national auditing to fulfill its economic governance role. The first mechanism is related to deterrence raised by national audit announcements. We found that analysts significantly reduce their optimism

and adopt a more cautious approach when national audit announcements convey a stronger negative tone. The second mechanism involves the provision of essential incremental information. National audit announcements uncover both existing and potential unlawful or irregular activities, as well as high-risk behaviors, within audited entities. These issues reveal survival risks and potential economic costs the audited entities face. And most importantly, this information is disclosed exclusively through national audit announcements. We found an interesting phenomenon: as the number of violations and unlawful activities disclosed by national audit announcements increases, analysts become more cautious and the accuracy of their forecasts improves. In addition, the impact driven by the disclosure of these issues is greater than that caused by other concerns related to accounting, finance, and operational management.

Second, this paper contributes to the literature on the announcement effects of audit reports. A key challenge in this family of literature is the difficulty in isolating the announcement effect of audit reports, partly due to the distinct institutional contexts and objectives of different audit types. For instance, social audits often involve a collaborative relationship between the auditor and the client, which can influence the nature and scope of disclosed information. Similarly, internal audits operate within a corporate governance framework where the dissemination of findings is typically subject to managerial discretion and confidentiality requirements (Lenz and Sarens, 2012; Lenz and Hahn, 2015).^[3] These factors can complicate the identification of a clear, market-discernible announcement effect. In contrast, national audits operate within a unique institutional setting. Mandated by law and funded by the central government, national audit bodies are endowed with a high degree of statutory independence and coercive authority. Audited entities, particularly central state-owned conglomerates, are legally obligated to cooperate fully, and insiders face legal risks for intentionally withholding information.^[4] This framework ensures a high level of independence from the audited entities and promotes an objective and transparent audit process.^[5] Furthermore, national auditors typically possess extensive experience, autonomy, and resources, allowing for thorough and in-depth investigations. The distinct characteristics of national audits—their statutory independence, thoroughness, and the public nature of their findings—provide a compelling context for examining the announcement effect of audit reports. We leverage this unique setting by conducting a detailed textual analysis of national audit announcements, scientifically quantifying their tones and the specific issues they address. This approach allows us to innovatively provide granular insights into the information that analysts prioritize and are sensitive to when making forecasts. Additionally, by examining the responses of information intermediaries, our study offers valuable feedback to national audit departments, helping to evaluate the effectiveness of their disclosure system and its impact on the capital market.

Third, we offer new insights into the types of information which are truly valuable to participants in the capital market. Prior studies primarily examined analysts' reactions to social audits (Ghosh and Moon, 2005; Behn *et al.*, 2008; Hassan and Giorgioni, 2018). But the independence of social auditors and the information quality of social audit announcements are often compromised by potential collusion since social auditors have tight financial ties to their clients. In contrast, our findings present that the national audit announcement is a more reliable source of information in the capital market.

The remainder of the paper proceeds as follows. Section 2 provides an overview of the national audit system and its disclosure practices in China. Section 3 reviews related literature and develops hypothesis. Section 4 outlines the empirical designs. Sections 5 expounds on the detailed empirical analysis. Sections 6 presents further analyses. The section of conclusion comes to the last part.

2. Institutional background

The national audit system in the United States exemplifies a legislative-based framework. Under the provisions of the *Budget and Accounting Act*, the U.S. GAO operates with authority granted by Congress, which means the U.S. national audit department operates independently from both the judicial and administrative branches of the U.S. government. It is widely recognized that a legislative national audit system provides a high level of independence and appropriate autonomy (Garrett, 1986).

By comparison, China's national audit system follows an administrative-based framework. The National Audit Office of the People's Republic of China acts as an official department within the central government, and it established regional branches within local governments. In China, the CNAO holds a similar status to the State-owned Assets Supervision and Administration Commission (SASAC). The SASAC acts as the representative shareholder and core manager of SOEs, and each SOE has its internal audit departments. In contrast, the CNAO serves as an external supervisor of SOEs, which is akin to the role of China's Securities Regulatory Commission for listed companies. The national audit institutions in China are accountable to the public interest, and have the legal authority to impose administrative penalties on SOEs found to have committed violations.

The mandatory public disclosure of national audit findings has played a crucial role in reinforcing the independence of national audits. The CNAO set up on September 15 in 1983. It initially functioned as a sub-governmental department with limited authority, and reported solely to the People's Congress and the government. However, the outbreak of SARS in 2003 uncovered the disadvantages of information blockages by governments, which partly led to significant social welfare losses. This highlighted the urgent need for greater transparency in government information.

In response, on December 15, 2003, the CNAO issued its first public report, the No. 1 National

Audit Report titled “*National Audit Results of the Use of Special Fund and Social Donations for the Prevention and Treatment of SARS*”.^[6] This marked the beginning of a public disclosure system for national audits in China. Audit reports have become a critical part of government transparency since then. The “Audit Storm” that followed in 2003 further intensified public scrutiny of audit findings (Liu and Lin, 2012; Mir *et al.*, 2017). And then, the CNAO intensified its audit efforts on the financial operations of CSOEs since 2009, in order to help address the financial crisis and protect state-owned assets. By 2010, the CNAO began the practice of issuing comprehensive national audit reports for each audited entity in an annual release every June. These dynamics highlight the evolution of China’s national audit system as a significant component of the modernization of national governance.

Currently, according to *the Constitution of the People’s Republic of China*, the CNAO is tasked with auditing all government departments, SOEs, public institutions, and other entities involved in public or governmental investments, such as infrastructure projects. The national audit programs include both regular annual audits and ad hoc inspections. The scope of national audits on SOEs in China encompasses: (i) verifying the accuracy of financial information and the legality of economic activities, (ii) assessing operational performance and identifying outstanding issues, and (iii) evaluating compliance with national macroeconomic policies and social responsibility obligations.^[7] Essentially, national audits on SOEs are designed to expose problems, losses, and potential risks within SOEs.

Additionally, a specific series of national audit announcements, titled “*Continuous Disclosure about The Follow-up Investigation and Punishment of Violations Found by National Audit*,” focuses on publicizing corruption and fraud cases involving board members, executives, and other staff within the audited SOEs. During our sample period (2010-2018), seventeen special national audit announcements revealed at least 98 cases of corruption, fraud, or other economic crimes involving prominent SOEs such as *China Southern Power Grid*, *China HuaNeng Group Co. Ltd.*, and *China Construction Bank Group*. Audited SOEs are required to address issues, rectify asset losses, and ensure the safety of state-owned capital by specified deadlines. Failure to comply can result in penalties imposed by the CNAO or other relevant departments.

Figure I shows the structure of national audit findings announcements. Typically, the announcement includes: (i) basic information about the audited SOEs, such as their age, registered capital, main business activities, number of subsidiaries and affiliated companies, key financial indicators, and audit opinions from social audit institutions; (ii) a detailed account of issues related to financial and operational performance, corporate governance, growth potential, adherence to national macroeconomic policies, and instances of corruption, fraud, or impropriety; and (iii) a

summary of any penalties and required corrective actions.

Figure I. An example of the structured national audit announcements in China



Data source: The National Audit Office of the People's Republic of China.

3. Literature review and hypothesis development

Analysts often display optimistic bias in their earnings forecasts and investment recommendations due to several factors, including self-interest-driven alignment with management and market expectations (Hayes, 1998; Ackert, 2003; Ke and Yu, 2006), herd behaviour (Clement and Tse, 2005; De Franco *et al.*, 2015; Do and Zhang, 2020), and cognitive biases stemming from

the selective optimistic disclosures of target companies (Sedor, 2002; Chen and Jiang, 2006; Drake and Mayers, 2011; Merkley *et al.*, 2013).

As noted, the Chinese national audit system is designed to serve the public interest, with its announcements aiming to expose existing problems and potential losses within audited CSOEs. Based on this, we hypothesize that national audit announcements will have a deterrent effect on the capital market, potentially reducing analysts' optimistic biases in their forecasts.

On one hand, violations can lead to substantial economic losses for firms, including administrative or criminal penalties and rectification costs. Hence, the revelations of those violations on national audit announcements often trigger public concerns regarding the firms' poor financial performance and even their potential bankruptcy. Such concerns and economic repercussions can cause fluctuations in capital markets (Chen *et al.*, 2014). Consequently, analysts, who are driven by self-interest and are sensitivity to the preferences of firms' management groups or the market reactions, may quickly revise their overly optimistic forecasts downward (Kanouse and Hansen, 1971; Ito *et al.*, 1998). Failure to adjust their forecasts accordingly may jeopardize their reputation and career prospects (Hong and Kubik, 2003; Ertimur *et al.*, 2011; Chu and Fang, 2018).

On the other hand, information available to capital market participants is often provided by the companies themselves, even to those collected by professional, star, or well-connected analysts. Companies may embellish information and obscure negative news (Li *et al.*, 2021; Saleeb Agaiby Bakhiyet, 2024). In contrast, national audit announcements officially disclose negative issues of audited enterprises, including their operational behaviours, financial performance, and particularly their compliance with macroeconomic policies, ethics, and integrity (Li and Ma, 2017). As is well known, negative information tends to be more valuable than positive news (Chen and Ghysels, 2010; Galil and Soffer, 2011). That is, the negative issues revealed in national audit announcements—such as poor macro policy implications, moral hazards, and even criminal activities—provide more valuable risk-related information when compared to the positive financial performance reports disclosed by social auditors and the companies themselves. This allows analysts to better manage their optimism and cognitive biases. Therefore, our first hypothesis is:

H1: Analysts' optimistic earnings forecasts will decrease following the announcement of national audit findings.

The accuracy of analysts' earnings forecasts is closely linked to the information environment and the quality of earnings reported by firms (Ramnath *et al.*, 2008; Christensen *et al.*, 2013). Interestingly, actual earnings of audited companies often align closely with analysts' expectations due to feedback effects and catering motivations (Robb, 1998; Matsumoto, 2002; Graham *et al.*, 2005; Davis *et al.*, 2009). Both earnings management and executives' opportunistic behaviors can

lead to inaccurate predictions by distorting accounting information (Abarbanell and Lehavy, 2003; Burgstahler and Eames, 2003).

We anticipate that analysts' forecasts will become more accurate as a result of national audit announcements. On one hand, prior research indicates that public announcements of national audit findings help curb earnings manipulation and improve the quality of self-disclosure of audited firms (Aubert and Grudnitski, 2012; Chu *et al.*, 2021). Management teams are motivated to provide more reliable information to alleviate pressure from both the national audit department and the public.^[8]

On the other hand, national audit announcements help to enhance the information transparency of audited firms. The multifaceted insights provided by national audit announcements help reduce information asymmetries between internal and external stakeholders, particularly in areas such as accounting and financial management, operations, implementation of macroeconomic policies (including the Party Central Committee's eight-point decisions), and issues of morality and integrity. In addition, the audited entities are required to address their shortcomings and disclose corrective actions promptly to the public (Bargeron, 2010).

In summary, both the improved information disclosure by firms and the analysts' enhanced access to internal information suggest that national audit announcements can aid in refining forecasting accuracy and rationality by providing higher-quality information. Therefore, our second hypothesis is:

H2: The accuracy of analysts' earnings forecasts will improve following the disclosure of national audit findings.

4. Research design

4.1 Sample and data

We focused on central state-owned conglomerates mentioned in national audit announcements from 2010 to 2018, as well as Chinese A-share listed companies directly owned by the government or controlled by parent SOEs. To link A-share listed companies with their parent central state-owned conglomerates, we used information from the "Ultimate Controlling Shareholder" section in the companies' public financial reports. For any missing data, we manually identified the relevant central state-owned conglomerates by consulting the official websites of the listed CSOEs and cross-referencing with the "Ultimate Controlling Shareholder" section in the "Great Wisdom" securities trading software. We then classified the listed companies whose parent central state-owned conglomerates were audited by the CNAO based on national audit announcements. Since some central state-owned conglomerates received multiple national audit announcements during the sample period, we recorded only the date of the first national audit announcement each conglomerate received. According to the CNAO's public reports up to June 2018, a total of 91

central state-owned conglomerates received national audit announcements from 2010 to 2018. Table I shows the distribution of these audited conglomerates and their listed subsidiaries by year.

Table I. Sample distribution by year.

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
Number of the audited central state-owned conglomerates	6	15	15	9	6	3	2	11	24	91
Number of the listed companies hold by the audited central state-owned conglomerates	14	35	49	14	22	25	18	26	37	240

Additional firm-level data was obtained from the China Stock Market and Accounting Research database. Observations from the financial industry and those with missing values were excluded. Only the most recent earnings forecasts made by analysts, between the date of the previous year's annual report disclosure and the current year's disclosure, were included in our analysis. Continuous variables were winsorized at the 1% and 99% percentiles. The final sample for the empirical analysis consists of 6,610 firm-year observations from 2010 to 2018.

4.2 Empirical model and definition of variables

4.2.1 Empirical model

As is mentioned above, it is inferred that each central state-owned conglomerate has almost the similar probability to be selected as the object of national audit. To certain extent, this shows that the CNAO is not selective about who it audits, and national audit can be used as a quasi-experiment. Accordingly, we identified the causal effect of national audit announcements with a stagger difference-in-differences design as follows, which is in reference to Wooldridge (2002), Carneiro and Heckman (2003), and Beck *et al.* (2010).

$$FOPT_{it} = \alpha_0 + \alpha_1 NAUDIT_i \times NAPOST_{it} + \alpha' Controls_{it} + YEAR_t + CODE_i + \varepsilon_{it}, \quad (1)$$

$$FERROR_{it} = \beta_0 + \beta_1 NAUDIT_i \times NAPOST_{it} + \beta' Controls_{it} + YEAR_t + CODE_i + \vartheta_{it}, \quad (2)$$

where $FOPT_{it}$ and $FERROR_{it}$ represent the level of optimism and absolute bias of analysts' earnings forecasts for firm i in year t , respectively; $NAUDIT_i$ and $NAPOST_{it}$ are the indicators for the treated group and the treatment period, respectively; $Control_{it}$ is a vector of the listed companies' attributes and the forecast attributes for the companies; both the year fixed effect ($YEAR_t$) and the firm fixed effect ($CODE_i$) are controlled; ε_{it} and ϑ_{it} are the residuals. The coefficients α_1 and β_1 are our interest for Hypothesis 1 and Hypothesis 2, respectively. It is the average treatment effect of the listed CSOEs after the first national audit announcement of their parent CSOEs are disclosed to the public. The negative α_1 and β_1 would illustrate the reduction of optimism bias and the improvement of accuracy in analysts' earnings forecasts on account of the public announcement of

nation audit findings.

4.2.2 Dependent variables

The main dependent variables are the optimism ($FOPT_{it}$) and the accuracy ($FERROR_{it}$) of the analysts' earnings forecasts. Their measurements are as follows:

$$FOPT_{it} = (Average(FEPS_{ikt}) - MEPS_{it}) / |MEPS_{it}| \quad (3)$$

$$FERROR_{it} = |Average(FEPS_{ikt}) - MEPS_{it}| / |MEPS_{it}| \quad (4)$$

where $FEPS_{ikt}$ is the most recent forecast of earnings per share (EPS) of firm i made by analyst k in year t ; $MEPS_{ikt}$ is the actual annual EPS of firm i in year t . And we replaced $FERROR_{it}$ with the squared difference between the average prediction of EPS the actual EPS of firm i in year t ($ERRORSQUARE_{it}$) as a robust test.

4.2.3 Key independent variables

$NAUDIT_i$ is a dummy variable indicating the listed company whose parent central state-owned conglomerates have once received national audit announcement during the sample period. $NAPOST_{it}$ is another binary dummy variable which is set to indicate the treated period which starts from the year the parent central state-owned conglomerates received their first national audit announcements to the end of the sample period. If the central state-owned conglomerates the listed companies belong to has never been listed in any public national audit announcement during the sample period, the value of $NAPOST_{it}$ equals 0 for all year t . Accordingly, the interacted variable, $NAUDIT_i \times NAPOST_{it}$, varies across years and firms, which is consistent with a traditional stagger difference-in-differences design, and the main effects of $NAUDIT$ and $NAPOST$ will be absorbed by the interactor due to collinearity (Wooldridge, 2002; Carneiro and Heckman, 2003; Beck *et al.*, 2010).

4.2.4 Control variables

We control the observable firm characteristics which can affect analyst earnings forecast, including firm size ($SIZE$), returns (ROE), losses ($LOSS$), growth ($GROWTH$), and leverage (LEV). We also control the percentage of intangible assets ($INTANGIBILITY$). It is because the value assessment of intangible assets is more subjective than other marketable assets (Gu and Wang, 2005), and the complexity of financial information increases with the level of intangible assets within the firm (Barth and Kasznik, 2001). Prior study has found that the concentration of ownership leads to closer monitoring and an error reduction in analyst forecast (Haw *et al.*, 2010), thus the percentage of shares owned by block holders (HHI) is also included in regressions. In light of Behn *et al.* (2008), higher qualified auditing is associated with an improvement in analysts' earnings forecasts. Hence, we introduce audit fees ($COST$) and the level of auditing firms ($BIG4$) as the proxy of audit quality. Besides of firm attributes, the number of analysts who follows the listed companies (ANA_NUM)

and the remaining days from the date of the last analyst earning forecast to the end of the current accounting period (*ANA_HORIZON*) are also taken into consideration, as they are systematically associated with earnings forecast (Clement, 1999; Richardson *et al.*, 1999). The detailed definition of variables is shown in Table II.

Table II. Definitions of main variables in baseline regressions.

Variables	Definition
<i>FOPT</i>	Optimism biases. Gap between the average forecasted EPS that is most recently claimed by analysts who follows the company and the actual EPS the company reports. And the gap is divided by the absolute value of actual EPS.
<i>FERROR</i>	Absolute forecast error. The numerator is the absolute difference between the average forecasted EPS that is most recently claimed by analysts who follows the company and the actual EPS the company reports. And the gap is divided by the absolute value of actual EPS.
<i>NAUDIT</i>	Dummy variable. It equals 1 if the central state-owned conglomerate the listed company belongs to has once received national audit announcements during the sample period. 0 otherwise.
<i>NAPOST</i>	Dummy variable. It equals 1 if the current year is during the treated period which starts from the year the parent central state-owned conglomerate the listed company belongs to received their first national audit announcements to the end of the sample period. 0 otherwise.
<i>SIZE</i>	Total assets (in yuan RMB). It is shown in natural logarithm in regressions.
<i>LEV</i>	Book value of total debts to total assets. It is shown in decimals in regressions.
<i>ROE</i>	Return on equity. It is shown in decimals in regressions.
<i>GROWTH</i>	Annual growth rate of sales. It is shown in decimals in regressions.
<i>LOSS</i>	Dummy variable. It equals 1 if the net profit is less than 0, and 0 otherwise.
<i>BIG4</i>	Dummy variable. It equals 1 if the social auditing agency of the listed company is one of Big Four (Deloitte, PwC, EY, and KPMG), and 0 otherwise.
<i>COST</i>	Auditing fees (in yuan RMB). It is shown in natural logarithm in regressions.
<i>INTANGIBILITY</i>	Book value of intangible assets to total assets. It is shown in decimals in regressions.
<i>HHI</i>	The level of centralization of the ownership. The quadratic sum of the proportion of shares held by the top 10 shareholders. It is shown in decimals in regressions.
<i>ANA_HORIZON</i>	Average remaining days from the disclosure of the last earning forecast for the current accounting period to the end of the current accounting period for each analyst who focus on the target listed company. It is shown in natural logarithm in regressions.

<i>ANA_NUM</i>	Number of analysts who have claimed earnings forecasts for the targeted company during the current accounting period. It is shown in natural logarithm in regressions.
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5. Empirical results

Our empirical analysis reveals that national audit announcements reduce the analysts' optimistic earnings forecasts of listed companies held by audited central state-owned conglomerates and improve their forecast accuracy following the disclosure.

5.1 Descriptive statistics

Table III presents the summary statistics for the main variables. On average, analysts exhibit an optimism bias of 0.608 in their earnings forecasts for listed companies. The mean forecast accuracy is 0.717, indicating that the absolute deviation between forecasted and actual EPS is less than 72%. The standard deviations of *FOPT* and *FERROR* are 1.653 and 1.860, respectively, highlighting significant variability in earnings forecasts for the same companies across different analysts. In 27.5% of the observations, the central state-owned conglomerates to which these companies belong have undergone a national audit with publicly disclosed findings. In contrast, the parent CSOEs of the remaining observations were not mentioned in any national audit announcements during the sample period. Additionally, 14.6% of the observations fall within the current year or the year following the initial public disclosure of national audit findings for their parent CSOEs. In addition, we conducted t-tests on main variables and gave the correlation matrix. The results are shown in Table X.A and in Table X.B as appendix, respectively.

Table III. Descriptive statistics of main variables.

Variable	Obs.	Mean	Std.	P25	P50	P75
<i>NAUDIT_{it}</i>	6,610	0.275	0.447	0	0	1
<i>NAPOST_{it}</i>	6,610	0.146	0.354	0	0	0
<i>FOPT_{it}</i>	6,610	0.608	1.653	0	0.133	0.507
<i>FERROR_{it}</i>	6,610	0.717	1.860	0.067	0.185	0.549
<i>SIZE_{it}</i>	6,610	22.990	1.358	21.990	22.870	23.840
<i>LEV_{it}</i>	6,610	0.504	0.191	0.363	0.515	0.652
<i>ROE_{it}</i>	6,610	0.090	0.103	0.044	0.087	0.138
<i>GROWTH_{it}</i>	6,610	0.375	1.177	-0.053	0.104	0.375
<i>LOSS_{it}</i>	6,610	0.062	0.241	0	0	0
<i>BIG4_{it}</i>	6,610	0.137	0.344	0	0	0
<i>COST_{it}</i>	6,610	14.02	0.887	13.380	13.860	14.510
<i>INTANGIBILITY_{it}</i>	6,610	0.053	0.060	0.015	0.033	0.061
<i>HHI_{it}</i>	6,610	0.202	0.130	0.097	0.179	0.283
<i>ANA_HORIZON_{it}</i>	6,610	5.063	0.523	4.824	5.159	5.409
<i>ANA_NUM_{it}</i>	6,610	2.423	0.816	1.792	2.485	3.091

5.2 Main results

The baseline results from the stagger DID model are shown in Table IV. We controlled for firm-specific attributes as well as year- and firm-fixed effects to mitigate potential bias from omitted variables. The coefficients for the interaction item $NAUDIT_i \times NAPOST_{it}$ are significantly negative in Columns (1) and (2). We replaced $FERROR_{it}$ with the squared difference between the average prediction of EPS the actual EPS of firm i in year t ($ERRORSQUARE_{it}$) in Column (3), and the results still keep robust. This indicates that national audit announcements prompt analysts to exercise increased caution and precision in their earnings forecasts. These announcements provide clearer insights into clients' financial risks and operational decisions, and may also reduce managers' opportunities for earnings manipulation.

Following the public release of national audit announcements for their parent CSOs, analysts' optimism bias and absolute deviations in earnings forecasts decreased by 0.175 and 0.183 basis points, respectively. This represents a reduction of approximately 28.78% in optimism and 25.52% in forecast bias, relative to the mean values of $FOPT$ (0.608) and $FERROR$ (0.717). While the effect of national audit announcements on forecast biases diminishes when the measurement is replaced with the squared gaps between average EPS predictions and actual EPS, it remains statistically significant at the 10% level.

Table IV. Optimism and bias of analyst earnings forecast after the national audit announcements.

Variables	(1) $FOPT_{it}$	(2) $FERROR_{it}$	(3) $ERRORSQUARE_{it}$
$NAUDIT_i \times NAPOST_{it}$	-0.175* (-1.85)	-0.183* (-1.71)	-0.015* (-1.75)
$SIZE_{it}$	-0.124* (-1.72)	-0.217*** (-2.66)	0.009 (1.40)
LEV_{it}	0.079 (0.32)	0.200 (0.72)	-0.002 (-0.07)
ROE_{it}	-4.335*** (-13.87)	-4.330*** (-12.24)	-0.423*** (-15.06)
$GROWTH_{it}$	-0.003 (-0.16)	0.034 (1.39)	0.001 (0.66)
$LOSS_{it}$	-0.362*** (-3.17)	-0.568*** (-4.39)	0.180*** (17.52)
$BIG4_{it}$	-0.020 (-0.12)	-0.056 (-0.29)	0.029* (1.92)
$COST_{it}$	0.009 (0.10)	0.087 (0.89)	0.005 (0.63)

HHI_{it}	-0.770*	-0.908*	0.047
	(-1.88)	(-1.96)	(1.28)
$INTANGIBILITY_{it}$	-0.152	-0.391	-0.021
	(-0.20)	(-0.46)	(-0.31)
$ANA_HORIZON_{it}$	0.426***	0.427***	0.043***
	(10.50)	(9.31)	(11.68)
ANA_NUM_{it}	-0.006	-0.070	0.019***
	(-0.14)	(-1.53)	(5.14)
Constant	2.404*	3.993**	-0.393***
	(1.69)	(2.48)	(-3.08)
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Observations	6,610	6,610	6,610
F-statistics	24.33***	22.50***	74.85***
Adjusted R ²	0.090	0.084	0.236

Notes: *, ** and ***, significant at 10%, 5% and 1%, respectively. *T*-Statistics are reported in parentheses (hereinafter). We additionally conducted stepwise regressions with control variables, and those results with relaxed assumptions showed higher significance.

5.3 Robustness tests

5.3.1 Propensity score matching methods and Heckman methods

A major concern is related to the potential endogeneity arising from the selection of audited firms based on certain attributes. This may lead to an overestimation of the impact of national audit announcements on analysts' forecasts in our baseline regressions. We addressed the non-selectivity of the audited firms on above, which indicates that each central state-owned conglomerate has a similar probability of being selected for national audit. To further address concerns about endogenous selection, we conducted additional empirical analyses.

First, we applied the Heckman Correction method, commonly used to address selection bias (Heckman, 1976). In the first stage, we estimated the probability of each listed company in the full sample being included in the treatment group, where the central state-owned conglomerates to which they belong are selected for national audit. We then calculated the inverse Mills ratio. In the second stage, we included the inverse Mills ratio (IMR_{it}) as a control variable in the baseline regressions (Columns (1) and (2)). As shown in Table V, the insignificant coefficients for IMR_{it} suggest minimal endogeneity in the selection of audited firms. The remaining significantly negative effects of national audit announcements indicate that the main results are robust even after accounting for potential selection bias.

Table V. Robustness checks with the Heckman method.

Variables	(1) $FOPT_{it}$	(2) $FOPT_{it}$	(3) $FERROR_{it}$	(4) $FERROR_{it}$
$NAUDIT_i \times NAPOST_{it}$	-0.175* (-1.85)	-0.175* (-1.86)	-0.183* (-1.71)	-0.183* (-1.72)
IMR_{it}		0.282 (1.65)		0.249 (1.28)
Constant	2.404* (1.69)	1.169 (0.76)	3.993** (2.48)	2.890* (1.67)
Firm attributes	YES	YES	YES	YES
Analyst attributes	YES	YES	YES	YES
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	6,610	6,598	6,610	6,598
F-statistics	24.33***	23.73***	22.50***	21.82***
Adjusted R ²	0.090	0.092	0.084	0.085

Second, following the approaches of Peel and Makepeace (2012) and Shipman *et al.* (2017), we used a traditional propensity score matching method to construct an adjusted sample free from selection bias and repeated the baseline regressions. Specifically, we employed the no-replacement nearest neighbour propensity score matching method to pair firms in the treatment group with those in the control group. The covariates used for matching were also included as control variables in the subsequent DID regressions. In Table VI, Panel A shows that there are no significant differences in firm characteristics between the treated and control groups. Panel B confirms that the coefficient for $NAUDIT_i \times NAPOST_{it}$ remains negative and significant at the 10% level.

Table VI. Robustness checks with the PSM-DID method.

Panel A: Differences between the means of the PSM sample			
Variables	The mean value within the treatment group	The mean value within the control group	T-values
<i>SIZE</i>	23.805	23.812	-0.050
<i>LEV</i>	0.537	0.539	-0.070
<i>ROE</i>	0.084	0.089	-0.510
<i>GROWTH</i>	0.573	0.715	-0.750
<i>LOSS</i>	0.061	0.049	0.480
<i>BIG4</i>	0.245	0.270	-0.510
<i>COST</i>	14.565	14.642	-0.770
<i>HHI</i>	0.226	0.213	0.890
<i>INTAGIBILITY</i>	0.042	0.042	-0.010
<i>ANA_HORIZON</i>	5.095	5.108	-0.240
<i>ANA_NUM</i>	2.646	2.692	-0.510
Panel B: Regression results with the PSM sample			

Variables	(1) $FOPT_{it}$	(2) $FERROR_{it}$
$NAUDIT_i \times NAPOST_{it}$	-0.233* (-1.67)	-0.261* (-1.72)
Constant	7.461*** (2.95)	3.993** (2.48)
Firm attributes	Yes	Yes
Analyst attributes	Yes	Yes
Year FE	Yes	Yes
Firm FE	Yes	Yes
Observations	2,183	2,183
F-statistics	7.96***	7.43***
Adjusted R ²	0.059	0.049

5.3.2 Dynamic DID regression

To address concerns about endogenous selection and to examine both short-term and long-term market responses to national audit announcements, we constructed a dynamic DID model based on Bertrand and Mullainathan (2003) as follows,

$$FOPT_{it} = \gamma_0 + \gamma_1 NAUDIT_i \times NAPOST_{it-2} + \gamma_2 NAUDIT_i \times NAPOST_{it-1} + \gamma_3 NAUDIT_i \times NAPOST_{it+1} + \gamma_4 NAUDIT_i \times NAPOST_{it+2} + \gamma' Controls_{it} + YEAR_t + CODE_i + \tau_{it}, \quad (5)$$

$$FERROR_{it} = \mu_0 + \mu_1 NAUDIT_i \times NAPOST_{it-2} + \mu_2 NAUDIT_i \times NAPOST_{it-1} + \mu_3 NAUDIT_i \times NAPOST_{it+1} + \mu_4 NAUDIT_i \times NAPOST_{it+2} + \mu' Controls_{it} + YEAR_t + CODE_i + \xi_{it}, \quad (6)$$

where we added four dummy variables, $NAPOST'_{it-2}$, $NAPOST'_{it-1}$, $NAPOST'_{it+1}$, and $NAPOST'_{it+2}$, to represent the periods two years before, one year before, one year after, and two years after the first national audit announcement for the parent CSOE, respectively. $NAPOST'_{it}$ indicates the current year of the announcement.

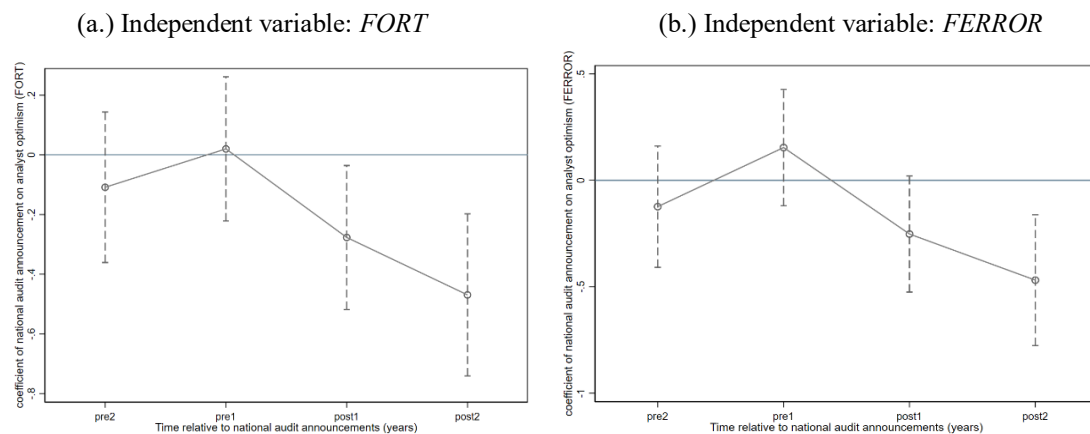
As shown in Table VII and Figure II, analysts cannot access information about national audits prior to the announcement, and therefore, do not significantly adjust their forecasts before the announcement. Moreover, the significant negative coefficients for $NAPOST'_{it+1}$ and $NAPOST'_{it+2}$ highlight the long-term effect of national audit announcements in enhancing the quality of analysts' earnings forecasts.

Table VII. Robustness checks with the dynamic DID regressions.

Variables	(1) $FOPT_{it}$	(2) $FERROR_{it}$
$NAUDIT_i \times NAPOST'_{it-2}$	-0.109 (-0.84)	-0.123 (-0.85)
$NAUDIT_i \times NAPOST'_{it-1}$	0.020 (0.16)	0.154 (1.11)
$NAUDIT_i \times NAPOST'_{it+1}$	-0.277** (-2.25)	-0.252* (-1.81)
$NAUDIT_i \times NAPOST'_{it+2}$	-0.469*** (-3.39)	-0.469*** (-2.99)

Constant	2.067 (1.45)	3.717** (2.31)
Firm attributes	Yes	Yes
Analyst attributes	Yes	Yes
Year FE	Yes	Yes
Firm FE	Yes	Yes
Observations	6,610	6,610
F-statistics	22.01***	20.36***
Adjusted R ²	0.092	0.086

Figure II. Dynamic effects of national audit announcements on analyst optimism and forecast accuracy.



Notes: The vertical axis is the coefficients of the dynamic interaction variables and the horizontal axis is the years before and after national audit reports are publicly disclosed. The dotted line indicates a 95% confidence interval.

5.3.3 Alternative measurements of analysts' earnings forecasts

When considering measurement errors, we choose alternative measurements of analysts' earnings forecasts for robustness checks in Table VIII. Column (1) and (4) represent the baseline results. The dependent variables are measured according to Equation (1) and (2). Then in Column (2) and (5), we replaced the average forecasted EPS ($Average(FEPS_{ikt})$) with the median one ($Median(FEPS_{ikt})$). At last, we further used the firm's total assets per share ($TAPS_{it}$) as the denominator in Column (3) and (6), and the final forms of the dependent variables are outlined as follows,

$$MFOPT_{it} = (Median(FEPS_{ikt}) - MEPS_{it}) / TAPS_{it}, \quad (7)$$

$$MFERROR_{it} = |Median(FEPS_{ikt}) - MEPS_{it}| / TAPS_{it}. \quad (8)$$

Table VIII shows that the results are robust.

Table VIII. Alternative measurements of analysts' earnings forecasts.

Variables	(1) $FOPT_{it}$	(2) $FOPT'_{it}$	(3) $MFOPT_{it}$	(4) $FERROR'_{it}$	(5) $FERROR_{it}$	(6) $MFERROR_{it}$
$NAUDIT_i \times$	-0.175*	-0.002*	-0.002*	-0.183*	-0.003**	-0.003**
$NAPOST_{it}$	(-1.85)	(-1.94)	(-1.95)	(-1.71)	(-2.12)	(-2.17)
Constant	2.404*	0.089***	0.083***	3.993**	0.115***	0.101***

	(1.69)	(4.70)	(4.33)	(2.48)	(6.32)	(5.45)
Firm attributes	Yes	Yes	Yes	Yes	Yes	Yes
Analyst attributes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,610	6,610	6,610	6,610	6,610	6,610
F-statistics	24.33***	111.27***	108.66***	22.50***	22.50***	88.42***
Adjusted R ²	0.090	0.311	0.306	0.089	0.084	0.264

Notes: $FOPT'_{it} = (Median(FEPS_{itk}) - MEPS_{it}) / |MEPS_{it}|$, $FERROR'_{it} = |Median(FEPS_{itk}) - MEPS_{it}| / |MEPS_{it}|$.

5.3.4 Dataset on the analyst level.

In baseline regressions, the optimism bias and absolute forecast deviations are calculated at the firm level. The forecasted EPS is the average of all forecasts made by analysts who take the targeted company within their portfolios. And the analyst attributes are also aggregated at the firm level. Brown and Mohd (2003) argue that analyst characteristics are another crucial factor in forecasting. In order to take fully consideration of the influence from analysts, we replicated the baseline regressions with an analyst-firm-year panel dataset. A total of 95,626 observations is included. The coefficients for $NAUDIT \times NAPOST$ in Table IX remain significantly negative.

Table IX. Dataset on the analyst-level.

Variables	(1) $FOPT'_{ikt}$	(2) $FERROR'_{ikt}$
$NAUDIT_i \times NAPOST_{it}$	-0.040** (-2.50)	-0.031* (-1.92)
$SIZE_{it}$	-0.046*** (-3.41)	-0.075*** (-5.44)
LEV_{it}	-0.500*** (-10.49)	-0.251*** (-5.10)
ROE_{it}	-7.905*** (-66.60)	-7.437*** (-60.77)
$GROWTH_{it}$	-0.033*** (-7.56)	-0.009** (-2.12)
$LOSS_{it}$	0.197*** (8.64)	0.105*** (4.46)
$BIG4_{it}$	0.074*** (2.76)	0.101*** (3.66)
$COST_{it}$	-0.040*** (-2.81)	-0.012 (-0.78)
HHI_{it}	-0.601*** (-7.85)	-0.619*** (-7.83)
$INTANGIBILITY_{it}$	-0.584*** (-4.13)	-0.627*** (-4.31)
$ANA_HORIZON_{it}$	0.387*** (44.79)	0.373*** (41.82)
ANA_NUM_{it}	-0.009	-0.060***

	(-1.04)	(-6.50)
Constant	1.438***	1.884***
	(5.42)	(6.89)
Year FE	Yes	Yes
Firm FE	Yes	Yes
Observations	95,626	95,626
F-statistics	495.01***	431.58***
Adjusted R ²	0.107	0.095

5.3.5 Placebo tests

In line with the methodologies outlined by Guo *et al.* (2021) and Liu *et al.* (2021), we conducted two placebo tests to validate the robustness of the causal effects observed from national audit announcements. One test involved setting a placebo announcement date two years prior to the actual announcement, while the other involved randomly reassigning the treatment group. Our results strongly indicate that the public disclosure of national audit findings provides substantial information to analysts when making earnings forecasts, rather than having negligible effects.

First, we established a fictitious announcement date for the treatment group, set two years earlier than the actual date. If changes in forecast optimism and accuracy were solely due to analysts' accumulated knowledge and experience, the empirical results should remain consistent regardless of the announcement date. Specifically, advancing the announcement date by two years resulted in insignificant coefficients for $NAUDIT_i \times NAPOST_{it}$, as shown in Table X. This indicates that improvements in the quality of analysts' earnings forecasts are directly associated with the actual announcement of national audit results.

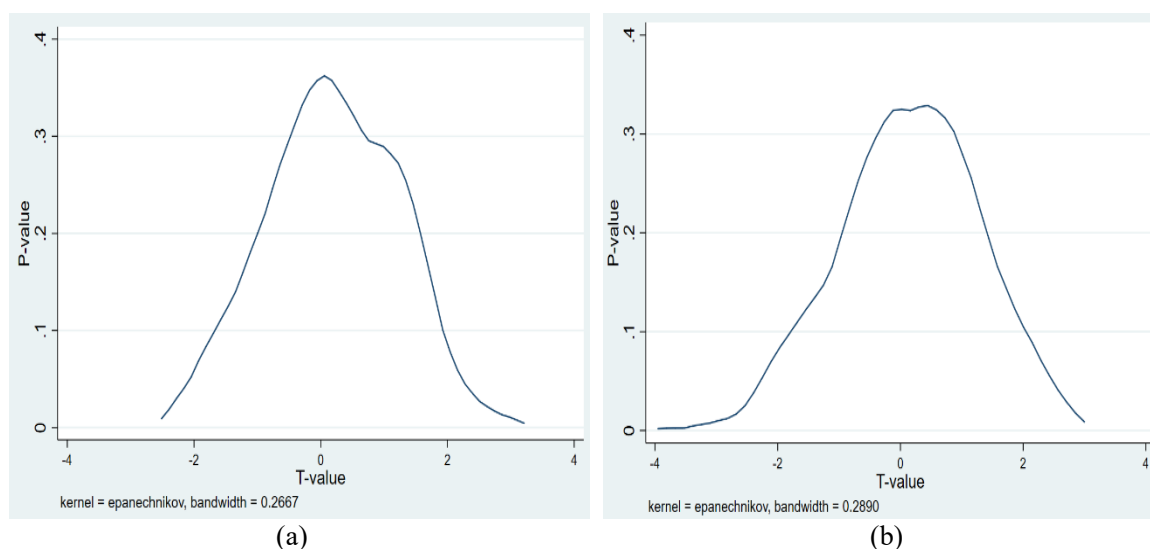
Table X. Placebo tests on the issuance date of national audit announcement.

Variables	(1) $FOPT_{it}$	(2) $FERROR_{it}$
$NAUDIT_i \times NAPOST2_{it}$	-0.161 (-1.57)	-0.099 (-0.85)
Constant	2.200 (1.55)	3.785** (2.36)
Firm attributes	Yes	Yes
Analyst attributes	Yes	Yes
Year FE	Yes	Yes
Firm FE	Yes	Yes
Observations	6,610	6,610
F-statistics	24.28***	22.40***
Adjusted R ²	0.063	0.071

Additionally, to rule out the possibility that analysts' forecasts might be influenced by unobservable random factors and to further validate our findings, we performed a placebo test by randomly assigning a national audit announcement to various CSOEs to create a new treatment

group. We randomly selected 223 companies from the full sample as the treatment group, irrespective of whether their parent CSOEs had actually received a public national audit announcement. The announcement dates were also assigned randomly. This procedure was repeated 500 times. Figure III displays the kernel density distribution of T-values for the independent variables across these 500 iterations. As illustrated, the estimated coefficients for the key independent variables are concentrated around zero, with absolute T-values generally falling below 2 in most samples. This suggests that changes in analysts' optimism and forecast accuracy are not related to the placebo national audit announcements, thereby eliminating potential random factors influencing the observed effects.

Figure III. The kernel density distribution.



Note: Panel (a) and (b) represent the kernel density distribution of the optimism and accuracy of analysts' earnings forecasts, respectively.

6. Additional analysis

6.1 How do the tone and detailed content of national audit announcements affect analysts' earnings forecasts?

The impact of national audit announcements on analysts' earnings forecasts extends beyond the mere occurrence of the announcement; the content and tone of the announcement also play a significant role. Qualitative information provided in these announcements can influence analysts' forecasts incrementally (Bonshall *et al.*, 2013). To explore this, we examined the proportion of issues reported in four categories: (i) accounting and finance ($AFPRATIO_{it}$), (ii) management and operations ($MOPRATIO_{it}$), (iii) implementation of macro policies ($IPPRATIO_{it}$), and (iv) moral and ethical conduct ($MHRATIO_{it}$). We replaced the baseline regression variable $NAPOST_{it}$ with these

four variables to determine which types of issues in national audit announcements offer the most valuable information to the public.

Intuitively, one might expect that analysts' forecasts would be more influenced by audit findings related to financial management and accounting than by other issues. However, Table XI reveals an intriguing phenomenon: the effects of issues related to policy implementation and moral conduct are significantly stronger than those related to accounting, financial management, and business operations.

Table XI. Detailed content of announcements.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$FOPT_{it}$	$FOPT_{it}$	$FOPT_{it}$	$FOPT_{it}$	$FERROR_{it}$	$FERROR_{it}$	$FERROR_{it}$	$FERROR_{it}$
$NAUDIT_i \times AFPRATIO_{it}$	-0.805** (-1.99)				-0.953** (-2.08)			
$NAUDIT_i \times MOPRATIO_{it}$		-0.351* (-1.93)				-0.336 (-1.62)		
$NAUDIT_i \times IPPRATIO_{it}$			-1.633*** (-2.66)				-1.548** (-2.22)	
$NAUDIT_i \times MHPRATIO_{it}$				-1.193* (-1.68)				-1.578** (-1.97)
$SIZE_{it}$	-0.118 (-1.63)	-0.119 (-1.64)	-0.127* (-1.75)	-0.112 (-1.52)	-0.212*** (-2.58)	-0.211** (-2.57)	-0.219** (-2.66)	-0.205** (-2.49)
LEV_{it}	0.079 (0.32)	0.067 (0.27)	0.064 (0.26)	0.083 (0.33)	0.199 (0.71)	0.186 (0.66)	0.184 (0.66)	0.194 (0.69)
ROE_{it}	-4.281*** (-13.59)	-4.282*** (-13.59)	-4.284*** (-13.61)	-4.303*** (-13.54)	-4.281*** (-12.00)	-4.277*** (-11.99)	-4.279*** (-12.00)	-4.318*** (-12.00)
$GROWTH_{it}$	-0.007 (-0.32)	-0.006 (-0.27)	-0.006 (-0.26)	-0.008 (-0.35)	0.031 (1.27)	0.032 (1.31)	0.032 (1.32)	0.031 (1.24)
$LOSS_{it}$	-0.358*** (-3.09)	-0.356*** (-3.08)	-0.358*** (-3.09)	-0.351*** (-3.00)	-0.566*** (-4.31)	-0.563*** (-4.29)	-0.565*** (-4.31)	-0.578*** (-4.37)
$BIG4_{it}$	-0.026 (-0.15)	-0.017 (-0.10)	-0.024 (-0.15)	-0.017 (-0.10)	-0.062 (-0.33)	-0.052 (-0.27)	-0.058 (-0.31)	-0.053 (-0.28)
$COST_{it}$	0.002 (0.03)	0.007 (0.08)	0.008 (0.09)	-0.001 (-0.01)	0.079 (0.80)	0.084 (0.86)	0.085 (0.87)	0.079 (0.80)
HHI_{it}	-0.794* (-1.93)	-0.744* (-1.81)	-0.735* (-1.79)	-0.788* (-1.91)	-0.943** (2.03)	-0.892* (-1.91)	-0.884* (-1.90)	-0.942** (-2.02)
$INTANGIBILITY_{it}$	-0.122 (-0.16)	-0.181 (-0.11)	-0.073 (-0.10)	-0.090 (-0.12)	-0.360 (-0.42)	-0.326 (-0.38)	-0.319 (-0.37)	-0.402 (-0.47)
$ANA_HORIZON_{it}$	0.430*** (10.54)	0.430*** (10.54)	0.429*** (10.51)	0.433*** (10.57)	0.431*** (9.34)	0.431*** (9.34)	0.430*** (9.31)	0.432*** (9.31)
ANA_NUM_{it}	-0.013 (-0.32)	-0.014 (-0.33)	-0.016 (-0.38)	-0.016 (-0.39)	-0.078* (-1.68)	-0.079* (-1.70)	-0.080* (-1.74)	-0.079* (-1.69)
Constant	2.371* (1.66)	2.315 (1.62)	2.499* (1.75)	2.248 (1.56)	3.999** (2.47)	3.891** (2.40)	4.064** (2.51)	3.865** (2.38)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,515	6,515	6,515	6,515	6,515	6,515	6,515	6,515
F-statistics	24.13***	24.12***	24.28***	24.13***	22.40***	22.32***	22.43***	22.35***

Adjusted R ²	0.091	0.091	0.091	0.091	0.085	0.084	0.085	0.085
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This phenomenon may be explained by at least two factors. First, issues concerning accounting and financial management are closely tied to corporate performance and are often accessible to analysts through public and insider information. In contrast, issues related to policy implementation and ethical conduct are less accessible to analysts or come with a high information cost. Moreover, these latter issues often signal substantial operational risks and significant potential economic costs, such as administrative fines and criminal penalties for economic crimes uncovered in the audited central state-owned conglomerates.

The tone of an announcement can convey the addressor's emotional stance to the audience (Feldman *et al.*, 2010), which in turn affects how receivers perceive, understand, and process the information. Compared to the concrete information provided by national audit announcements, such as the number of uncovered compliance issues and accounting violations, the tone—often seen as “soft” information—can more easily provoke irrational market reactions. To measure the tone of national audit announcements, we conducted a textual analysis (Henry, 2006; Wang and Zhang, 2019).

We sourced the primary text data from the official website of the CNAO (www.audit.gov.cn) and utilized the third-party library “jieba” in Python for word segmentation of Chinese sentences. In the first step, we developed a specialized dictionary for Chinese national audit announcements by filtering out non-informative words, such as stop words, and then counted the number of words in each announcement (*WORDS*). In the second step, we created two additional dictionaries to measure the emotional content of the announcements, based on the *HowNet* dictionary provided by the China National Knowledge Internet. One dictionary included positive words to gauge optimism, while the other contained negative words to assess pessimism. We counted the occurrences of positive (*PWORDS*) and negative words (*NWORDS*) in each announcement. The net tone (*NETTONE*) was calculated as the difference between *NWORDS* and *PWORDS* divided by the total number of words (*WORDS*). For entities audited multiple times during the sample period, only the first announcement was used for analysis.

Initially, we addressed concerns about analysts potentially being influenced to provide overly optimistic forecasts to counteract negative national audit outcomes. We discussed the minimal likelihood of analysts purchasing optimistic forecasts before the national audit findings were announced. To further mitigate this concern, we conducted a t-test comparing the net tone of national audit announcements between firms with positive forecasts and those with negative forecasts. According to Table XII, there are no significant differences in the net tone between these groups, indicating that national audit announcements consistently maintain a cautious tone regardless of

analysts' earnings forecasts.

Table XII. T-test of net tone of national audit announcements.

Variable	Sample	With positive forecasts ($FORT \geq 0$)		With negative forecasts ($FORT < 0$)		Mean Diff.	t-value	Pr(T > t)
		N.	Mean	N.	Mean			
<i>NETONE</i>	(1)	4,941	0.072	1,676	0.066	0.006	1.109	0.268
<i>NETONE</i>	(2)	1,384	0.256	438	0.253	0.003	0.206	0.837
<i>NETONE</i>	(3)	739	0.480	230	0.482	-0.002	-0.178	0.859

Note: The variable *NETONE* represents the net negative tone of national audit announcements. It is measured by the residual after subtracting the numbers of negative words from that of positive words, which is divided by the total number of effective words in the announcements. It means more problems than other information and a net negative tone of the announcement when *NETONE* has a value under 0. Both of the controlled observations and those of the audited enterprises before audit holds the value of 0 in *NETONE*. The issue *FORT* is the proxy of analyst optimism. The positive value of *FORT* means the average earning forecast of a certain enterprise is higher than its actual earnings, referring to analyst optimism. Sample (1) refers to the full sample. Sample (2) consist of the observations of the audited enterprises during the full sample period. Sample (3) only covers the observations after the audited enterprises after receiving audit announcements.

Table XIII illustrates the impact of announcement tone on analysts' earnings forecasts. The coefficient of $NAUDIT_i \times NETONE_{it}$ in Column (1) is negative and significant at the 10% level, suggesting that authoritative negative information reduces analysts' optimistic bias towards earnings forecasts. This implies that analysts tend to adopt a more realistic or pessimistic outlook in response to bad news, whether historical or current. Additionally, the significantly negative coefficient of the interaction variable in Column (2) indicates that a negative tone enhances the accuracy of analysts' forecasts. One possible explanation is that a disapproving tone deters managers from engaging in opportunistic earnings manipulation, thereby allowing analysts to base their forecasts on more reliable information.

Table XIII. Tone of announcement.

Variables	(1) $FOPT_{it}$	(2) $FERROR_{it}$
$NAUDIT_i \times NETONE_{it}$	-0.323* (-1.91)	-0.342* (-1.79)
Constant	2.308 (1.63)	3.894** (2.43)
Firm attributes	Yes	Yes

Analyst attributes	Yes	Yes
Year FE	Yes	Yes
Firm FE	Yes	Yes
Observations	6,610	6,610
F-statistics	24.34***	22.51***
Adjusted R ²	0.090	0.084

Notes: $NETONE = (NWORDS - PWORDS) \div WORDS$.

6.2 Can analyst ability influence the relationship between national audit announcement and analysts' earnings forecasts?

Star analysts are distinguished by their extensive industry experience, superior professional skills, and higher access to reliable corporate information. Which helps them maintain their reputations (Clement, 1999; Fang and Yasuda, 2009). In contrast, non-star analysts often struggle to access valuable internal information, especially negative news (Scharfstein and Stein, 1990). Consequently, star analysts are less influenced by market noises when making predictions and their forecasts are generally more highly regarded (Stickle, 1992; Xu *et al.*, 2013).

To examine whether analyst ability affects the relationship between national audit announcements and analysts' earnings forecasts, we conducted comparison tests between high- and low-ability analysts. We divided the full sample of listed companies into two groups based on the proportion of star analysts covering each firm. Firms with a proportion of star analysts above the median were classified as having “high-qualified analysts”, while those below the median were classified as having “low-qualified analysts” (Chu *et al.*, 2019).

Our analysis, presented in Table XIV, shows that in firms with low-qualified analysts, the coefficient of $NAUDIT_i \times NAPOST_{it}$ is significantly negative, with an economic impact larger than observed in the baseline regressions (Table IV). In contrast, the coefficient for firms with high-qualified analysts is not significant. This finding provides additional support for both the information and reputation channels in explaining the main results. Specifically, the impact of national audit announcements on improving information quality is more pronounced in environments where the information is typically poor, such as those faced by low-qualified analysts.

Table XIV. Heterogenous responses in forecasting across analysts with high and low ability.

Variables	With low-qualified analysts		With high-qualified analysts	
	(1) $FOPT_{it}$	(2) $FERROR_{it}$	(3) $FOPT_{it}$	(4) $FERROR_{it}$
$NAUDIT_i \times NAPOST_{it}$	-0.214*	-0.255**	-0.137	-0.060
	(-1.90)	(-1.99)	(-0.83)	(-0.33)

Constant	2.505 (1.49)	4.145** (2.17)	6.933*** (2.62)	8.769*** (3.05)
Firm attributes	Yes	Yes	Yes	Yes
Analyst attributes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	1,491	1,491	5,119	5,119
F-statistics	22.04***	20.01***	7.77***	7.49***

6.3 Do the relationships between national audit announcement and analysts' earnings forecasts vary with different levels of information asymmetry?

Information transparency varies among enterprises, significantly influencing the reliability of analysts' forecasts (Fang, 2007; Bhushan, 1989). Low transparency is associated with high information asymmetry and increased costs in information searching and understanding. National audit announcements can substantially reduce these information costs for analysts covering enterprises with low levels of transparency. According to Barron *et al.* (2009), greater variation among forecasts from different analysts for the same enterprise indicates higher levels of information asymmetry at the firm level. To assess this, we divided the full sample into two groups based on the median level of forecast divergence. Table XV shows that the impact of national audit announcements is significantly more pronounced for firms with higher levels of information asymmetry.

Table XV. Heterogenous responses in analyst forecast across firms with different level of information asymmetry.

Variables	High level of information asymmetry		Low level of information asymmetry	
	(1) $FOPT_{it}$	(2) $FERROR_{it}$	(3) $FOPT_{it}$	(4) $FERROR_{it}$
$NAUDIT_i \times NAPOST_{it}$	-0.278* (-1.67)	-0.329* (-1.74)	-0.016 (-0.17)	0.020 (0.20)
Constant	2.891 (1.13)	4.317 (1.48)	3.867*** (2.82)	5.727*** (3.78)
Firm attributes	Yes	Yes	Yes	Yes
Analyst attributes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	3,073	3,073	3,573	3,573
F-statistics	15.28***	14.87***	15.51***	14.48***

Adjusted R ²	0.119	0.116	0.106	0.099
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6.4 What is the role of media coverage in the relationships between national audit announcements and analysts' earnings forecasts?

In China, media coverage is a crucial information channel for analysts, second only to corporate financial reports (Hu *et al.*, 2003). The media serves to elaborate on the issues highlighted in national audit announcements, thereby providing valuable supplementary information (Aman and Moriyasu, 2017). Additionally, the media acts as a form of social oversight. When media coverage focuses on audited enterprises after the announcement and informs investors about the audit findings, it enhances the effectiveness of national audit announcements in terms of disclosure, prevention, and deterrence.

To examine the role of media coverage, we used data from the Chinese Research Data Services, which includes information from 600 web media outlets and 8 mainstream financial newspapers (Wu *et al.*, 2022). We categorized firms based on the median level of media coverage. Firms with media attention above the median are considered high-exposure firms. As shown in Table XVI, the coefficients of $NAUDIT_i \times NAPOST_{it}$ are insignificant for firms with low levels of media coverage. In contrast, firms with higher media attention receive less optimistic and more accurate earnings forecasts from analysts. These results indicate that media coverage plays a vital role in reducing the costs associated with information search and collection, thereby improving analysts' understanding of national audit announcements.

Table XVI. Media coverage on firms.

Variables	Low level of media coverage		High level of media coverage	
	(1) $FOPT_{it}$	(2) $FERROR_{it}$	(3) $FOPT_{it}$	(4) $FERROR_{it}$
$NAUDIT_i \times NAPOST_{it}$	-0.066 (-0.48)	0.000 (0.00)	-0.226* (-1.71)	-0.285* (-1.93)
Constant	5.093*** (2.74)	7.206*** (3.37)	-1.360 (-0.60)	-0.626 (-0.25)
Firm attributes	Yes	Yes	Yes	Yes
Analyst attributes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	3,191	3,191	3,419	3,419
F-statistics	10.19***	9.26***	15.74***	14.96***
Adjusted R ²	-0.108	-0.117	-0.019	-0.025

7. Conclusions

This study examines how national audit announcements impact the efficiency and effectiveness of information disclosure and transfer in capital markets by investigating analysts' responses to these announcements. We employed a difference-in-differences model and found significant positive changes in analysts' earnings forecasts for companies affected by national audit announcements. Specifically, companies that undergo national audits receive increased attention from analysts, leading to improved accuracy in earnings forecasts as the audit findings mitigate analyst optimism.

Our text analysis of national audit reports reveals that the impact of the announcements on analysts' forecasts is more pronounced when the reports highlight issues related to policy implementation and ethics, or when the tone of the report is negative. Additionally, the effect of national audit announcements on forecast quality is amplified in environments with higher information asymmetry. Non-star analysts, in particular, rely more on national audit announcements, and the impact is greater for firms with higher levels of information asymmetry. Media attention further reduces information frictions, enhancing the positive effect of audit announcements on forecast quality. Our results are consistent across various robustness checks, including the Heckman method, PSM-DID method, a dynamic DID model, and several placebo tests.

These findings have several implications. Firstly, a robust information disclosure system enhances the quality of national audit announcements by making them more comprehensive and informative, increasing the focus on rule-breaking activities, and reinforcing their role as a deterrent and supervisory mechanism in economic governance. Secondly, the positive effects of national audit announcements can be strengthened through intelligent media coverage, stringent public oversight, and effective corporate governance, which help reduce information risks and improve the allocation of public resources in economic growth. Additionally, supervision departments at both central and local government levels should play a dual role of external oversight and internal improvement. Analysts should adhere to professional ethics of impartiality and objectivity, and be encouraged to gather high-value information through appropriate channels. This approach will provide individual investors with more rational guidance and enhance the information efficiency of the capital market.

Notes

[1] Data source: The National Audit Office of the People's Republic of China (<https://www.audit.gov.cn/en/n744/c68255/content.html>). It is an official website of the CNAO in English.

[2] Data source: China Audit Journal (<https://www.sohu.com/a/604445845121106842>). And by the end of our sample period 2018, over 94 percent of China's CSOEs had undergone audit practices conducted

by the central government.

[3] Data source: IIA's revised 2013 definition of "The board".

[4] Data source: Article 34 of Audit Law of the People's Republic of China (2021 Amendment).

[5] Data source: IIA's Practice Advisory 2440-2.

[6] The No.1 National Audit Report could be found in the governmental website of the National Audit Office of the People's Republic of China (<https://www.audit.gov.cn/n5/n25/c63442/content.html>).

[7] Data source: The National Audit Office of the People's Republic of China (<https://www.audit.gov.cn/n9/n489/n498/c14097/content.html>).

[8] This was clearly stated in the Regulations on Economic Responsibility Audit of Leading Cadres of the Party and Government and Leading Personnel of State-owned Firms and Institutions jointly issued by the Central Committee of the Communist Party of China and the State Council of the PRC in 2019.

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Appendix

Table X.A. T-tests on mean values of analyst optimism and forecast absolute biases for the treated group during the pre-treated and treated period.

Variable	POST=1		POST=0		Mean Diff.	T-value
	N	Mean	N	Mean		
$FOPT_{it}$	969	0.627	853	0.791	-0.164*	1.895
$FERROR_{it}$	969	0.737	853	0.931	-0.194**	2.024

Notes: Significance at 1%, 5%, and 10% levels are indicated by ***, **, and *, respectively (hereinafter).

