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## Article

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# Non-CEO top managers' monitoring power and CEO pay-performance sensitivity in state-owned enterprises: Evidence from Chinese state-owned listed firms

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## ABSTRACT

Few studies have focused on the role of non-CEO top manager inside directors in corporate governance, especially in the context of emerging countries. Despite their tendency to be subject to CEOs, non-CEO top manager inside directors can counterbalance CEOs in specific situations. Using panel data on state-owned listed companies in China, we conduct an empirical study of how non-CEO top manager inside directors influence CEO pay-performance sensitivity under serious agency conflicts. We find that the proportion of non-CEO top manager inside directors is significantly negatively correlated with CEO pay-performance sensitivity in state-owned enterprises, whereas the shareholding proportion of the controlling shareholders weakens this relationship. Furthermore, we find that non-CEO top manager inside directors significantly increase executives' on-the-job consumption. Our conclusions are robust to endogeneity testing and alternative specifications.

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## 1. Introduction

Although boards of directors serve as a critical corporate governance mechanism, our knowledge of what makes boards effective is limited (Masulis and Mobbs, 2011). Studies have investigated the impacts of various governance subjects on board decision making and corporate behavior from the perspective of controlling shareholders, the CEO, independent directors, and institutional investors. However, few studies have focused

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on the impact of inside directors, and most of these do not distinguish between CEO inside directors and non-CEO inside directors or examine the monitoring role of non-CEO inside directors. Most of the literature considers top managers as a whole and does not discuss the diverse roles of different top manager positions. Some studies have discussed the compensation gap between CEOs and VPs (Main et al., 1993; Bognanno, 2001; Li et al., 2012) and the compensation contracts for VPs (Ederhof, 2011). However, these studies do not indicate whether non-CEO top managers can reduce CEOs' agency problems.

We address whether non-CEO top managers monitor CEOs when the former are also directors. The conclusions about the governance effect of inside directors remain controversial in the literature. For example, Weisbach (1988) finds that firm performance is more related to CEO turnover for firms with boards of directors dominated by outside directors than for firms with boards dominated by inside directors. Bozec (2005) argues that firms must be exposed to a competitive environment for inside directors to be effective. Raheja (2005), Adams and Ferreira (2007), and Harris and Raviv (2008) show that inside directors are valuable in enhancing a board's advisory and monitoring functions.

Non-CEO top managers have more information advantages than outside directors. Although they can conduct more timely and effective supervision of CEOs' agency behavior, they are not independent from the CEO. Some recent studies explore the roles of inside directors. Acharya et al. (2011) point out that inside directors can improve efficiency when CEOs are less inclined to harm firm interests. Masulis and Mobbs (2011) find that firms with inside directors holding outside directorship demonstrate better operating performance and market-to-book ratios, especially when monitoring is more difficult. These firms make better acquisition decisions, have greater cash holdings, and overstate earnings less often. Mobbs (2013) finds that talented inside operating officers, as indicated by their holding of an outside board seat, are associated with increased CEO turnover sensitivity to firm accounting performance and greater sensitivity of CEO compensation to stock performance and that they are more likely to become a CEO than are other non-CEO inside directors. All of the above studies show that inside directors can increase pressure on current CEOs to perform rather than entrench CEOs. However, these studies are based on the United States' capital market, which has strong legal protection for investors. We focus on the role of non-CEO top manager inside directors in China's capital market, which has weak legal protection for investors.

In firms with manager-shareholder agency problems, CEOs may use their managerial power to gain private benefits (Jensen and Meckling, 1976; Murphy, 1999), such as on-the-job consumption (Burrough and Helyar, 1990), over-investment for more resources, or higher compensation (Jensen, 1986); to entrench themselves by making manager-specific investments that make it costly for shareholders to replace them (Shleifer and Vishny, 1989); to alter their compensation contracts (Core et al., 1999; Grinstein and Hribar, 2004; Cheng and Indjejikian, 2009); or to benefit from completed mergers and acquisitions (Hartzell et al., 2004).

Performance-based pay can reduce manager-shareholder agency costs (Jensen and Murphy, 1990). Managers in China's state-owned enterprises (SOEs) receive direct incentives for economic performance through the use of performance-based compensation, which has been both encouraged and enforced through government regulation. China's SOEs demonstrate serious manager-shareholder agency problems (Lei et al., 2013), providing a good setting for us to study the role of non-CEO inside directors in monitoring CEOs through pay-performance sensitivity. China is a transition economy with weak investor protection and ownership concentration and SOEs remain a vital part of the Chinese economy. By definition, SOEs are owned by "the whole people", which is an abstract concept and not a legal entity. This ownership structure can be perceived as the root cause of SOEs' agency problems. Agency problems exist as long as investors and managers are not the same people. They are especially worse among SOEs, as the ability of the principal—all citizens—to monitor the agent is extremely weak. This inability creates greater opportunities for SOE managers (relative to their private counterparts) to pursue wasteful projects for managerial interests, such as empire building at the cost of investors.

Agency theory and stewardship theory facilitate our understanding of the role of inside directors in corporate governance (Nicholson and Kiel, 2007). Agency theory concerns aligning the interests of owners and managers (Jensen and Meckling, 1976). It is based on the premise that an inherent conflict exists between the interests of a firm's owners and its management. Agency theory suggests that a greater proportion of non-CEO inside directors is unable to monitor any self-interested CEO actions. As a result, the CEO has more opportunity to pursue self-interest at the expense of the owners, such that the shareholders enjoy fewer

returns. In contrast to agency theory, stewardship theory posits that inside directors are essentially trustworthy individuals and that superior corporate performance is linked to a majority of inside directors, as they naturally work to maximize shareholder profit. Stewardship theory suggests that a greater proportion of non-CEO inside directors can monitor any self-interested CEO actions. This monitoring decreases the opportunity for CEOs to pursue self-interest at the expense of the owners, such that the shareholders enjoy more returns. Nisbett and Ross (1980) find that people's behavior is susceptible to their environment. Thus, we argue that the behavior of non-CEO inside directors is influenced by CEO behavior. If the CEO's interests are aligned with the firm's, the non-CEO inside directors facilitate higher-quality decision making and better corporate performance. Otherwise, if the CEO is entrenched for private benefit, the non-CEO inside directors become his conspirators. Large shareholders can monitor managers (Vishny and Shleifer, 1986) and affect the role of non-CEO inside directors.

Using a sample of Chinese listed SOEs from 2007 to 2017, we find that SOEs with more non-CEO top manager inside directors demonstrate lower CEO pay-performance sensitivity. Furthermore, the negative effect of non-CEO top manager inside directors on CEO pay-performance sensitivity is less pronounced in SOEs with more large shareholders' shareholding. Our conclusions are robust to endogeneity testing. Additional testing shows that non-CEO top managers can increase managers' on-the-job consumption. We also find that VP inside directors and CFO inside directors can significantly reduce CEO pay-performance sensitivity, but the influence of board secretary inside directors on CEO pay-performance sensitivity is not significant.

We contribute to the literature in the following ways. We conduct the first study to show a significant negative relationship between non-CEO top manager inside directors and CEO pay-performance sensitivity in SOEs. We extend the emerging literature on inside directors and CEO compensation, which has received a great deal of research attention. We provide new evidence that in firms with serious manager-shareholder agency problems, non-CEO top manager inside directors can reduce CEO pay-performance sensitivity and increase agency costs above other influencing factors identified by previous research. We also lend further empirical support to the agency theory on inside directors. Overall, this paper has important practical significance for understanding the agency problems of SOEs and the role of non-CEO inside directors.

The remainder of this paper is structured as follows. Section 2 analyzes China's institutional background, reviews the related literature, and presents our hypotheses. Section 3 describes our sample and research design. Section 4 discusses our empirical results. Section 5 presents the endogeneity test. Section 6 outlines the additional tests. Finally, Section 7 concludes the paper.

## 2. Institutional background, related literature, and hypotheses

Boards of directors serve as a critical corporate governance mechanism that can monitor managers, reduce agency costs, and improve firm performance. According to the Chinese Company Law, directors are appointed by shareholders. In China, directors are appointed by large shareholders. Furthermore, SOEs' boards of directors are mainly appointed by state-owned shareholders. Arranging the board of directors reasonably is of great significance to the efficiency of the corporate governance of SOEs.

In China, under the system of ownership by all people, property rights belong to everyone and to no one in particular, and state ownership property rights are intrinsically ambiguous. SOEs in China are affiliated with the county, city, province, or central government. In 1993, the Corporate Law system was introduced and the internal governance system of SOEs was restructured along the pattern of a modern corporation. The Corporate Law system requires SOEs to establish a governance structure that includes shareholders and a board of directors. The reform of traditional SOEs significantly reduced the role of government intervention in the management of SOEs. However, the rights and responsibilities of SOE stakeholders and management were ill-defined and the boards of directors in SOEs were given weak incentives to monitor CEOs and protect investor benefits. Thus, when non-CEO top managers are also board members, they may have incentives to collude with the CEO for private benefit, which increases SOEs' manager-shareholder agency costs.

In addition, SOE boards of directors and CEOs are often appointed and dismissed by the government and treated as government officials. This greatly limits the power of appointment and removal of personnel of SOEs' boards of directors, which correspondingly weakens the supervisory ability of boards of directors over management.

Weakening board supervision increases manager-shareholder agency problems, which are serious in Chinese SOEs. Jensen (1986) and Hanson and Song (2000) argue that management shareholding helps reduce agency costs and increase firm value, but management shareholding in SOEs is rather low. At the same time, soft budget constraints are present, and SOEs can easily borrow from state-owned banks (Brandt and Li, 2003; Cull and Xu, 2005). Such systemic features of SOEs (e.g., soft budget constraints) undermine the incentives and disciplinary mechanisms essential to corporate governance. Most board members and managers in SOEs also still have a corresponding status of civil service, and their remuneration promotions still rely on the assessments of their superiors in the political and administrative hierarchy rather than on market performance. Company managers need not worry that poor management may cause their company to be taken over. Public shareholders cannot “vote with their feet,” and managers are not concerned about their rights, giving SOE managers a strong incentive to entrench themselves for private benefit.

The Chinese culture embodies the characteristics of strong power distance, and the bureaucratic system of SOEs makes CEOs rather authoritative. This authoritativeness exerts great pressure on non-CEO managers, who have a weak incentive to monitor CEOs.

According to managers, the missing link between executive pay and firm performance is the power imbalance between executives and shareholders. CEOs can use their power to pursue self-interests, such as increased pay and decreased pay-performance sensitivity (Bertrand and Mullainathan, 2001; Bebchuk and Fried, 2003; Grinstein and Hribar, 2004; Otten and Heugens, 2007; Weisbach, 2007). CEOs can also influence the pay decisions made by the board of directors or the remuneration committee due to the inefficiency of outside and inside directors. Main et al. (1995) find that independent boards of directors may not safeguard shareholders' interests and minimize opportunism on the behalf of management. Social influence may be responsible for significant increments in CEO compensation beyond what economic theories predict. Core et al. (1999) find that firms with weaker governance structures have greater agency problems and that the CEOs of firms with greater agency problems receive greater compensation. Furthermore, Grinstein and Hribar (2004) find that CEOs with more power to influence board decisions receive significantly larger bonuses. Overall, CEOs may have great incentives to increase their pay and decrease pay-performance sensitivity to entrench themselves. Furthermore, non-CEO top managers may increase CEOs' agency costs and salary-manipulating behavior.

First, the systemic features of SOEs include soft budget constraints, ill-defined rights and responsibilities of SOE stakeholders and management, and ambiguous property rights, which undermine the incentives and disciplinary mechanism essential to corporate governance. As manager-shareholder agency problems are more serious in SOEs than in non-SOEs (Lei et al., 2013), non-CEO top managers have little incentive to monitor CEOs or improve firm performance. Second, the CEO power in SOEs is strong, and CEOs can exert great pressure on non-CEO top managers. As such, non-CEO top managers in Chinese SOEs may collude with CEOs, increasing agency problems between managers and outside shareholders. In SOEs with more non-CEO top managers, CEO agency problems are presumably greater and pay-performance sensitivity may be lower than those in SOEs with fewer non-CEO top managers.

Considering the above discussion, we propose the following hypothesis in the alternative form:

**H1.** All else being equal, SOEs with more non-CEO top manager inside directors demonstrate lower CEO pay-performance sensitivity.

La Porta et al. (1999) find that with the exception of economies with very good shareholder protection, relatively few firms are widely held, and they are typically controlled by families or the state. Firms with centralized ownership structures may have fewer manager-shareholder agency problems than firms with decentralized ownership structures. Controlling shareholders monitor managers effectively and reduce manager-shareholder agency costs (Lei et al., 2013). Berle and Means (1932) point out that over-decentralized ownership structures may increase the cost of shareholders' decision making, thereby reducing the welfare of owners. The free rider problem is an issue in economics. It is considered an example of a market failure. This is a situation where individuals are able to consume a good without paying. Grossman and Hart (1980) argue that shareholders can free ride on raiders' improvement of the corporation, thereby seriously limiting the raiders' profit. Gorton and Schmid (1999) study corporate governance efficiency using Austrian cooperative banking, an organizational form in which the ownership structure is exogenous. They show that firm performance

decreases as the number of cooperative members increases, corresponding to a greater separation of ownership and control. That is, more centralized ownership structures may monitor managers efficiently and improve firm performance.

Large shareholders can have an important impact on corporate behavior. Studies have found that large shareholders can significantly influence capital structure (Cao et al., 2004; Zhao and Zhu, 2006; Xiao and Zou, 2008), investment (Wang and Hu, 2005; Yang et al., 2010; Luo et al., 2014), and dividend policy (Liu and Hu, 2003; Deng and Zeng, 2005; Yang, 2008). Large shareholders also have strong incentives to monitor managers and reduce manager-shareholder agency problems (Huang and Zhou, 2012; Wang et al., 2015), thereby increasing firm value (Holderness, 2003).

Despite the ambiguous property rights of SOEs and the ill-defined rights and responsibilities of SOE stakeholders and management, the government pays more attention to SOEs and gains more incentive to monitor managers as the proportion of the first largest SOE shareholder increases. In this context, non-CEO top managers have less opportunity and incentive to collude with CEOs.

Considering the above discussion, we propose our second hypothesis:

**H2.** All else being equal, the negative effect of non-CEO top manager inside directors on CEO pay-performance sensitivity is less pronounced in SOEs with more large shareholders' shareholding.

### 3. Sample and research design

#### 3.1. Sample and data source

The sample includes all of the A-share companies in the Shanghai and Shenzhen stock markets from 2007 to 2017. We start our sample period in 2007, as this is the year in which the new Chinese accounting standards came into effect. Thus, all of the financial variables are comparable across our samples. We remove financial listed firms, non-SOE firms, and firms with missing variables from the regression models. We obtain a final sample of 8894 firm-year observations from 2007 to 2017.

All of the non-dummy variables are winsorized at the 1% and 99% levels to alleviate the potential effects of outliers. We obtain each firm's financial accounting information from the China Stock Market & Accounting Research (CSMAR) database.

We mainly focus on collusion or mutual monitoring with top managers. In China, the annual report of a listed firm must disclose the names and basic information of its board of directors, board of supervisors, and top managers. According to the Chinese Company Law, the top managers in listed firms include general managers (or the CEO), the VP, the CFO, the secretaries of the board of directors, and other top managers in the articles of association. The other top managers are different in different listed firms, but nearly all listed firms disclose the basic information of general managers (or the CEO), the VP, the CFO, and the secretaries of the board of directors, such that we have two alternatives for the quantities of non-CEO top managers. The first alternative refers only to the VP, CFO, and secretaries of the board of directors. The second alternative refers to the VP, CFO, secretaries of the board of directors, and other top managers disclosed in annual reports.

We obtain the top manager information of listed firms from the CSMAR database and manually collate the data on the non-CEO top manager inside directors.

#### 3.2. Research design

We use model (1) to test H1 as follows:

$$\begin{aligned} \ln CEO\_salary = & \beta_0 + \beta_1 * ROA + \beta_2 * ID + \beta_3 * ROA * ID + \beta_4 * Asset + \beta_5 * Debt \\ & + \beta_6 * Growth + \beta_7 * Ind\_Dir + \beta_8 * Boardsize + \beta_9 * First + \beta_{10} * Dual \\ & + \beta_{11} * Boardsal\_dum + \beta_{12} * Separation + \beta_{13} * Age + \beta_{14} * CEO\_Age \\ & + \beta_{15} * CEO\_Age^2 + Year + Industry + \varepsilon \end{aligned} \quad (1)$$

We use model (2) to test H2 as follows:

$$\begin{aligned}
\text{LnCEO\_salary} = & \beta_0 + \beta_1 * \text{ROA} + \beta_2 * \text{ID} + \beta_3 * \text{First} + \beta_4 * \text{ROA} * \text{ID} + \beta_5 * \text{ROA} * \text{First} \\
& + \beta_6 * \text{First} * \text{ID} + \beta_7 * \text{ROA} * \text{ID} * \text{First} + \beta_8 * \text{Asset} + \beta_9 * \text{Debt} + \beta_{10} * \text{Growth} \\
& + \beta_{11} * \text{Ind.Dir} + \beta_{12} * \text{Boardsize} + \beta_{13} * \text{Dual} + \beta_{14} * \text{Boardsal\_dum} + \beta_{15} * \text{Separation} \\
& + \beta_{16} * \text{Age} + \beta_{17} * \text{CEO\_Age} + \beta_{18} * \text{CEO\_Age}^2 + \text{Year} + \text{Industry} + \varepsilon
\end{aligned} \tag{2}$$

where LnCEO\_salary is the natural logarithm of total CEO salary, ROA is the net profit divided by total assets, and ID is the number of non-CEO top manager inside directors. We have two alternatives for the number of non-CEO top managers. The first alternative refers only to the VP, CFO, and secretaries of the board of directors. The second alternative refers to the VP, CFO, secretaries of the board of directors, and other top managers disclosed in annual reports. Thus, we have six alternatives (ID1\_dir, ID1\_exe, ID1\_dum, ID2\_dir, ID2\_exe, and ID2\_dum) for the number of non-CEO top manager inside directors. ID1\_dir is the number of first alternatives for the non-CEO top manager inside directors divided by the number of board members. ID1\_exe is the number of first alternatives for the non-CEO top manager inside directors divided by the number of first alternatives for the non-CEO top managers. ID1\_dum is an indicator variable that equals 1 if the first alternatives for the non-CEO top managers include inside directors and 0 otherwise. ID2\_dir is the number of second alternatives for the non-CEO top manager inside directors divided by the number of board members. ID2\_exe is the number of second alternatives for the non-CEO top manager inside directors divided by the number of second alternatives for the non-CEO top managers. ID2\_dum is an indicator variable that equals 1 if the second alternatives for the non-CEO top managers include inside directors and 0 otherwise.

The control variables are Asset, Debt, Growth, Ind\_dir, Boardsize, First, Dual, Boardsal\_dum, Separation, Age, CEO\_Age, CEO\_Age<sup>2</sup>, Year, and Industry. Asset is the natural logarithm of total assets. Debt is the total liabilities divided by total assets. Growth is the growth of firm sales. Ind\_dir is the percentage of independent directors, which equals the number of independent directors divided by the total number of board members. Boardsize is the total number of board members. First is the percentage of shares held by the largest shareholder of the listed firm. Dual is an indicator variable that equals 1 if the chairman and CEO of the listed firm are the same person and 0 otherwise. Boardsal\_dum is an indicator variable that equals 1 if the listed firm pays the chairman and 0 otherwise. Separation is the separation of ownership and control, which equals the control rights minus the cash flow rights of the firms' ultimate controllers. Age is the firm age, which is the number of years since listing. CEO\_Age is the CEO age. CEO\_Age<sup>2</sup> is the square of CEO age. Year is the year-fixed effects and Industry is the industry-fixed effects.

All of the variable definitions are provided in Table 1.

## 4. Empirical results

### 4.1. Descriptive statistics

Table 2 presents the descriptive statistics for all of the variables used in the regression analyses. The mean of ROA is 0.0298. ROA demonstrates a broad range, from a minimum value of −0.2106 to a maximum value of 0.1844, which suggests that ROA varies widely among listed SOEs. The mean of ID1\_dir is 0.0878, which suggests that 8.78% of the board members in listed SOEs are non-CEO top managers (including the VP, CFO, and secretaries of the board of directors). The mean of ID1\_exe is 0.1799, which suggests that 17.99% of the non-CEO top managers (including the VP, CFO, and secretaries of the board of directors) are inside directors in listed SOEs. The mean of ID1\_dum is 0.5664, which suggests that 56.64% of the listed SOEs have non-CEO top manager inside directors (including the VP, CFO, and secretaries of the board of directors). The mean of Boardsize is 9.3295, which suggests that Chinese listed SOEs have nine board members on average. The mean of First is 39.0651, which suggests that the average shareholding of the largest shareholder in SOEs is 39% and is relatively concentrated.

### 4.2. Multivariate tests of H1 and H2

H1 predicts that SOEs with more non-CEO top manager inside directors demonstrate lower CEO pay-performance sensitivity. We conduct multivariate regression analyses to test H1 with the full set of control

Table 1  
Variable definitions.

Dependent variables	Description
CEO_salary	The total CEO salary
LnCEO_salary	The natural logarithm of the total CEO salary
Independent variables	Description
ROA	The net profit divided by the total assets
ID1_dir	The number of first alternatives for the non-CEO top manager inside directors divided by the number of board members
ID1_exe	The number of first alternatives for the non-CEO top manager inside directors divided by the number of first alternatives for the non-CEO top managers
ID1_dum	An indicator variable that equals 1 if the first alternatives for the non-CEO top managers include inside directors and 0 otherwise
ID2_dir	The number of second alternatives for the non-CEO top manager inside directors divided by the number of board members
ID2_exe	The number of second alternatives for the non-CEO top manager inside directors divided by the number of second alternatives for the non-CEO top managers
ID2_dum	An indicator variable that equals 1 if the second alternatives for the non-CEO top managers include inside directors and 0 otherwise
Control variables	Description
Asset	The natural logarithm of the total assets
Debt	The total liabilities divided by the total assets
Growth	The growth of firm sales
Ind_Dir	The percentage of independent directors, which equals the number of independent directors divided by the total board members
Boardsize	The total board members
First	The percentage of shares held by the largest shareholder of the listed firm, multiplied by 100
Dual	An indicator variable that equals 1 if the chairman and CEO of the listed firm are the same person and 0 otherwise
Boardsal_dum	An indicator variable that equals 1 if the listed firm pays the chairman and 0 otherwise
Separation	The separation of ownership and control, which equals the control rights minus the cash flow rights of the firms' ultimate controllers
Age	The firm age, which is the number of years since listing
CEO_Age	The CEO age
CEO_Age <sup>2</sup>	The square of CEO age
Year	The year-fixed effects
Industry	The industry-fixed effects

variables. To alleviate concerns about potential standard errors in the data, we report t-values on an adjusted basis using robust standard errors.

As shown in columns (1), (2), (3), and (4) of Table 3, all else being equal, the coefficients of ROA\*ID1\_dir (−3.1575,  $t = -2.16$ ), ROA\*ID2\_dir (−2.3633,  $t = -1.79$ ), ROA\*ID1\_exe (−1.9497,  $t = -2.85$ ), and ROA\*ID2\_exe (2.1964,  $t = -2.84$ ) are all significant and display the expected signs. This means that SOEs with more non-CEO top manager inside directors demonstrate lower CEO pay-performance sensitivity. Furthermore, CEO pay-performance sensitivity decreases as the number of non-CEO top manager inside directors increases, which is consistent with H1.

As the proportion of the first largest SOE shareholder increases, the government pays more attention to SOEs and has more incentive to monitor managers. In this context, non-CEO top managers have less opportunity and incentive to collude with CEOs. Therefore, H2 predicts that the negative effect of non-CEO top manager inside directors on CEO pay-performance sensitivity is less pronounced in SOEs with more controlling shareholders' shareholding. To test H2, we choose the largest shareholders' shareholding (First) as the moderator and investigate how it moderates the correlation between the number of non-CEO top manager inside directors and pay-performance sensitivity. The regression results are presented in Table 4, where the coefficients of ROA\*First\*ID1\_dir (0.2070,  $t = 2.14$ ), ROA\*First\*ID1\_exe (0.1233,  $t = 2.75$ ),

Table 2  
Descriptive statistics.

Variables	Obs.	Mean	Median	Std. Dev.	Min.	Max.
CEO_sal	8894	578,368	456,750	505,344	24,000	3,105,000
LnCEO_sal	8894	12.9459	13.0319	0.8494	10.3450	14.9485
ROA	8894	0.0298	0.0283	0.0552	−0.2106	0.1844
ID1_dir	8894	0.0878	0.0833	0.0971	0.0000	0.3750
ID2_dir	8894	0.1057	0.0909	0.1063	0.0000	0.4000
ID1_exe	8894	0.1799	0.1429	0.2112	0.0000	1.0000
ID2_exe	8894	0.1786	0.1429	0.1880	0.0000	0.7500
ID1_dum	8894	0.5664	1.0000	0.4956	0.0000	1.0000
ID2_dum	8894	0.6248	1.0000	0.4842	0.0000	1.0000
Asset	8894	22.3840	22.2088	1.3615	19.6883	26.4656
Debt	8894	0.5222	0.5322	0.2033	0.0857	0.9994
Growth	8894	0.1726	0.0973	0.4654	−0.5725	3.0990
Ind_Dir	8894	0.3660	0.3333	0.0518	0.3000	0.5714
Boardsize	8894	9.3295	9.0000	1.8272	5.0000	15.0000
First	8894	39.0651	38.4600	15.2820	11.2970	77.0200
Dual	8894	0.0914	0.0000	0.2882	0.0000	1.0000
Boardsal_dum	8894	0.5381	1.0000	0.4986	0.0000	1.0000
Separation	8894	4.2888	0.0000	7.5910	0.0000	27.9277
Age	8894	13.4366	14.0000	5.5792	2.0000	24.0000
CEO_Age	8894	49.2651	49.0000	5.4286	37.0000	62.0000
CEO_Age2	8894	2457	2401	537	1369	3844

ROA\*First\*ID2\_exe (0.1172,  $t = 2.33$ ), ROA\*First\*ID1\_dum (0.0509,  $t = 2.58$ ), and ROA\*First\*ID2\_dum (0.0448 with  $t = 2.27$ ) are all significant and display the expected signs. This means that the negative effect of non-CEO top manager inside directors on CEO pay-performance sensitivity weakens in SOEs as the number of largest shareholders' shareholding increases, which is consistent with H2.

## 5. Robustness checks

### 5.1. Endogeneity analysis

As discussed above, many of the managerial positions in SOEs are directly appointed by the government, bypassing shareholders' meetings and the board of directors. The government may appoint more non-CEO top manager inside directors to alleviate information asymmetry in firms with low CEO pay-performance sensitivity, which leads to endogeneity bias. We introduce instrumental variables and use two-stage regression method to alleviate the endogeneity problems mentioned above.

Beyond the targeted company itself, we introduce the mean of the quantity of non-CEO top manager inside directors of all other listed SOEs in the same year, city, and industry as the target company (ID\_mean) as an instrumental variable. Different cities and industries have different laws and financial institutions, which are very important for the appointment of non-CEO top managers. Therefore, this instrument variable is reasonable. We use the provincial legal environment (Legal-envir) as another instrumental variable for the quantity of non-CEO top manager inside directors. The legal environment in different regions affects agency costs and the companies' decisions regarding whether to increase the quantity of non-CEO top manager inside directors.

Table 5 shows the second-stage results of the two-stage regressions. All else being equal, the coefficients of ROA\*ID1\_dir (3.770,  $t = -2.23$ ), ROA\*ID2\_dir (−2.7992,  $t = -1.83$ ), ROA\*ID1\_exe (−1.8440,  $t = -2.41$ ), and ROA\*ID2\_exe (−1.9080,  $t = -2.11$ ) are all significant and display the expected signs. This means that our conclusion that SOEs with more non-CEO top manager inside directors demonstrate lower CEO pay-performance sensitivity does not change after controlling for the endogeneity problem.

Table 3

The impact of non-CEO top manager inside directors on CEO pay-performance sensitivity.

Variables	(1) LnCEO_sal	(2) LnCEO_sal	(3) LnCEO_sal	(4) LnCEO_sal	(5) LnCEO_sal	(6) LnCEO_sal
ROA	3.7817*** (16.29)	3.7618*** (15.71)	3.8685*** (17.41)	3.9079*** (16.84)	3.7312*** (14.66)	3.6377*** (13.55)
ID1_dir	−0.3642*** (−4.14)					
ROA*ID1_dir	−3.1575** (−2.16)					
ID2_dir		−0.2174*** (−2.70)				
ROA*ID2_dir		−2.3633* (−1.79)				
ID1_exe			−0.2157*** (−5.20)			
ROA*ID1_exe			−1.9497*** (−2.85)			
ID2_exe				−0.2057*** (−4.50)		
ROA*ID2_exe				−2.1964*** (−2.84)		
ID1_dum					−0.0716*** (−3.91)	
ROA*ID1_dum					−0.3888 (−1.27)	
ID2_dum						−0.0276 (−1.47)
ROA*ID2_dum						−0.1972 (−0.63)
Asset	0.2314*** (30.24)	0.2323*** (30.34)	0.2269*** (29.58)	0.2276*** (29.65)	0.2307*** (30.21)	0.2316*** (30.26)
Debt	−0.2682*** (−5.27)	−0.2700*** (−5.30)	−0.2702*** (−5.32)	−0.2714*** (−5.34)	−0.2697*** (−5.31)	−0.2707*** (−5.31)
Growth	−0.0592*** (−2.91)	−0.0594*** (−2.92)	−0.0575*** (−2.82)	−0.0574*** (−2.82)	−0.0574*** (−2.84)	−0.0584*** (−2.87)
Ind_Dir	−0.4560*** (−2.82)	−0.4319*** (−2.67)	−0.4667*** (−2.89)	−0.4520*** (−2.80)	−0.4401*** (−2.72)	−0.4109** (−2.54)
Boardsize	0.0174*** (3.81)	0.0172*** (3.76)	0.0200*** (4.36)	0.0201*** (4.36)	0.0188*** (4.10)	0.0172*** (3.74)
First	−0.0044*** (−7.96)	−0.0045*** (−8.04)	−0.0043*** (−7.77)	−0.0044*** (−7.91)	−0.0044*** (−8.03)	−0.0044*** (−7.96)
Dual	0.1327*** (4.62)	0.1237*** (4.32)	0.1360*** (4.73)	0.1334*** (4.64)	0.1237*** (4.35)	0.1144*** (4.03)
Boardsal_dum	0.0104 (0.64)	0.0082 (0.51)	0.0108 (0.67)	0.0122 (0.76)	0.0093 (0.57)	0.0029 (0.18)
Separation	0.0076*** (7.08)	0.0076*** (7.06)	0.0076*** (7.13)	0.0075*** (7.02)	0.0077*** (7.13)	0.0078*** (7.20)
Age	−0.0013 (−0.83)	−0.0011 (−0.72)	−0.0008 (−0.51)	−0.0008 (−0.48)	−0.0012 (−0.78)	−0.0012 (−0.78)
CEO_Age	0.0846*** (3.79)	0.0848*** (3.79)	0.0847*** (3.81)	0.0841*** (3.77)	0.0853*** (3.82)	0.0852*** (3.81)
CEO_Age <sup>2</sup>	−0.0008*** (−3.45)	−0.0008*** (−3.45)	−0.0008*** (−3.48)	−0.0008*** (−3.44)	−0.0008*** (−3.48)	−0.0008*** (−3.47)
Year	Control	Control	Control	Control	Control	Control
Industry	Control	Control	Control	Control	Control	Control
Constant	5.0054*** (8.82)	4.9744*** (8.74)	5.0791*** (8.97)	5.0745*** (8.95)	4.9989*** (8.80)	4.9756*** (8.74)

(continued on next page)

Table 3 (continued)

Variables	(1) LnCEO_sal	(2) LnCEO_sal	(3) LnCEO_sal	(4) LnCEO_sal	(5) LnCEO_sal	(6) LnCEO_sal
Obs.	8894	8894	8894	8894	8894	8894
Adjusted R <sup>2</sup>	0.3196	0.3182	0.3215	0.3205	0.3191	0.3172
F	61.67	61.16	62.14	61.74	61.60	61.02

Notes: Robust t-statistics are in parentheses.

\*\*\* p < 0.01.

\*\* p < 0.05, and

\* p < 0.1.

Table 4

The impact of non-CEO top manager inside directors on CEO pay-performance sensitivity: The effects of the largest shareholders' shareholding.

Variables	(1) LnCEO_sal	(2) LnCEO_sal	(3) LnCEO_sal	(4) LnCEO_sal	(5) LnCEO_sal	(6) LnCEO_sal
ROA	4.6784*** (7.83)	4.3781*** (7.34)	4.9521*** (8.78)	4.9370*** (8.30)	5.0442*** (7.45)	4.8594*** (6.95)
First	−0.0041*** (−4.94)	−0.0042*** (−4.91)	−0.0040*** (−4.92)	−0.0042*** (−5.00)	−0.0037*** (−4.07)	−0.0036*** (−3.79)
ROA*First	−0.0226* (−1.65)	−0.0159 (−1.15)	−0.0270** (−2.07)	−0.0257* (−1.88)	−0.0330** (−2.19)	−0.0309** (−2.01)
ID1_dir	−0.3418 (−1.50)					
ROA*ID1_dir	−11.3116*** (−2.82)					
First*ID1_dir	−0.0010 (−0.19)					
ROA*First *ID1_dir	0.2070** (2.14)					
ID2_dir		−0.1865 (−0.92)				
ROA*ID2_dir		−6.6928* (−1.93)				
First*ID2_dir		−0.0011 (−0.22)				
ROA*First *ID2_dir		0.1120 (1.31)				
ID1_exe			−0.2229** (−2.06)			
ROA*ID1_exe			−6.8460*** (−3.62)			
First*ID1_exe			−0.0002 (−0.06)			
ROA*First *ID1_exe			0.1233*** (2.75)			
ID2_exe				−0.2317* (−1.96)		
ROA*ID2_exe				−6.8625*** (−3.21)		
First*ID2_exe				0.0004 (0.13)		

Table 4 (continued)

Variables	(1) LnCEO_sal	(2) LnCEO_sal	(3) LnCEO_sal	(4) LnCEO_sal	(5) LnCEO_sal	(6) LnCEO_sal
ROA*First *ID2_exe				0.1172** (2.33)		
ID1_dum					−0.0386 (−0.79)	
ROA*ID1_dum					−2.3656*** (−2.82)	
First*ID1_dum					−0.0010 (−0.84)	
ROA*First *ID1_dum					0.0509*** (2.58)	
ID2_dum						0.0111 (0.22)
ROA*ID2_dum						−1.9337** (−2.27)
First*ID2_dum						−0.0011 (−0.94)
ROA*First *ID2_dum						0.0448** (2.27)
Asset	0.2312*** (30.19)	0.2321*** (30.28)	0.2265*** (29.47)	0.2276*** (29.53)	0.2304*** (30.13)	0.2313*** (30.14)
Debt	−0.2681*** (−5.26)	−0.2705*** (−5.30)	−0.2693*** (−5.30)	−0.2710*** (−5.33)	−0.2664*** (−5.24)	−0.2689*** (−5.27)
Growth	−0.0590*** (−2.91)	−0.0592*** (−2.91)	−0.0571*** (−2.81)	−0.0572*** (−2.81)	−0.0572*** (−2.84)	−0.0580*** (−2.86)
Ind_Dir	−0.4476*** (−2.77)	−0.4243*** (−2.63)	−0.4581*** (−2.85)	−0.4447*** (−2.76)	−0.4368*** (−2.70)	−0.4075** (−2.52)
Boardsize	0.0173*** (3.77)	0.0173*** (3.78)	0.0200*** (4.37)	0.0201*** (4.38)	0.0185*** (4.02)	0.0171*** (3.71)
Dual	0.1323*** (4.60)	0.1231*** (4.29)	0.1355*** (4.71)	0.1325*** (4.60)	0.1234*** (4.34)	0.1138*** (4.00)
Boardsal_dum	0.0103 (0.64)	0.0082 (0.51)	0.0099 (0.62)	0.0115 (0.71)	0.0090 (0.55)	0.0028 (0.17)
Separation	0.0076*** (7.07)	0.0076*** (7.06)	0.0076*** (7.12)	0.0075*** (6.99)	0.0077*** (7.14)	0.0078*** (7.21)
Age	−0.0011 (−0.71)	−0.0010 (−0.65)	−0.0006 (−0.37)	−0.0005 (−0.33)	−0.0011 (−0.72)	−0.0012 (−0.73)
CEO_Age	0.0861*** (3.85)	0.0860*** (3.83)	0.0865*** (3.87)	0.0860*** (3.85)	0.0875*** (3.90)	0.0869*** (3.87)
CEO_Age <sup>2</sup>	−0.0008*** (−3.51)	−0.0008*** (−3.49)	−0.0008*** (−3.55)	−0.0008*** (−3.51)	−0.0008*** (−3.57)	−0.0008*** (−3.53)
Year	Control	Control	Control	Control	Control	Control
Industry	Control	Control	Control	Control	Control	Control
Constant	4.9581*** (8.70)	4.9361*** (8.65)	5.0302*** (8.86)	5.0180*** (8.82)	4.9247*** (8.61)	4.9105*** (8.58)
Obs.	8894	8894	8894	8894	8894	8894
Adjusted R <sup>2</sup>	0.3198	0.3181	0.3222	0.3210	0.3196	0.3174
F	59.29	58.62	59.50	59.14	59.14	58.58

Notes: Robust t-statistics are in parentheses.

\*\*\* p &lt; 0.01.

\*\* p &lt; 0.05, and

\* p &lt; 0.1.

Table 5

The impact of non-CEO top manager inside directors on CEO pay-performance sensitivity controlling for endogeneity: The Second-stage results.

Variables	(1) LnCEO_sal	(2) LnCEO_sal	(3) LnCEO_sal	(4) LnCEO_sal	(5) LnCEO_sal	(6) LnCEO_sal
ROA	3.8500*** (15.52)	3.8260*** (14.88)	3.8574*** (16.36)	3.8608*** (15.40)	3.7613*** (13.37)	3.6547*** (12.23)
ID1_dir	−0.4185*** (−4.06)					
ROA*ID1_dir	−3.7708** (−2.23)					
ID2_dir		−0.2208** (−2.31)				
ROA*ID2_dir		−2.7992* (−1.83)				
ID1_exe			−0.2592*** (−5.42)			
ROA*ID1_exe			−1.8440** (−2.41)			
ID2_exe				−0.2688*** (−4.97)		
ROA*ID2_exe				−1.9080** (−2.11)		
ID1_dum					−0.0935*** (−4.28)	
ROA*ID1_dum					−0.4146 (−1.16)	
ID2_dum						−0.0404* (−1.82)
ROA*ID2_dum						−0.1947 (−0.53)
Asset	0.2311*** (29.77)	0.2320*** (29.84)	0.2261*** (29.07)	0.2265*** (29.10)	0.2303*** (29.73)	0.2313*** (29.77)
Debt	−0.2644*** (−5.09)	−0.2664*** (−5.12)	−0.2668*** (−5.15)	−0.2677*** (−5.17)	−0.2661*** (−5.14)	−0.2667*** (−5.12)
Growth	−0.0582*** (−2.80)	−0.0585*** (−2.81)	−0.0561*** (−2.69)	−0.0560*** (−2.69)	−0.0559*** (−2.71)	−0.0574*** (−2.76)
Ind_Dir	−0.4650*** (−2.85)	−0.4323*** (−2.64)	−0.4768*** (−2.93)	−0.4625*** (−2.84)	−0.4518*** (−2.77)	−0.4155** (−2.54)
Boardsize	0.0171*** (3.72)	0.0168*** (3.65)	0.0200*** (4.34)	0.0203*** (4.38)	0.0190*** (4.12)	0.0171*** (3.69)
First	−0.0045*** (−8.04)	−0.0045*** (−8.10)	−0.0044*** (−7.84)	−0.0045*** (−8.00)	−0.0046*** (−8.14)	−0.0045*** (−8.05)
Dual	0.1444*** (5.00)	0.1327*** (4.59)	0.1478*** (5.12)	0.1461*** (5.05)	0.1355*** (4.76)	0.1243*** (4.35)
Boardsal_dum	0.0109 (0.67)	0.0071 (0.43)	0.0116 (0.71)	0.0137 (0.84)	0.0109 (0.66)	0.0030 (0.18)
Separation	0.0073*** (6.65)	0.0073*** (6.65)	0.0073*** (6.72)	0.0072*** (6.57)	0.0073*** (6.68)	0.0074*** (6.76)
Age	−0.0014 (−0.87)	−0.0012 (−0.77)	−0.0008 (−0.50)	−0.0007 (−0.45)	−0.0013 (−0.81)	−0.0013 (−0.81)
CEO_Age	0.0830*** (3.67)	0.0831*** (3.66)	0.0827*** (3.66)	0.0819*** (3.62)	0.0835*** (3.69)	0.0832*** (3.67)
CEO_Age <sup>2</sup>	−0.0008*** (−3.36)	−0.0008*** (−3.35)	−0.0008*** (−3.37)	−0.0008*** (−3.32)	−0.0008*** (−3.39)	−0.0008*** (−3.36)
Year	Control	Control	Control	Control	Control	Control
Industry	Control	Control	Control	Control	Control	Control

Table 5 (continued)

Variables	(1) LnCEO_sal	(2) LnCEO_sal	(3) LnCEO_sal	(4) LnCEO_sal	(5) LnCEO_sal	(6) LnCEO_sal
Constant	5.0647*** (8.80)	5.0337*** (8.72)	5.1612*** (8.99)	5.1648*** (8.99)	5.0713*** (8.81)	5.0463*** (8.74)
Obs.	8732	8732	8732	8732	8732	8732
Adjusted R <sup>2</sup>	0.3199	0.3182	0.3219	0.3206	0.3193	0.3170
F	62.57	62.00	63.24	62.71	62.55	61.82

Notes: Robust t-statistics are in parentheses.

\*\*\* p < 0.01.

\*\* p < 0.05, and

\* p < 0.1.

## 5.2. Alternative measures of firm performance

In this section, we use three alternative measures of firm performance to test the robustness of our conclusion that SOEs with more non-CEO top manager inside directors demonstrate lower CEO pay-performance sensitivity: *opeROA* (the operating profit divided by total assets), *ROE* (the net profit divided by total equity), and *opeROE* (the operating profit divided by total equity).

Table 6 shows the results of the impact of non-CEO top manager inside directors on CEO pay-performance sensitivity using *opeROA* as the dependent variable. As shown in columns (1), (3), and (4) of Table 6, all else

Table 6

The impact of non-CEO top manager inside directors on CEO pay-performance sensitivity: *opeROA* as the dependent variable.

Variables	(1) LnCEO_sal	(2) LnCEO_sal	(3) LnCEO_sal	(4) LnCEO_sal	(5) LnCEO_sal	(6) LnCEO_sal
<i>opeROA</i>	3.3888*** (17.06)	3.3508*** (16.39)	3.3995*** (17.68)	3.4108*** (17.14)	3.2356*** (14.68)	3.1732*** (13.80)
<i>ID1_dir</i>	−0.3876*** (−4.51)					
<i>opeROA *ID1_dir</i>	−2.3029* (−1.93)					
<i>ID2_dir</i>		−0.2391*** (−3.03)				
<i>opeROA *ID2_dir</i>		−1.5263 (−1.39)				
<i>ID1_exe</i>			−0.2365*** (−5.81)			
<i>opeROA *ID1_exe</i>			−1.1746** (−2.08)			
<i>ID2_exe</i>				−0.2288*** (−5.11)		
<i>opeROA *ID2_exe</i>				−1.2728** (−1.98)		
<i>ID1_dum</i>					−0.0828*** (−4.63)	
<i>opeROA *ID1_dum</i>					−0.0876 (−0.34)	
<i>ID2_dum</i>						−0.0374** (−2.04)
<i>opeROA *ID2_dum</i>						0.0251 (0.09)
Asset	0.2217*** (28.94)	0.2224*** (29.02)	0.2171*** (28.21)	0.2178*** (28.33)	0.2208*** (28.85)	0.2216*** (28.92)

(continued on next page)

Table 6 (continued)

Variables	(1) LnCEO_sal	(2) LnCEO_sal	(3) LnCEO_sal	(4) LnCEO_sal	(5) LnCEO_sal	(6) LnCEO_sal
Debt	−0.2140*** (−4.23)	−0.2153*** (−4.26)	−0.2162*** (−4.27)	−0.2177*** (−4.31)	−0.2142*** (−4.24)	−0.2149*** (−4.25)
Growth	−0.0639*** (−3.16)	−0.0641*** (−3.16)	−0.0621*** (−3.06)	−0.0619*** (−3.05)	−0.0621*** (−3.08)	−0.0631*** (−3.12)
Ind_Dir	−0.4387*** (−2.72)	−0.4150** (−2.57)	−0.4480*** (−2.78)	−0.4343*** (−2.69)	−0.4234*** (−2.63)	−0.3946** (−2.44)
Boardsize	0.0179*** (3.88)	0.0177*** (3.83)	0.0205*** (4.42)	0.0204*** (4.40)	0.0193*** (4.17)	0.0177*** (3.81)
First	−0.0045*** (−8.16)	−0.0046*** (−8.24)	−0.0044*** (−7.99)	−0.0045*** (−8.13)	−0.0046*** (−8.24)	−0.0045*** (−8.18)
Dual	0.1369*** (4.81)	0.1279*** (4.51)	0.1397*** (4.90)	0.1370*** (4.82)	0.1279*** (4.54)	0.1187*** (4.21)
Boardsal_dum	0.0067 (0.41)	0.0045 (0.27)	0.0071 (0.44)	0.0083 (0.52)	0.0060 (0.37)	−0.0003 (−0.02)
Separation	0.0077*** (7.21)	0.0078*** (7.21)	0.0078*** (7.27)	0.0077*** (7.18)	0.0078*** (7.26)	0.0079*** (7.33)
Age	−0.0009 (−0.56)	−0.0007 (−0.46)	−0.0004 (−0.24)	−0.0003 (−0.22)	−0.0008 (−0.52)	−0.0008 (−0.51)
CEO_Age	0.0897*** (4.04)	0.0903*** (4.05)	0.0893*** (4.03)	0.0889*** (4.00)	0.0908*** (4.08)	0.0911*** (4.09)
CEO_Age <sup>2</sup>	−0.0008*** (−3.70)	−0.0008*** (−3.71)	−0.0008*** (−3.71)	−0.0008*** (−3.67)	−0.0008*** (−3.75)	−0.0008*** (−3.75)
Year	Control	Control	Control	Control	Control	Control
Industry	Control	Control	Control	Control	Control	Control
Constant	5.1060*** (9.03)	5.0697*** (8.94)	5.1959*** (9.21)	5.1897*** (9.19)	5.0976*** (9.01)	5.0666*** (8.94)
Obs.	8894	8894	8894	8894	8894	8894
Adjusted R <sup>2</sup>	0.3208	0.3193	0.3224	0.3214	0.3203	0.3185
F	62.58	62.03	63.01	62.62	62.59	61.79

Notes: Robust t-statistics are in parentheses.

\*\*\* p < 0.01.

\*\* p < 0.05, and

\* p < 0.1.

being equal, the coefficients of  $\text{opeROA} \times \text{ID1\_dir}$  (−2.3029,  $t = -1.93$ ),  $\text{opeROA} \times \text{ID1\_exe}$  (−1.1746,  $t = -2.08$ ), and  $\text{opeROA} \times \text{ID2\_exe}$  (−1.2728,  $t = -1.98$ ) are all significant and display the expected signs. This means that our conclusion that SOEs with more non-CEO top manager inside directors demonstrate lower CEO pay-performance sensitivity is robust.

Using ROE as the dependent variable (Zhang et al., 2014), Table 7 shows the results of the impact of non-CEO top manager inside directors on CEO pay-performance sensitivity. As shown in columns (1), (2), (3), (4), and (5) of Table 7, all else being equal, the coefficients of  $\text{ROE} \times \text{ID1\_dir}$  (−1.3688,  $t = -2.54$ ),  $\text{ROE} \times \text{ID2\_dir}$  (−1.1146,  $t = -2.43$ ),  $\text{ROE} \times \text{ID1\_exe}$  (−0.8484,  $t = -4.01$ ),  $\text{ROE} \times \text{ID2\_exe}$  (−0.8666,  $t = -3.62$ ), and  $\text{ROE} \times \text{ID1\_dum}$  (−0.1805,  $t = -1.66$ ) are all significant and display the expected signs. This means that our conclusion that SOEs with more non-CEO top manager inside directors demonstrate lower CEO pay-performance sensitivity is robust.

Table 8 shows the results of the impact of non-CEO top manager inside directors on CEO pay-performance sensitivity using  $\text{opeROE}$  as the dependent variable. As shown in columns (1), (2), (3), (4), and (5) of Table 8, all else being equal, the coefficients of  $\text{opeROE} \times \text{ID1\_dir}$  (−1.2938,  $t = -3.00$ ),  $\text{opeROE} \times \text{ID2\_dir}$  (−0.9034,  $t = -2.41$ ),  $\text{opeROE} \times \text{ID1\_exe}$  (−0.8040,  $t = -4.68$ ),  $\text{opeROE} \times \text{ID2\_exe}$  (−0.7959,  $t = -3.89$ ), and  $\text{opeROE} \times \text{ID1\_dum}$  (−0.1697,  $t = -1.84$ ) are all significant and display the expected signs, which is consistent with H1.

Table 7

The impact of non-CEO top manager inside directors on CEO pay-performance sensitivity: ROE as the dependent variable.

Variables	(1) LnCEO_sal	(2) LnCEO_sal	(3) LnCEO_sal	(4) LnCEO_sal	(5) LnCEO_sal	(6) LnCEO_sal
ROE	0.9374*** (11.80)	0.9368*** (11.60)	0.9852*** (12.78)	0.9816*** (12.38)	0.9131*** (10.19)	0.9091*** (9.67)
ID1_dir	−0.3886*** (−4.60)					
ROE*ID1_dir	−1.3688** (−2.54)					
ID2_dir		−0.2241*** (−2.90)				
ROE*ID2_dir		−1.1146** (−2.43)				
ID1_exe			−0.2264*** (−5.78)			
ROE*ID1_exe			−0.8484*** (−4.01)			
ID2_exe				−0.2221*** (−5.11)		
ROE*ID2_exe				−0.8666*** (−3.62)		
ID1_dum					−0.0714*** (−4.16)	
ROE*ID1_dum					−0.1805* (−1.66)	
ID2_dum						−0.0218 (−1.25)
ROE*ID2_dum						−0.1531 (−1.37)
Asset	0.2500*** (33.38)	0.2510*** (33.49)	0.2453*** (32.64)	0.2461*** (32.72)	0.2497*** (33.34)	0.2507*** (33.42)
Debt	−0.5662*** (−11.97)	−0.5687*** (−12.00)	−0.5691*** (−12.04)	−0.5708*** (−12.07)	−0.5704*** (−12.05)	−0.5712*** (−12.03)
Growth	−0.0296 (−1.43)	−0.0299 (−1.45)	−0.0284 (−1.37)	−0.0283 (−1.37)	−0.0272 (−1.32)	−0.0285 (−1.38)
Ind_Dir	−0.5519*** (−3.38)	−0.5269*** (−3.22)	−0.5602*** (−3.44)	−0.5480*** (−3.37)	−0.5311*** (−3.26)	−0.5025*** (−3.08)
Boardsize	0.0179*** (3.88)	0.0177*** (3.83)	0.0205*** (4.42)	0.0204*** (4.40)	0.0193*** (4.16)	0.0177*** (3.80)
First	−0.0041*** (−7.29)	−0.0041*** (−7.36)	−0.0040*** (−7.13)	−0.0041*** (−7.26)	−0.0041*** (−7.35)	−0.0041*** (−7.28)
Dual	0.1320*** (4.55)	0.1226*** (4.24)	0.1344*** (4.64)	0.1319*** (4.55)	0.1226*** (4.27)	0.1133*** (3.95)
Boardsal_dum	0.0133 (0.81)	0.0107 (0.65)	0.0132 (0.81)	0.0145 (0.89)	0.0118 (0.72)	0.0052 (0.31)
Separation	0.0078*** (7.23)	0.0078*** (7.22)	0.0078*** (7.24)	0.0077*** (7.13)	0.0079*** (7.29)	0.0080*** (7.38)
Age	−0.0019 (−1.17)	−0.0017 (−1.07)	−0.0014 (−0.85)	−0.0013 (−0.81)	−0.0018 (−1.12)	−0.0018 (−1.14)
CEO_Age	0.0867*** (3.87)	0.0870*** (3.87)	0.0867*** (3.88)	0.0861*** (3.85)	0.0869*** (3.87)	0.0869*** (3.86)
CEO_Age <sup>2</sup>	−0.0008*** (−3.52)	−0.0008*** (−3.52)	−0.0008*** (−3.54)	−0.0008*** (−3.50)	−0.0008*** (−3.53)	−0.0008*** (−3.52)
Year	Control	Control	Control	Control	Control	Control
Industry	Control	Control	Control	Control	Control	Control

(continued on next page)

Table 7 (continued)

Variables	(1) LnCEO_sal	(2) LnCEO_sal	(3) LnCEO_sal	(4) LnCEO_sal	(5) LnCEO_sal	(6) LnCEO_sal
Constant	4.7679*** (8.37)	4.7365*** (8.29)	4.8514*** (8.54)	4.8457*** (8.52)	4.7691*** (8.36)	4.7376*** (8.28)
Obs.	8893	8893	8893	8893	8893	8893
Adjusted R <sup>2</sup>	0.3070	0.3055	0.3092	0.3079	0.3062	0.3043
F	57.12	56.76	57.52	57.20	57.11	56.63

Notes: Robust t-statistics are in parentheses.

\*\*\* p &lt; 0.01.

\*\* p &lt; 0.05, and

\* p &lt; 0.1.

Table 8

The impact of non-CEO top manager inside directors on CEO pay-performance sensitivity: opEROE as the dependent variable.

Variables	(1) LnCEO_sal	(2) LnCEO_sal	(3) LnCEO_sal	(4) LnCEO_sal	(5) LnCEO_sal	(6) LnCEO_sal
opEROE	0.8935*** (13.14)	0.8732*** (12.63)	0.9437*** (14.38)	0.9317*** (13.73)	0.8673*** (11.42)	0.8445*** (10.73)
ID1_dir	−0.36*** (−4.51)					
opEROE*ID1_dir	−1.2938*** (−3.00)					
ID2_dir		−0.2169*** (−2.88)				
opEROE*ID2_dir		−0.9034** (−2.41)				
ID1_exe			−0.2193*** (−5.70)			
opEROE*ID1_exe			−0.8040*** (−4.68)			
ID2_exe				−0.2179*** (−5.07)		
opEROE*ID2_exe				−0.7959*** (−3.89)		
ID1_dum					−0.0692*** (−4.12)	
opEROE*ID1_dum					−0.1697* (−1.84)	
ID2_dum						−0.0227 (−1.33)
opEROE*ID2_dum						−0.1172 (−1.25)
Asset	0.2424*** (32.01)	0.2431*** (32.07)	0.2379*** (31.37)	0.2385*** (31.42)	0.2420*** (31.95)	0.2428*** (32.00)
Debt	−0.5247*** (−10.94)	−0.5252*** (−10.93)	−0.5286*** (−11.04)	−0.5282*** (−11.03)	−0.5266*** (−10.97)	−0.5260*** (−10.93)
Growth	−0.0339 (−1.63)	−0.0342 (−1.64)	−0.0322 (−1.54)	−0.0322 (−1.54)	−0.0317 (−1.53)	−0.0331 (−1.59)
Ind_Dir	−0.5191*** (−3.22)	−0.4943*** (−3.06)	−0.5328*** (−3.32)	−0.5184*** (−3.23)	−0.5000*** (−3.11)	−0.4715*** (−2.92)
Boardsize	0.0184*** (3.98)	0.0182*** (3.92)	0.0207*** (4.45)	0.0208*** (4.46)	0.0198*** (4.25)	0.0182*** (3.89)
First	−0.0041*** (−7.37)	−0.0042*** (−7.43)	−0.0041*** (−7.29)	−0.0041*** (−7.39)	−0.0041*** (−7.41)	−0.0041*** (−7.34)

Table 8 (continued)

Variables	(1) LnCEO_sal	(2) LnCEO_sal	(3) LnCEO_sal	(4) LnCEO_sal	(5) LnCEO_sal	(6) LnCEO_sal
Dual	0.1353*** (4.71)	0.1260*** (4.40)	0.1381*** (4.80)	0.1358*** (4.72)	0.1266*** (4.45)	0.1176*** (4.14)
Boardsal_dum	0.0125 (0.76)	0.0101 (0.62)	0.0120 (0.74)	0.0138 (0.85)	0.0115 (0.71)	0.0052 (0.31)
Separation	0.0075*** (6.98)	0.0076*** (6.98)	0.0075*** (7.00)	0.0074*** (6.89)	0.0076*** (7.04)	0.0077*** (7.12)
Age	−0.0014 (−0.90)	−0.0013 (−0.80)	−0.0010 (−0.62)	−0.0009 (−0.57)	−0.0014 (−0.86)	−0.0014 (−0.86)
CEO_Age	0.0901*** (4.04)	0.0903*** (4.04)	0.0903*** (4.07)	0.0892*** (4.01)	0.0907*** (4.06)	0.0906*** (4.05)
CEO_Age <sup>2</sup>	−0.0008*** (−3.69)	−0.0008*** (−3.68)	−0.0008*** (−3.72)	−0.0008*** (−3.65)	−0.0008*** (−3.71)	−0.0008*** (−3.70)
Year	Control	Control	Control	Control	Control	Control
Industry	Control	Control	Control	Control	Control	Control
Constant	4.8300*** (8.52)	4.8040*** (8.45)	4.9110*** (8.70)	4.9187*** (8.70)	4.8198*** (8.49)	4.7951*** (8.42)
Obs.	8893	8893	8893	8893	8893	8893
Adjusted R <sup>2</sup>	0.3096	0.3080	0.3120	0.3106	0.3088	0.3070
F	57.44	57.04	57.99	57.60	57.31	56.90

Notes: Robust t-statistics are in parentheses.

\*\*\* p < 0.01.

\*\* p < 0.05, and

\* p < 0.1.

## 6. Additional tests

### 6.1. Additional tests of the agent role of non-CEO top manager inside directors

Agency theory concerns aligning the interests of owners and managers (Jensen and Meckling, 1976). It is based on the premise that an inherent conflict exists between the interests of a firm's owners and its management. Agency theory suggests that a greater proportion of non-CEO inside directors is unable to monitor any self-interested CEO actions. Our empirical results are consistent with agency theory. We further test the agent role of non-CEO top manager inside directors through the perspective of the impact of non-CEO inside directors on managers' on-the-job consumption.

Table 9 shows the empirical results of the impact of non-CEO top manager inside directors on managers' on-the-job consumption. As shown in columns (4) and (6) of Table 9, all else being equal, the coefficients of ID2\_exe (0.0032, t = 2.25) and ID2\_dum (0.0011, t = 2.09) are both significant with a positive sign. The empirical results suggest that non-CEO top manager inside directors increase managers' on-the-job consumption, which is consistent with the agent role of non-CEO top manager inside directors.

### 6.2. Effects of different types of non-CEO top manager inside directors on CEO pay-performance sensitivity

According to the Chinese Company Law, the non-CEO top managers in listed firms are mainly the VP, CFO, and secretaries of the board of directors. Thus, we test the impact of VP inside directors, CFO inside directors, and board secretary inside directors on CEO pay-performance sensitivity. We find that VP inside directors and CFO inside directors have significant impacts on CEO pay-performance sensitivity. However, the influence of board secretary inside directors on CEO pay-performance sensitivity is not significant. The corresponding regression results are not shown here due to space constraints.

Table 9

The impact of non-CEO top manager inside directors on CEO managers' on-the-job consumption.

Variables	(1) Perks	(2) Perks	(3) Perks	(4) Perks	(5) Perks	(6) Perks
ROA	0.0252*** (4.31)	0.0253*** (4.33)	0.0254*** (4.34)	0.0255*** (4.37)	0.0253*** (4.33)	0.0252*** (4.32)
ID1_dir	−0.0005 (−0.21)					
ID2_dir		0.0023 (0.98)				
ID1_exe			0.0018 (1.49)			
ID2_exe				0.0032** (2.25)		
ID1_dum					0.0007 (1.45)	
ID2_dum						0.0011** (2.09)
Asset	−0.0045*** (−18.69)	−0.0045*** (−18.71)	−0.0044*** (−18.50)	−0.0044*** (−18.38)	−0.0045*** (−18.66)	−0.0045*** (−18.68)
Debt	−0.0031** (−2.02)	−0.0031** (−2.04)	−0.0031** (−2.04)	−0.0031** (−2.04)	−0.0031** (−2.04)	−0.0031** (−2.06)
Growth	−0.0007 (−0.95)	−0.0007 (−0.95)	−0.0007 (−0.96)	−0.0007 (−0.97)	−0.0007 (−0.97)	−0.0007 (−0.97)
Ind_Dir	−0.0025 (−0.49)	−0.0021 (−0.42)	−0.0020 (−0.39)	−0.0018 (−0.35)	−0.0021 (−0.40)	−0.0020 (−0.39)
Boardsize	0.0001 (0.51)	0.0001 (0.44)	0.0001 (0.32)	0.0000 (0.20)	0.0001 (0.34)	0.0000 (0.27)
First	0.0001*** (5.93)	0.0001*** (5.97)	0.0001*** (5.90)	0.0001*** (5.95)	0.0001*** (5.97)	0.0001*** (6.02)
Dual	−0.0003 (−0.30)	−0.0004 (−0.46)	−0.0005 (−0.52)	−0.0006 (−0.63)	−0.0004 (−0.47)	−0.0005 (−0.50)
Boardsal_dum	0.0004 (0.72)	0.0003 (0.53)	0.0003 (0.52)	0.0002 (0.37)	0.0003 (0.49)	0.0002 (0.39)
Separation	0.0001** (1.99)	0.0001** (2.07)	0.0001** (2.06)	0.0001** (2.13)	0.0001** (2.07)	0.0001** (2.14)
Age	0.0003*** (6.49)	0.0003*** (6.45)	0.0003*** (6.43)	0.0003*** (6.35)	0.0003*** (6.48)	0.0003*** (6.43)
CEO_Age	0.0000 (0.03)	0.0000 (0.04)	0.0000 (0.05)	0.0000 (0.07)	0.0000 (0.03)	0.0000 (0.03)
CEO_Age <sup>2</sup>	0.0000 (0.28)	0.0000 (0.27)	0.0000 (0.26)	0.0000 (0.24)	0.0000 (0.27)	0.0000 (0.27)
Year	Control	Control	Control	Control	Control	Control
Industry	Control	Control	Control	Control	Control	Control
Constant	0.0874*** (5.23)	0.0871*** (5.21)	0.0863*** (5.16)	0.0856*** (5.11)	0.0869*** (5.20)	0.0870*** (5.21)
Obs.	8772	8772	8772	8772	8772	8772
Adjusted R <sup>2</sup>	0.0617	0.0618	0.0620	0.0623	0.0620	0.0622
F	9.879	9.893	9.915	9.967	9.913	9.950

Notes: Robust t-statistics are in parentheses.

\*\*\* p &lt; 0.01.

\*\* p &lt; 0.05, and \*p &lt; 0.1.

### 6.3. Effects of non-CEO top manager inside directors on CEO pay-performance sensitivity in different types of SOE

We divide SOEs into central SOEs, provincial SOEs, and municipal SOEs. We then test the relationship between non-CEO top manager inside directors and CEO pay-performance sensitivity in SOEs. We find that non-CEO top manager inside directors have a significant impact on CEO pay-performance sensitivity in

central SOEs and municipal SOEs but not in provincial SOEs, possibly because central SOEs are very important to the national economy and municipal SOEs also play an important role in regional economic development. Therefore, the managers in central SOEs and municipal SOEs are subject to greater supervision than those in provincial SOEs and have fewer agency problems.

## 7. Conclusions

Agency theory and stewardship theory help us understand the role of inside directors in corporate governance (Nicholson and Kiel, 2007). Agency theory suggests that a greater proportion of non-CEO inside directors is unable to monitor any self-interested CEO actions. As a result, the CEO has more opportunity to pursue self-interest at the expense of owners. In contrast to agency theory, stewardship theory suggests that a greater proportion of non-CEO inside directors can monitor any self-interested CEO actions. Using listed SOEs as our sample, our empirical results are consistent with agency theory. We find that the proportion of non-CEO top manager inside directors has a significant negative correlation with CEO pay-performance sensitivity in SOEs, whereas the shareholding proportion of the controlling shareholders can weaken this relationship. Our conclusions are robust to endogeneity testing and alternative specifications. Furthermore, we find that non-CEO top manager inside directors significantly increase executives' on-the-job consumption. Overall, we contribute to the literature on inside directors.

The results of this paper also have practical implications. Specifically, the government should strengthen the supervision of SOE managers' behavior and decrease manager-shareholder agency problems. This would stimulate the stewardship role of non-CEO top manager inside directors and protect investor interests.

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