Government Ownership, Non-CEO Top Executives' Horizontal Pay Dispersion and Firm Performance

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ABSTRACT: The objective of this study is to analyze the compensation practices of non-CEO top executives as a group measured by horizontal pay dispersion. We address two specific questions. First, we examine whether government ownership affects non-CEO executives' horizontal pay dispersion. Second, we examine how such ownership-induced horizontal pay dispersion affects firm performance. We find that non-CEO top executives' horizontal pay dispersion is lower in government-controlled firms (SOEs) than in privately-controlled firms (non-SOEs). We show that the difference in horizontal pay dispersion between SOEs and non-SOEs is consistent with the institutional differences between the two ownership types. There is evidence that such ownership-induced horizontal pay dispersion is associated with lower firm performance, suggesting that SOEs' horizontal pay dispersion is suboptimal from the perspective of shareholder value maximization.

Key words: horizontal pay dispersion; non-CEO top executives; China; SOEs; firm performance

1. Introduction

There is a large literature on executive compensation, but most studies focus on the CEO's compensation. While it has been long recognized in the management literature (e.g., Hambrick and Mason 1984) that the CEO works with his other top executives as a team and relies on his top lieutenants to design and implement many strategic corporate decisions, little is known about the compensation practices of the non-CEO top executives. To the extent that some studies do examine the pay of non-CEO top executives (e.g., the CFO's pay), they tend to analyze individual executive's pay in isolation and doesn't consider the potential positive or negative externalities that one executive's pay may impose on other executives.

The objective of this study is to examine the compensation practices of the non-CEO top executives as a group measured by the non-CEO top executives' horizontal pay dispersion. We address two specific questions. First, we examine whether ownership structure affects non-CEO top executives' horizontal pay dispersion. Second, we examine how non-CEO top executives' horizontal pay dispersion resulting from the ownership structure affects firm performance. We test our idea using a sample of publicly listed Chinese firms on the Shanghai and Shenzhen stock exchanges. Ownership structure refers to government-controlled firms versus privately-controlled firms (hereafter referred to as SOEs and non-SOEs, respectively).

Existing research suggests that there are two competing forces that pull a firm's non-CEO top executives' horizontal pay dispersion in the opposite directions. On one hand, the classic agency view in economics (Holmstrom 1979, 1982; Jensen and Murphy 1990) suggests that an executive's pay should be linked to his individual performance, resulting in significant horizontal pay dispersion among similar executives due to ex post variation in individual executives' performance. On the other hand, several psychological theories predict a smaller horizontal pay dispersion among the non-CEO top executives than what is predicted by the agency theory due to the negative externalities resulting from strong pay-for-individual-

performance sensitivities (referred to as the equity view). For example, the social comparison theory (Festinger, 1954) argues that larger horizontal pay dispersion can cause perceptions of jealousy, dissatisfaction, and inequity (e.g., Adams 1965; Kruglanski and Mayseless 1990; Suls and Wheeler 2000; Wood 1989) and is counter-productive for the firm. Likewise, the inequity aversion theory (e.g., Fehr and Schmidt 1999) argues that individuals dislike both advantageous and disadvantageous inequality in compensation. Since social preferences could be a source of intrinsic motivation (e.g., Akerlof 1982; Akerlof and Yellen 1988, 1990), team-based compensation could be preferred to individual performance-based compensation when agents are sufficiently averse to ex post inequality (Englmaier and Wambach 2010; Bartling 2011). Finally, the loss aversion theory (e.g., Kahneman and Tversky 1979; Tversky and Kahneman 1991; Koszegi and Rabin 2006, 2007) could also explain agents' aversion to horizontal pay dispersion. If moral hazard problem is sufficiently weak, the flat-rate contract might be preferred if the agents are loss averse (e.g., Herweg and Mierendorff 2013; Herweg et al. 2010; Koszegi and Rabin 2006, 2007; Macera 2012; de Meza and Webb 2007).

Following the logic of the agency view, we expect non-CEO top executives' horizontal pay dispersion to be greater for SOEs than for non-SOEs. The reason is that SOEs are expected to suffer from greater severe agency conflicts between shareholders and management. While the ultimate controlling shareholder of SOEs is a government agency that itself is an agent, the ultimate controlling shareholder of non-SOEs is typically one or a few related individuals who have both the ability and incentive to monitor the hired managers due to their highly concentrated ownership (Ke et al. 1999). Furthermore, the ultimate controlling shareholder of non-SOEs is usually part of the firm management. Hence, SOEs should have a greater need to adopt stronger pay-for-individual-performance contracts to motivate the firm's top executives, leading to greater horizontal pay dispersion among the non-CEO top executives.

On the other hand, the equity view would predict non-CEO top executives' horizontal pay dispersion to be smaller for SOEs than for non-SOEs. While the loss aversion theory may apply to both SOEs and non-SOEs, the social comparison theory and the inequity aversion theory are likely to apply to SOEs to a greater extent. The reason is that all Chinese SOEs used to have an almost zero horizontal pay dispersion among the top executives due to the fact that China was a strict state planning economy with a strong communism ideology for a long time. While a stronger pay-for-performance compensation contract could better motivate an individual employee, the ex post greater horizontal pay dispersion resulting from such high-powered compensation contracts could upset the status quo and result in unhappiness, jealousy and even resentment among the SOE employees.

In addition, one could argue that many Chinese SOEs operate in monopoly industries and receive favorable treatment in input factor markets (e.g., financing). As a result, an SOE's performance could be largely determined by government policies rather than the effort of individual executives. Hence, adopting stronger pay-for-individual-performance managerial compensation contracts may be less necessary for SOEs even under the agency view.

Both the agency view and the equity view are developed under the explicit or implicit assumption that a firm's objective is to maximize shareholder value. This assumption may not hold for SOEs for several reasons. First, unlike non-SOEs whose primary objective is to pursue profit maximization, many SOEs are an important political apparatus used by government agencies (the controlling shareholder) to advance their political, economic or social agenda that may conflict with shareholder value maximization (e.g., employment stability and social harmony).

Second, the top executives in many Chinese SOEs (especially the CEO and board chairman) are quasi-government bureaucrats and are therefore subject to China's rigid and hierarchical government personnel system (see Chen et al. 2013 for a more detailed discussion).

Hence, it is difficult to grant these SOE executives (especially the CEO and board chairman) strong pay-for-performance compensation contracts that are out of line with the government's bureaucrat compensation guidelines. Given Chinese SOEs' collective culture and rigid hierarchy (see Ke et al. 2017), if the CEO and board chairman could not receive high-powered incentive compensation contracts, it would be difficult for their subordinates (i.e., the non-CEO top executives) to receive high-powered compensation that would result in greater horizontal pay dispersion.

Third, the Chinese SOEs' labor market is closed to external market competition (Chen et al. 2013), thus most SOEs' executives (the CEO and board chairman in particular) care more about their political promotion within the government's personnel system (e.g., being promoted to a higher level government position) than financial reward. Hence, the SOE executives who have a greater prospect for political promotion would be more willing to sacrifice their financial reward in order to minimize potential accusations from both their opponents and the general public that they are more interested in pursuing personal reward rather than serving the public interests (Chen et al. 2013).

All of those non-shareholder value maximization factors could further reduce SOE executives' pay-for-individual-performance sensitivity, leading to a lower (suboptimal) horizontal pay dispersion among the non-CEO top executives from the perspective of shareholder value maximization. Because of these conflicting views, the impact of government ownership on non-CEO top executives' horizontal pay dispersion is an empirical question.

China is an interesting setting to test our research questions for several reasons. First, publicly listed Chinese firms are required to disclose the names and total annual compensation for the entire top management team in their annual reports, making it possible to compute the

horizontal pay dispersion among the non-CEO top executives for all publicly listed firms.[1] Second, publicly listed Chinese firms have two distinctive ownership structure types, SOEs and non-SOEs, creating a powerful setting to test the impact of ownership structure on non-CEO top executives' horizontal pay dispersion.

Following Ke, Mao, Wang and Zuo (2017), we define the top management team (TMT) as a firm's top executives explicitly disclosed in the firm's annual report, including the board chairman, the CEO, vice presidents, the CFO (if included), the board secretary, and other top managers designated by the firm. We exclude the board chairman from the analysis as a substantial portion of the board chairmen are compensated by the listed firm's parent holding company and hence their annual compensation details are typically not publicly disclosed.

Consistent with the existing literature (e.g., Fredrickson et al. 2010; Jaskiewicz et al. 2017), non-CEO top executives' horizontal pay dispersion is defined as the coefficient of variation of total annual compensation among the top management team other than the CEO. A firm's non-CEO top executives' horizontal pay dispersion could be correlated with the firm's vertical managerial pay dispersion (defined below). Hence, we also control for the vertical managerial pay dispersion in relevant empirical analyses below. We consider two types of vertical pay dispersion metrics: (i) the vertical pay dispersion between the CEO and the non-CEO TMT members; and (ii) the vertical pay dispersion between the average non-CEO TMT member and the average company employee.

With respect to our first research question, we find that on average, SOEs exhibit a lower horizontal pay dispersion among the non-CEO top executives than non-SOEs, suggesting that the equity view and non-shareholder value maximization motives dominate the agency

[1] In contrast, publicly traded firms in the U.S. are required to disclose the compensation for the top five executives only.

view in explaining the difference in non-CEO top executives' horizontal pay dispersion between SOEs and non-SOEs in China.

To better understand the driving force behind SOEs' lower horizontal pay dispersion, we identify the factors that can explain the cross-sectional variation in the SOEs' non-CEO top executives' horizontal pay dispersion. First, we examine whether non-CEO top executives' horizontal pay dispersion differs for central government controlled SOEs (referred to as central SOEs) and local government controlled SOEs (referred to as local SOEs). We do not make any ex ante prediction because central SOEs and local SOEs differ on various dimensions. On one hand, central SOEs may exhibit lower horizontal pay dispersion because they are directly controlled by the central government and therefore they could be more likely used by the government as a political apparatus to advance its political, economic or social agenda (Sun and Tong 2003; Bai et al. 2006; Fan et al. 2007). Central SOE executives may also have a greater prospect for political promotion and therefore they could be more willing to sacrifice their short-term financial reward. On the other hand, Ke et al. (2016) show that central SOEs often lead local SOEs in the reform of establishing central SOEs and local SOEs as modern profit-oriented business enterprises, implying that central SOEs may exhibit a greater horizontal pay dispersion. Empirically, we find that the non-CEO top executives' horizontal pay dispersion to be significantly smaller for central SOEs than for local SOEs, suggesting that central SOEs face greater constraints in designing individualized managerial compensation contracts than local SOEs.

Second, we examine whether non-CEO top executives' horizontal pay dispersion is smaller for the SOEs operating in the monopoly industries as noted above. We find supporting evidence for this prediction, but we find no evidence of a similar effect (as expected) for the non-SOEs operating in the same monopoly industries. More importantly, however, controlling

for this industry effect does not affect the relative difference in horizontal pay dispersion between SOEs and non-SOEs or central SOEs versus local SOEs.

The quality of China's institutional environment differs across provinces. Hence, our third cross-sectional analysis examines how non-CEO top executives' horizontal pay dispersion varies across both the SOEs and non-SOEs domiciled in such diverse institutional environments. We find no evidence that non-CEO top executives' horizontal pay dispersion varies with local institutional environment quality for SOEs, but we find evidence that non-CEO top executives' horizontal pay dispersion becomes larger for the non-SOEs domiciled in provinces with more developed institutional environments. These results provide further evidence that SOEs face greater constraints than non-SOEs in designing individualized managerial compensation contracts.

Our second research question examines how the difference in non-CEO top executives' horizontal pay dispersion for SOEs and non-SOEs affects firm performance. To the extent that the observed pay dispersion gap for SOEs versus non-SOEs represents a deviation from the optimal pay contracts for the purpose of shareholder value maximization, we should expect the gap in the non-CEO top executives' horizontal pay dispersion for SOEs versus non-SOEs to be negatively associated with firm performance. Using operating ROA as a proxy for firm performance, we find supporting evidence for this prediction.

We contribute to two streams of existing literatures. Our first contribution is to the broad managerial compensation literature.[2] While top executives work as a team, most studies on executive compensation focus on individual executives (e.g., the CEO in particular) in isolation. There is only limited research on the compensation practices of top executives as a group. There are three types of managerial pay dispersion definitions: the vertical managerial

[2] There are also studies that examine horizontal pay dispersion among *non-executive employees* (see Fehr et al. 2009 for a review of this literature; Pfeffer and Langton 1988 and Pfeffer and Davis-Blake 1990, and Pfeffer and Langton 1993 for university faculty employees; Bloom 1999 for baseball players).

pay dispersion between the CEO and non-CEO top executives, the horizontal managerial pay dispersion among the non-CEO top executives, and total managerial pay dispersion among all top executives including the CEO. Some studies have examined the total managerial pay dispersion (e.g., Bushman et al. 2016; Siegel and Hambrick 2005; Bloom and Michel 2002) and the vertical managerial pay dispersion (e.g., Siegel and Hambrick 2005; Carpenter and Sanders 2004; Burns et al. 2013; Chen et al. 2013; Kale et al. 2009; Kini and Williams 2012). Even though non-CEO top executives play a critical role in helping the CEO to design and implement major corporate initiatives, very few studies have examined non-CEO top executives' horizontal pay dispersion. A notable exception is Siegel and Hambrick (2005) who use proprietary executive compensation data from a consulting company to examine the impact of three major types of pay disparity (vertical, horizontal, and total) on firm performance. We are not aware of any existing studies published in top business journals that examine the determinants of non-CEO top executives' horizontal pay dispersion. We contribute to this literature by being the first to analyze the impact of government ownership on non-CEO top executives' horizontal pay dispersion. In addition, while prior studies tend to find a negative correlation between non-CEO top executives' horizontal pay dispersion and firm performance (e.g., Siegel and Hambrick 2005), we document the opposite, suggesting that government ownership depresses the SOEs' optimal level of horizontal pay dispersion for the purpose of shareholder value maximization.

Our second contribution is to the SOE literature. There is a growing literature devoted to understanding the managerial compensation of SOEs, but most studies in this literature focus on the CEO only (Conyon and He 2011; Firth et al. 2006; Ke et al. 2012; Ke et al. 2016; Wang and Xiao 2011). Our contribution is to examine the managerial compensation for the non-CEO top executives as a group and identify the major institutional factors that explain the cross-sectional variation in SOEs' non-CEO top executives' horizontal pay dispersion.

The rest of the paper is organized as follows. Section 2 discusses the sample selection procedures. Section 3 examines our first research question on the effect of government ownership on non-CEO top executives' horizontal pay dispersion. Section 4 compares the level of managerial compensation for SOEs vs. non-SOEs in order to rule out an alternative explanation for the results in Section 3. Section 5 examines our second research question on the impact of non-CEO top executives' horizontal pay dispersion on future firm performance. Section 6 concludes.

2. Sample selection procedures

The data used in this paper come from the China Stock Market & Accounting Research (CSMAR) database and WIND database. Table 1 shows our sample selection procedures. We started with 2,695 unique publicly listed firms on the Shanghai Stock Exchange and Shenzhen Stock Exchange for the period 2005-2014, representing 90,241 unique firm-executives and 337,901 firm-executive-years. Our sample starts from 2005 because it was the first year when publicly listed Chinese firms were required to disclose individual managerial compensation data. Our sample ends in 2014, the year when we began our data collection. As noted in section 1, we define the top management team as a firm's top executives explicitly disclosed in the firm's annual report, including the board chairman, the CEO, vice presidents, the CFO (if included), the board secretary, and other top managers designated by the firm in the annual report. However, we exclude the board chairman in our study because a significant portion of the board chairmen are paid by the listed firm's parent holding company and therefore their compensation numbers are not disclosed. We delete executives with zero compensation from the listed firm or executives who joined the firm during the middle of the year. In addition, we exclude the firms that are listed in both A and H stock markets. These sample selection criteria

result in a sample in Table 1 of 2,556 unique firms, representing 22,858 unique firm-executives and 82,827 firm-executive-years.

We define a firm year as an SOE if the ultimate controlling shareholder of the publicly listed firm is a central government agency, local government agency, or a university. The rest of the publicly listed firm years are classified as non-SOEs. We delete the firm years with unclear ultimate controlling shareholder types, resulting in a final sample in Table 1 of 17,805 firm years, among which 8,881 are SOEs and 8,924 are non-SOEs.

3. The effect of government ownership on non-CEO top executives' horizontal pay dispersion

3.1. Research design and variable definitions

Our first research question examines the impact of government ownership on non-CEO top executives' horizontal pay dispersion using the following regression model:

$$HORIZON\_DISP_{it} = \alpha + \beta OWNERSHIP_{it-1} + \gamma CONTROL_{it-1} + year\ fixed\ effects + \varepsilon_{it} \quad (1)$$

See the appendix for all variable definitions. The unit of observation is a firm (i) year (t). *CONTROL* includes two classes of control variables plus a miscellaneous list of other control variables. The first class is firm characteristics. We control for firm size (*ln(ASSETS)*) because prior research finds that firm size is positively associated with pay dispersion (Bloom and Michel 2002; Henderson and Fredrickson 2001). We also control for firm growth (*Q*) because prior research (Smith and Watts 1992) finds that higher growth firms tend to adopt stronger pay-for-performance compensation contracts that would lead to greater horizontal pay dispersion. Existing studies argue that pay dispersion should be lower if a firm's business requires more coordination (Edmans et al. 2013; Gomez-Mejia and Balkin 1992; Siegel and Hambrick 2005). Prior research shows that R&D intensive firms and less diversified firms demand more teamwork and coordination (Michel and Hambrick 1992; Hill, Hitt, and Hoskisson 1992). Hence, we also control for proxies of R&D intensity (*PATENT*) and business

diversification (*DIVERSIFY*). We control for several proxies of a firm's governance quality because corporate governance is expected to affect a firm's managerial compensation contracts: a firm's board size (*BOARDSIZE*), the percentage of independent board members (*INDEPBOARD*), the top shareholder's ownership (*TOP1SHAREHOLDER*), and mutual fund ownership (*MUTUALFUND*).

The second class of control variables are top management team characteristics. We include the top management team's size (*TMTSIZE*) because larger top management teams could mean more diversity and variety of job functions in a firm, leading to greater pay dispersion (Weber 1946; Siegel and Hambrick 2005). We also control for the non-CEO top management team's total compensation size (*ln(TOTALTMTPAY*)) because Pfeffer and Davis-Blake (1990) show that pay dispersion increases when there are more rewards available to distribute. Moreover, Pfeffer and Langton (1988) and Pfeffer and Davis-Blake (1990) find variations in gender, job tenure, and race are positively related to the horizontal pay dispersion within departments in the US colleges and universities. Hence, we control for the composition of gender by using the percentage of female top managers in a non-CEO top management team (*FEMALE*) and the coefficient of variation in the age (*CV_AGE*) and tenure (*CV_TENURE*) of the non-CEO top management team.

Although we focus on the horizontal pay dispersion among the non-CEO top management team, the CEO and board chairman could also affect the horizontal pay dispersion. For example, board chairman's tenure can affect the allocation of compensation among the top management team (Henderson and Fredrickson 2001). Sanders and Carpenter (1998) argue that the internationalization via higher CEO pay could affect the top management team's pay as well. Hence, we control for several CEO/board chairman's personal characteristics

(*ln(CEO_COMP), ln(CEO_TENURE), ln(CHAIR_TENURE), ln(CHAIR_COMP), CEO_EDU, and CHAIR_EDU*).[3] We also include year fixed effects to control for time effects.

3.2. Regression results for the main model

Table 2 shows the descriptive statistics, correlations and regression results for the regression model (1). Panel A of Table 2 shows the descriptive statistics for the full sample as well as for the SOE and non-SOE subsamples. Column (1) of Panel B reports the OLS regression results of model (1). We cluster standard errors by firm. The coefficient on *SOE* is significantly negative, suggesting that non-CEO top executives' horizontal pay dispersion is significant smaller for SOEs than for non-SOEs.[4]

With regard to the control variables, we find that the only firm characteristic that is significant is the positive coefficient on *ln(TOTALTMTPAY)*. The coefficients on several top management team characteristics (*FEMALE*, *CV_AGE*, and *CV_TENURE*) are also significant as predicted. Although we have no ex ante predictions, it is interesting to note that the coefficients on *ln(CHAIR_TENURE)* and *CHAIR_EDU* are significant.

3.3. Sources of the difference in non-CEO top executives' horizontal pay dispersion between SOEs and non-SOEs

We perform several more refined analyses to better understand the drivers behind the difference in the non-CEO top executives' horizontal pay dispersion between SOEs and non-SOEs. First, we examine whether central SOEs exhibit a different horizontal pay dispersion among the non-CEO top executives compared to local SOEs. As noted in Section 1, we do not

[3] There are a significant number of missing values for *ln(CHAIR_COMP), CEO_EDU, and CHAIR_EDU*. To avoid losing observations, we recode such missing values as zero. In addition, we include a dummy variable indicating the non-missing observations for each of these three variables (denoted as *CHAIR_COMP_D, CEO_EDU_D*, and *CHAIR_EDU_D*, respectively) to account for the separate effects of such missing observations.
[4] We also include industry fixed effects and province fixed effects and obtain similar inferences for the coefficients on *SOE*, *CENTRALSOE*, and *LOCALSOE* for all the models in Table 2 (untabulated).

make any ex ante prediction because there are several significant differences between central SOEs and local SOEs that could lead to different implications for the horizontal pay dispersion. Column (2) of Panel B, Table 2 shows the regression results of this test. We find that the coefficients on *CENTRALSOE* and *LOCALSOE* are both significantly negative but the coefficient on *CENTRALSOE* is more negative than the coefficient on *LOCALSOE*. We yield similar results if we limit the sample to the SOEs only (see column (3) of Table 2). Overall, these results suggest that the difference in the non-CEO top executives' horizontal pay dispersion for SOEs versus non-SOEs is due to both central SOEs and local SOEs. However, central SOEs make a greater contribution to the difference in the non-CEO top executives' horizontal pay dispersion for SOEs versus non-SOEs.

Second, we examine whether non-CEO top executives' horizontal pay dispersion is smaller for the SOEs operating in the monopoly industries. As argued in Section 1, many Chinese SOEs operating in the monopoly industries receive favourable government treatment in input factor markets (e.g., financing). As a result, it is difficult to determine whether an SOE's performance is due to the effort of an individual executive or the special privileges from the government. Hence, the agency theory would predict weaker pay-for-individual-performance managerial compensation contracts. Hence, we expect the SOEs operating in the monopoly industries to exhibit smaller horizontal pay dispersion among the non-CEO top executives. To test this hypothesis, we include a proxy for the monopoly industries (*MONOPOLY*) in our regression model and repeat the regression models in columns (1) to (4) of Table 2. The results are reported in columns (5)-(8) of Table 2. Consistent with our predictions, the coefficient on *MONOPOLY* is significantly negative for the sample of SOEs (see column (7)) but insignificant for the sample of non-SOEs (see column (8)). In addition, our inferences for the coefficients on *SOE*, *CENTRALSOE*, and *LOCALSOE* continue to hold

after controlling for *MONOPOLY*, suggesting that the coefficient on *SOE* (or *CENTRALSOE* and *LOCALSOE*) in Table 2 is not entirely attributable to the monopoly industry effect.

3.4. Non-CEO top executives' horizontal pay dispersion by institutional environment quality

China's institutional environment quality varies significantly across provinces. Hence, an interesting question is to examine how the local institutional environment quality in the province of a firm's domicile affects the firm's non-CEO top executives' horizontal pay dispersion. Because local institutional environment quality could affect SOEs and non-SOEs differently, we do not make any prediction on the difference in the non-CEO top executives' horizontal pay dispersion between SOEs and non-SOEs for provinces with strong versus weak institutional environment quality.

Table 3 reports the regression results. We divide our sample firms into two groups (*MKT_DUMMY*) based on the median provincial business environment index compiled by Wang et al. (2013). The model in column (1) of Table 3 uses *SOE* while the model in column (2) breaks *SOE* into *CENTRALSOE* and *LOCALSOE*. The coefficients on *SOE* is significantly negative, suggesting that non-CEO top executives' horizontal pay dispersion is significantly smaller for SOEs than for non-SOEs in provinces with weaker institutional environments. The coefficient on *SOE*×*MKT_DUMMY* is also significantly negative, suggesting that the gap in the non-CEO top executives' horizontal pay dispersion for SOEs versus non-SOEs is even greater in provinces with stronger institutional environments. The coefficient on *MKT_DUMMY* is significantly positive, while the sum of the coefficients on *MKT_DUMMY* and *SOE*×*MKT_DUMMY* is close to zero. These latter results suggest that the increased gap in the non-CEO top executives' horizontal pay dispersion for SOEs versus non-SOEs in the strong versus weak institutional environments is caused by the higher non-CEO top executives' horizontal pay dispersion of the non-SOEs in the strong institutional environments. This

finding may not be too surprising given that Chinese SOEs' managerial compensation policies are strictly controlled and regulated by the government (see Chen et al. 2013) and therefore should not be too sensitive to external market conditions.

When we break *SOE* into *CENTRALSOE* and *LOCALSOE* in column (2) of Table 3, we find similar inferences. The only exception is that the coefficient on *CENTRALSOE*×*MKT_DUMMY* is not significant.[5]

4. The level of managerial compensation for SOEs vs. non-SOEs

The agency theory (Holmstrom 1979) shows that when a principal imposes a greater managerial pay-for-performance sensitivity on an agent, the principal also has to offer the agent a higher compensation level in order to compensate the risk averse agent for the increased compensation risk sharing. Hence, one could argue that non-CEO top executives' horizontal pay dispersion is lower for SOEs than for non-SOEs because the average managerial pay level is lower for the SOEs than for non-SOEs. To test the validity of this alternative explanation, we compare the average annual compensation for the non-CEO top executives for SOEs versus non-SOEs. Following Conyon et al. (2011) and Grinstein and Hribar (2004), we control for the common economic determinants of managerial compensation. As shown in Table 4, we find that the coefficient on *SOE* is significantly positive in column (1) while the coefficient on *CENTRALSOE* is significantly positive and the coefficient on *LOCALSOE* is insignificant in column (2). Overall, we find no evidence to support the alternative explanation.[6]

[5] We also include industry fixed effects and province fixed effects and obtain similar inferences for the coefficients on *SOE*, *SOE*×*MKT_DUMMY*, *CENTRALSOE*, *LOCALSOE*, *CENTRALSOE*×*MKT_DUMMY*, *LOCALSOE*×*MKT_DUMMY* for all the models in Table 2 (untabulated). As expected, the coefficient on *MKT_DUMMY* becomes insignificant once we control for province fixed effects.

[6] We also include industry fixed effects and province fixed effects and obtain similar inferences for the coefficients on *SOE*, *CENTRALSOE*, and *LOCALSOE* for all the models in Table 4 (untabulated). The only exception is that the coefficient on *LOCALSOE* becomes significantly positive at the 5% two-tailed significance level.

5. The performance consequence of non-CEO top executives' horizontal pay dispersion

Our second research question examines how the difference in non-CEO top executives' horizontal pay dispersion for SOEs and non-SOEs affects firm performance. Specifically, we estimate the following regression model:

$$\begin{aligned} ROA_{it} &= \alpha + \beta_1 HORIZON\_DISP_{it-1} + \beta_2 VERTICAL\_DISP\_TMT_{it-1} \\ &+ \beta_3 VERTICAL\_DISP\_EMP_{it-1} + \gamma CONTROL_{lt-1} \\ &+ year \times province\ fixed\ effects + industry\ fixed\ effects + \varepsilon_{it} \end{aligned} \quad (2)$$

See the appendix for all variable definitions. We include both the vertical managerial pay dispersion for the CEO versus non-CEO TMT members (*VERTICAL_DISP_TMT*) and the vertical pay dispersion for the non-CEO TMT members versus non-executive employees (*VERTICAL_DISP_EMP*) because vertical pay dispersion could also impact firm performance. Following prior research (e.g., Anderson and Reeb 2003), *CONTROL* contains a standard set of common determinants of firm performance. For example, firm size is significantly correlated with *ROA*. Tobin's Q (*Q*), top shareholder's stock ownership (*TOP1SHAREHOLDER*), leverage (*LEV*), and the volatility of ROA (*ROA_SD*) would also affect firm performance. We also include industry fixed effects to control for unobservable industry effects and year×province fixed effects to control for unobservable province effects in each year.

As shown in the first column of Table 5, we find that the coefficient on *HORIZON_DISP* is significantly positive, suggesting that greater non-CEO top executives' horizontal pay dispersion is associated with higher firm performance. With regard to the vertical pay dispersion, we find that the coefficients on *VERTICAL_DISP_TMT* and *VERTICAL_DISP_EMP* are both significantly positive, suggesting that greater vertical pay dispersion is associated with improved firm performance.

To better isolate the effect of non-CEO top executives' horizontal pay dispersion due to the ownership structure, we follow the approach of Core et al. (1999) by computing the predicted component of *HORIZON_DISP* due to the ownership structure

(*HORIZON_DISP_SOE*) and the predicted component of *HORIZON_DISP* due to other common economic determinants (*HORIZON_DISP_ECON*) based on Table 2 column 2's model. As shown in the second column of Table 5, the coefficient on *HORIZON_DISP_SOE* is still significantly positive, suggesting that the ownership-induced horizontal pay dispersion is associated with lower future firm performance. The coefficient on *HORIZON_DISP_ECON* is also significantly positive. We yield similar results even if we divide the *HORIZON_DISP_SOE* into *HORIZON_DISP_CENTRALSOE* and *HORIZON_DISP_LOCALSOE* (see column (3) of Table 5).

6. Conclusion

While non-CEO top executives play an important role in helping the CEO design and implementing many strategic corporate decisions, the existing executive compensation literature has paid scant attention to how these executives are compensated. In addition, extant research examines individual executives' compensation in isolation even though the CEO and his non-CEO TMT work as a team and therefore an executive's pay may impose externalities on the other executives.

The objective of this study is to contribute to the existing executive compensation literature by examining the horizontal pay dispersion among the non-CEO top executives. We examine how ownership structure affects the horizontal pay dispersion among the non-CEO top executives. In addition, we assess how the ownership structure-induced horizontal pay dispersion among the non-CEO top executive affects firm performance. We test our idea using a sample of publicly listed Chinese firms on the Shanghai and Shenzhen stock exchanges over the period 2005-2014, where the individual compensation data for the entire TMT are readily available. In addition, publicly listed Chinese firms have two distinctive ownership types, government-controlled firms (i.e., SOEs) and privately-controlled firms (i.e., non-SOEs),

creating a powerful setting to test the impact of ownership structure on non-CEO top executives' horizontal pay dispersion.

Our key findings are as follows. First, we find that non-CEO top executives' horizontal pay dispersion is significantly lower for SOEs than for non-SOEs. Second, we trace the aforementioned difference in the non-CEO top executives' horizontal pay dispersion to several sources. Specifically, we find that the non-CEO top executives' horizontal pay dispersion is smaller for central government controlled SOEs than for local government controlled SOEs. We also find that the non-CEO top executives' horizontal pay dispersion is lower for the SOEs that operate in the monopoly industries. Finally, we find that the gap in the non-CEO top executives' horizontal pay dispersion for SOEs versus non-SOEs is greater in provinces with better developed institutional environments, driven by the non-SOEs' greater sensitivity to external market conditions. Third, we find that the government ownership-induced horizontal pay dispersion is associated with lower future firm performance, suggesting that government ownership-induced horizontal pay dispersion is suboptimal for the purposes of shareholder value maximization.

Overall, our empirical results contribute to our understanding of the managerial compensation practices for the non-CEO TMT members as a group, an important part of a firm's top echelon neglected by most executive compensation research. We show how government ownership not only affects the non-CEO top executives' horizontal pay dispersion but also how such ownership structure-induced pay dispersion affects future firm performance. Different from past studies on U.S. firms, our results suggest that government ownership depresses the SOEs' optimal level of horizontal pay dispersion among the non-CEO top executives for the purpose of shareholder value maximization. Our study also contributes to the SOE literature that tends to focus on only the CEO compensation.

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Appendix. Variable Definitions

HORIZON_DISP	The coefficient of variation of non-CEO top executives' (non-CEO TMT's) annual compensation, defined as the standard deviation divided by the mean of the non-CEO top executives's annual compensation in a firm-year.
SOE	A dummy variable that equals one if the ultimate owner of a listed firm is a central government agency, a local government, or a university and zero otherwise.
CENTRALSOE	A dummy variable if an SOE's ultimate owner is a central government agency and zero otherwise. We dropped the listed firms whose ultimate owners are universities
LOCALSOE	A dummy variable if an SOE's ultimate owner is a local government agency and zero otherwise. We dropped the listed firms whose ultimate owners are universities
LN(ASSETS)	The natural logarithm of total assets
LN(SALES)	The natural logarithm of total sales
DIVERSIFY	The entropy measure for firm diversification, defined as $\sum[P\_i \ln(1/P\_i)]$, where P_i is the proportion of a firm's sales in area i. We use the top 5 areas where the firm's sales come from
Q	Tobin's Q, calculated as the sum of the market value of tradable shares and the book values of non-tradable shares and debt over the book value of total assets, winsorized at the top 1 percentile
MUTUALFUND	The percentage of shares held by mutual fund investors who are in the top 10 shareholders
BOARDSIZE	Number of board members
INDEPBOARD	The ratio of number of independent directors to number of board members
TOP1SHAREHOLDER	The ownership percentage by the immediate largest shareholder of a listed firm
PATENT	A dummy variable that equals one if a firm has outstanding patents at the year end and zero otherwise
MKT_DUMMY	A dummy variable that equals one if Wang et al.'s (2013) overall provincial business environment index in a year is greater than the median and zero otherwise. Because the index is available for 2006, 2008, 2010, and 2012 only, we use the values of 2006 for 2005, the values of 2008 for 2007, the values of 2010 for 2009, the values of 2012 for 2011 and 2013-2014
TMTSIZE	Number of non-CEO top executives in a firm year
TOTALTMTPAY	Sum of all compensation paid to the non-CEO top executives in a firm year
LN(TMTAVGPAY)	The natural logarithm of (TotalTMTPay/TMTSIZE+1)
CEO_COMP	CEO annual compensation (excluding stock ownership)
CEO_EDU	The education level of the CEO: 1 for secondary school or lower, 2 for three-year colleges, 3 for four-year colleges, 4 for master degrees, 5 for Ph.D. degrees
CEO_EDU_D	A dummy variable that equals one if CEO_EDU is non-missing and zero otherwise

Appendix. Variable Definitions

CHAIR_COMP	The annual cash compensation paid to the board Chairman by the listed firm (excluding stock ownership)
CHAIR_COMP_D	A dummy variable that equals one if CHAIR_COMP is non-missing and zero otherwise
CHAIR_EDUC	The education level of the board Chairman: 1 for secondary school or lower, 2 for three-year colleges, 3 for four-year colleges, 4 for master degrees, 5 for Ph.D. degrees
CHAIR_EDU_D	A dummy variable that equals one if CHAIR_EDU is non-missing and zero otherwise
FEMALE	the percentage of non-CEO top executives who are female in a firm-year
CV_AGE	The coefficient of variation for the age of non-CEO top executives in a firm-year
CEO_TENURE	The number of months that the person has been the CEO of the company
CHAIR_TENURE	Number of months since a person became the Chairman of a listed company
CV_TENURE	The coefficient of variation for the tenure (number of months) of non-CEO top executives in a firm-year
MONOPOLY	A dummy variable that equals one for firms that operate in the regulated industries in China and zero otherwise. The regulated industries are defined following Ke et al. (2017)
ROA	Return on assets, defined as operating income plus finance costs divided by the average total assets. ROA is winsorized at the top and bottom one percentiles
VERTICAL_DISP_TMT	The ratio of the CEO's annual cash compensation (CEO_COMP) to the average annual cash compensation of the non-CEO top executives in a firm-year
HORIZON_DISP_ECON	The predicted value of HORIZON_DISP using the independent variables other than CENTRALSOE and LOCALSOE from the regression model of Table 2 Panel B column 2
HORIZON_DISP_LOCALSOE	The predicted value of HORIZON_DISP for LOCALSOE from the regression model of Table 2 Panel B column 2
HORIZON_DISP_CENTRALSOE	The predicted value of HORIZON_DISP for CENTRALSOE from the regression model of Table 2 Panel B column 2
HORIZON_DISP_SOE	The predicted value of HORIZON_DISP for CENTRALSOE dummy and LOCALSOE from the regression model of Table 2 Panel B column 2
VERTICAL_DISP_EMP	The ratio of the non-CEO top executives average annual cash compensation to the average worker's annual cash pay
LEV	Contemporaneous leverage ratio which equals total debt divided by total equity
ROA_SD	The standard deviation of firm's ROA during the last 3 years (i.e., t-1, t-2, and t-3)
IRISK	Following Bushee and Noe (2000), IRISK is the standard deviation of the market-model residuals calculated from daily stock returns measured over a period of one year (minimum of 125 observations)

Appendix. Variable Definitions

RETURN	The annual dividend inclusive stock return

Table 1
Sample Selection Procedures

Original Sample Size			
Number of Firms	Number of Firm-Executives	Total observations	Total Firm-Year
2,695	90,241	337,901	19,803
Exclude supervisors and board members			
Number of Firms	Number of Firm-Executives	Total observations	Total Firm-Year
2,695	33,077	124,828	19,779
Exclude CEO and Chairman			
Number of Firms	Number of Firm-Executives	Total observations	Total Firm-Year
2,695	28,493	104,805	19,738
Delete 0 Compensation			
Number of Firms	Number of Firm-Executives	Total observations	Total Firm-Year
2,695	27,889	102,284	19,615
Exclude TMTs joined in the middle of a year			
Number of Firms	Number of Firm-Executives	Total observations	Total Firm-Year
2,646	23,997	87,492	19,206
Exclude A-H Firms			
Number of Firms	Number of Firm-Executives	Total observations	Total Firm-Year
2,556	22,858	82,827	18,491
Exclude Firms with Unclear Controlling Shareholder Type			
Number of Firms	Number of Firm-Executives	Total observations	Total Firm-Year
2,519	22,236	79,448	17,805

Table 2
Panel A - Summary Statistics

Panel A.1 : The whole sample

Variable	Obs	Mean	Std. Dev.	Min	Max	P25	P50	P75
HORIZON_DISP	16,857	0.19	0.19	0.00	2.17	0.06	0.15	0.28
SOE	17,805	0.50	0.50	0.00	1.00	0.00	0.00	1.00
CENTRALSOE	17,805	0.14	0.35	0.00	1.00	0.00	0.00	0.00
LOCALSOE	17,805	0.36	0.48	0.00	1.00	0.00	0.00	1.00
Ln(ASSETS)	17,804	21.60	1.29	0.00	29.07	20.77	21.48	22.29
Ln(SALES)	17,798	20.91	1.70	0.00	27.41	20.03	20.91	21.83
LEV	17,456	1.36	1.75	0.00	12.98	0.41	0.88	1.65
MONOPOLY	17,805	0.25	0.44	0.00	1.00	0.00	0.00	1.00
DIVERSIFY	16,291	0.68	0.49	0.00	1.61	0.27	0.62	1.13
Q	17,494	4.39	3.84	0.39	26.93	2.17	3.22	5.09
MUTUALFUND	17,805	0.02	0.04	0.00	0.49	0.00	0.01	0.03
PATENT	17,805	0.45	0.50	0.00	1.00	0.00	0.00	1.00
MKT_DUMMY	17,805	0.43	0.50	0.00	1.00	0.00	0.00	1.00
BOARDSIZE	17,761	9.00	1.85	4.00	19.00	8.00	9.00	9.00
INDEPBOARD	17,761	0.37	0.05	0.09	0.80	0.33	0.33	0.38
TOP1SHAREHOLDER	17,622	0.37	0.16	0.02	0.96	0.24	0.35	0.48
TMTSIZE	17,805	4.48	2.18	1.00	39.00	3.00	4.00	6.00
TOTALTMTPAY	17,744	1661679	1999686	5600	31300000	555000	1100000	2100000
CEO_COMP	17,308	496489.00	566184.20	0.00	22900000.00	206645.00	371850.00	625000.00
CEO_EDU	8,554	3.45	0.83	1.00	5.00	3.00	4.00	4.00
CHAIR_COMP	17,599	376118.40	652311.60	0.00	22900000.00	0.00	240000.00	510000.00
CHAIR_EDU	8,522	3.45	0.90	1.00	5.00	3.00	4.00	4.00
FEMALE	17,805	0.16	0.22	0.00	1.00	0.00	0.00	0.25
CV_AGE	16,888	0.12	0.06	0.00	0.46	0.08	0.12	0.16
CEO_TENURE	17,068	47.42	37.35	0.00	252.00	19.00	39.00	67.00
CV_TENURE	16,681	0.41	0.28	0.00	1.52	0.19	0.41	0.60
CHAIR_TENURE	17,236	54.61	39.42	0.00	264.00	24.00	48.00	78.00
ROA	17,745	0.03	0.04	-0.12	0.13	0.01	0.03	0.04
ROA_SD	14,174	0.01	0.02	0.00	0.17	0.00	0.01	0.02
VERTICAL_DISP_TMT	17,305	1.46	0.83	0.00	23.81	1.17	1.34	1.65
VERTICAL_DISP_EMP	17,245	5.71	7.29	0.00	700.86	2.82	4.44	6.96
IRISK	16,680	0.03	0.02	0.01	1.73	0.02	0.02	0.03
RETURN	16,362	0.36	0.85	-0.74	3.70	-0.21	0.13	0.67

Table 2
Panel A - Summary Statistics

LN(TMTAvgPay)	17,744	12.464	0.77	8.19	15.27	11.98	12.50	12.97
CEO_Edu_D	17,805	0.48	0.50	0.00	1.00	0.00	0.00	1.00
Chair_Edu_D	17,805	0.48	0.50	0.00	1.00	0.00	0.00	1.00
Chair_comp_D	17,805	0.99	0.11	0.00	1.00	1.00	1.00	1.00

Panel A.2: SOEs

Variable	Obs	Mean	Std. Dev.	Min	Max	P25	P50	P75
HORIZON_DISP	8,509	0.16	0.17	0.00	2.07	0.05	0.12	0.24
CENTRALSOE	8,881	0.28	0.45	0.00	1.00	0.00	0.00	1.00
LOCALSOE	8,881	0.72	0.45	0.00	1.00	0.00	1.00	1.00
Ln(ASSETS)	8,881	21.98	1.33	0.00	29.07	21.16	21.93	22.92
Ln(SALES)	8,876	21.37	1.59	0.00	27.41	20.48	21.31	22.25
LEV	8,751	1.67	1.90	0.01	12.98	0.61	1.15	2.01
MONOPOLY	8,881	0.34	0.47	0.00	1.00	0.00	0.00	1.00
DIVERSIFY	7,833	0.58	0.48	0.00	1.60	0.15	0.53	0.95
Q	8,821	4.18	3.25	0.39	26.93	2.24	3.18	4.86
MUTUALFUND	8,881	0.03	0.04	0.00	0.49	0.00	0.01	0.04
PATENT	8,881	0.36	0.48	0.00	1.00	0.00	0.00	1.00
MKT_DUMMY	8,881	0.40	0.49	0.00	1.00	0.00	0.00	1.00
BOARDSIZE	8,855	9.50	1.97	4.00	19.00	9.00	9.00	11.00
INDEPBOARD	8,855	0.36	0.05	0.09	0.80	0.33	0.33	0.38
TOP1SHAREHOLDER	8,743	0.39	0.16	0.04	0.94	0.27	0.39	0.51
TMTSIZE	8,881	4.78	2.21	1.00	39.00	3.00	5.00	6.00
TOTALTMTPAY	8,841	1879747	2226144	17000	24200000	624400	1300000	2400000
CEO_COMP	8,561	481171.00	498871.10	0.00	7675200.00	200000.00	375200.00	629450.00
CEO_EDU	3,267	3.60	0.73	1.00	5.00	3.00	4.00	4.00
CHAIR_COMP	8,743	276656.40	542668.20	0.00	11500000.00	0.00	52800.00	406600.00
CHAIR_EDU	3,357	3.71	0.74	1.00	5.00	3.00	4.00	4.00
FEMALE	8,881	0.14	0.20	0.00	1.00	0.00	0.00	0.25
CV_AGE	8,535	0.11	0.05	0.00	0.46	0.08	0.11	0.15
CEO_TENURE	8,443	47.87	38.81	0.00	252.00	18.00	38.00	68.00
CV_TENURE	8,409	0.46	0.27	0.00	1.52	0.28	0.46	0.64
CHAIR_TENURE	8,550	51.77	41.77	0.00	237.00	18.00	42.00	77.00
ROA	8,833	0.02	0.03	-0.12	0.13	0.01	0.02	0.04
ROA_SD	8,189	0.01	0.02	0.00	0.17	0.00	0.01	0.02
VERTICAL_DISP_TMT	8,561	1.34	0.66	0.00	23.81	1.15	1.29	1.50
VERTICAL_DISP_EMP	8,534	5.42	9.00	0.00	700.86	2.56	4.08	6.51

Table 2
Panel A - Summary Statistics

IRISK	8,610	0.02	0.01	0.01	0.29	0.02	0.02	0.03
RETURN	8,659	0.38	0.89	-0.74	3.70	-0.23	0.12	0.75
LN(TMTAvgPay)	8,841	12.50	0.81	8.99	14.97	12.01	12.56	13.03
CEO_Edu_D	8,881	0.37	0.48	0.00	1.00	0.00	0.00	1.00
Chair_Edu_D	8,881	0.38	0.48	0.00	1.00	0.00	0.00	1.00
Chair_comp_D	8,881	0.98	0.12	0.00	1.00	1.00	1.00	1.00

Panel A.3: Non-SOEs

Variable	Obs	Mean	Std. Dev.	Min	Max	P25	P50	P75
HORIZON_DISP	8,348	0.23	0.20	0.00	2.17	0.09	0.19	0.32
Ln(ASSETS)	8,923	21.21	1.12	0.00	27.10	20.56	21.14	21.86
Ln(SALES)	8,922	20.46	1.70	0.00	25.68	19.70	20.52	21.36
LEV	8,705	1.06	1.53	0.00	12.98	0.27	0.63	1.24
MONOPOLY	8,924	0.17	0.38	0.00	1.00	0.00	0.00	0.00
DIVERSIFY	8,458	0.76	0.49	0.00	1.61	0.39	0.68	1.24
Q	8,673	4.60	4.36	0.52	26.93	2.05	3.19	5.31
MUTUALFUND	8,924	0.02	0.04	0.00	0.34	0.00	0.00	0.03
PATENT	8,924	0.53	0.50	0.00	1.00	0.00	1.00	1.00
MKT_DUMMY	8,924	0.46	0.50	0.00	1.00	0.00	0.00	1.00
BOARDSIZE	8,906	8.50	1.57	4.00	17.00	7.00	9.00	9.00
INDEPBOARD	8,906	0.37	0.05	0.11	0.67	0.33	0.33	0.43
TOP1SHAREHOLDER	8,879	0.34	0.15	0.02	0.96	0.23	0.31	0.43
TMTSIZE	8,924	4.18	2.10	1.00	19.00	3.00	4.00	5.00
TOTALTMTPAY	8,903	1445129	1718941	5600	31300000	500000	986610	1800000
CEO_COMP	8,747	511481.30	624751.30	0.00	22900000.00	216000.00	370000.00	620000.00
CEO_EDU	5,287	3.36	0.88	1.00	5.00	3.00	3.00	4.00
CHAIR_COMP	8,856	474311.20	731777.00	0.00	22900000.00	150000.00	343300.00	600000.00
CHAIR_EDU	5,165	3.28	0.95	1.00	5.00	3.00	3.00	4.00
FEMALE	8,924	0.19	0.23	0.00	1.00	0.00	0.14	0.33
CV_AGE	8,353	0.13	0.07	0.00	0.46	0.08	0.13	0.17
CEO_TENURE	8,625	46.98	35.86	0.00	240.00	20.00	40.00	66.00
CV_TENURE	8,272	0.35	0.28	0.00	1.43	0.04	0.35	0.54
CHAIR_TENURE	8,686	57.41	36.74	0.00	264.00	30.00	52.00	78.00
ROA	8,912	0.03	0.04	-0.12	0.13	0.01	0.03	0.05
ROA_SD	5,985	0.02	0.02	0	0.17	0.00	0.01	0.02
VERTICAL_DISP_TMT	8,744	1.58	0.94	0.00	22.04	1.20	1.43	1.77

Table 2
Panel A - Summary Statistics

VERTICAL_DISP_EMP	8,711	5.99	5.07	0.00	94.97	3.13	4.80	7.35
IRISK	8,070	0.03	0.03	0.01	1.73	0.02	0.02	0.03
RETURN	7,703	0.34	0.81	-0.74	3.70	-0.19	0.13	0.60
LN(TMTAvgPay)	8,903	12.43	0.73	8.19	15.27	11.97	12.46	12.90
CEO_Edu_D	8,924	0.59	0.49	0.00	1.00	0.00	0.00	1.00
Chair_Edu_D	8,924	0.58	0.49	0.00	1.00	0.00	0.00	1.00
Chair_comp_D	8,924	0.99	0.09	0.00	1.00	1.00	1.00	1.00

Note. Table 2 Panel A shows the summary statistics of the regression variables between 2005 and 2014. See the appendix for detailed variable definitions.

Table 2 Panel B

Government Ownership and Non-CEO Top Executives' Horizontal Pay Dispersion

	Whole Sample		SOE	Non-SOE	Whole Sample		SOE	Non-SOE
	1	2	3	4	5	6	7	8
VARIABLES	HORIZON_DISP	HORIZON_DISP	HORIZON_DISP	HORIZON_DISP	HORIZON_DISP	HORIZON_DISP	HORIZON_DISP	HORIZON_DISP
CONSTANT	-40.432***	-40.515***	-34.302***	-52.516***	-43.320***	-42.815***	-33.625***	-54.675***
	(7.954)	(7.931)	(9.369)	(13.423)	(8.367)	(8.341)	(9.838)	(13.515)
SOE	-6.674***				-6.266***			
	(0.686)				(0.713)			
CENTRALSOE		-8.874***	-2.619***			-8.211***	-2.244***	
		(0.879)	(0.769)			(0.891)	(0.805)	
LOCALSOE		-5.981***				-5.647***		
		(0.716)				(0.748)		
MONOPOLY					-2.020***	-1.950***	-2.761***	-0.585
					(0.634)	(0.632)	(0.696)	(1.137)
Ln(ASSETS)	0.517	0.490	0.726*	0.493	0.648*	0.623*	0.993**	0.448
	(0.327)	(0.325)	(0.397)	(0.541)	(0.332)	(0.331)	(0.401)	(0.542)
Q	0.087	0.091	0.135	0.076	0.080	0.084	0.144	0.054
	(0.085)	(0.085)	(0.128)	(0.108)	(0.083)	(0.083)	(0.127)	(0.110)
DIVERSIFY	0.844	1.114**	1.529**	0.710	0.789	1.015*	1.286*	1.009
	(0.532)	(0.530)	(0.756)	(0.736)	(0.535)	(0.535)	(0.753)	(0.750)
PATENT	0.203	0.329	0.792	-0.385	-0.280	-0.145	0.270	-0.682
	(0.533)	(0.534)	(0.713)	(0.769)	(0.532)	(0.533)	(0.713)	(0.759)
INDEPBOARD	-4.769	-4.894	-7.064	1.238	-3.139	-3.159	-4.097	3.582
	(5.013)	(4.975)	(5.909)	(9.534)	(4.946)	(4.921)	(5.942)	(9.378)
BOARDSIZE	-0.191	-0.186	-0.237	0.051	-0.142	-0.138	-0.120	0.068
	(0.183)	(0.183)	(0.173)	(0.427)	(0.180)	(0.180)	(0.172)	(0.407)

Table 2 Panel B

Government Ownership and Non-CEO Top Executives' Horizontal Pay Dispersion

	Whole Sample		SOE	Non-SOE	Whole Sample		SOE	Non-SOE
	1	2	3	4	5	6	7	8
MUTUALFUND	-4.563	-4.242	-3.659	-4.744	-4.007	-3.728	-2.812	-0.545
	(5.634)	(5.611)	(6.644)	(9.306)	(5.517)	(5.519)	(6.533)	(9.063)
TOP1SHAREHOLDER	0.473	0.460	-2.148	3.276	0.815	0.749	-1.036	2.771
	(1.917)	(1.913)	(2.252)	(3.028)	(1.927)	(1.923)	(2.311)	(3.020)
TMTSIZE	-0.266	-0.286	-0.336*	-0.169	-0.271	-0.288	-0.258	-0.209
	(0.254)	(0.253)	(0.191)	(0.477)	(0.251)	(0.251)	(0.194)	(0.459)
Ln(TOTALTMTPAY)	3.462***	3.607***	2.390***	4.606***	3.442***	3.554***	1.794***	4.814***
	(0.490)	(0.495)	(0.595)	(0.796)	(0.513)	(0.519)	(0.632)	(0.811)
FEMALE	5.623***	5.621***	7.165***	4.595**	5.694***	5.660***	6.840***	4.803***
	(1.339)	(1.342)	(1.776)	(1.899)	(1.307)	(1.313)	(1.754)	(1.844)
CV_AGE	29.772***	29.201***	30.210***	28.119***	29.595***	29.206***	29.229***	29.531***
	(3.890)	(3.881)	(5.503)	(5.200)	(3.853)	(3.843)	(5.435)	(5.125)
CV_TENURE	4.586***	4.589***	5.007***	4.488***	4.804***	4.809***	4.981***	4.993***
	(0.812)	(0.809)	(1.017)	(1.220)	(0.817)	(0.814)	(1.009)	(1.247)
Ln(CEO_COMP)	0.097	0.085	-0.052	0.353	0.093	0.081	-0.041	0.337
	(0.113)	(0.112)	(0.114)	(0.240)	(0.110)	(0.109)	(0.110)	(0.240)
Ln(CEO_TENURE)	-0.337	-0.364	-0.397	-0.217	-0.403*	-0.425*	-0.418*	-0.308
	(0.223)	(0.223)	(0.246)	(0.375)	(0.222)	(0.221)	(0.243)	(0.376)
Ln(CHAIR_TENURE)	0.668***	0.605***	0.726***	0.281	0.601***	0.548**	0.633**	0.204
	(0.231)	(0.229)	(0.254)	(0.442)	(0.228)	(0.226)	(0.251)	(0.431)
CHAIR_COMP_D	1.639	1.060	3.603	-9.584**	0.429	-0.053	2.975	-10.615**
	(2.981)	(3.013)	(3.075)	(4.511)	(3.020)	(3.021)	(2.963)	(4.923)
CHAIR_COMP_D*Ln(CHAIR_COMP)	0.012	-0.025	-0.033	-0.025	0.028	-0.003	-0.016	0.009
	(0.046)	(0.047)	(0.055)	(0.086)	(0.046)	(0.047)	(0.056)	(0.085)

Table 2 Panel B

Government Ownership and Non-CEO Top Executives' Horizontal Pay Dispersion

	Whole Sample		SOE	Non-SOE	Whole Sample		SOE	Non-SOE
	1	2	3	4	5	6	7	8
CEO_EDU_D	-1.643	-1.727	6.609**	-5.246*	-1.800	-1.838	5.733*	-5.187*
	(2.143)	(2.142)	(3.151)	(2.751)	(2.118)	(2.118)	(3.084)	(2.708)
CEO_EDU_D*CEO_EDU	0.672	0.688	-1.211*	1.584**	0.680	0.687	-1.151*	1.598**
	(0.566)	(0.565)	(0.690)	(0.764)	(0.565)	(0.565)	(0.683)	(0.762)
CHAIR_EDU_D	5.434**	5.330**	2.613	6.515**	4.920**	4.849**	3.019	5.588*
	(2.382)	(2.381)	(3.124)	(2.981)	(2.300)	(2.301)	(3.065)	(2.857)
CHAIR_EDU_D*CHAIR_EDU	-1.584**	-1.563**	-1.198*	-1.823**	-1.434**	-1.421**	-1.225*	-1.617**
	(0.634)	(0.634)	(0.652)	(0.828)	(0.615)	(0.615)	(0.643)	(0.799)
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	14,230	14,230	6,875	7,355	14,230	14,230	6,875	7,355
R-squared	0.075	0.077	0.051	0.063	0.088	0.089	0.076	0.079

Note: This table shows the regression results of equation 1. CEO_COMP, CHAIR_COMP, CEO_TENURE, and CHAIR_TENURE could have zero values and hence we add one to each variable before taking the logarithm. Standard errors are clustered at the firm level. Superscripts ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 3

Institutional Environment Quality and Non-CEO Top Executives' Horizontal Pay Dispersion

	Whole Sample	
	(1)	(2)
VARIABLES	HORIZON_DISP	HORIZON_DISP
CONSTANT	-41.327***	-41.349***
	(7.988)	(7.971)
SOE	-5.046***	
	(1.014)	
SOE*MKT_DUMMY	-2.062*	
	(1.106)	
CENTRALSOE		-7.536***
		(1.253)
LOCALSOE		-4.369***
		(1.063)
CENTRALSOE*MKT_DUMMY		-1.651
		(1.406)
LOCALSOE*MKT_DUMMY		-2.045*
		(1.165)
MKT_DUMMY	2.289**	2.277**
	(0.994)	(0.992)
Ln(ASSETS)	0.542*	0.514
	(0.327)	(0.325)
Q	0.096	0.100
	(0.085)	(0.085)
DIVERSIFY	0.855	1.129**
	(0.532)	(0.530)
PATENT	0.087	0.215
	(0.532)	(0.533)
INDEPBOARD	-4.707	-4.798
	(4.997)	(4.962)
BOARDSIZE	-0.180	-0.173
	(0.183)	(0.183)
MUTUALFUND	-3.802	-3.492
	(5.616)	(5.591)
TOP1SHAREHOLDER	0.351	0.332
	(1.917)	(1.913)
TMTSIZE	-0.243	-0.262
	(0.256)	(0.256)
Ln(TOTALTMTPAY)	3.376***	3.516***

Table 3

Institutional Environment Quality and Non-CEO Top Executives' Horizontal Pay Dispersion

	Whole Sample	
	(1)	**(2)**
	(0.497)	(0.502)
FEMALE	5.580***	5.585***
	(1.335)	(1.339)
CV_AGE	29.507***	28.916***
	(3.889)	(3.879)
CV_TENURE	4.715***	4.717***
	(0.815)	(0.812)
Ln(CEO_COMP)	0.096	0.084
	(0.113)	(0.112)
Ln(CEO_TENURE)	-0.358	-0.385*
	(0.223)	(0.222)
Ln(CHAIR_TENURE)	0.654***	0.591***
	(0.231)	(0.229)
CHAIR_COMP_D	1.663	1.125
	(2.979)	(3.027)
CHAIR_COMP_D*Ln(CHAIR_COMP)	0.010	-0.026
	(0.046)	(0.047)
CEO_EDU_D	-1.578	-1.656
	(2.133)	(2.133)
CEO_EDU_D*CEO_EDU	0.659	0.672
	(0.563)	(0.563)
CHAIR_EDU_D	5.292**	5.190**
	(2.371)	(2.370)
CHAIR_EDU_D*CHAIR_EDU	-1.555**	-1.533**
	(0.632)	(0.631)
Year Fixed Effects	YES	YES
Observations	14,230	14,230
R-squared	0.076	0.078

Note. This table shows the regression results on the determinants of non-CEO TMT's horizontal pay dispersion for firms domiciled in strong versus weak institutional environments. CEO_COMP, CHAIR_COMP, CEO_TENURE, and CHAIR_TENURE could have zero values and hence we add one to each variable before taking the logarithm. Standard errors are clustered at the firm level. Superscripts ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4
Government Ownership and Non-CEO Top Executives' Average Compensation Level

	1	2
VARIABLES	Ln(TMTAVGPAY)	Ln(TMTAVGPAY)
CONSTANT	8.048***	8.040***
	(0.250)	(0.247)
SOE	0.068**	
	(0.027)	
CENTRALSOE		0.186***
		(0.037)
LOCALSOE		0.024
		(0.028)
Ln(SALES)	0.155***	0.152***
	(0.011)	(0.011)
ROA	4.371***	4.425***
	(0.320)	(0.319)
Q	-0.000	-0.001
	(0.003)	(0.003)
LEV	-0.022***	-0.021***
	(0.006)	(0.006)
Ln(IRISK)	-0.044	-0.059*
	(0.034)	(0.034)
RETURN	0.009	0.010
	(0.010)	(0.010)
INDEPBOARD	0.303	0.313*
	(0.187)	(0.185)
BOARDSIZE	0.017**	0.017**
	(0.007)	(0.007)
TMTSIZE	0.020***	0.020***
	(0.005)	(0.005)
Ln(CEO_TENURE)	0.010	0.013*
	(0.008)	(0.008)
TOP1SHAREHOLDER	-0.187**	-0.196**
	(0.081)	(0.081)
CHAIR_COMP_D	-0.058	-0.042
	(0.083)	(0.081)
Year Fixed Effects	YES	YES
Observations	14,943	14,943
R-squared	0.376	0.381

Note. This table presents the regression results of non-CEO TMT's average annual compensation on firm characteristics. We control for year fixed effects in all columns. CEO_TENURE could have zero values and hence we add one to the variable before taking the logarithm. Standard errors are clustered at the firm level. Superscripts ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 5
Non-CEO Top Executives' Horizontal Pay Dispersion and Firm Performance

	1	2	3
VARIABLES	ROA	ROA	ROA
CONSTANT	-0.084***	-0.063***	-0.064***
	(0.016)	(0.012)	(0.012)
HORIZON_DISP	0.005**		
	(0.002)		
HORIZON_DISP_SOE		0.105***	
		(0.016)	
HORIZON_DISP_CENTRALSOE			0.093***
			(0.017)
HORIZON_DISP_LOCALSOE			0.127***
			(0.021)
HORIZON_DISP_ECON		0.136***	0.134***
		(0.016)	(0.016)
VERTICAL_DISP_TMT	0.003***	0.002***	0.002***
	(0.001)	(0.001)	(0.001)
VERTICAL_DISP_EMP	0.000*	0.000*	0.000*
	(0.000)	(0.000)	(0.000)
Ln(ASSETS)	0.004***	0.002***	0.003***
	(0.001)	(0.001)	(0.001)
Q	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)
TOP1SHAREHOLDER	0.013***	0.016***	0.016***
	(0.004)	(0.004)	(0.004)
LEV	-0.006***	-0.005***	-0.005***
	(0.000)	(0.000)	(0.000)
ROA_SD	-0.009	0.001	-0.000
	(0.030)	(0.028)	(0.028)
Observations	11,670	10,977	10,977
R-squared	0.234	0.256	0.256
Year*Province Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes

Note. This table shows the regression results of how non-CEO top executives' horizontal pay dispersion affects firm performance. We control for year*province fixed effects and industry fixed effects. Standard errors are clustered at the firm level. Superscripts ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.