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Article

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Regulating CEO compensation: A remedy for corporate misconducts in China's state-owned enterprises

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ABSTRACT

The growing compensation disparity between CEOs and employees has become a global concern, underscoring the need for regulatory measures to ensure fair and equitable remuneration practices. Drawing insights from China's government regulation of CEO compensation (GRCC) for state-owned enterprises (SOEs), this study investigates the impact of GRCC on fraudulent activities within SOEs. Using data from China's A-share listed firms between 2010 and 2022 and applying logit regression models within a difference-in-difference framework, our empirical findings show a significant reduction in fraud following the implementation of GRCC. Additionally, the effect of GRCC is more pronounced in local SOEs compared to their central counterparts. Channel analysis reveals that GRCC promotes CEO political promotion, improves the quality of internal controls, and alleviates financial constraints within firms, which collectively reduce fraudulent activities. The results remain robust across various endogeneity tests, parallel trend assumptions, propensity score matching, placebo tests and alternative variable measurements.

1. Introduction

The pay disparity between CEOs and employees has become a focal point in discussions on income inequality. The debate is particularly pronounced in countries like the United States and Australia, where the gap is substantially wider compared to European nations. In the United States, the average CEO-to-worker pay ratio was reported as 351-to-1 in recent years, marking a significant increase from the 21-to-1 ratio observed in 1965 (Sanders, 2023). Similarly, Australia exhibits a notable pay gap, with CEOs earning 132 times more than their average local employees. In contrast, European countries generally display smaller pay gaps. For instance, in the United Kingdom, the CEO-to-worker pay ratio stands at 94-to-1, reflecting a relatively lower level of compensation disparity compared to the United States and Australia (Kotnik, Sakinç, & Guduras, 2018). Proponents argue that high CEO pay attracts top talent and enhances firm value (Conyon & He, 2012; Kweh, Tebourbi, Lo, & Huang, 2022). However, critics highlight its negative effects, including employee demotivation, lower productivity, and increased income inequality (Hendriks, Burger, & Commandeur, 2022; Weng & Yang, 2024).

In response to these issues, various regulatory measures have been adopted globally to address CEO pay disparity. In the United States, legislative efforts such as the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 have aimed to improve transparency and accountability in executive compensation (Congress, 2010). Australia has implemented the Corporations Amendment (Improving Accountability on Director and Executive Remuneration) Act 2011, which seeks to enhance the regulation of CEO pay and ensure it is aligned with firm performance and shareholder interests (Hill, 2012). China's approach to regulating CEO compensation is distinctive due to its Government regulation of CEO compensation (GRCC) for state-owned enterprises (SOEs). This regulatory framework differentiates itself from other methods of controlling CEO pay, which typically involve granting shareholders the right to vote on executive compensation. China introduced its first executive compensation regulations for SOEs in 2004, setting a formula based on financial and industry benchmarks. The framework was revised in 2009 to include retirement benefits and insurance, ensuring a structured system under key regulatory bodies to enhance transparency and address income disparity. By 2014, the measures include capping base salaries, limiting bonuses, and restricting

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total annual compensation. These regulations have effectively curtailed excessive CEO pay, resulting in top executives' compensation typically being 7–8 times higher than the average employee salary, a stark contrast to the figures observed in countries such as Australia and the United States. Extensive studies have explored how Chinese GRCC affects various aspects of SOE's firm performance. Key areas of impact include stock price volatility (Bai, Wang, Yu, & Zheng, 2019), performance decline (Jiang & Zhang, 2018; Su, Jiang, & Tian, 2020), reduced green innovation and environmental performance (Li, Maqsood, & Zahid, 2024), improved internal controls (Han, Xu, Zhang, Shen, & Lu, 2022), talent retention challenges (Nanda, Silveri, Wang, & Zhao, 2024), and compromised social performance (Jiang, Hu, Su, & Zhu, 2021; Maqsood, Li, Zahid, & Wang, 2023). Given the significant impact of GRCC on these aspects of firm-wide performance, this study aims to expand the CEO pay regulation literature by further exploring the effects of these regulations on corporate misconduct, particularly within SOEs across various types local and central levels.

Studies have identified several determinants of corporate fraud. Social literature underscores a positive correlation between corporate social responsibility (CSR) and fraud (Liao, Chen, & Zheng, 2019), suggesting that firms engaged in CSR activities may sometimes engage in fraudulent behavior to maintain their public image. In contrast, economic, financial and technological literature reveals various determinants of fraud, including financial analysis (He, Conyon, & Chen, 2020), digital transformation (Wang & Han, 2023), and regional trust and culture (Tang, Gu, Weng, & Ho, 2022). These studies suggest that financial analysts' forecasts, the level of technological advancement and the underlying cultural trust within a region can shape the likelihood of fraudulent practices in organizations. However, few studies explore the effect of CEO compensation or incentives on fraud and their conclusions often present conflicting narratives, contributing to ongoing debates in the field. Helge, Müller, and Vergauwe (2015) provide both analytical and empirical evidence that CEO tournament incentives, which include the evaluation of relative firm performance against peers, may lead to financial misreporting. CEOs may engage in such behavior as part of a competitive "tournament" to outperform their counterparts, driven by career concerns and the pressure to maintain their position. This manipulation, often aimed at portraying superior performance, creates an environment conducive to financial misreporting. Additionally, Goel and Thakor (2008) demonstrate that when executives are confronted with tournament incentives, higher risk-taking incentives might lead to more efficient operating and financial policies. In contrast, Armstrong, Larcker, Ormazabal, and Taylor (2013) argue that such incentives could escalate the occurrence of financial misreporting. Their research suggests that the pursuit of performance relative to peers may distort managerial judgment, making executives more prone to manipulation in order to meet performance targets. Moreover, literature also highlights the role of CEO compensation structure, specifically performance-based pay, in influencing the propensity for fraud. While some scholars argue that aligning CEO compensation with company performance reduces the incentive for fraudulent reporting (Jensen & Meckling, 1976), others note that highly competitive compensation structures may inadvertently foster a culture of financial misreporting (Bebchuk & Fried, 2010). The divergence in these views underscores the complexity of determining whether controlling CEO compensation encourages or discourages financial misreporting. Thus, the question of whether regulating these factors helps curb or exacerbates financial misreporting remains an unresolved issue in corporate governance research.

In this study, we leverage the introduction of GRCC in Chinese SOEs as an exogenous event to address the question of whether monitoring CEO compensation can reduce fraudulent activity at the firm level. By considering both agency theory and tournament theory, we posit that regulating CEO pay can indeed mitigate fraudulent behavior. On one hand, agency theory focuses on the relationship between principals and agents. It posits a potential conflict of interest between shareholders, who seek to maximize their returns, and executives, who may pursue

their own interests (Jensen & Meckling, 1976). CEO pay regulation, particularly through performance-based incentives, aims to align the interests of executives with those of shareholders. By structuring compensation to reward long-term performance and penalize short-term manipulative financial practices (Gillan, Hartzell, Koch, & Starks, 2010, p. 10), agency theory suggests that executives will have reduced incentives to commit fraud. Conversely, tournament theory proposes that executives compete for promotions and higher compensation, creating a competitive environment akin to a tournament (Chen, Ezzamel, & Cai, 2011). By regulating CEO pay and reducing the overly competitive nature of compensation structures, the pressure to engage in fraud to win the "tournament" can be mitigated. This theory suggests that moderation in competition can reduce the likelihood of risky and unethical behavior. This view is supported by Su et al. (2020), who found that regulating CEO pay reduces their risk-taking behaviors. Moreover, Donelson, Ege, and McInnis (2017) establish a consequential link by demonstrating that weak internal controls elevate fraudulent activities and misreporting. This causal relationship is further underscored by (Han et al., 2022), who assert that the introduction of GRCC serves to strengthen the internal control of the firm. The oversight function may dissuade CEOs from engaging in fraudulent activities. Furthermore, GRCC offers a solution to agency problems associated with monitoring difficulties, preventing issues such as managerial shirking (Henderson & Fredrickson, 2001; Su et al., 2020). Additionally, aligning with the literature on the determinants of fraud (Armstrong et al., 2013; Goel & Thakor, 2008; Helge et al., 2015), CEO incentives emerge as pivotal factors motivating manipulations and misreporting of the firm's financial performance. We argue that regulating CEO compensation curtails this motivation by mitigating their risk-taking activities, thereby reducing the likelihood of fraudulent practices and the pursuit of tournament-winning strategies. Therefore, as a stringent monitoring function, the introduction of GRCC within Chinese SOEs may contribute to a reduction in fraud.

Moreover, the impact of GRCC on corporate fraud varies significantly between different types of SOEs. In mainland China, SOEs are broadly categorized into central SOEs (CSOEs) and local SOEs (LSOEs), with each type employing distinct methods for controlling and selecting their CEOs (Jin, Xu, Xin, & Adhikari, 2022). CSOEs are directly controlled by the central government, often through the State-owned Assets Supervision and Administration Commission (SASAC), whereas LSOEs are controlled by local governments (Jin et al., 2022). CSOEs are typically larger and play a more strategic role in the national economy, while LSOEs are more regionally focused and smaller in scale. This study further proposed that GRCC has a more pronounced effect on reducing fraud in LSOEs compared to CSOEs. The reasoning behind this includes the varying governance and oversight functions across different types of SOEs. CSOEs are subject to more stringent oversight by central authorities, which reduces the incidence of fraud irrespective of any specific regulation (Jiang & Kim, 2015). In contrast, LSOEs with less rigorous oversight, might experience a greater impact from CEO pay regulation. Additionally, the scale and scope of operations in SOEs differ significantly (Jiang & Kim, 2020; Shi, Aguilera, & Wang, 2020). CSOEs, being larger and more complex, have more robust internal controls and audit mechanisms, mitigating the risk of corporate misconduct. On the other hand, LSOEs might lack such sophisticated systems, making CEO pay regulation a more critical tool in fraud prevention.

To test our research questions, we employed a logit regression model within a Difference-in-Difference (DiD) framework, analyzing data from Chinese listed firms from 2010 to 2022. Our results indicate a significant reduction in fraud among SOEs following the implementation of GRCC. Additionally, we explored the varying effects of GRCC across different types of SOEs. Since CEO appointments differ based on the ownership structure of SOEs (Jin et al., 2022; Tam, 2000), our findings reveal that the impact of CEO pay regulation on reducing fraud is more pronounced in LSOEs compared to CSOEs. To analyze the mechanisms through which GRCC impacts corporate fraud in SOEs, we examine three key

channels. First, the political promotion channel suggests that CEOs in Chinese SOEs are driven by political advancement (Cao, Lemmon, Pan, Qian, & Tian, 2019). GRCC mitigates fraud by aligning CEO incentives with ethical behavior, reducing misconduct linked to career-driven opportunism (McCarten, Diaz-Rainey, Roberts, & Tan, 2022). Second, through the internal control mechanism, GRCC enhances monitoring systems within SOEs, strengthening oversight and reducing fraudulent activities (Han et al., 2022). Lastly, the financing constraint channel indicates that SOEs face greater financial pressures than non-SOEs. GRCC alleviates these constraints, decreasing the need for fraudulent practices to secure external funding. The study results are robust when controlling for various firm characteristics and conducting additional tests.

Based on the empirical findings of this study, it makes several significant contributions to the current literature. Firstly, the study enhances the understanding of GRCC by differentiating it from prior research such as (Su et al., 2020), Li, Maqsood, Zahid, and Anwar (2024) and Maqsood et al. (2023) examining the adverse effects of these government regulations, providing evidence that controlling CEO pay negatively impacts environmental, social and financial performance. Unlike the traditional focus on the negative outcomes of GRCC, this study demonstrates that GRCC can also have a synergistic impact, functioning as a proactive mechanism that helps mitigate corporate fraud. This provides a more balanced perspective on the role of GRCC in corporate governance. Secondly, the study also contributes to the broader field of government regulation and corporate governance by addressing the influence of formal institutions, particularly government regulation, on corporate fraud (Tang et al., 2022). While much of the literature on fraud determinants emphasizes informal institutions, such as cultural or social factors, this study highlights the significant role of formal government regulation in mitigating fraud. Furthermore, the study builds on the work of Cao et al. (2019), demonstrating that executives of SOEs are strongly motivated by political promotion incentives, which discourages fraudulent behavior. This finding underscores the importance of political factors in shaping corporate practices in the context of SOEs. Thirdly, the study makes a crucial contribution by comparing the 2009 and 2014 CEO pay regulations in China. While most prior research has focused on the 2014 policy, this study extends the literature by investigating both the announcement and enforcement stages of these two policies. The findings show that the 2009 policy, which was weakly enforced, had no significant impact on corporate fraud. In contrast, the stricter enforcement of the 2014 policy led to a significant reduction in corporate fraud. This comparison enriches the literature by providing a nuanced understanding of the impact of policy enforcement on corporate behavior. Lastly, the study contributes to the literature on corporate ownership structures, which has often been overlooked in previous research on CEO pay regulation. By examining the type of SOEs, this study provides evidence of how differences in ownership and appointment structures influence the effects of GRCC. The findings reveal that GRCC has a significantly greater impact on reducing corporate fraud in LSOEs compared to CSOEs, where ownership structures and appointments differ. This insight adds depth to the understanding of how ownership structures interact with regulatory interventions.

The remainder of this work is organized as follows: Section 2 provides the background of Chinese government pay regulation, Section 3 covers the relevant literature and hypothesis development, Section 4 presents the data sample, variable measurement, and research model, Section 5 explains the study results, and Section 6 concludes the paper.

2. Background on Chinese government regulation of CEO compensation

Government regulation of CEO compensation is a crucial mechanism that has garnered significant global attention as a means to ensure fair and equitable executive pay. Notable examples include the CEO Pay Act

in Australia and the United States (Atif, Huang, & Liu, 2020; Kotnik et al., 2018). In China, the government has been particularly proactive in addressing pay inequality by implementing stringent regulations to limit CEO compensation. In 2004, China introduced its inaugural executive compensation laws and guidelines for all SOEs.¹ These regulations provided a formula for determining the maximum compensation of top executives, including the CEO, deputy CEO and CFO. The formula takes into account factors such as total assets, major operational revenues, net assets and net profit. Additionally, it benchmarks the average employee wages of SOEs nationwide, within the same geographic area and across the same industry to establish appropriate pay levels for senior executives.

This regulatory framework was further refined in 2009, incorporating additional components such as retirement benefits and insurance as part of executive compensation. Superannuation and insurance were also included in the overall CEO salary package, ensuring a more structured and comprehensive remuneration system. The 2009 reform was guided by directives from key regulatory bodies, including the Ministry of Finance, the SASAC, the Ministry of Human Resources and Social Security, and the Organization Department of the Communist Party of China.² This revision sought to enhance transparency, standardize compensation structures and address growing concerns over income disparity between executives and average employees.

The regulation was further amended in 2014, implementing more stringent pay controls on senior executives in central SOEs. Senior executives' base salaries were capped at no more than twice the average salary of regular employees. Furthermore, bonuses derived from share-based incentives were limited to a maximum of twice the executive's base pay. Although stock-based compensation is infrequently used in Chinese SOEs, the 2014 legislation stipulated that share-based incentives for top executives could not exceed 30% of their total annual compensation (Politburo of the Chinese Communist Party, 2014). This regulation also introduced strict penalties for policy violations or delays in enforcement, ensuring compliance and swift corrective action. The rationale behind these stringent regulations is multi-faceted. Firstly, they aim to curb excessive executive compensation that can lead to significant income disparity within organizations. By linking compensation more closely with average employee wages and limiting share-based incentives, the regulations promote a more equitable and performance-oriented pay structure. Furthermore, these measures enhance the transparency and accountability of executive compensation, which is crucial for maintaining public trust in SOEs. By setting clear and enforceable limits, the Chinese government seeks to create a more balanced and just corporate environment. Additionally, these regulations are designed to align executive incentives with the long-term health and performance of the organization. By capping base salaries and bonuses, the regulations discourage short-term risk-taking and promote sustainable business practices. This alignment is particularly important in SOEs, where the government has a vested interest in ensuring that these entities contribute positively to the economy and society.

In our study, we examine the impact of GRCC on corporate fraud in SOEs. The 2014 regulations provide a comprehensive and stringent framework, making them an ideal context for assessing the regulatory impact on corporate governance and ethical practices. Through this analysis, we aim to contribute to the broader discourse on the

¹ Information regarding the supervision of executive pay in Chinese SOEs can be found on the websites of the State-owned Assets Supervision and Administration Commission at <http://www.sasac.gov.cn> and the Ministry of Finance at <http://www.mof.gov.cn>.

² Refer to the 2006 "Instructions on Regulating Executive 'On-Job' Consumptions in Chinese SOEs" by the State-owned Assets Supervision and Administration Commission at http://www.gov.cn/gzdt/2006-06/08/content_303536.htm.

effectiveness of government intervention in executive compensation and its implications for corporate integrity and performance.

3. Relevant literature and hypothesis development

3.1. Impact of government regulation for CEO compensation on corporate fraud

The relationship between how CEOs are compensated and their potential involvement in corporate fraud is crucial for understanding corporate governance. This literature review examines this relationship through the lens of agency theory and tournament incentive theory. Agency theory, developed by [Jensen and Meckling \(1976\)](#), explores the conflicts of interest between principals (shareholders) and agents (CEOs). The theory posits that because CEOs may pursue personal goals that do not align with shareholders' interests, compensation structures must align CEOs' actions with shareholders' objectives. This alignment is often achieved through performance-based compensation ([Jensen & Meckling, 1976](#)). While the tournament incentive theory, as proposed by [Lazear and Rosen \(1981\)](#), describes how individuals in hierarchical organizations compete for higher positions. The theory suggests that large disparities in rewards at the top can motivate individuals to exert high levels of effort. However, this intense competition can also lead to unethical behavior, including corporate fraud, as individuals strive to win the "tournament" ([Lazear & Rosen, 1981](#)).

CEO compensation typically includes a mix of salary, bonuses, stock options, and long-term incentive plans. The structure of compensation packages is influenced by factors such as firm size, industry, and financial performance ([Murphy & Jensen, 2018](#)). Stock options and bonuses, tied to short-term financial metrics, can lead to risk-taking behaviors aimed at inflating short-term results ([Bebchuk & Fried, 2006](#)). Corporate fraud encompasses a range of illegal activities undertaken by firm executives to deceive stakeholders and gain financial benefits. Notable examples include Enron, WorldCom, and more recently, the Volkswagen emissions scandal. These frauds have significant repercussions, leading to loss of investor trust, legal penalties, and in severe cases, company collapse ([Coffee Jr, 2005](#)).

Empirical studies indicate that excessive CEO compensation, especially when heavily reliant on stock options and bonuses, can create incentives for fraudulent activities. CEOs may engage in earnings manipulation, insider trading, or other unethical practices to boost short-term stock prices and, consequently, their compensation ([Bebchuk & Fried, 2006](#); [Helge et al., 2015](#)). This relationship highlights the need for balanced compensation structures to mitigate the risk of fraud. As agency theory highlights the principal-agent problem, where the divergent interests of shareholders and CEOs can lead to governance issues. Aligning the interests of CEOs with those of shareholders is critical to mitigating fraud. Performance-based compensation is designed to achieve this alignment, though it can sometimes have the opposite effect if not properly structured ([Jensen & Meckling, 1976](#)). Tournament incentive theory suggests that the substantial rewards for top executives can lead to intense competition. While this can drive high performance, it can also incentivize unethical behavior as individuals strive to outdo each other. This theory helps explain why some CEOs might resort to fraudulent activities to secure their position and maximize their rewards ([Lazear & Rosen, 1981](#)).

Considering both theoretical frameworks, we contend that government regulation for CEO compensation, which enforces a significant portion of CEO compensation to be tied to non-financial performance metrics, will reduce the temptation for CEOs to commit fraud for financial gain. According to agency theory, aligning the interests of CEOs with those of shareholders through well-structured compensation can mitigate the principal-agent problem ([Jensen & Meckling, 1976](#)). Government regulations that enforce such alignment can therefore reduce the incentives for fraud. Tournament incentive theory suggests that high rewards for top positions can drive intense competition and

potentially unethical behavior ([Lazear & Rosen, 1981](#)). By regulating the disparities in compensation and ensuring that incentives are aligned with long-term, sustainable performance, the likelihood of corporate fraud can be minimized. Thus, based on the aforementioned theoretical background, our study advances the following hypothesis 1.

H1. Government regulation for SOEs CEO compensation can reduce the incidence of corporate fraud.

3.2. Impact of government regulation for CEO compensation on corporate fraud in different types of SOEs

SOEs serve as the backbone of China's economic framework, acting as critical extensions of the state in driving national development. These enterprises play a pivotal role in implementing government policies, stabilizing key industries and ensuring economic security ([Jin et al., 2022](#)). Over the past decades, SOEs have contributed significantly to China's industrialization, infrastructure development and technological advancement, reinforcing the country's global economic influence. Their role extends beyond domestic boundaries, as many Chinese SOEs are actively engaged in international markets through foreign investments, cross-border mergers and large-scale infrastructure projects under initiatives such as the Belt and Road initiative ([Kong, 2023](#)). While SOEs are broadly classified as key instruments of state control, they can be further divided into CSOs and LSOs, each with distinct characteristics in governance, strategic priorities and managerial structures ([Clarke, 2003](#); [Lin, Lu, Zhang, & Zheng, 2020](#)). CSOs are directly supervised by the central government and often oversee industries of national importance, such as energy, telecommunications and defense. In contrast, LSOs are managed at the provincial or municipal level, operating in a wider range of sectors with varying degrees of government intervention. LSOs are more exposed to regional economic conditions, political networks and financial constraints, which may create vulnerabilities in governance and operational transparency.

A key distinction between CSOs and LSOs lies in their corporate governance structures, particularly in the appointment and composition of senior management ([Li, Maqsood, & Zahid, 2024](#)). In CSOs, the selection of executives is highly centralized, often influenced by national-level political considerations, while LSOs exhibit a more decentralized appointment process, where local government officials play a dominant role in leadership decisions ([Gu, Wu, & Gao, 2024](#)). This divergence extends to executive compensation structures, where CSOs follow stricter regulatory frameworks, aligning CEO pay with performance-based incentives set by central authorities. Conversely, LSOs may experience greater discretion in pay-setting practices, potentially leading to weaker oversight and higher risks of misalignment between executive incentives and corporate objectives ([Li, Maqsood, & Zahid, 2024](#)). Given these differences, the impact of government regulation on CEO compensation and corporate fraud is likely to vary across SOE types. This study posits that the effect of CEO pay regulation in mitigating corporate fraud is more pronounced in LSOs compared to central SOEs. Due to the localized nature of governance and reduced oversight mechanisms, LSOs may face greater risks of fraudulent activities when regulatory frameworks are either weakly enforced or subject to local political interference. In contrast, CSOs, with their direct supervision from central authorities, may exhibit stronger internal controls, reducing the likelihood of fraudulent practices despite similar regulatory interventions.

H2. The impact of government regulation for CEO compensation on corporate fraud is more pronounced in local SOEs compared to central SOEs

4. Data sample, variable measurement and research methods

4.1. Sample selection and data source

To empirically examine our study question, we have utilized the dataset of Chinese A-shares listed firms from 2010 to 2022. To accurately capture our variables, we have filtered our dataset by dropping firms with missing values, financial firms, and firms with special treatments. After conducting this filtering process, our final dataset consists of 40055 firm-year observations, involving a total of 4859 unique firms. The data for measuring the study variables were sourced from two main databases: China stock market & accounting research (CSMAR) and RESSET. Specifically, information on fraud, data on CEO compensation and other financial variables used to calculate control variables was obtained from these sources.

4.2. Variable measurement

4.2.1. Dependent variable

The primary objective of this study is to accurately capture instances of corporate fraud. Building upon the existing literature on corporate fraud (Armstrong et al., 2013; Wang & Han, 2023), we have identified specific criteria for defining and measuring fraudulent activities. These criteria include inaccurate general accounting practices, unintentional illegal transactions, and unusual operational activities. After careful consideration, we have finalized our fraud proxy, which is a binary variable indicating the occurrence of fraudulent behavior by a firm in a given year. This variable takes the value of 1 if the firm is reported to have initiated fraudulent behavior during the corresponding year; otherwise, it is coded as 0. The data for this proxy is sourced from the CSMAR database.

To ensure the robustness of our fraud measurement, we introduce an additional measure for corporate fraud, named Fraud1. This measure utilizes data from the RESSET database and focuses on three types of violations that are indicative of fraudulent actions: periodic reports, earnings pre-announcements, and connected transactions. These violations often signal fraudulent activities such as delayed disclosures or information concealment (Wang & Han, 2023). In cases where a firm incurs multiple fines within the same year, only the first penalty imposed by regulatory bodies like the China securities regulatory commission (CSRC) is recorded. By employing these two measures, we aim to provide a comprehensive and reliable assessment of corporate fraud within the scope of our study. As a result, Fraud1 is a binary variable that takes the value of 1 if the firm is involved in a violation; otherwise, it is coded as 0.

4.2.2. Independent variable

In this study, the variable of interest is the GRCC. This regulation, specifically targeting SOEs, was initially introduced in 2004 with the aim of monitoring and controlling CEO pay. The regulation underwent significant revisions in 2009 to address emerging challenges and improve its effectiveness. However, it wasn't until 2014 that the enforcement of these regulations became stringent, with firms facing substantial penalties for non-compliance (Jiang et al., 2021). Consequently, the 2014 enforcement marks a critical juncture in the regulation's impact on CEO compensation within SOEs. To operationalize this variable, we assign a value of 1 to GRCC₂₀₁₄ for the years 2014 and beyond, signifying the period of strict enforcement. For years prior to 2014, GRCC₂₀₁₄ is assigned a value of 0, representing the period before

the stringent enforcement measures were implemented. This operationalization is consistent with the study by (Jiang et al., 2021; Li, Maqsood, & Zahid, 2024; Su et al., 2020).

For robustness, the study also introduces a variable called CEO pay restriction (CPR). This variable is designed to measure the extent of pay restriction between non-SOEs and SOEs, providing additional insight into the regulatory impact on executive compensation. Following recent studies on CEO compensation restriction (Li, Maqsood, & Zahid, 2024; Maqsood et al., 2023), the CPR is calculated using the following equation:

$$CPR_{i,j,t} = AvgPaygap_nonSOEs_{j,t} - SOEsPaygap_{i,j,t} \quad (1)$$

Where; $AvgPaygap_nonSOEs_{j,t}$, represents the average pay gap of non-SOEs in industry j for year t , while $SOEsPaygap_{i,j,t}$ is the ratio of the top-3 executive pay to the pay of other employees for each SOE observation i within industry j for year t . The difference between these two measures, CPR, indicates the degree of pay restriction. A high CPR suggests that SOE executive compensation is highly regulated compared to the industry-year average for non-SOEs, while a low CPR indicates less regulation. By employing both the GRCC and CPR variables, this study aims to provide a comprehensive analysis of the impact of government regulations on CEO pay within SOEs. The differentiation between pre-2014 and post-2014 periods allows for a clear assessment of the regulation's effectiveness, while the CPR variable offers a nuanced comparison of pay restrictions between SOEs and non-SOEs across various industries and years.

4.2.3. Firm and board level control variables

Building on existing research on corporate fraud, CEO compensation and regulation, this study also includes a comprehensive array of control variables at both the firm and board levels (Armstrong et al., 2013; Beasley, Carcello, Hermanson, & Lapedes, 2000; Karpoff, Lee, & Martin, 2008; Li, Maqsood, & Zahid, 2024; Maqsood et al., 2023; Shi et al., 2020; Su et al., 2020; Wang & Han, 2023). These controls are essential to isolate the effect of GRCC₂₀₁₄ by accounting for other factors that might influence corporate fraud.

At the firm level several key variables are considered. Firm size (Size) is measured as the logarithm of the firm's total assets. Larger firms may have more resources to implement stronger controls but also might present more opportunities for fraud due to their complexity. Firm age (Age), defined as the number of years the firm has been listed, is included to account for the possibility that older firms might have more established procedures and controls, affecting the likelihood of fraud. Leverage (Lev), calculated as the ratio of total liabilities to total assets, considers the financial pressure firms with higher leverage might face, potentially increasing the temptation to commit fraud. Return on assets (ROA) is another important variable, defined as the ratio of earnings before interest and tax (EBIT) to total assets. This measure of profitability can influence managerial behavior and the likelihood of fraudulent activities. Firm sales (lnsale), measured as the natural logarithm of sales, is included as higher sales might indicate better performance, which could correlate with both higher opportunities and stronger internal controls. The cash ratio (CR), the proportion of cash and cash equivalents relative to total assets, is considered because high liquidity might reduce the need for fraudulent activities to meet short-term obligations. Finally, property, plant, and equipment (PPE), defined as the ratio of property, plant, and equipment to total assets, is included to account for the tangible asset base of the firm.

At the board level several variables are also controlled. CEO duality

Table 1
Variable definition and explanation.

Type	Variable	Definition	Source	
<i>Dependent variable</i>				
Fraud	Corporate fraud	A binary variable takes 1 if it is reported to have initiated fraudulent behavior in the corresponding year; otherwise, it is coded as 0.	RESSET and CSMAR	
Fraud1		A binary variable takes 1 if the firm is identified as a fraud firm; otherwise, it is coded as 0.		
<i>Independent variable</i>				
GRCC ₂₀₁₄	Government regulation for CEO pay	A dummy variable takes a value of 1 if the year in and after 2014; otherwise, it takes 0.	Authors calculation based on the study of (Li, Maqsood, & Zahid, 2024; Su et al., 2020)	
SOEs	State-owned enterprises	A treated group which takes the value 1 if the firm is controlled by the government, otherwise is take the value of zero.		
GRCC ₂₀₁₄ × SOEs	Interaction term	The interaction between the government regulation for CEO pay and treated group.		
CEO pay restriction proxy				
CPR	CEO pay restriction	$CPR_{i,j,t} = AvgPaygap_nonSOE_{j,t} - Paygap_{i,j,t}$ Where $AvgPaygap_nonSOE_{j,t}$, is the average pay gap computing for each industry (j) and year (t) by using non SOEs. The pay gap, measured for each SOE sample observation, is the ratio of the average compensation of the top three executives to the average wage of normal workers.		
<i>Firm and board Control variable</i>				
Size	Firm size	Firm total assets logarithm.	Author's calculation based on data from CSMAR and the literature	
Age	Firm age	Number of years of firm listed.		
Lev	Firm leverage	The ratio of total liability/total assets.		
ROA	Return on assets	The ratio of earnings before interest and tax and total assets.		
Ln (Sales)	Logarithm of sales	Natural logarithm of sales.		
CR	Cash ratio	The proportion of cash and cash equivalents relative to total assets.		
PPE	Property, plant and equipment	The ratio of property, plant, and equipment to total assets.		
Duality	CEO duality	A dummy variable = 1 if the CEO serves as the board's chairman.		
BS	Board size	The logarithm of the number of directors on the board.	Author's calculation based on the study of (Cao et al., 2019)	
Ind	Independent director	The percentage of independent directors on the board.		
<i>Other variable used in analysis</i>				
Political promotion incentives	PPI	If an executive is promoted, the PPI value is set to 1; if they are transferred or demoted, it is set to 0.		
IC	Internal control	The <i>Dibo</i> internal control index		
KZ	Financing constraint	The assessment of financing constraints is conducted using Kaplan and Zingales (1997) methodology, known as the KZ index.		
LSOEs	Local state-owned enterprises	Dummy variable = 1 for firms with control; by local government and zero otherwise.		
CSOEs	Central state-owned enterprises	Dummy variable = 1 for firms with control; by central government and zero otherwise.		
PC	Political connection	A dummy variable that takes the value 1 if the CEO of the targeted firm has political connections; otherwise, it takes the value 0.	Author's calculation based on data from CSMAR and the literature	
Gender	CEO gender	A dummy variable that equals 1 if the CEO of the targeted firm is male, and 0 if otherwise.		
Fin-background	Financial background	A dummy variable that equals 1 if the CEO of the targeted firm has a financial background, and 0 otherwise.		

Note: This table provides detailed definitions, measurements, and sources of all variables used in this study.

(Duality) is a dummy variable set to 1 if the CEO serves as the board's chairman. This variable is important as dual roles may affect the board's oversight capabilities. Board size (BS), measured as the logarithm of the number of directors on the board. Lastly, the percentage of independent directors (ind) on the board is considered, as independent directors can provide more unbiased oversight, potentially reducing the likelihood of fraud. To manage outliers, firm-level controls were winsorized at the 1% and 99% levels. Table 1 provides detailed definitions and explanations of all variables used in this study, ensuring clarity and transparency in the operationalization of these control variables.

4.3. Research method

To examine the impact of GRCC₂₀₁₄ on fraud within SOEs, we employ a logit regression model in DiD framework as specified in equation (2).

$$\begin{aligned} \text{Logit (Fraud } i, t) = & \alpha_0 + \alpha_1 \text{ SOEs}_{i,t} + \alpha_2 \text{ GRCC}_{2014\ i,t} \\ & + \alpha_3 \text{ GRCC}_{2014} \text{ 'SOEs}_{i,t} + \alpha_4 \text{ CONTROL}_{i,t} + \text{Industry FE}_t + \text{Year FE}_j \\ & + \text{Firm FE}_i + \varepsilon_{i,t} \end{aligned} \quad (2)$$

The subscripts *i* and *t* denote industry and year respectively. Fraud is a binary variable (1 for fraud, 0 for non-fraud). Our key variable is the

Table 2
Data distribution.

Panel A: Sample distribution by year						
Years	Total sample	Percentage	Non-Fraud Firm	Percentage	Fraud firm	Percentage
2010	1003	2.5041	721	2.2077	282	3.8129
2011	1346	3.3604	940	2.8782	406	5.4895
2012	2473	6.1740	1999	6.1208	474	6.4089
2013	2521	6.2938	2074	6.3505	447	6.0438
2014	2546	6.3563	2110	6.4607	436	5.8951
2015	2840	7.0903	2273	6.9598	567	7.6663
2016	3020	7.5396	2341	7.1680	679	9.1806
2017	3450	8.6132	2707	8.2887	743	10.0460
2018	3591	8.9652	2758	8.4448	833	11.2628
2019	3803	9.4944	3030	9.2777	773	10.4516
2020	3871	9.6642	3157	9.6666	714	9.6539
2021	4584	11.4443	3946	12.0824	638	8.6263
2022	5007	12.5003	4603	14.0941	404	5.4624
Total observation by year	40055	100.0000	32659	100.0000	7396	100.0000
Panel B: Sample distribution by industry						
Industry names	Total sample	Percentage	Fraud firm	Percentage	Non-Fraud Firm	Percentage
Real estate industry	615	1.5354	186	2.5149	429	1.3136
Accommodation	716	1.7875	171	2.3121	545	1.6688
Internet and relevant services	654	1.6328	132	1.7847	522	1.5983
Wholesale	534	1.3332	86	1.1628	448	1.3718
Railway, shipbuilding, aerospace	661	1.6502	94	1.2710	567	1.7361
Conglomerates	798	1.9923	140	1.8929	658	2.0148
Retailing	501	1.2508	71	0.9600	430	1.3166
Special equipment manufacturing	121	0.3021	21	0.2839	100	0.3062
Civil engineering construction	100	0.2497	24	0.3245	76	0.2327
Non-metallic mineral products	161	0.4019	14	0.1893	147	0.4501
Computer, communication and electronic device manufacturing	343	0.8563	93	1.2574	250	0.7655
Textile industry	145	0.3620	19	0.2569	126	0.3858
Construction decoration and other construction	162	0.4044	13	0.1758	149	0.4562
Wine, drinks and refined tea manufacturing	355	0.8863	74	1.0005	281	0.8604
Loading unloading and transportation agency	3274	8.1738	563	7.6122	2711	8.3009
Water transportation	1746	4.3590	462	6.2466	1284	3.9315
Building construction	450	1.1235	53	0.7166	397	1.2156
Production and supply of electric power and thermal power	958	2.3917	171	2.3121	787	2.4097
Medicine manufacturing	1401	3.4977	232	3.1368	1169	3.5794
Other manufacturing	662	1.6527	68	0.9194	594	1.8188
Automobile manufacturing	1021	2.5490	181	2.4473	840	2.5720
Ecological preservation and environmental treatment industry	793	1.9798	81	1.0952	712	2.1801
Business services	1688	4.2142	245	3.3126	1443	4.4184
Metal products	2511	6.2689	384	5.1920	2127	6.5128
Farm and sideline products processing	1499	3.7424	208	2.8123	1291	3.9530
Electric machines and apparatuses manufacturing	797	1.9898	105	1.4197	692	2.1189
Leasing industry	1715	4.2816	498	6.7334	1217	3.7264
Petroleum processing, coking and nuclear fuel processing	2066	5.1579	643	8.6939	1423	4.3571
Non-ferrous metals smelting & rolling processing	532	1.3282	58	0.7842	474	1.4514
Public utility management	404	1.0086	79	1.0681	325	0.9951
Road transport	39	0.0974	11	0.1487	28	0.0857
Air transport	2	0.0050	0	0.0000	2	0.0061
Other services	1581	3.9471	179	2.4202	1402	4.2928
Raw chemical materials and chemical products	1164	2.9060	196	2.6501	968	2.9640
Rubber and plastic product industry	1349	3.3679	365	4.9351	984	3.0130
Broadcast, television, film and television recording industry	1555	3.8822	141	1.9064	1414	4.3296
Software and IT services	201	0.5018	34	0.4597	167	0.5113
Chemical fibre manufacturing	1794	4.4788	498	6.7334	1296	3.9683
General equipment manufacturing	2	0.0050	0	0.0000	2	0.0061
Gas production & supply	1828	4.5637	303	4.0968	1525	4.6695
Ferrous metals mining and dressing	587	1.4655	116	1.5684	471	1.4422
Resident services	422	1.0536	40	0.5408	382	1.1697
Nonferrous metal mining	552	1.3781	77	1.0411	475	1.4544
Papermaking & paper products	83	0.2072	8	0.1082	75	0.2296
Telecommunications, television, and satellite transmission services	40	0.0999	12	0.1622	28	0.0857
News and publishing industry	82	0.2047	15	0.2028	67	0.2052
Science and technology promotion and application services	507	1.2658	84	1.1357	423	1.2952
Health care	884	2.2070	148	2.0011	736	2.2536
Total observation by industry	40055	100	7396	100	32659	100

Note: This table provides the data distribution by year in Panel A and by industry in Panel B, respectively.

Table 3
Summary statistics.

	Non-Fraud firms				Fraud firms			
	Mean	SD	Median	N	Mean	SD	Median	N
SOEs	0.3571	0.4792	0.0000	32659	0.2683	0.4431	0.0000	7396
GRCC ₂₀₁₄	0.7276	0.4452	1.0000	32659	0.7546	0.4304	1.0000	7396
GRCC ₂₀₁₄ × SOEs	0.1872	0.3901	0.0000	32659	0.1298	0.3361	0.0000	7396
CPR	6.5219	28.3622	6.8434	8313	8.7892	15.5819	6.9870	1333
Size	22.1426	1.3410	21.9410	32659	22.0405	1.1792	21.9542	7396
Lev	0.4092	0.2094	0.3954	32659	0.4739	0.2233	0.4699	7396
Ln (Sales)	21.4615	1.4918	21.2985	32659	21.2176	1.4264	21.1957	7396
Age	2.0674	0.9281	2.1972	32659	2.2888	0.7325	2.3979	7396
ROA	0.0498	0.0648	0.0454	32659	0.0077	0.0988	0.0221	7396
CR	0.1732	0.1350	0.1332	32659	0.1374	0.1202	0.1034	7396
PPE	0.2087	0.1595	0.1751	32659	0.2010	0.1576	0.1666	7396
Duality	0.3067	0.4611	0.0000	32659	0.3052	0.4605	0.0000	7396
BS	2.1188	0.1988	2.1972	32659	2.1005	0.2011	2.1972	7396
Ind	3.6176	0.1377	3.5935	32659	3.6243	0.1428	3.5935	7396
CSOEs	0.0184	0.1344	0.0000	27618	0.0132	0.1142	0.0000	5674
LSOEs	0.2193	0.4138	0.0000	27618	0.1866	0.3897	0.0000	5674

Note: This table presents the descriptive statistics for all variables used in this study from the perspectives of fraudulent and non-fraudulent firms. The results in each column respectively include the number of observations, mean, standard deviation, and median.

interaction between (state-owned enterprises, treated group³) and "GRCC₂₀₁₄" (Government regulation for CEO compensation), examining its impact before and after regulatory changes. *CONTROL* includes firm and board-level variables (defined in section 4.2.3). The model features fixed effects for industries, years and firms, with ϵ representing the error term capturing unobserved factors affecting the dependent variable.

5. Empirical result

5.1. Descriptive statistic and correlation matrix

Table 2 presents the sample distribution across years in Panel A and industries in Panel B, categorized by fraud and non-fraud firms. It highlights a notable increase in fraud cases reported in the year 2018. In Panel B, the industries with the highest reported fraud incidents are loading/unloading, transportation agencies and petroleum processing, coking and nuclear fuel processing.

Table 3 displays the descriptive statistics of all variables used in this study, comparing fraud and non-fraud firms. The results indicate that GRCC₂₀₁₄ captures a higher proportion of non-fraudulent firms compared to fraudulent firms. Additionally, fraudulent firms exhibit higher Lev and CR, compared to non-fraudulent firms. Non-fraudulent firms, on the other hand tend to be larger in size and show slightly Lnsales compared to fraudulent firms. Further, non-fraudulent firms show a higher proportion of CEO duality compared to fraudulent firms. It is noteworthy that CEO duality is relatively rare among Chinese-listed firms in comparison to those listed in the U.S. Furthermore, the average independence of Ind and BS shows a similar distribution across both groups. Moreover, fraudulent firms are noted to be more mature in terms of age compared to non-fraudulent firms.

Table 4 displays the correlation matrix results, which provide initial support for our study's hypotheses. Specifically, the matrix reveals a negative relationship between the GRCC₂₀₁₄ SOEs with corporate fraud. This indicates that as the strength of GRCC₂₀₁₄ increases in SOEs, the incidence of corporate fraud decreases. The negative correlation suggests that enhanced government regulation effectively mitigates instances of corporate misconduct within SOEs, supporting our hypothesis that GRCC₂₀₁₄ can serve as a significant mechanism for improving corporate governance.

5.2. Main evidence: government regulation for CEO compensation and corporate fraud

Our study investigates the impact of GRCC₂₀₁₄ on corporate fraud, utilizing a logit regression within DiD framework. The dependent variable in this analysis is fraud, defined earlier in the study. The primary variable of interest is the interaction term GRCC₂₀₁₄ × SOEs (Indicating Government regulation for CEO compensation × Treated firm). Beginning with Column 1 of Table 5, we estimate the regression without control variables. The coefficient of SOEs is both negative and significant suggesting that SOEs experience less fraud activity due to direct government oversight. This finding aligns with the research by Jin et al. (2022) and Jiang and Kim (2020), which provides evidence on the corporate governance of Chinese SOEs. Notably, the interaction term GRCC₂₀₁₄ × SOEs is also negative and significant, indicating that the implementation of CEO compensation regulation for SOEs significantly reduces corporate fraud in comparison to non-SOEs. In Column 2, we incorporate additional control variables. Despite a slight incline in the coefficient, the interaction variable coefficient remains negative and significant, indicating that the control variables impact this relationship. The coefficients of the control variables are largely consistent with existing literature (Beasley et al., 2000; Karpoff et al., 2008). For example, Size is positively related to fraud, implying that larger firms are more involved in corporate fraud. Further, Column 3 introduces year and firm fixed effects. The results continue to demonstrate that, compared to non-SOEs, targeted firms under government regulation tend to exhibit a decline in corporate fraud. These findings are both statistically and economically significant. Specifically, the coefficient reported in Column 3 suggests that regulation targeted firms experience a 20.17% reduction in fraud, compared to those not subjected to such regulation. Lastly, in Column 4, we include the marginal effects, which consistently show the negative impact of GRCC on fraud in policy-targeted firms. Overall, findings highlight the effectiveness of government regulations on CEO compensation in reducing corporate fraud, particularly within SOEs.

³ We establish a treated group for state-owned enterprises due to a direct policy impact, by following Li et al., 2024 and Su et al. (2020).

Table 4
Correlation matrix.

	Fraud	SOE	GRCC ₂₀₁₄	GRCC ₂₀₁₄ × SOEs	CPR	Size	Lev	Ln(sales)	Age	ROA	CR	PPE	Duality	BS	Ind	CSOE	LSOE
Fraud	1																
SOEs	−0.0498***	1															
GRCC ₂₀₁₄	−0.0229*	0.0173	1														
GRCC ₂₀₁₄ × SOEs	−0.0250*	0.0674***	0.997***	1													
CPR	0.0275**	−0.0138	0.00396	0.00304	1												
Size	−0.0629***	0.0299**	0.158***	0.158***	−0.208***	1											
Lev	0.105***	0.0711***	−0.0838***	−0.0806***	−0.0911***	0.402***	1										
Ln (Sales)	−0.0679***	0.0393***	0.0886***	0.0893***	−0.203***	0.877***	0.381***	1									
Age	0.0214*	−0.00918	0.138***	0.137***	0.00231	0.165***	0.179***	0.153***	1								
ROA	−0.158***	−0.0689***	−0.0339**	−0.0360***	0.0117	0.0428***	−0.394***	0.102***	−0.185***	0.290***	1						
CR	−0.0755***	−0.0365***	0.00289	0.00253	0.0214*	−0.210***	−0.374***	−0.141***	0.00785	−0.112***	−0.355***	1					
PPE	−0.00268	0.0196	−0.0474***	−0.0473***	0.0254*	0.0490***	0.0294*	0.0382***	−0.0258*	−0.000925	0.0169	−0.0352***	1				
Duality	0.0256*	−0.0578***	−0.00538	−0.00748	0.0121	−0.0427***	0.000295	0.0294*	−0.0448***	0.0313**	−0.0498***	0.140***	−0.0844***	1			
BS	−0.00608	−0.00270	−0.0789***	−0.0799***	0.0533***	0.184***	0.0542***	0.156***	−0.0413***	0.00256	−0.0437***	0.0617***	−0.394***	0.140***	1		
Ind	−0.0134	0.0607***	0.0383***	0.0404***	−0.116***	0.149***	0.0740***	0.121***	0.0329**	−0.0420***	0.00256	−0.0437***	0.0617***	−0.394***	0.140***	1	
CSOEs	0.0118	0.0121	0.0407***	0.0413***	−0.0145	−0.0435***	−0.0585***	−0.0315**	−0.119***	0.0168	0.0684***	−0.0334**	−0.00904	0.0221*	−0.0285**	1	
LSOEs	0.0551***	0.0687***	0.000598	0.00404	0.129***	−0.0394***	0.0297**	−0.0660***	0.0995***	−0.0252*	−0.0537***	0.0307**	0.0557***	0.00317	−0.0212*	−0.297***	1

Note: The table provides the correlation coefficients between the variables in the study. The significance levels are indicated as follows: . Standard errors are in parentheses ***p < 0.01, **p < 0.05, *p < 0.1, highlighting the strength of the relationships.

Table 5

Main evidence: Government regulation from CEO pay and corporate fraud.

	(1)	(2)	(3)	(4)
Variables	Fraud			Marginal effect
SOEs	−0.3935*** (0.0438)	−0.5162*** (0.0499)	−0.5179*** (0.0838)	−0.0617*** (0.0071)
GRCC ₂₀₁₄	−0.1395 (0.1189)	−0.0456 (0.2209)		0.0113** (0.0049)
GRCC ₂₀₁₄ × SOEs	−0.1508** (0.0594)	−0.2060*** (0.0639)	−0.2017** (0.0912)	−0.0291*** (0.0071)
Size		0.1056*** (0.0276)	0.0189** (0.0385)	−0.0174*** (0.0037)
Lev		0.4963*** (0.0668)	0.4214*** (0.1128)	0.0337*** (0.0088)
Ln (Sales)		−0.1883*** (0.0229)	−0.1176*** (0.0323)	−0.0181*** (0.0031)
Age		0.2833*** (0.0229)	0.2734*** (0.0343)	0.0454*** (0.0034)
ROA		−4.8618*** (0.2133)	−5.0198*** (0.2742)	−0.4011*** (0.0253)
CR		−1.3395*** (0.1433)	−1.3043*** (0.2013)	−0.0986*** (0.0171)
PPE		−0.7582*** (0.1132)	−0.4717*** (0.1644)	0.0731*** (0.0147)
Duality		0.0013 (0.0346)	0.0025 (0.0523)	0.0040 (0.0045)
BS		−0.0945 (0.0909)	−0.0887 (0.1487)	−0.0102 (0.0128)
Ind		−0.0343 (0.1246)	−0.0287 (0.1900)	−0.0143 (0.0164)
_cons	−1.2268*** (0.1375)	0.3057 (0.6350)	0.0782 (0.9513)	
Industry FE	YES	YES	NO	NO
Year FE	YES	YES	YES	YES
Firm FE	NO	NO	YES	YES
Observations	40055	40055	40055	40055
Pseudo R ²	0.0276	0.0837	0.0757	

Note: This table provides the study main results, the value reported in column (1 and 2) shows the impact of GRCC with interaction term of our treated sample on corporate fraud by using probit model in Difference in Difference framework. Column (3), shows the marginal effect of GRCC × SOEs on fraud. Standard errors are in parentheses ***p < 0.01, **p < 0.05, *p < 0.1. The definition of all variables used in this study can be found in Table 1.

5.3. Impact of government regulation for CEO compensation on corporate fraud in different types of SOEs

In China, SOE executives who function essentially as government employees with political roles, operate within a tightly constrained domestic job market (Chen, Kim, Li, & Liang, 2018). Further, the appointment and compensation of these SOE CEOs vary depending on their ownership types (Li, Maqsood, & Zahid, 2024). Thus, to assess the variations in the impact of GRCC₂₀₁₄ on corporate fraud across different types of SOEs, we examined both LSOEs and CSOEs. The findings are reported in Table 6. Our variables of interest, GRCC₂₀₁₄ × LSOEs and GRCC₂₀₁₄ × CSOEs, capture the interaction between government regulation for CEO compensation and local and central SOEs, respectively. In columns 1 and 3, where we include results without control variables, the coefficient for LSOEs is positive and significant compared to CSOEs. This suggests that there is a higher incidence of fraudulent behavior in LSOEs before the implementation of pay regulation. However, after the implementation of GRCC₂₀₁₄, our variables of interest in columns 2 and 4 reveal that the reduction in fraud is more pronounced in LSOEs compared to CSOEs. These findings suggest significant differences in the scale and scope of operations between local and central SOEs. CSOEs, being larger and more complex, tend to have more robust internal controls and audit mechanisms, which help mitigate the risk of corporate misconduct. In contrast, LSOEs might lack such sophisticated systems, making the regulation of CEO compensation a more crucial tool

Table 6

Government regulation from CEO pay and corporate fraud: Types of SOEs.

Variables	(1)	(2)	(3)	(4)
	Fraud			
LSOEs	−0.0473 (0.0460)	−0.1015** (0.0509)		
CSOEs			−0.2714** (0.1344)	−0.0729 (0.1492)
GRCC ₂₀₁₄	0.2403** (0.1106)	0.3187 (0.2150)	0.1654 (0.1108)	0.2613 (0.2151)
GRCC ₂₀₁₄ × LSOEs	−0.2636*** (0.0650)	−0.3042*** (0.0698)		
GRCC ₂₀₁₄ × CSOEs			−0.1206 (0.2002)	−0.1817 (0.2142)
Size		0.1072*** (0.0271)		0.1060*** (0.0271)
Lev		0.5062*** (0.0661)		0.4852*** (0.0661)
Ln (Sales)		−0.2170*** (0.0225)		−0.2188*** (0.0225)
Age		0.2084*** (0.0218)		0.1732*** (0.0212)
ROA		−4.7837*** (0.2089)		−4.7907*** (0.2089)
CR		−1.4730*** (0.1410)		−1.5586*** (0.1406)
PPE		−0.8427*** (0.1113)		−0.8864*** (0.1109)
Duality		0.0689** (0.0338)		0.0898*** (0.0337)
BS		−0.2454*** (0.0890)		−0.2987*** (0.0884)
Ind		−0.0980 (0.1221)		−0.1210 (0.1217)
_cons	−1.5110*** (0.1337)	1.2279** (0.6188)	−1.5028*** (0.1338)	1.5538** (0.6165)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	40055	40055	40055	40055
Log likelihood	−18732.744	−16262.032	−18748.816	−16292.683

Note: This table provide the result of GRCC for SOEs on Fraud with respect to Chinese types of SOEs (local vs central). Column (1–2) shows that the impact of GRCC₂₀₁₄ × LSOEs on fraud is more pronounced in LSOEs as compared to CSOEs in column (3–4). Standard errors are in parentheses ***p < 0.01, **p < 0.05, *p < 0.1. The definition of all variables used in this study can be found in Table 1.

for fraud prevention.

5.4. Channel analysis

This study also provides empirical evidence demonstrating why firms subject to CEO pay regulation targets experience a reduction in corporate fraud compared to those that are not. For that we utilized three key measures: the first mechanism is political promotion incentives (PPI), based on methodologies established in prior research of (Cao et al., 2019). This variable is assigned a value of one when an executive receives a promotion in a given year and a value of zero for transfers or demotions. Second, the firm internal control (IC) measure from the Dibo IC index and the financing constraint measured by the KZ_INDEX. Previous studies, such as those by Cao et al. (2019) have shown that SOEs in mainland China are more inclined to seek promotion to higher ranks. We identify political promotion incentives as a mechanism in this context. Further, Donelson et al. (2017), have shown that weak IC increases the risk of fraud by CEOs and that there is a significant correlation between fraud and the quality of IC within a firm. Additionally, research by Cao, Geng, Zhang, & Li, 2023 provides evidence that financially constrained corporations are more likely to commit fraud, and their fraudulent behaviors are less likely to be detected. Our primary focus is to investigate why and how GRCC₂₀₁₄ leads to a reduction in corporate fraud in regulation targeted firms. The findings

presented in Table 7 reveal a significant outcome. Specifically, the implementation of GRCC₂₀₁₄ within SOEs, as observed in Column 1, promotes PPI following the introduction of pay regulation. Column 3 shows a notable alleviation of financial constraints within the firm, evidenced by a significant reduction in the KZ_INDEX. Additionally, in Column 5, GRCC₂₀₁₄ is found to strengthen IC, as indicated by improvements in firm IC. These findings align with the research by Han et al. (2022), which demonstrates that narrowing CEO pay enhances a firm's internal controls. Ultimately, these changes lead to a substantial reduction in fraud, as shown in Columns 2, 4, and 6. The robustness of these analytical outcomes underscores the connection between GRCC₂₀₁₄ for SOEs, PPI, financial constraints, IC and the prevalence of fraud. This alignment reinforces the theory that effective regulatory measures can encourage CEOs to achieve higher ranks, enhance internal corporate governance and reduce financial pressures, thereby mitigating fraudulent activities.

5.5. Comparing the dual impact of GRCC₂₀₀₉ and GRCC₂₀₁₄ on corporate fraud

To assess the differential impact of CEO pay regulations on corporate fraud, the analysis compares the policy implementations of 2009 and 2014 using a DiD framework. The 2004 policy was excluded from direct comparison due to a limited number of observations, making the primary focus evaluating the effectiveness of the 2009 and 2014 policy revisions. The regression results presented in Table 8 indicate that while both policy revisions aimed to strengthen corporate governance and reduce fraudulent activities within Chinese SOEs, their impact varied in terms of significance and magnitude. The findings suggest that the 2014 policy had a more pronounced and statistically significant negative impact on corporate fraud, whereas the 2009 policy, while also exhibiting a negative coefficient, did not show statistical significance. This difference underscores the stricter enforcement mechanisms introduced in 2014, which likely enhanced compliance and internal control measures, leading to a more tangible reduction in corporate misconduct.

One plausible explanation for these results is that the 2009 policy introduced preliminary regulatory constraints on executive compensation, but enforcement mechanisms were relatively weaker. In contrast, the 2014 policy implemented stricter monitoring and compliance frameworks, reinforcing the alignment between CEO compensation and firm performance while simultaneously deterring fraudulent activities more effectively. The significant reduction in corporate fraud post-2014 suggests that the stricter governance measures were more effective in curbing opportunistic behavior and enhancing financial transparency within SOEs.

5.6. Replacing variable analysis

To enhance the robustness of our findings, we incorporated an alternative variable analysis by making two key adjustments. Firstly, we replaced the interaction term GRCC₂₀₁₄ × SOEs with CPR, based on the framework established by Li, Maqsood, & Zahid, 2024, Maqsood et al. (2023) and Su et al. (2020) regarding CEO pay regulation in the Chinese context. The results of this alternative variable analysis, presented in Table 9, provide more robust evidence supporting our initial hypothesis. In Columns 1 and 2, the negative and statistically significant coefficient for CPR indicates that CEO pay restrictions are associated with a reduction in fraudulent activities within firms.

Secondly, we replaced the dependent variable, initially denoted as fraud, with an alternative measure, fraud_1. The findings are reported in Table 9, specifically in Columns 3 and 4. The coefficient of the interaction term GRCC₂₀₁₄ × SOEs in both columns are negative and statistically significant. The negative and significant coefficient supports the notion that regulatory measures have a differential impact on SOEs as opposed to non-SOEs. This differential impact underscores the effectiveness of governance reforms in reducing fraudulent activities within

Table 7
Channel test.

Variables	(1) PPI	(2) Fraud	(3) KZ	(4) Fraud	(5) IC	(6) Fraud
SOEs	−0.0167 (0.0333)	−0.3756*** (0.0518)	0.3425*** (0.1063)	−0.4432*** (0.0501)	−0.0229* (0.0125)	−0.3187*** (0.0686)
GRCC ₂₀₁₄	−0.2475*** (0.0248)	−0.5853 (0.5080)	−0.8714*** (0.0812)	0.3370 (0.2223)	−0.1518*** (0.0080)	−0.3744*** (0.0988)
GRCC ₂₀₁₄ × SOEs	0.0686*** (0.0195)	−0.1291* (0.0701)	−0.2996*** (0.0521)	−0.1634** (0.0649)	0.0153*** (0.0056)	−0.3741*** (0.0807)
PPI		0.0875** (0.0366)				
KZ				0.0977*** (0.0088)		
IC						−1.7248*** (0.1024)
Size	0.0415*** (0.0139)	0.1251*** (0.0314)	−0.3142*** (0.0523)	0.1800*** (0.0282)	0.0362*** (0.0063)	0.1514*** (0.0336)
Ln(sales)	0.0084 (0.0109)	−0.1576*** (0.0265)	0.0854** (0.0424)	−0.1929*** (0.0236)	0.0276*** (0.0052)	−0.1367*** (0.0285)
ROA	−0.0635 (0.0500)	−6.0788*** (0.2465)	−8.6672*** (0.2549)	−4.6560*** (0.2319)	0.0752*** (0.0269)	−5.2805*** (0.2570)
CR	−0.0205 (0.0340)	−1.7211*** (0.1537)	−8.4692*** (0.1640)	−0.9991*** (0.1607)	0.0371** (0.0166)	−1.8529*** (0.1860)
PPE	0.0485 (0.0533)	−0.8293*** (0.1272)	0.1873 (0.1855)	−0.6673*** (0.1167)	−0.0320 (0.0241)	−1.0391*** (0.1413)
Duality	−0.0641*** (0.0123)	−0.0007 (0.0390)	−0.0361 (0.0355)	−0.0358 (0.0350)	0.0038 (0.0045)	0.0035 (0.0416)
BS	−0.0255 (0.0447)	−0.0588 (0.1010)	−0.1357 (0.1203)	−0.1129 (0.0924)	0.0253* (0.0148)	−0.1435 (0.1144)
Ind	0.0514 (0.0499)	0.0263 (0.1387)	0.1544 (0.1287)	−0.1132 (0.1268)	0.0073 (0.0171)	0.1171 (0.1559)
_cons	−0.9169** (0.3600)	−0.2221 (0.6972)	8.9237*** (1.2709)	−0.7100 (0.6477)	−0.6843*** (0.1368)	0.3091 (0.7673)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Observations	40055	40055	40055	40055	40055	40055
Log likelihood		−12644.659		−15297.663		−10377.049
R-square	0.0523		0.4647		0.0550	

Note: This table presents the findings from the channel test analysis and provides evidence for the existence of these relationships. In Column (1), we utilize the political promotion incentives (PPI) measure as outlined by [Cao et al. \(2019\)](#). Column (3) accounts for the KZ index developed by [Kaplan and Zingales \(1997\)](#) to assess financing constraints. In Column (5), we employ the Dibo internal control (IC) index to evaluate the quality of the firm's internal controls. Standard errors are reported in parentheses, with significance levels indicated as *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$. A comprehensive definition of all variables used in this study can be found in [Table 1](#).

SOEs. The consistent negative sign and significance across different model specifications in [Table 7](#) further validate the robustness of our findings.

5.7. Alternative model and balance sample

This study adopts an alternative analytical framework alongside a balanced sample to enhance the robustness of the initial findings. Instead of relying solely on the baseline model, which employed a logit DiD regression, this analysis replaces it with a Linear Probability Model (LPM) to capture the outcomes in probabilistic terms. Further, the balanced sample comprises data spanning from 2010 to 2018, providing a comparative view of four years before and after the introduction of GRCC₂₀₁₄ in SOEs. The findings are presented in [Table 10](#), with columns 1 to 6 offering a thorough comparison. Specifically, columns 1 to 3

reflect the results derived from the LPM, showcasing an alternative estimation method, while columns 4 to 6 focus on the results obtained from the balanced eight-year sample. Across both models, the results are consistently aligned with those from the baseline analysis ([Table 5](#)), thereby reinforcing the validity and robustness of the original conclusions.

5.8. Endogeneity test

In our study, rigorous endogeneity tests were employed to validate the research model and ensure the reliability of our findings regarding the impact of the GRCC on fraud in treated firms. These tests were crucial to address concerns about omitted explanatory variables, potential selection biases, and the robustness of our statistical inferences.

Firstly, we conducted a parallel trends test to examine the temporal

Table 8

The impact of 2009 and 2014 GRCC on corporate fraud.

Variables	(1)	(2)
	Fraud	
SOEs	−0.4460*** (0.0843)	−0.4498*** (0.1345)
GRCC ₂₀₀₉	0.4598** (0.2247)	
GRCC ₂₀₁₄	−0.4590*** (0.0877)	
GRCC ₂₀₀₉ × SOEs	−0.1045 (0.1009)	−0.1014 (0.1395)
GRCC ₂₀₁₄ × SOEs	−0.1739** (0.0711)	−0.1705* (0.0932)
Size	0.1054*** (0.0276)	0.0188 (0.0385)
Lev	0.5031*** (0.0671)	0.4278*** (0.1133)
Ln (Sales)	−0.1884*** (0.0229)	−0.1179*** (0.0323)
Age	0.2848*** (0.0230)	0.2749*** (0.0343)
ROA	−4.8564*** (0.2133)	−5.0142*** (0.2743)
CR	−1.3419*** (0.1434)	−1.3062*** (0.2014)
PPE	−0.7577*** (0.1132)	−0.4711*** (0.1645)
Duality	0.0003 (0.0346)	0.0014 (0.0524)
BS	−0.0932 (0.0909)	−0.0875 (0.1488)
Ind	−0.0323 (0.1247)	−0.0269 (0.1901)
_cons	0.2519 (0.6370)	0.0266 (0.9587)
Industry FE	YES	NO
Year FE	YES	YES
Firm FE	NO	YES
Observations	40051	40055
Pseudo R ²	0.0838	0.0757

Note: This table presents the results of comparing the two policies using the difference-in-differences approach, examining the 2009 and the 2014 pay regulation. Standard errors are reported in parentheses, with significance levels indicated as ***p < .01, **p < .05, and * p < .1. Detailed definitions of all variables used in this study are provided in [Table 1](#).

effects of GRCC introduction for SOEs on fraud. The parallel trends test involves setting indicators for years relative to the introduction of GRCC. (We set $\text{Pre_GRCC}_{2014} \times \text{Treated}_{t-3}$, $\text{Pre_GRCC}_{2014} \times \text{Treated}_{t-2}$, $\text{Pre_GRCC}_{2014} \times \text{Treated}_{t-1}$ if the year is -1 , -2 , or -3 before the introduction of GRCC₂₀₁₄, and 0 otherwise; $\text{Current_GRCC}_{2014} \times \text{Treated}_t$, $\text{Post_GRCC}_{2014} \times \text{Treated}_{t+1}$, $\text{Post_GRCC}_{2014} \times \text{Treated}_{t+2}$, $\text{Post_GRCC}_{2014} \times \text{Treated}_{t+3}$, $\text{Post_GRCC}_{2014} \times \text{Treated}_{t+4}$, $\text{Post_GRCC}_{2014} \times \text{Treated}_{t+5}$, and $\text{Post_GRCC}_{2014} \times \text{Treated}_{t+6}$, are set to 0, 1, 2, 3, 4, 5 or 6 in policy year and after the GRCC₂₀₁₄ is introduced, and 0 otherwise). Our analysis, detailed in [Table 11](#) and illustrated in [Fig. 1](#), revealed that the significant impact of GRCC₂₀₁₄ on fraud in treated firms was observable only post-implementation. This finding underscores the validity of our model estimation by demonstrating distinct changes in fraud trends following GRCC₂₀₁₄ enactment.

Secondly, to mitigate potential selection biases, we employed

Table 9

Alternative variables analysis.

Variables	(1)	(2)	(3)	(4)
	Fraud		Fraud_1	
CPR	−0.4784*** (0.0393)	−0.2955*** (0.0500)		
SOEs			0.1639** (0.0759)	−0.4762*** (0.0831)
GRCC ₂₀₁₄			0.4091*** (0.0514)	0.3606*** (0.0572)
GRCC ₂₀₁₄ × SOEs			−0.4033*** (0.0828)	−0.1728* (0.0888)
Size		−0.0964** (0.0475)		−0.0715* (0.0372)
Lev		1.0922*** (0.1801)		1.4921*** (0.1183)
Ln (Sales)		−0.0306 (0.0407)		−0.1963*** (0.0310)
Age		−0.0302 (0.0541)		0.5787*** (0.0350)
ROA		−4.3359*** (0.5801)		−3.6509*** (0.2755)
CR		−1.4818*** (0.3491)		−0.7932*** (0.2059)
PPE		−0.7028*** (0.1756)		0.1510 (0.1437)
Duality		0.2285** (0.0967)		0.0300 (0.0486)
BS		0.2761 (0.1812)		−0.2976** (0.1400)
Ind		−0.1682 (0.2517)		−0.2370 (0.1879)
_cons	5.4244*** (0.5931)	5.4792*** (1.2053)	−2.4174*** (0.0550)	3.3953*** (0.9213)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	9646	9646	29237	29237
Log likelihood	−3869.05	−3647.837	−11504.15	−10049.758

Note: The table presents the results of an alternative variable analysis, replacing the independent variable with CPR (CEO pay restriction) based on the study by [Li, Maqsood, & Zahid, 2024](#) in columns 1 and 2. In columns 3 and 4, we replace the variable “fraud” with “fraud_1.” Our findings remain robust with these alternative measures. Standard errors are in parentheses: ***p < 0.01, **p < 0.05, *p < 0.1. The definitions of all variables used in this study can be found in [Table 1](#).

propensity score matching (PSM). Treated firms (SOEs) were matched with non-SOEs based on a comprehensive set of firm characteristics such as size, leverage, sales, age, profitability metrics, board structure, and industry classification. The results, as presented in [Table 12](#), confirmed the robustness of our main findings regarding the impact of GRCC₂₀₁₄ on fraud, providing additional assurance against biases in our sample selection.

Thirdly, we utilized placebo tests to further strengthen our conclusions against omitted variable bias. Pseudo-treated firms were randomly assigned, and the baseline model was simulated multiple times (2000 iterations). The distribution of coefficients of interest from these simulations, depicted in [Fig. 2](#), showed that the actual coefficient of GRCC₂₀₁₄ × SOEs (−0.1673) significantly deviated from the mean of the placebo test distribution. This statistical evidence strongly supports our assertion that the introduction of GRCC₂₀₁₄ effectively reduces fraud, as indicated by the observed negative coefficient in our empirical analysis

Table 10
Alternative model and balance sample.

	Linear Probability Model (LPM)			Balance sample (2010–2018)		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	<i>Fraud</i>					
SOEs	−0.0471*** (0.0054)	−0.0638*** (0.0059)	−0.0636*** (0.0098)	−0.3009*** (0.0556)	−0.5515*** (0.0624)	−0.6385*** (0.0839)
<i>GRCC</i> ₂₀₁₄	−0.0117 (0.0131)	0.0022 (0.0219)		0.6434*** (0.0856)	0.2775*** (0.0963)	
<i>GRCC</i> ₂₀₁₄ × <i>SOEs</i>	−0.0242*** (0.0073)	−0.0320*** (0.0075)	−0.0316*** (0.0105)	−0.2314*** (0.0750)	−0.1476* (0.0789)	0.0229** (0.0782)
Size		0.0155*** (0.0035)	0.0043 (0.0049)		0.0847** (0.0352)	0.0040* (0.0455)
Lev		0.0854*** (0.0090)	0.0710*** (0.0168)		0.8089*** (0.1064)	0.6195*** (0.1431)
Ln (Sales)		−0.0273*** (0.0029)	−0.0177*** (0.0043)		−0.1691*** (0.0299)	−0.0887** (0.0377)
Age		0.0302*** (0.0026)	0.0300*** (0.0038)		0.2472*** (0.0290)	0.2440*** (0.0427)
ROA		−0.7467*** (0.0281)	−0.7627*** (0.0401)		−5.5109*** (0.3306)	−5.7960*** (0.4210)
CR		−0.1182*** (0.0159)	−0.1106*** (0.0209)		−0.9248*** (0.1753)	−0.9357*** (0.2276)
PPE		−0.0976*** (0.0137)	−0.0560*** (0.0202)		−0.9016*** (0.1464)	−0.5967*** (0.1908)
Duality		−0.0007 (0.0043)	−0.0002 (0.0066)		0.0666 (0.0431)	0.0782 (0.0602)
BS		−0.0122 (0.0108)	−0.0100 (0.0176)		−0.0648 (0.1171)	−0.0720 (0.1721)
Ind		−0.0022 (0.0149)	−0.0013 (0.0225)		−0.0084 (0.1610)	−0.0058 (0.2263)
_cons	0.2394*** (0.0180)	0.4636*** (0.0742)	0.4068*** (0.1089)	−1.2659*** (0.1439)	0.4786 (0.7865)	0.3424 (1.0908)
Industry FE	YES	YES	NO	YES	YES	NO
Year FE	YES	YES	YES	YES	YES	YES
Firm FE	NO	NO	YES	NO	NO	YES
Observations	43420	40055	40055	23126	22386	22386
R-squared	0.0231	0.0747	0.0672	0.0191	0.0694	0.0577

Note: This table presents the results from an alternative model and balanced sample. We replaced the logit regression DiD model with a linear probability model (LPM) and balanced the sample to include four years before and four years after the introduction of CEO pay regulation. Standard errors are reported in parentheses, with significance levels denoted as ***p < 0.01, ** p < 0.05, and * p < 0.1.

Table 11
Parallel trend assumption.

	(1)	(2)
Variables	<i>Fraud</i>	
<i>Pre_GRCC</i> ₂₀₁₄ × <i>Treated</i> _{t-3}	0.3463*** (0.1193)	0.6826*** (0.1273)
<i>Pre_GRCC</i> ₂₀₁₄ × <i>Treated</i> _{t-2}	0.2464** (0.1127)	0.5073*** (0.1182)
<i>Pre_GRCC</i> ₂₀₁₄ × <i>Treated</i> _{t-1}	0.3040*** (0.1169)	0.5259*** (0.1218)
<i>Current_GRCC</i> ₂₀₁₄ × <i>Treated</i> _t	−0.2055* (0.1190)	−0.4009*** (0.1247)
<i>Post_GRCC</i> ₂₀₁₄ × <i>Treated</i> _{t+1}	−0.3542*** (0.1096)	−0.5776*** (0.1147)
<i>Post_GRCC</i> ₂₀₁₄ × <i>Treated</i> _{t+2}	−0.3348*** (0.1039)	−0.5496*** (0.1090)
<i>Post_GRCC</i> ₂₀₁₄ × <i>Treated</i> _{t+3}	−0.4476*** (0.1040)	−0.6424*** (0.1097)
<i>Post_GRCC</i> ₂₀₁₄ × <i>Treated</i> _{t+4}	−0.7961*** (0.1058)	−0.8320*** (0.1131)
<i>Post_GRCC</i> ₂₀₁₄ × <i>Treated</i> _{t+5}	−0.8829*** (0.1130)	−0.9688*** (0.1209)
<i>Post_GRCC</i> ₂₀₁₄ × <i>Treated</i> _{t+6}	−0.5725*** (0.1112)	−0.7393*** (0.1187)
Size		0.1053*** (0.0276)
Lev		0.5400*** (0.0667)
Ln (Sales)		−0.1983*** (0.0229)
Age		0.2675*** (0.0228)
ROA		−4.7733***

Table 11 (continued)

	(1)	(2)
Variables	<i>Fraud</i>	
CR		(0.2136) −1.3562*** (0.1437)
PPE		−0.7862*** (0.1132)
Duality		0.0145 (0.0346)
BS		−0.1334 (0.0906)
Ind		−0.0423 (0.1244)
_cons	−1.5139*** (0.1337)	0.2970 (0.6337)
Industry FE	YES	YES
Year FE	YES	YES
Observations	40055	40055
Pseudo R ²	0.0268	0.0829
Log likelihood	−18207.732	−15790.852

Note: This table provides the result of the endogeneity test. Column 1 and 2 we provide the result of parallel trend assumption. The parallel trends test involves setting indicators for years relative to the introduction of *GRCC*₂₀₁₄. (We set *Pre_GRCC*₂₀₁₄ × *Treated*_{t-3}, *Pre_GRCC*₂₀₁₄ × *Treated*_{t-2}, *Pre_GRCC*₂₀₁₄ × *Treated*_{t-1} if the year is −1, −2, or −3 before the introduction of *GRCC*₂₀₁₄; and 0 otherwise; *Current_GRCC*₂₀₁₄ × *Treated*, *Post_GRCC*₂₀₁₄ × *Treated*_{t+1}, *Post_GRCC*₂₀₁₄ × *Treated*_{t+2}, *Post_GRCC*₂₀₁₄ × *Treated*_{t+3}, *Post_GRCC*₂₀₁₄ × *Treated*_{t+4}, *Post_GRCC*₂₀₁₄ × *Treated*_{t+5}, and *Post_GRCC*₂₀₁₄ × *Treated*_{t+6}, are set to 0, 1, 2, 3, 4, 5 or 6 in policy year and after the *GRCC*₂₀₁₄ is introduced, and 0 otherwise). Standard errors are in parentheses ***p < 0.01, **p < 0.05, *p < 0.1. The definition of all variables used in this study can be found in [Table 1](#).

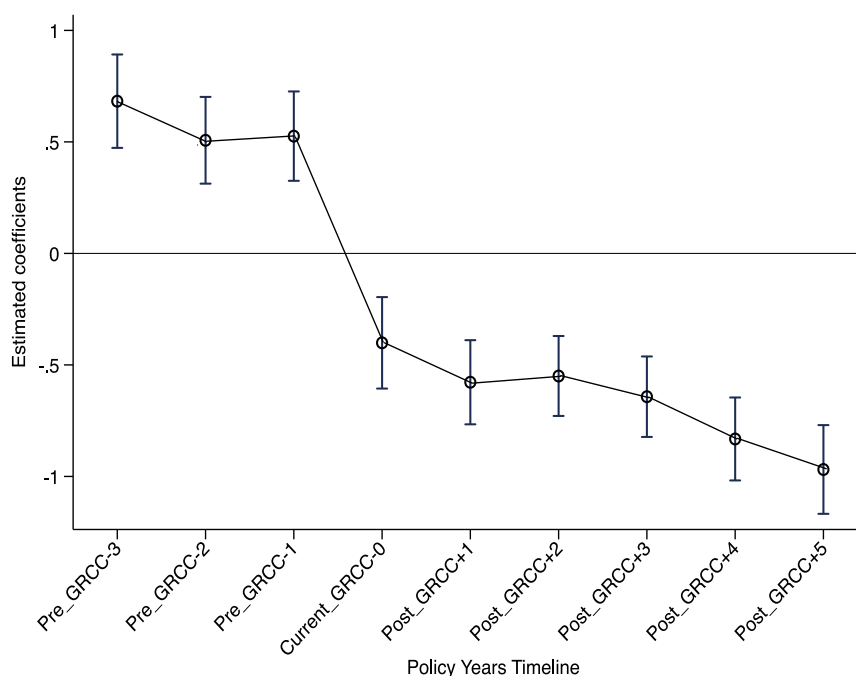


Fig. 1. Shows the change in fraud before and after the introduction of GRCC₂₀₁₄. The plotted coefficient based on reported value in Table 10 column (2).

Table 5 column 2. Overall, these rigorous endogeneity tests collectively validate our research model and provide robust empirical evidence of the impact of GRCC₂₀₁₄ on fraud reduction in treated firms. By addressing methodological concerns and employing multiple analytical approaches, we ensure the reliability and integrity of our study's conclusions regarding the regulatory intervention's efficacy in combating fraudulent practices.

5.9. Additional robustness test

We conducted a series of additional robust tests, detailed in Table 13. Columns 1–2 demonstrate the impact of GRCC₂₀₁₄ in targeted firms on fraud concerning politically connected CEOs. Columns 3–4 examine the impact considering CEO gender and Columns 5–6 address firms CEOs with financial background.

The findings in Columns 1–2 reveal that Chinese government regulations on CEO pay effectively reduce corporate fraud, particularly among politically connected CEOs. These CEOs, who typically benefit from protective networks, become more susceptible to regulatory oversight under stringent pay regulations, diminishing their capacity to evade scrutiny and leading to a significant reduction in fraudulent activities. Politically connected CEOs usually enjoy protection from rigorous regulatory scrutiny (Jiang & Kim, 2020), but the uniform application of pay regulations disrupts this protection. Consequently, these regulations enforce equal scrutiny and penalties, resulting in a pronounced decrease in corporate fraud among politically connected firms. Conversely, CEOs without political connections already face stringent oversight, so additional pay regulations do not significantly

alter their operational behavior. Empirical studies support this observation, for example the study of Fan, Wong, and Zhang (2007) highlights that politically connected CEOs are more likely to be involved in fraudulent practices, but this tendency is mitigated by effective regulatory frameworks. Similarly, Piotroski and Zhang (2014) provides evidence that political connections can lead to increased scrutiny and regulation, thereby reducing the incidence of corporate fraud.

To further probe the robustness of our findings, we conducted additional analysis by restricting our sample to CEO gender, considering insights from the gender diversity literature which posits that female CEOs tend to exhibit higher ethical orientations. By doing so, we aimed to explore whether our main findings might be influenced by gender dynamics. In columns 3 and 4, we present the results of our restricted sample analysis. Notably, we find that the reported coefficient of GRCC₂₀₁₄ $\times$ SOEs demonstrates a statistically significant negative impact on fraud, specifically when the CEO is male. This supplementary analysis provides robustness to our primary findings, indicating that the observed effects of government regulation on fraud prevention extend beyond gender-specific CEO characteristics. By controlling for CEO gender, we strengthen the validity of our conclusions regarding the influence of regulatory frameworks on corporate ethical behavior.

Next, we address the concern regarding whether the observed results are influenced by the presence of CEOs with a financial background. To examine this, we refine our analysis by restricting the sample to CEOs who possess financial expertise. The results of this investigation are presented in Columns 5 and 6. Specifically, we aim to determine if the impact of GRCC₂₀₁₄ on fraudulent behavior in SOEs varies based on the CEO's financial background. Our findings reveal a notable distinction:

Table 12

Propensity score matching.

Variable	Mean		t-test		V(T)/	
	Treated	Control	%bias	t	p > t	V(C)
Size	22.9530	23.0960	−11.0000	−5.8600	0.0000	0.90*
Lev	0.4914	0.4949	−1.5	−0.9900	0.3230	0.88*
Ln (sales)	22.2130	22.3150	−6.9	−3.7200	0.0000	0.84*
Age	2.7188	2.6404	10.2	7.5	0.0000	1.51*
ROA	0.0317	0.0345	−4.2	−2.4700	0.0140	0.57*
CR	0.1498	0.1557	−4.6	−2.9300	0.0030	0.79*
PPE	0.2424	0.2412	0.7	0.37	0.7090	0.99
Duality	0.0980	0.0946	0.9	0.6899	0.4900	.
BS	2.1875	2.2	−6.3	−3.6200	0.0000	0.81*
Ind	3.6072	3.6019	3.8	2.24	0.0250	1.04

Variables	(1)	(2)
	Fraud	Fraud
SOEs	−0.2913** (0.1302)	−0.2141 (0.1367)
GRCC ₂₀₁₄	0.0157 (0.1860)	0.1019 (0.1928)
GRCC ₂₀₁₄ × SOEs	−0.5752*** (0.1439)	−0.6407*** (0.1499)
Size		0.0703 (0.0514)
Lev		1.0417*** (0.1694)
Ln (Sales)		−0.2616*** (0.0439)
Age		0.1024** (0.0519)
ROA		−4.3378*** (0.4538)
CR		−1.6070*** (0.3063)
PPE		−0.6363*** (0.2102)
Duality		−0.0789 (0.0900)
BS		−0.1908 (0.1738)
Ind		0.0008 (0.2368)
_cons	−0.8893*** (0.2416)	3.0800*** (1.1298)
Industry FE	YES	YES
Year FE	YES	YES
Observations	11519	11519
Pseudo R ²	0.0462	0.0946
Log likelihood	−4526.0993	−4296.7962

PSM regression

Note: This table provides the results on propensity score matching (PSM). The treated group consists of SOEs, matched with a control group of non-SOEs based on the same set of firm characteristics used in the baseline model (i.e., Size, Lev, Ln(sales), Age, ROA, CR, PPE, Duality, BS, and Ind). Using PSM, we obtain one-to-one nearest neighbors for each treated firm. Standard errors are in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The definition of all variables used in this study can be found in Table 2.

GRCC exerts a more pronounced effect on curbing fraudulent activities in SOEs led by CEOs without a financial background, compared to those with financial expertise. This suggests that CEOs without financial training may be more susceptible to external regulatory mechanisms like GRCC, which could play a critical role in shaping their behavior and reducing fraudulent practices. Conversely, CEOs with a financial background might possess the knowledge and skills to navigate or mitigate the effects of such regulations, resulting in a less significant impact. These findings underscore the importance of considering the CEO's expertise when evaluating the effectiveness of regulatory interventions in corporate governance, particularly in the context of fraud prevention within SOEs.

6. Conclusion

As most existing studies examine the determinants of CEO incentives in terms of tournament incentives, performance-based levels and incentive types such as short and long-term incentives, an equally important and significant question arises regarding the effect of controlling, monitoring, or regulating CEO pay. Thus, taking full advantage of changes in Chinese government regulation for CEO compensation post-2014 as an exogenous shock, our study provides evidence that regulatory measures significantly reduce corporate fraud using a difference-in-differences in logit framework. Apart from unintended consequences, our study proves that regulation of CEO pay substantially reduces corporate misconduct, thereby playing a synergistic governance role. While controlling CEO pay enhances fair wealth distribution, reduces CEO opportunistic behavior, and curtails corporate misconduct, our findings highlight that the impact of such regulation is more pronounced in LSOEs compared to their counterparts. This suggests that instead of pursuing personal gains unethically, regulation motivates CEOs of LSOEs to strive for promotion, thereby reducing their inclination towards misconduct. Moreover, our study sheds light on how regulatory frameworks play a crucial role in political promotion incentives, in reducing financing constraints and bolstering internal controls within firms. Regulations mandate transparency in financial disclosures, enabling investors and lenders to make well-informed decisions. This transparency not only reduces perceived risks but also enhances market confidence, thereby easing access to external financing. Moreover, stringent regulatory requirements for governance and accountability contribute to robust IC, effectively deterring fraudulent activities. By fostering a climate of transparency and accountability, regulations ultimately mitigate financial risks and promote a more secure financial environment for all stakeholders involved. However, to effectively pursue regulation, governments should allow CEOs to have shareholdings in targeted firms following the regulation. For policymakers, our study underscores the effectiveness of Government regulation in fostering a transparent and trustworthy business environment. This approach not only promotes regulatory compliance but also enhances overall corporate governance standards.

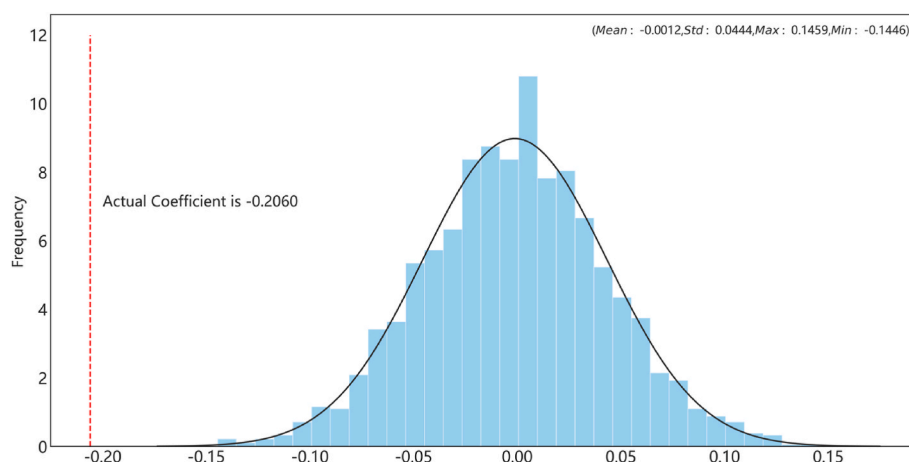


Fig. 2. This figure plots the probability density function of the estimated coefficient of $GRCC_{2014} \times SOEs$ from 2000 simulations. The vertical dash line presents the coefficient of $GRCC_{2014} \times SOEs$ as reported in column (2) of Table 5.

Table 13
Additional robustness test.

	Political connection		Gender		Fin-Back	
	YES	NO	Male	Female	YES	NO
	(1)	(2)	(3)	(4)	(5)	(6)
SOEs	-0.3636*** (0.0951)	-0.5399*** (0.0643)	-0.4463*** (0.0592)	-0.7920** (0.3528)	-0.4775*** (0.1179)	-0.4702*** (0.0676)
$GRCC_{2014}$	0.3840** (0.1826)	-0.3929 (0.5100)	0.0873 (0.2526)	-0.6897 (1.2119)	0.1451 (0.3921)	-0.0698 (0.1436)
$GRCC_{2014} \times SOEs$	-0.3376*** (0.1300)	-0.1618 (0.0852)	-0.2193*** (0.0773)	-0.5944 (0.4703)	-0.3266 (0.2254)	-0.2138** (0.0837)
Other control	YES	YES	YES	YES	YES	YES
_cons	1.4270 (1.2266)	-0.1008 (0.8379)	-0.4987 (0.7841)	1.1269 (4.9059)	-0.1204 (1.7110)	-0.2383 (0.8482)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Pseudo R ²	0.0775	0.0803	0.0800	0.1042	0.1271	0.0713
Observations	9063	22766	24829	1211	21479	18576
Log likelihood	-3461.6901	-8045.4709	-9001.3378	-425.37736	-7859.3294	-6759.8405

Note: This table presents additional robustness tests based on various CEO characteristics, including political connections, gender, and financial background. Definitions of these variables can be found in Table 1. Control variables are included but not reported for brevity. Standard errors are in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

Data availability statement

The data used in this study is obtained from the China Stock Market and Accounting Research (CSMAR) database. Access to the CSMAR data is subject to licensing and restrictions by the provider. Researchers interested in accessing the data can obtain it through CSMAR by following their subscription and access policies (<https://www.csmar.com/en/>). Due to licensing agreements, the dataset cannot be shared publicly.

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Declaration of competing interest

The authors declare that there is no conflict of interests regarding the publication of this article.

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