

ARTICLE

# Effect of Employees' Pay-performance Sensitivity on Future Firm Performance: Evidence from State-owned Listed Enterprises in China over 2007-2015

Changzheng Zhang\* Gaimei Yang

School of Economics & Management, Xi'an University of Technology, Xi'an 710054, China

ARTICLE INFO

*Article history*

Received: 18 June 2019

Accepted: 5 July 2019

Published Online: 19 July 2019

*Keywords:*

Employees' pay-performance sensitivity (PPS)

Future firm performance

State-owned enterprises

China

Incentive effect

Risk-aversion effect

ABSTRACT

Taking a balanced panel data consisting of 4365 firm-year observations drawn from the listed state-owned enterprises in Shanghai and Shenzhen Stock Exchange over 2007-2015 as the research sample, the paper examines the effect of the employees' pay-performance sensitivity (PPS) on the future firm performance from the two competing perspectives of "incentive effect" and "risk-aversion effect", adopting the method of multiple regression analysis based on OLS and applying the SPSS23 as the data processing tool. Theoretical analysis and empirical results demonstrate that there is a positive link between the employees' PPS and the future firm performance. To improve the employees' PPS can stimulate the engagement of the employees, improve their working quality, enrich their workplace innovative behavior, and further lead to higher future firm performance. Meanwhile, the positive effect of the employees' PPS on the future firm performance is, on average, lower than that of the top executives' PPS on the future firm performance. Implications of the findings are provided in the end.

## 1. Introduction

The growing interest conflicts between the top managers, as the agents, and the shareholders, as the principals, deriving from the never-ending separation of operating right and ownership are capturing even more attention from both the scholars and practitioners, especially in China. Due to the incompleteness of hiring contract, the information asymmetry and the goal inconsistencies between the two parties, the agents' deviation and even departure from the principals' interests were most likely to emerge. In order to avoid this problem, the principal-agent theory proposes an effective application of

compensation contract for the top managers. Such a contract should align the interests of the top managers with those of the shareholders by linking their compensation with firm performance. As a consequence, the pay-performance sensitivity (PPS) of top managers is always considered as the core issue of executive compensation arrangements in existing literature<sup>[1, 2, 3]</sup>.

PPS of top managers is usually defined as the positive link between executive compensation and firm performance, which is calculated by the top managers' compensation change units derived from each unit change of firm performance<sup>[4]</sup>. In existing literature, PPS of top managers is a measure of interest alignment between owners and

\*Corresponding Author:

Changzheng Zhang,

School of Economics & Management, Xi'an University of Technology, Xi'an 710054, China;

Email: zcz7901@163.com

managers<sup>[5, 6]</sup>. Therefore, the effect of top managers' PPS on future firm performance has been explored to a large extent since 1990s, both in the western countries and China<sup>[7, 8]</sup>. On the whole, the existing literature on this topic has concluded two competing views, i.e., "incentive effect" and "risk-aversion effect"<sup>[9, 10, 11]</sup>.

The former view holds that the interest conflicts between the principals and the agents can be mitigated or weakened by paying the executives strictly according to firm performance, and a higher PPS can produce higher incentive effect of the top managers. As a quintessential example, holding the view of "incentive effect", Tianna Yang and Wenxuan Hou<sup>[8]</sup> used a sample of US closed-end funds from 2006 to 2009, and investigated the firm consequences of PPS of fund managers, which was specified in their contracts as the marginal rate of the funds' net asset value. It was found that fund PPS positively determined the managers' risk-taking behaviors, which would lead to higher future performance at a higher possibility, especially in the emerging markets. In contrast, the later opposite view argues that when the top executives' pay is too closely linked with firm performance, due to the nature of risk aversion, they will reduce the operating risk of the whole firm in order to avoid the extra-risk they themselves would bear. In this case, firm performance would be harmed by the executives' too much lower risk-taking behavior. As another quintessential example, holding the view of "risk-aversion effect", Ivan E. Brick et al.<sup>[4]</sup> examined the relation between PPS and future stock returns for a large sample of firms between 1992 and 2004, and concluded that higher PPS was associated with lower future stock returns.

The results of literature review demonstrate that, in most of the existing studies, except for exceedingly limited research work, the top managers' PPS produces the higher incentive effect than the risk-aversion effect. In other words, to set a higher PPS is beneficial to motivate the top managers to work hard with the purpose of maximizing the interests of the shareholders. A large quantity of existing literature has explored the effect of the top managers' PPS on future firm performance to a large extent, which is of great significance for setting the optimal compensation contract of the top managers. When we draw our attentions from the top managers to the front-line employees, it can be found that, as the actual creators of the firm performance, the employees have greater power than the top executives in determining firm's output, especially in the capital-or-labor intensive industries. However, till today, the effect of the employees' PPS on future firm performance has not been explored yet.

This study empirically examines the incentive effect

and risk-aversion effect of the employees' PPS by testing the relation between the employees' PPS and the future firm performance, measured by earnings per share and return on assets. We attempt to answer two research questions: first, is higher PPS of the employees associated with greater financial performance, and second, whether or not the positive effect of the employees' PPS on the future firm performance is lower than that of the top executives' PPS on the future firm performance? The study focuses on Chinese state-owned enterprises because the existing literature has not fully considered the PPS's effect in the context of the state-owned enterprises in China, while such enterprises are different from the others in nature and are basically essential to the economic growth of China. Based on the data consisting of 4365 firm-year observations drawn from the listed state-owned enterprises in Shanghai and Shenzhen Stock Exchange over 2007-2015, we find that there is a positive link between the employees' PPS and the future firm performance, which indicates that to improve the employees' PPS can stimulate the engagement of the employees, improve their working quality, enrich their workplace innovative behavior, and further lead to higher future firm performance. Furthermore, the positive effect of the employees' PPS on the future firm performance is, on average, lower than that of the top executives' PPS on the future firm performance.

The contribution of this paper to the compensation literature is threefold. First, we are among the first to examine empirically the performance consequences of the employees' PPS. Despite the popularity of PPS of the top managers in existing literature, the extent to which the incentive role of the employees' PPS is effective remains unexplored. Second, we are the first to compare the incentive effect on firm performance between the employees' PPS and the top managers' PPS. Third, we add new knowledge in understanding the trade-off mechanisms between the incentive effect and risk-aversion effect of the employees' PPS in the context of listed state-owned enterprises in China, the second largest economy in the world.

## 2. Literature Review and Hypothesis

Incentive effect and risk-aversion effect of the top managers' PPS are two closely linked core concepts in the optimal contract theory, which pays attention to the design the top managers' compensation contracts effectively and the discussion on the contracts' effectiveness. The two effects run at the same time in practice, and when incentive effect exceed the risk-aversion effect, higher PPS would leader to higher firm performance; while when the risk-aversion effect dominates the incentive effect, higher PPS is correlated with poorer future firm performance.

In the opinion of the incentive effect, a higher PPS can assure the interest alignment between the shareholders, as the principal, and the top managers, as the agents, which allows the top managers enjoy the residuals claim rights just as the shareholders do<sup>[12]</sup>. Facing a higher PPS, the top managers will find it is their best choice to work hard for the maximization of firm value. As such, the top managers would like to adopt more projects with higher risk exerting their best efforts, instead of avoiding beneficial risks. Such an effect of PPS is called as the “incentive effect”<sup>[13, 14]</sup>. While according to the view of the risk-aversion perspective, too high PPS would make the top managers face too high risks, both in their income and job safety. In this case, the top managers bear too much risk transferred from the shareholders, and they would like to avoid risky projects and withdraw their innovative efforts, with the purpose of making themselves endure fewer risk exposures. As such, with the increase of the PPS, risk-aversion effect would exceed the incentive effect<sup>[4]</sup>.

From the perspective of incentive effect, the existing literature has argued that the improvement of the top managers’ PPS would enhance the interests of consistency of the shareholders and top managers. Such a fact would induce the later to take on more risky projects and invest more energy in running their firms, and thus the firm value can be improved. Prior studies have provided empirical support to the incentive effect perspective.

Firstly, Abowd<sup>[13]</sup> explored the link between the top managers’ PPS and future firm performance by selecting the data of 250 American large companies over 1981-1986 as the sample adopted the two-step method. The survey results manifest that top managers’ compensation is positively related to firm performance and a higher PPS of the top managers would certainly lead to a much higher future firm performance.

Secondly, Mehran<sup>[14]</sup> concluded that the top managers’ PPS is positively linked with firm performance based on the data of 153 randomly selected manufacturing enterprises over 1979-1980. Besides, he further demonstrated that it is the structure of the compensation rather than the level that can motivate the top managers to involve themselves in the firm running effort. The findings of this research provided strong evidence for the advocates that support the applications of performance-based incentive compensation.

Thirdly, McConaughy and Mishra<sup>[12]</sup> confirmed that, for American companies, higher PPS of the top managers would improve future firm performance to a certain degree by making a regression analysis of the top managers’ PPS on the risk-adjusted ROE. However, such an improvement of the top managers’ PPS is not significant for

the firms originally performing well, while it is greater in the firms with underdeveloped performance in their recent history.

Fourthly, Mishra, McConaughy and Gobeli<sup>[15]</sup> made a though study on this topic by employing the listed American enterprises over 1974-1988, which came to a positive relationship between the top managers’ PPS and future firm performance. What is more, with the increase of the top managers’ PPS, such a positive link would get weaker and weaker. At the same time, they also found that there is a much stronger positive relationship between the top managers’ PPS and future firm performance in the low-risk firms than that in the higher-risk firms.

Finally, in China, employing the data of the top managers’ compensation of the Chinese listed companies over 2002-2004 as the sample, Zhou Jianan and Huang Dengshi<sup>[16]</sup> concluded that the top executives’ PPS has a positive relationship with the firms’ future performance and risk-bearing behavior in the firms with higher growth opportunities, while there is a negative relationship between the two in the firms with poorer growth opportunities. Such a fact means that growth opportunities can moderate the effect of the top managers’ PPS on future firm performance.

From the perspective of risk-aversion effect, a too high PPS would lead to the top managers to lower the overall operating risk of their firms with the purpose of minimizing their own risk in position safety and compensation level, while such a lower risk-bearing intention would reduce the overall value of the responding firms. On the whole, prior studies have provided rather limited empirical support to the risk-aversion perspective.

To be specific, Oded Palmon et al.<sup>[4]</sup> explored the relationship between the top executives’ PPS and future firm performance by adopting the data of American large companies over 1992-2004. And contrary to the previous studies, they concluded a negative link between the two. According to their opinion, the reason for such a negative link may rely on the risk-aversion effect of the top managers’ PPS. In other words, with the increase of the PPS, the risk-aversion intention of the top managers would be inspired, which would induce the top managers to reduce the whole risk-exposing level of their firms in order to assure their baseline compensation level, and thus the accompanied results would be the lower firm performance. In a similar vein, after considering the effect of the endogenous variables on the top executives’ compensation, Palia<sup>[17]</sup> found insignificant positive relationship between PPS and future firm performance. Instead, he argued an insignificant negative link between the two concepts due to the simultaneous working of a positive incentive effect

and a relatively stronger negative risk-aversion effect.

An ocean of existing literature has confirmed the positive effect of a higher PPS of the top managers on the future firm performance derived from the incentive effect, while only exceedingly limited scholars are still supporting the negative relationship between the two deriving from the risk-aversion effect. However, when it comes to the effect of the employees' PPS on future firm performance, how the two competing effects would play their roles? Since it is still a black-box for such a mechanism, the next part would try to reveal the link between the employees' PPS and future firm performance under the background of Chinese state-owned companies.

Firstly, before 2000s, the Chinese state-owned enterprises adopted a compensation system called as "the mess", which led to the absolute equalitarianism phenomenon whereby everyone gets the usual and fixed pay irrespective of his or her work performance. Though after 2000s, most of the state-owned enterprises in China took the reform in compensation system and performance management system which enhanced the gap between different employees with various performance, and thereafter provided a stronger link between firm performance and employees' pay, such changes didn't reach the expectations of the employees of the state-owned enterprises, especially the core staff who can account for more than 80% of the variation in firm performance determined by rank and file staff. Under this background, an increase in the employees' PPS would be appreciated by the core staff, since they have much higher confidence and capability in determining their own performance and the firm performance effectively. The remaining 80% rank and file staff may have vague or uncertain attitude towards a higher PPS, however, the positive attitude of the core staff towards it would have the essential improvement effects on firm performance.

Secondly, the so-called "Consumption Upgrading" in China has never stopped in the past two decades. Such a fact leads to a rapid increase in household consumption expenditure of employees, especially the employees who have one or two sons. For most of the employees, as the average folks, their income mainly depends on the compensation or wages paid by their firms. A higher PPS of the employees provides them with a pleasurable opportunity receiving higher compensation which can satisfy their ever-growing needs for consumption expenditure. Therefore, most of the employees would like to accept a higher PPS rather than a lower PPS, especially the core staff, who have stronger confidence in achieving higher individual performance and thus leading to higher firm performance at a high possibility.

Thirdly, a high PPS not only means the pay-firm performance sensitivity would be higher, but means the pay-individual performance sensitivity would be higher. The later would lead to a higher pay gap between highly-performing employees and poorly-performing employees. A fact is that the post-90s workers are increasingly taking the dominant part of the front-line employees, and thus firm performance is determined by the younger post-90s workers to a larger degree. Such a group manifests higher favor over competition among employees, emphasize the balance between giving and receiving to a higher degree, and enjoy a higher sense of self-achievement and a sense of distinction derived from their higher compensation compared with their peers. Here, a higher PPS of the employees would improve the possibility of satisfying such needs or favors of the post-90s workers', since a higher individual performance would enlarge the pay gap between them and others, and would further provide them with getting ever increasing compensation levels under such a higher PPS, only if they could improve their performance and their firm's performance to a large extent. By the way, the post-90s employees usually own a much stronger sense of self-efficacy than their seniors. Therefore, facing a higher PPS, they don't fare challenges and would like to embrace competitions, instead, a higher effort degree and engagement in work would be motivated by such a high PPS. What is more, incentive strength of such a higher PPS can even stimulate the innovative capability of the post-90s employees. And thus, firm performance would get better.

The last but not the least, there is a strong wage rigidity for employees in Chinese state-owned enterprises, since such enterprises not only bear the economic responsibility, but bear more social and political responsibility. In this case, there would be an implicit psychological contract between the top managers and the employees, which demonstrates that the employees' pay can be improved according to higher firm performance, while it cannot be reduced proportionately according to poorer firm performance. Otherwise, a huge number of employees of the state-owned enterprises who have been reduced their wages significantly would express their anger toward the top managers and even the local government. And the top managers would face the risk of losing their jobs or even other heavier punishments due to the social harmony issues. Hence, when a higher PPS is set for the employees, both the top managers and the employees know that when the state-owned enterprises' performance is higher, the employees' compensation would be increased essentially; while when the performance gets poorer, the employees' compensation would not be reduced to a large degree.

That is to say, a higher PPS in fact would reflect as an asymmetric change of the employees' compensation, which is beneficial to the employees. On the whole, under the background of wage rigidity of the state-owned enterprises, higher PPS of the employees would improve their work engagement and thus lead to higher firm performance.

Based on the discussion above, the following hypothesis can be put forward.

**H1: The employees' PPS of the state-owned enterprises is positively associated with the future firm performance.**

Since it is widely shared that the employees, on average, have higher risk-aversion intentions than the top managers do, then the risk-aversion effect of the employees' PPS is much higher than that of the top managers' PPS. At the same time, the incentive effect of the employees' PPS is relatively weaker than those of the top managers' PPS, since the links between individual employees' performance and firm performance is lower than the links between the top managers' performance and firm performance. Accordingly, it can be concluded as the follows.

**H2: The positive effect of the employees' PPS on the future firm performance is lower than that of the top executives' PPS on the future firm performance.**

### 3. Methodology

#### 3.1 Sample and Data

Taking all the A-share listed state-owned enterprises in Shenzhen and Shanghai Stock Exchange over 2007-2015 as the sample framework, the following steps are executed to select the final research sample: (1) Listed companies ever marked with ST, PT, SST, \*ST should be removed from the sample; (2) Listed companies belonging to Finance and Insurance Industry should be removed from the sample; (3) Listed companies without disclosing all the data needed in this research should be eliminated from the sample; (4) Listed companies with extreme values (i.e., outliers) should be removed from the sample. For example, if the employees' compensation is higher than the average compensation of the top managers, then such firms should be removed; (5) Listed companies should have been listed before 2006.

All the data are downloaded from the financial database of CSMAR. Based on the mentioned selection requirements, a balanced panel sample consisting of 4365 firm-year observations over 9 years is chosen. Spss23 is the main data processing software.

#### 3.2 Measures

Independent variable: Employees' PPS (EPPS). Referring to the idea of Babenko<sup>[18]</sup> and considering the data availability in China, the following steps finally get the result of EPPS. (1) Step 1: The number of front-line employees (ENUM) is determined by the difference between the whole number of employees disclosed in the annual report (WNUM) and the number of top managers, i.e.,  $ENUM=WNUM-TNUM$ . (2) Step 2: The total remuneration of employees in the current period (TREC) is simultaneously determined by the cash paid to and for employees (CPTE), salary payable at the end of the term (SPET) and salary payable at the beginning of the term (SPBT), i.e.,  $TREC=CPTE+SPET-SPBT$ . (3) Step 3: The average compensation of the front-line employees (ACFE) is determined by both ENUM and TREC, i.e.,  $ACFE=TREC/ENUM$ . (4) Step 4: EPPS is co-determined by the ACFE in the year of  $t$  ( $ACFE_t$ ), ACFE in the year of  $t-1$  ( $ACFE_{t-1}$ ), the earnings per share in the year of  $t$  ( $EPS_t$ ) and the earnings per share in the year of  $t-1$  ( $EPS_{t-1}$ ), i.e.,  $EPPS=(ACFE_t-ACFE_{t-1})/(EPS_t-EPS_{t-1})$ .

However, when we calculate the distribution characteristics of EPPS, the kurtosis, skewness and variance all manifest that EPPS follows an excessive skewed distribution which is far away from the normal distribution. Besides, the P-P Diagram Test confirms such a result, too. Therefore, according to Zhang Changzheng & Mu Xin<sup>[19]</sup>, further transformation of EPPS is needed to ensure the validity of the regression results.

Since the dimensions of  $(ACFE_t-ACFE_{t-1})$  and  $(EPS_t-EPS_{t-1})$  are extremely different, we try to translate them into a unified dimensionless. To be specific, when  $(ACFE_t-ACFE_{t-1})$  is positive, after sorting the sub-sample by it,  $(ACFE_t-ACFE_{t-1})$  of the firms located over top 20%, top 40% to 20%, top 60% to 80% and below top 80% is respectively marked as 5, 4, 3, 2 and 1; While when  $(ACFE_t-ACFE_{t-1})$  is negative, after sorting the sub-sample by it,  $(ACFE_t-ACFE_{t-1})^T$  of the firms located above top 20%, top 40% to 20%, top 60% to 80% and below top 80% is respectively marked as -1, -2, -3, -4 and -5. In the same logic,  $(EPS_t-EPS_{t-1})^T$  can be categorized into -1, -2, -3, -4, -5, 1, 2, 3, 4 and 5. The final transformed EPPS ( $EPPS^T$ ) can be known based on the ratio of  $(ACFE_t-ACFE_{t-1})^T$  to  $(EPS_t-EPS_{t-1})^T$ .

Dependent variable: Future firm performance. Following Nyberg et al.<sup>[20]</sup>, return on equity in the year of  $t+1$  ( $ROE_{t+1}$ ) is adopted as the measure of future firm performance.

Control variables: Referring to the existing literature on the antecedents of firm future performance<sup>[4, 15, 21, 22, 23, 24]</sup>,

considering the data availability, the following factors are selected as the control variables. (1) SIZE is the natural logarithm of total assets; (2) DEBT is the asset-liability ratio; (3) BOARD is the number of the directors; (4) RID is the ratio of the independent directors to BOARD; (5) DUAL is 1 when CEO and Chairman are taken by the same character, otherwise DUAL is 0; (6) AGE is the real CEO age measured by years; (7) TENU is the tenure of the CEO measured by months; (8) RFE is the ratio of female executives to the number of the top managers; (9) RFS is the ratio of the first shareholder's share to total shares; (10) BDS is the ratio of the sum of the second to the ninth largest shareholders' share to the first shareholder's share; (11) RMS is the ratio of the top managers' shareholdings to the total number; (12) EAST is set as 1 when the firm is registered in the eastern regions in China, otherwise, EAST is set as 0.

### 3.3 Analytical Technique

In this study, we construct a regression model based on OLS shown in Model 1, which contains an explanatory variable (EPPS<sup>T</sup>), a dependent variable (ROE<sub>t+1</sub>) and thirteen control variables.

$$ROE_{t+1} = \alpha_0 + \beta_1 EPPS_{t+1}^T + \beta_2 SIZE_{t+1} + \beta_3 DEBT_{t+1} + \beta_4 BOARD_{t+1} + \beta_5 RID_{t+1} + \beta_6 DUAL_{t+1} + \beta_7 RFE_{t+1} + \beta_8 AGE_{t+1} + \beta_9 TENU_{t+1} + \beta_{10} RFS_{t+1} + \beta_{11} BDS_{t+1} + \beta_{12} RMS_{t+1} + \beta_{13} EAST_{t+1} + \varepsilon_{t+1}$$

(1)

In Model 1, if  $\beta_1$  is significantly positive, then we can draw a conclusion that the employees' PPS (EPPST) does positively determine future firm performance (ROE<sub>t+1</sub>). In other words, H1 can be tested to a large extent.

Referring to the definition of Lee<sup>[25]</sup> and Nyberg et al.<sup>[20]</sup>, the top managers' PPS is calculated as the ratio of  $\Delta$  (logarithm of the top managers' total compensation) to  $\Delta$ EPS. If the result is positive, the top managers PPS (TMPPS) is set as 1, otherwise, TMPPS is set as 0. To replace EPPST with TMPPS, and replace ROE<sub>t+1</sub> with EPS<sub>t+1</sub> in Model 1, Model 2 is constructed.

$$EPS_{t+1} = \alpha_0 + \beta_1 TMPPS_{t+1} + \beta_2 SIZE_{t+1} + \beta_3 DEBT_{t+1} + \beta_4 BOARD_{t+1} + \beta_5 RID_{t+1} + \beta_6 DUAL_{t+1} + \beta_7 RFE_{t+1} + \beta_8 AGE_{t+1} + \beta_9 TENU_{t+1} + \beta_{10} RFS_{t+1} + \beta_{11} BDS_{t+1} + \beta_{12} RMS_{t+1} + \beta_{13} EAST_{t+1} + \varepsilon_{t+1}$$

(2)

In Model 2, if  $\beta_1$  is significantly positive, then we can draw a conclusion that the top managers' PPS (TMPPS) does positively determine future firm performance (EPS<sub>t+1</sub>). If  $\beta_1$  in Model 2 is obviously higher than that in Model 1, then H2 holds.

## 4. Results

### 4.1 Descriptive Statistics and Correlation Analysis

Table 1 manifests that the mean value of employees' PPS (EPPS<sup>T</sup>) is 0.138, which demonstrates that the

employees' compensation is actually positively related to firm performance of the former period, however, the sensitivity is rather weak in its strength. For example, if we adopt the same measurement method to calculate the top managers' PPS, then the mean value would be 0.263, which is nearly twice as much that of employees' PPS. It can be seen that on the whole the PPS of the top managers is relatively higher than that of the employees in the state-owned enterprises of China, and the top managers bear higher risk of their rewards. The mean value of ROE<sub>t+1</sub> is 7.1%, which is higher than that of the non-state-owned enterprises. Hence, the state-owned enterprises economically perform better than the other enterprises in China. Besides, the mean value of the ratio of female executives is 12.7%, the mean value of CEO age is about 50 years, the mean value of CEO tenure is about 33.31 months, the mean value of the ratio of independent directors is 36.6%, and about 9.1% firms choose the same character as the CEO and Chairman.

According to Table 1, there is a significant positive relationship between ROE<sub>t+1</sub> and EPPS<sup>T</sup> (Coefficient=0.035, P<0.05), which preliminarily confirms this hypothesis. And most of the control variables are significantly correlated with ROE<sub>t+1</sub>, which means that the selection of the control variables is of excellent rationality. What is more, all the coefficients among the research variables are below than 0.5, which means that the multiple collinearity problems in this study are acceptable. Besides, the link between firm size and ROE<sub>t+1</sub> is the strongest, while there is no significant relationship between CEO tenure and ROE<sub>t+1</sub>, which needs further exportation in depth.

### 4.2 Test on H1

In order to test H1, Model 1 is executed by applying the sample mentioned above, and the regression results are shown in Table 2.

Table 2 manifests F value of Model 1 is 21.531 and its significance level is 0.000, which mean that the regression validity, i.e., the goodness of fit of Model 1, is acceptable, and this model can explain the variance of future firm performance (ROE<sub>t+1</sub>) to a large extent. Results manifest that EPPST is positively related to ROE<sub>t+1</sub> (Beta = 0.030, T = 2.059), which means that the employees' PPS would improve the future firm performance. In other words, the incentive effect of PPS dominates over its risk-aversion effect of employees in the state-owned enterprises in China. H1 holds.

Besides, among the control variables, SIZE, RFE, RFS, BDS and RMS are all positively related to ROE<sub>t+1</sub>, which means that firm size, the ratio of female executives, equity concentration degree, equity balance degree and share-

**Table 1.** Descriptive statistics and correlations

	Variables	Means	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	ROE <sub>t+1</sub>	.07	.08														
2	EPPS <sup>T</sup>	.14	1.73	.04*													
3	SIZE	22.27	1.18	.13**	.01												
4	DEBT	.53	.19	-.02	-.02	.38**											
5	BAORD	9.36	1.84	.02	.00	.27**	.11**										
6	RID	.37	.05	-.04*	.01	.08**	.03*	-.25**									
7	DUAL	.09	0.29	.00	-.01	-.07**	-.00	-.05**	.05**								
8	RFE	.13	.15	.03*	.01	-.13**	-.07**	-.10**	.02	.01							
9	AGE	49.00	5.74	.05**	.01	.13**	-.03	.04*	-.03	.09**	-.03*						
10	TENU	33.31	32.58	-.02	.01	.12**	-.02	.00	.02	.10**	.03	.28**					
11	RFS	.38	.14	.10**	.00	.24**	-.01	-.01	.04*	-.08**	-.10**	.03	-.05**				
12	BDS	.52	0.48	.06**	.01	-.04**	.00	.11**	-.06**	.01	.07**	.00	.04**	-.67**			
13	RMS	.00	.01	.09**	.00	-.05**	-.11**	-.07**	-.05**	.15**	.06**	.01	.04**	-.08**	.13**		
14	EAST	.61	.49	.06**	.01	.07**	-.09**	-.10**	-.09**	.03*	.08**	.08**	.02	.11**	-.09**	.05**	

Note: Valid N: 4665.

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

The full names of the abbreviations can be seen in 3.2.

**Table 2.** Regression results of EPPS<sup>T</sup> on ROE<sub>t+1</sub>

Model B		Unstandardized coefficients		Standardized coefficients	t	Sig.	
		Std. Error	Beta				
Model 1	(Constant)		-.156	.026		-5.923	.000
	EPPS <sup>T</sup>		.001	.001	.030	2.059	.040
	SIZE		.008	.001	.120	6.632	.000
	DEBT		-.020	.007	-.045	-2.769	.006
	BAORD		-.001	.001	-.024	-1.475	.140
	RID		-.069	.025	-.043	-2.750	.006
	DUAL		.005	.004	.019	1.246	.213
	RFE		.024	.008	.045	2.976	.003
	AGE		.000	.000	.031	1.990	.047
	TENU		.000	.000	-.046	-2.955	.003
	RFS		.121	.012	.205	9.733	.000
	BDS		.033	.004	.194	9.476	.000
	RMS		.460	.100	.070	4.587	.000
	EAST		.004	.003	.022	1.432	.152
	<b>R</b>		0.246	<b>R<sup>2</sup></b>	0.060	Adjusted R <sup>2</sup>	0.058
<b>F</b>		21.531	<b>Model Sig.</b>	0.000	N	4365	

holdings of top executives can improve future firm performance. On the whole, the above results are consistent with the existing literature; DEBT and RID are both negatively related to ROE<sub>t+1</sub>, which means that the asset-liability ratio and the ratio of independent directors both have negative effects on future firm performance. The results manifest that the utilization efficiency of debt funds of the state-owned enterprises is rather financially-challenged, and the independent directors have not performed their responsibilities effectively; BOARD, DUAL and EAST all have no significant relationship with ROE<sub>t+1</sub>, which means that the board size, CEO duality and being located in the eastern China have nothing to do with future firm performance.

### 4.3 Robustness test on H1

#### a. Robustness test on H1 based the measurement of the employees' PPS

Referring to the view of Lee<sup>[25]</sup> and Nyberg et al.<sup>[20]</sup>, the employees' PPS is calculated as the ratio of the change of TREC's logarithm to the change of EPS. If the result is positive, the employees' PPS (EPPS01) is set as 1, otherwise, EPPS01 is set as 0.

To replace EPPST with EPPS01 in Model 1, Model 1\* is constructed. Regression results of Model 1\* are shown in Table 3, which indicates that the coefficient of EPPS01 on ROE<sub>t+1</sub> is still significantly positive ( $\beta=0.075$ ,

**Table 3.** Regression results of EPPS01 on ROE<sub>t+1</sub>

Model B		Unstandardized coefficients		Standardized coefficients	t	Sig.
		Std. Error	Beta			
Model 1*	(Constant)	-.160	.026		-6.090	.000
	<b>EPPS01</b>	<b>.012</b>	<b>.002</b>	<b>.075</b>	<b>5.139</b>	<b>.000</b>
	SIZE	.008	.001	.119	6.604	.000
	DEBT	-.019	.007	-.044	-2.722	.007
	BAORD	-.001	.001	-.025	-1.530	.126
	RID	-.069	.025	-.043	-2.769	.006
	DUAL	.005	.004	.019	1.250	.211
	RFE	.025	.008	.045	3.012	.003
	AGE	.000	.000	.030	1.922	.055
	TENU	.000	.000	-.046	-2.944	.003
	RFS	.120	.012	.204	9.685	.000
	BDS	.033	.003	.192	9.423	.000
	RMS	.470	.100	.071	4.693	.000
	EAST	.004	.003	.023	1.491	.136
	<b>R</b>	0.255	R <sup>2</sup>	0.065	Adjusted R <sup>2</sup>	0.062
<b>F</b>	23.345	Model Sig	0.000	N	4365	

**Table 4.** Regression results of EPPSR on ROE<sub>t+1</sub>

Model B		Unstandardized coefficients		Standardized coefficients	t	Sig.
		Std. Error	Beta			
Model 1**	(Constant)	-.036	.012		-2.987	.003
	EPPSR	.001	.000	.026	1.856	.063
	SIZE	.004	.001	.109	6.349	.000
	DEBT	-.073	.003	-.347	-22.343	.000
	BAORD	.000	.000	-.007	-.442	.658
	RID	-.041	.011	-.053	-3.549	.000
	DUAL	.003	.002	.022	1.501	.133
	RFE	.007	.004	.028	1.986	.047
	AGE	.000	.000	.049	3.307	.001
	TENU	-4.293E-5	.000	-.036	-2.412	.016
	RFS	.050	.006	.178	8.888	.000
	BDS	.014	.002	.164	8.445	.000
	RMS	.204	.046	.064	4.444	.000
	EAST	.002	.001	.022	1.507	.132
	<b>R</b>	0.391	R <sup>2</sup>	0.153	Adjusted R <sup>2</sup>	0.15
<b>F</b>	60.274	Model Sig	0.000	N	4365	

P=0.000), which means H1 still holds.

Referring to the method of Takao & Kubo<sup>[26]</sup> and Kampkötter<sup>[27]</sup>, the employees' PPS is calculated as the ratio of the change rate of employees' total compensation to the change rate of firm performance (EPS). To be specific, the employees' PPS (EPPSR) can be expressed by "[ $(TREC_t - TREC_{t-1}) / TREC_{t-1}$ ] / [ $(EPS_t - EPS_{t-1}) / EPS_{t-1}$ ]".

To replace EPPST with EPPSR in Model 1, Model 1\*\* is constructed. Regression results of Model 1\*\* are shown in Table 4. According to Table 4, the coefficient of EPPSR on ROE<sub>t+1</sub> is still significantly positive ( $\beta=0.026$ ,

$P=0.063$ ). Hence, all the three measurement methods adopted in this study confirm H1.

**b. Robustness test on H1 based the measurement of the future firm performance**

To replace ROE<sub>t+1</sub> with ROA<sub>t+1</sub> in Model 1, Model 1\*\*\* is constructed. Regression results of Model 1\*\*\* with the whole sample are shown in Table 5. According to Table 5, the coefficient of EPPST on ROA<sub>t+1</sub> is still significantly positive ( $\beta=0.031$ ,  $P=0.024$ ). H1 still holds when the measurement of future firm performance is changed into

**Table 5.** Regression results of EPPS<sup>T</sup> on ROA<sub>t+1</sub>

Model B		Unstandardized coefficients		Standardized coefficients	t	Sig.
		Std. Error	Beta			
Model 1***	(Constant)	-.036	.012		-2.978	.003
	EPPS <sup>T</sup>	<b>.001</b>	<b>.000</b>	<b>.031</b>	<b>2.251</b>	<b>.024</b>
	SIZE	.004	.001	.109	6.329	.000
	DEBT	-.073	.003	-.346	-22.319	.000
	BAORD	.000	.000	-.007	-.429	.668
	RID	-.040	.011	-.052	-3.527	.000
	DUAL	.003	.002	.022	1.529	.126
	RFE	.007	.004	.028	1.985	.047
	AGE	.000	.000	.049	3.311	.001
	TENU	-4.322E-5	.000	-.036	-2.429	.015
	RFS	.050	.006	.178	8.903	.000
	BDS	.014	.002	.164	8.445	.000
	RMS	.204	.046	.064	4.458	.000
	EAST	.002	.001	.022	1.499	.134
	<b>R</b>	0.391	<b>R<sup>2</sup></b>	.153	<b>Adjusted R<sup>2</sup></b>	.150
<b>F</b>	60.420	<b>Model Sig</b>	0.000	<b>N</b>	4365	

**Table 6.** Regression results of EPPS<sup>T</sup> on EPS<sub>t+1</sub>

Model B		Unstandardized coefficients		Standardized coefficients	t	Sig.
		Std. Error	Beta			
Model 1****	(Constant)	-1.861	.111		-16.791	.000
	EPPS <sup>T</sup>	<b>.005</b>	<b>.003</b>	<b>.025</b>	<b>1.814</b>	<b>.070</b>
	SIZE	.104	.005	.342	19.797	.000
	DEBT	-.352	.030	-.183	-11.708	.000
	BAORD	-.011	.003	-.055	-3.528	.000
	RID	-.537	.105	-.076	-5.092	.000
	DUAL	.049	.018	.039	2.735	.006
	RFE	.081	.034	.034	2.342	.019
	AGE	.002	.001	.035	2.356	.018
	TENU	.000	.000	-.033	-2.214	.027
	RFS	.407	.052	.157	7.783	.000
	BDS	.131	.015	.174	8.904	.000
	RMS	2.061	.422	.071	4.880	.000
	EAST	-.020	.011	-.027	-1.818	.069
	<b>R</b>	0.379	<b>R<sup>2</sup></b>	0.144	<b>Adjusted R<sup>2</sup></b>	0.141
<b>F</b>	56.217	<b>Model Sig.</b>	0.000	<b>N</b>	4365	

ROA<sub>t+1</sub>.

To replace ROE<sub>t+1</sub> with EPS<sub>t+1</sub> in Model 1, Model 1\*\*\*\* is constructed. Regression results of Model 1\*\*\*\* are shown in Table 6. According to Table 6, the coefficient of EPPST on EPS<sub>t+1</sub> is still significantly positive (β=0.025, P=0.070). H1 still holds when the measurement of future firm performance is changed into EPS<sub>t+1</sub>.

**4.4 Test on H2**

Regression results of Model 2 are shown in Table 7. According to Table 7, the coefficient of TMPPS on EPS<sub>t+1</sub> is

significantly positive (β=0.073, P=0.000). To compare the results of the coefficient of TMPPS in Table 7 and the coefficient of EPPST in Table 6, it can be known H2 holds.

It is worth mentioning that when we respectively input all the dummy variables of years and industries into Model 1, Model 1\*, Model 1\*\*, Model 1\*\*\*, Model 1\*\*\*\* and Model 2, all the links between the employees' PPS and the future firm performance would not change. In addition, the results of Model 1\*\*\*\* and Model 2 would get even more significant. Due to the paper length limitation, the detailed tables on such regression results are omitted.

**Table 7.** Regression results of TMPPS on  $EPS_{t+1}$ 

Model B		Unstandardized coefficients		Standardized coefficients	t	Sig.
		Std. Error	Beta			
Model 2	(Constant)	-.163	.026		-6.181	.000
	TMPPS	<b>.012</b>	<b>.002</b>	<b>.073</b>	<b>4.969</b>	<b>.000</b>
	SIZE	.008	.001	.120	6.642	.000
	DEBT	-.020	.007	-.046	-2.813	.005
	BAORD	-.001	.001	-.025	-1.523	.128
	RID	-.067	.025	-.042	-2.694	.007
	DUAL	.005	.004	.018	1.183	.237
	RFE	.025	.008	.046	3.051	.002
	AGE	.000	.000	.030	1.954	.051
	TENU	.000	.000	-.044	-2.813	.005
	RFS	.121	.012	.204	9.728	.000
	BDS	.033	.003	.193	9.450	.000
	RMS	.458	.100	.069	4.574	.000
	EAST	.004	.003	.021	1.399	.162
	<b>R</b>	0.255	<b>R<sup>2</sup></b>	0.065	<b>Adjusted R<sup>2</sup></b>	0.062
<b>F</b>	23.204	<b>Model Sig</b>	0.000	<b>N</b>	4365	

## 5. Discussion

### 5.1 General Findings

Facing the research gap in exploring the link between the employees' PPS and the future firm performance under Chinese context, a well-designed balanced pane data consisting of 4365 firm-year observations of Chinese listed state-owned enterprises over 2007-2015 is employed, and the multiple regression analysis based on OLS is adopted with SPSS23 to investigate how the incentive effect and risk-aversion effect of the employees' PPS would affect the future firm performance. Empirical results manifest that the employees' PPS can enhance the future firm performance, which is consistent with our hypothesis. In this logic, the four potential paths of higher employees' PPS to improve the future firm performance should be correct. However, the standardized coefficients of the employees' PPS on the future firm performance in Model1 to Model6 are rather low, which mean that in practice the incentive effect of the employees' PPS is rather weak. And such a weak incentive effect doesn't reach the expectations of the researchers and policy-makers.

The potential reasons for this fact, except for the possible risk-aversion effect of the higher employees' PPS mentioned at the beginning of the paper, may rely on the nature of the state-owned enterprises heavily. To be specific, most of the state-owned enterprises in China operate in natural monopoly industries or policy monopoly industries, where firm performance is essentially determined by their monopoly situation and top managers' strategic planning to a large part, while leaving less performance improvement room

for the employees to strive for. In this case, the incentive effect of higher employees' PPS would be rather weak for most of the rank and file staff, except for the limited core employees who have strong confidence in improving firm performance and realizing their self-worth.

Besides, compared with the incentive effect of the top managers' PPS, the incentive effect of the employees' PPS is relatively weaker. The possible two reasons can potentially explain such a result. One is that, compared with the employees, the top managers have much stronger capability and influence in determining the future firm performance, which confirms to the basic assumption of the Upper Echelons theory. On the other hand, the top managers are more willing to take higher performance risks than the rank and file staff, because they generally have a stronger sense of responsibility and a higher capability of accountability.

### 5.2 Theoretical Contributions

There are three theoretical contributions derived from the results. First, we confirm and clarify the positive performance consequences of the employees' PPS for the first time, which enriches the theoretical framework of compensation incentive mechanisms by extending the application levels of PPS to the front-line employees. Theoretical analysis confirms that a higher employees' PPS would be beneficial to the future firm performance for the Chinese listed state-owned enterprises. In other words, the incentive effect of the employees' PPS dominates over the risk-aversion effect.

Second, we are the first to compare the incentive effect on firm performance between the employees' PPS and

the top managers' PPS. Empirical results suggest that the positive effect of the employees' PPS on the future firm performance does not reach the theoretical expectations, and it is weaker than the positive effect of the top managers' PPS on the future firm performance. However, the dark side of the so-called incentive effect cannot be ignored. A more recent study by Yu-Ju Chen et al.<sup>[28]</sup> argued that managers and employees with too high PPS, which means higher incentive effect, will engage to making risky decisions which may harm firms' value in the future. Therefore, it seems that compensation committee should redesign managers' compensation contract for limiting their risk-taking behavior.

Third, we add new knowledge in understanding the trade-off mechanisms between the incentive effect and risk-aversion effect of the employees' PPS in the context of the listed state-owned enterprises in China. According to Horovitz and Thietart<sup>[29]</sup>, who argued that the validity of internal performance management system is the key to align the objectives of the employees facing higher incentive compensation with the improvement of firm performance, the new knowledge found in this paper indicates that on the one hand, the employees in Chinese listed state-owned enterprises hold positive attitudes towards risk, and on the other hand, the validity and correctness of the performance management system in such enterprises are getting better and better.

### 5.3 Practical Implications

Based on the conclusions, the following suggestions can be proposed. (1) To improve the employees' PPS to a greater degree, since at present higher PPS would improve the future firm performance; (2) To improve the diversity of employees' rewards by providing them with more delayed salary, long-term salary or equity salary, since cash compensation itself cannot effectively align the long-term interests objects between the employees and the firm; (3) To perfect the performance management system inside the state-owned enterprises, since unreasonable performance evaluation would do harm to the incentive effect of the higher employees' PPS; (4) To endow the employees with higher job discretion and promote the participatory management, which can satisfy the employees' senses of achievements and self-worth, and further improve their engagement in their jobs and stimulate them to execute more innovative workplace behavior.

### 5.4 Limitations and Directions for Future Research

Future research should further explore the following

topics: First, the paper only focuses on the state-owned enterprises, while leaving the non-state-owned enterprises unexplored. The future studies should expand the samples into more types of enterprises, and attempts to describe and compare the effects of the employees' PPS on future firm performance between the state-owned enterprises and the other enterprises, or between the manufacturing enterprises and the non-manufacturing enterprises. Second, the paper takes the all the employees as a whole, however, different types of employees would have various attitudes towards a higher PPS. Hence, the future studies can categorize employees into multiple types, and compare the effects of PPS on future firm performance among different types of employees, e.g., sales staff VS production staff, or core staff VS general staff.

### Acknowledgements

This research was supported by the National Natural Science Foundation of PRC under Grant "71872149".

### References

- [1] Ataay, A.. Performance Sensitivity of Executive Pay: The Role of Ownership Structure, Board Leadership Structure and Board Characteristic. *Ekonomiska Istrazivanja*, 2018, 31(1): 1152-1168.
- [2] Chen, Ma, B. Li. and N. Dong.. Do Chinese Listed Firms Actively Alter the Design of Pay-performance Sensitivity Following Financial Restatement? *Asia-Pacific Journal of Accounting and Economics*, 2015, 1-27.
- [3] Zhang C. Z., Lv Y. F. and Zhang G. L.. CEO Discretion, CEO Tenure and Executive Pay-performance Sensitivity: A Dynamic Model Based on Game Theory. *Journal of Interdisciplinary Mathematics*, 2017, 20(3): 701-713.
- [4] Ivan E. Brick, Oded Palmon, John K. Wald.. Too Much Pay-Performance Sensitivity. *The Review of Economics and Statistics*, MIT Press, 2012, 94(1): 287-303.
- [5] Jensen, M. and K. Murphy.. Performance Pay and Top-management Incentives. *Journal of Political Economy*, 1990, 225-264.
- [6] Conyon, M., S. Peck, L. Read and G. Sadlaer. Econometric Modeling of UK Executive Compensation.. *Managerial Finance*, 2000, 26(3): 3-20.
- [7] Yaron Amzaleg, Ofer Azar, Ben-Zion, Uri and Ahron Rosenfeld.. CEO Control, Corporate Performance and Pay-performance Sensitivity. *Journal of Economic Behavior & Organization*, 2014, 106(C): 166-174.
- [8] Tianna Yang and Wenxuan Hou.. Pay-performance Sensitivity and Risk-taking Behaviors: Evidence

- from Closed-end Funds. *Emerging Markets Review*, 2016, 29(C): 274-288.
- [9] Guthrie K, Kwon I and Sokolowsky J.. What Does CEOs' Pay-for-Performance Reveal About Shareholders' Attitude Toward Earnings Overstatements? *Journal of Business Ethics*, 2017, 146(2): 1-32.
- [10] Kim Kyonghee.. Blockholder Monitoring and the Efficiency of Pay-performance Benchmarking. *Journal of Corporate Finance*, 2010, 16(5): 748-766.
- [11] Katarzyna Cieślak.. Agency Conflicts, Executive Compensation Regulations and CEO Pay-performance Sensitivity: Evidence from Sweden. *Journal of Management & Governance*, 2018, 1-29.
- [12] Daniel L., McConaughy and Chandra S.. Mishra. Debt, Performance-Based Incentives, and Firm Performance. *Financial Management*, 1996, 37-51.
- [13] Abowd John, M.. Does Performance-based Compensation Affect Corporate Performance? *Industrial and Labor Relations Review*, 1990, 43(3): 52S-73S.
- [14] Mehran, Hamid.. Executive Compensation Structure, Ownership, and Firm Performance. *Journal of Financial Economics*, 1995, 38(2): 163-84.
- [15] Chandra S. Mishra, Daniel L. McConaughy and David H.. Gobeli. Effectiveness of CEO Pay-for-Performance. *Review of Financial Economics*, 2000, 1-13.
- [16] Zhou Jianan and Huang Dengshi.. Risk and Performance Pay Sensitivity in Managerial Compensation: Evidence from Listed Companies in China. *Accounting Research*, 2006, 44-50.
- [17] Darius Palia.. The Endogeneity of Managerial Compensation in Firm Valuation: A Solution. *The Review of Financial Studies*, 2001, 735-764.
- [18] Babenko I.. Share Repurchases and Pay-Performance Sensitivity of Employee Compensation Contracts. *Journal of Finance*, 2010, 64(1): 117-150.
- [19] Zhang Changzheng and Mu Xin.. Study on the Effect of CEO Discretion on the Top Executives' Pay-performance Sensitivity: Based on the Perspective of Technology Intensity. *Productivity Research*, 2016, 126-130.
- [20] Nyberg A. J., Pieper J. R. and Trevor C. O.. Pay-for-performance's Effect on Future Employee Performance: Integrating Psychological and Economic Principles Toward a Contingency Perspective. *Journal of Management*, 2013, 1753-1783.
- [21] Aboody D, Johnson N B and Kasznik R.. Employee Stock Options and Future Firm Performance: Evidence from Option Repricing. *Journal of Accounting & Economics*, 2010, 50(1): 74-92.
- [22] Mayew W J and Venkatachalam M.. The Power of Voice: Managerial Affective States and Future Firm Performance. *Journal of Finance*, 2012, 67(1): 1-43.
- [23] Schaefer S.. The Dependence of Pay-Performance Sensitivity on the Size of the Firm. *Review of Economics & Statistics*, 2006, 80(3): 436-443.
- [24] Shi DaLin.. Pay-performance Sensitivity and the Behavior of Corporate Risk-taking. *Journal of Nanjing University of Finance and Economics*, 2015, 87-95.
- [25] Lee J.. Executive Performance-based remuneration, performance change and board structures. *International Journal of Accounting*, 2009, 44(2): 138-162.
- [26] Takao Kato and Katsuyuki Kubo.. CEO Compensation and Firm Performance in Japan: Evidence from New Panel Data on Individual CEO Pay. *Japanese Economics*, 2006, 1-19.
- [27] Kampkötter P.. Pay-performance Sensitivity of Compensation Contracts for Nonexecutive Employees: The Case of the Financial Crisis. *Applied Economics Letters*, 2015, 22(9): 734-738.
- [28] Yu-Ju Chen and Bi-Ying Shih.. An Exploratory Analysis of Cash Holdings and Pay-Performance Sensitivity before and after IFRS Adoption. *International Journal of Economic Sciences*, 2014, 86-102.
- [29] Horovitz J. H. and Thietart R. A.. Strategy, Management Design and Firm Performance. *Strategic Management Journal*, 1982, 3(1): 67-76.