Institutional Investors and Employee Wages

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Abstract

We find that institutional investor ownership concentration can increase pay for firm performance sensitivity of non-executive employees using the data of Chinese publicly listed firms. More importantly, this positive effect is not driven by pay for the "luck" component of firm performance and it is stronger when firms have negative earnings. Additionally, this effect is stronger for firms with high intangible asset ratio and in bad legal environments. These findings shed light on the roles of institutional investors in enhancing the efficiency of labor compensation policies.

Keywords: Labor and finance; Institutional investors; Corporate governance; Wages;

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Abstract

We examine the impacts of institutional investor influence on non-executive employee wages using the data of Chinese publicly listed firms. We find that institutional investor ownership concentration can increase pay for firm performance sensitivity of non-executive employees. More importantly, this positive effect is not driven by pay for the luck component of firm performance and it is stronger when firms have negative earnings. Additionally, this effect is stronger for firms with high intangible asset ratio and in bad legal environments. These findings shed light on the roles of institutional investors in enhancing the efficiency of labor compensation policies.

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1. Introduction

Previous studies (e.g., Bertrand and Mullainathan, 2000; Hartzell and Starks, 2003) find that blockholder and institutional investor ownership can increase pay for performance sensitivity for top executives, and enhance managerial incentive, leading to better performance of firms. However, top executives are just small portion of employees, and firm performance also replies on other non-executive employees' inputs. The compensation paid to all employees reflects the labor costs of a firm and it critically affects firm's profitability. Thus, these previous studies leave out an important research question about the potential impacts of institutional investors on the labor costs of other employees. In this paper, we will fill in the gap of the literature and examine the impacts of institutional investor ownership on non-executive employee wages.

Institutional investor ownership has been considered as an important external governance mechanism due to their monitoring roles on managers[1]. Institutional investors hold more shares, making them more motivated to monitor firms (e.g. Grossman and Hart, 1980; Shleifer and Vishny, 1986). Institutional investors are also professional, they are better at collecting and analyzing information than individual investors (Bjerring et al.,1983; O'brien and Bhushan,1990), thus they are more efficient at monitoring. Due to these advantages, institutional investors tend to monitor the firm and affect the daily operation of companies actively through shareholder activism channel (Gillan and Starks, 2007; Brav et al, 2008). Besides, institutional investors can

[1]See Shleifer and Vishny (1986), Bertrand and Mullainathan (2000), Hartzell and Starks (2003), Cremers and Nair (2005), Brav, Jiang, Partnoy, and Thomas (2008), Edmans (2009), Kim and Lu (2011), and Edmans and Manso (2011) demonstrate important roles blockholders and institutional investors play in shaping corporate governance.

vote with their feet, which can impose pressures on firm managers and discipline them by causing changes in firms' stock prices (Parrino et al, 2003). Therefore, higher institutional investor concentration is associated with better corporate governance.

Better corporate governance brought by stronger external monitoring can reduce agency costs. Agency costs can appear in different forms. Paying higher wages to employees can be considered as an important phenomenon associated with agency costs. Paying non-executive employees higher wages can increase firm labor costs and hence hurt firm performance. However, through paying more to employees, managers can exert less effort on wage bargaining, working with capable and pleasant subordinates (Bertrand and Mullainathan, 2003, Cronqvist et al., 2009), and preventing takeover (Pagano and Volpin, 2005). Therefore, we expect that the monitoring function of institutional investors may help improve the efficiency of employee pay.

In the paper, we examine the impacts of institutional investor influence on employee wages using the data of Chinese publicly listed firms from 2003 to 2014. There are several advantages of studying this question with Chinese data. First, China has relatively weak corporate governance and legal system (e.g., Allen, Qian and Qian, 2003, Aharony, Lee and Wong, 2000), providing more latitude for managers and controlling shareholders to derive private benefits of control. Hence, agency problems associated with labor issue, if any, would be more prevalent in China.

Second, China has the largest population in the world and has a large amount of labor intensive industries. Thus, labor cost is of the most important consideration for firms in China. For example, On September 19, 2014, Alibaba made an equity offering

in America. An article in Financial Times reports, "Mr. Ma (the founder-CEO) says his priorities are 'customers first, employees second, and shareholders third.' What will this mean in practice?"[2] It may mean a sound strategic vision that could lead to practices good for the long-run. But on the day of the offering an article on the same newspaper appearing points out, "backing Mr. Ma and his team brings with it a hefty degree of governance risk". Thus, the evidence on the relation between corporate governance and labor issues if any will be more pronounced in China.

Third, unlike U.S., the CSRC (equivalent to the SEC in U.S.) requires publicly listed firms to disclose information of total payroll of employees and the number of employees in Chinese publicly listed firms, which provide creditable employee wage data to study this question.

Since institutional investors would be expected to have greater influence when they own larger percentage of shares (e.g., Shleifer and Vishny, 1986) and when they have allies in the form of other shareholders (e.g., Black, 1992), following Hartzell and Starks (2003), we measure institutional investor influence by the concentration of institutional investor ownership. Our primary measure is the Herfindahl Index of the proportion of the institutional investor ownership accounted for the top ten largest shareholders in the firm.

An efficient executive compensation policy requires that executives should be paid for their performance. This notion has been widely documented by previous literature

[2] Lucy Colback and Robert Armstrong, "Lex in depth: Alibaba" Financial Times, London Edition (September 10, 2014) P.11.

(See Murphy, 1999). This should also apply for other employees. Accordingly, in this paper, we focus on pay for performance sensitivity for employees.

Our analyses start with examining the impacts of institutional investor ownership concentration on pay for performance sensitivity for employees. We find that institutional investor ownership concentration can significantly increase the sensitivity of non-executive employee pay to firm performance. This result is robust to addressing the potential endogeneity problem in institutional investor ownership concentration variable with the two-stage least square regression approach with the instrumental variable. The results are also robust to alternative measures of institutional investor ownership concentration and firm performance.

Positive employee salary for firm performance sensitivity can be driven by either increases in pay for positive earnings (i.e., reward pay) or decreases in pay due to negative earnings (i.e., pay cut penalty). Thus, we further examine the impacts of institutional investor ownership concentration on pay for performance sensitivity for positive earnings and negative earnings, respectively. We find that the impact of institutional investor ownership concentration is more pronounced when firms have negative earnings.

Firm performance can be largely affected by the macro-economic and industrial factors, which is considered as the "luck" factors. The performance changes due to luck factors do not reflect firm insiders' work efforts and capability. Consequently, employee compensation should not be changed based on the changes in firm performance due to luck factors. However, Bertrand and Mullainathan (2001) show that executives tend to

enjoy pay themselves for the luck component of performance. We examine the impacts of institutional investor concentration on the sensitivity of employee salary to luck and skill components, respectively. We find that institutional investor concentration can significantly increase the sensitivity of employee salary to the skill component of performance, but not to the luck component of performance. All these findings further buttress the prediction that institutional investors can improve firms' employee compensation policy efficiency by enhancing firms' corporate governance due to stronger external monitoring on firms.

Finally, we examine some heterogeneous effects of the impact of institutional investor ownership concentration on non-executive employee pay for performance sensitivity. We first find that the positive impact of institutional investor ownership concentration on pay for performance of employees is stronger for firms with high intangible asset ratio. This result can be explained by the differences of occupations between firms with high intangible asset ratio and those with low intangible asset ratio. Employees in firms with low intangible asset ratio typically engage in routine, repetitive jobs, which are easy to monitor. However, employees in firms with high intangible asset ratio always do creative and innovative jobs, which are hard to monitor. Therefore, increasing the sensitivity of employee pay to firm performance is a better choice in firms with high intangible asset ratio.

We also find that the positive impact of institutional investor ownership concentration on pay for performance of employees is stronger for firms located in

provinces with bad legal environment. This result suggests that institutional investors and law enforcement are substitutes, which is consistent with our main results.

This paper makes the contribution to the literature by deepening our understanding on the roles of institutional investors in shaping firm behaviors, especially on stakeholders. Previous studies have studied institutional investors' role in corporate governance from many perspectives, such as market value (McConnell and Servaes ,1990) and stock return (e.g. Brav et al., 2008). However, this paper investigates the impacts of institutional investors from a new aspect, the non-executive employee wages. The results of this paper show that the concentration of institutional ownership not only changes executive compensation (Hartzell and Starks, 2003), but also affects the sensitivity of employee salary to firm performance.

Besides, the findings of this paper show a link between finance and non-executive employees' compensation. The labor and finance research is getting more and more attention today. Current research shows that some financial factors, such as leverage (Hanka, 1998; Chemmanur et al., 2013), can play big roles in deciding employee wages. However, no one, as far as we know, has studied the relation between institutional investors and employee wages. Our paper can also contribute to the current labor and finance literature.

The remaining is organized as follows. Section 2 reviews the related literatures and develops the hypotheses. Section 3 introduces the institutional background of Chinese labor market and employee wages. Section 4 describes variables, data and

empirical strategies. Section 5 discusses the results and robustness checks. And Section 6 concludes.

2. Literature Review and Hypothesis Development

2.1 The Effects of Institutional Investors on Corporate Governance

Since 1980s, U.S. institutional investors started to actively involving in the firms' management and try to improve the firms' performance. This phenomenon is called shareholder activism and it has attracted lots of academic attentions. Many researchers study the institutional investors' role in corporate governance.

Previous studies suggest that institutional investors can play a positive role in corporate governance. Firstly, the institutional investors can better monitor managers. Due to the free rider problem, individual investors have less incentive to monitor managers (Grossman and Hart, 1980), however, institutional investors normally holder a block of shares, therefore they have greater incentive to monitor the managers of invested firms (Shleifer and Vishny, 1986). Second, the institutional investors are more professional and hence better at collecting and analyzing information (Bjerring et al.,1983; Obrien and Bhushan,1990), sometimes they can even obtain private information of the management teams (Chidambaran and John,2001), and therefore, they can be more efficient at monitoring. Institutional investors can exercise their monitoring function via voting on the board or selecting the board members of their interest, considering as "voting with hands". However, institutional investors can also vote with feet. They can sell stocks when they are unsatisfied with firm performance,

thus impose pressures to firm managers (Parrino et al, 2003; Admati and Pfleiderer, 2009), and thus discipline their behaviors. Many researchers also provide empirical evidence to support the positive role of institutional investors on corporate governance. For example, Hartzell and Starks (2003) find higher sensitivity of executive compensation to firm value when institutional investor ownership becomes more concentrated. Kim and Lu (2011b) find that the negative effects of CEO power on corporate governance is smaller for firms with high institutional investor ownership concentration. As a result, institutional investors can enhance the value of the firm. McConnell and Servaes (1990) find a positive relationship between the shares owned by institutional investors and Tobin's Q. Agrawal and Mandelker (1990) find that institutional ownership is positively related with changes in wealth around antitakeover amendments. Brav et al (2008) find that after hedge funds announce activism, they gain higher abnormal return and the companies have higher CEO turnover and better performance. Executive managerial ownership has been considered as an important governance mechanism. Kim and Lu (2011a) find that the inverted-U shape effects of CEO ownership on firm value are weaker when intuitional investor ownership concentration is higher, which further confirm institutional investors' governance roles.

In spite of the abovementioned positive effects of institutional investors on corporate governance, some studies, such as Brickley et al (1988), Almazan et al (2005), and Chen et al (2007), explore the heterogeneous effects of institutional investors on corporate governance. They find that institutional investors tend to have larger effect on corporate governance for firms with lower monitor costs, and pursuing long-term returns. Gillan

and Starks (2007) suggest that although short-term market reactions to some kinds of institutional investor activism are significant, long-term operating performance and stock market performance show no improvement after the activism.

Besides these studies, there also are some studies showing some limited roles of institutional investors on improving corporate governance and firm performance. For example, David and Kochhar (1996) suggest the highly diversified investment strategies would limit the effects of institutional investors. Black and Coffee (1994) also find the British institutional investors rarely intervene firms' operation due to practical reasons.

2.2 Determinants of Employee Wages

Economists have focused on the role of human capital factors (Becker, 1993; Ben-Porath, 1967), such as schooling (Mincer, 1974), on-the-job training (Acemoglu and Pischke, 1999; Barron et al, 1999; Autor, 2001), and health (Bleakley, 2007), in determining employee salary. In contrast, Spence (1973) considers human capital as a signal, which determines the wage that employees can get.

The theory of efficiency wage is also explored in the literature. For example, Shapiro and Stiglitz (1984) find that employers are paid more than market equilibrium wages to avoid shirking. Besides, employers also are paid with high wages to reduce labor turnover (Stiglitz, 1974; Salop, 1979) and keep fairness (Akerlof and Yellon, 1990).

Some studies in the labor and finance literature take the conflict of interest between shareholders and managers (i.e., agency costs) into consideration. For example, Jensen and Meckling (1976) find that managers gain private benefits through raising employee salary. Bertrand and Mullainathan (2003) find that firms under lower pressures from the market for corporate control tend to pay higher employee wages, but have lower profitability. Pagano and Volpin (2005) find that managers pay higher wages to prevent takeover. Cronqvist et al (2009) find that firms with weak corporate governance pay higher wages.

2. 3 Hypothesis Development

How does institutional investor ownership influence non-executive employee pay structure? The main production inputs of firms are labor and capital. As labor costs, employee wages are firms' major production costs, and hence play important roles in determining firm performance. Greater saving in employee wages, higher profits will be available to shareholders.

Comparing individual investors or other minority shareholders, institutional investors normally own a large amount of shares of firms, therefore, they are less affected by the free-rider problem (Grossman and Hart, 1980; Shleifer and Vishny, 1986) and they can also benefit more from monitoring firms through voting in board meetings. Therefore, they have stronger incentive to monitor firm behaviors to improve firms' profitability. Besides, institutional investors are also more capable to provide effective monitor than individual investors or other minority shareholders. On the one hand, their

large ownership allows them to send directors to the board and directly intervene firm's decision making process, such as employee wage policies. On the other hand, the institutional investors have expertise in collecting and analyzing information, thus they can be more efficient at monitoring the managers. The enhanced monitoring brought by institutional investors prevents firms from overpaying their employees, and makes them draw better pay schemes for employees to improve their performance. Furthermore, the pressures stemming from the potential sale of stocks from institutional investors can also discipline managers, if they overpay the employees or set inefficient pay structure, the institutional investors would sell the firms' stocks and make the stock prices crash. Therefore, the managers tend to introduce better compensation policies for the employees. Consequently, institutional investors can help improve the efficiency of compensation policy.

Employees obtain pay by providing efforts. Better performance due to more efforts should be compensated with higher pay. So, the absolute level of employee wages cannot reflect the efficiency of employee compensation polices of firms. However, the sensitivity of pay to the performance should serve a better measure of the efficiency of firm employee compensation policy. As a result, our first key prediction is as follows:

Hypothesis 1: Institutional investor concentration can increase non-executive employee pay for firm performance sensitivity.

The pay for performance sensitivity could be asymmetry between firms having positive earnings and firms having negative earnings. The positive pay for performance for positive earning firms means higher pay as rewards to employees' performance;

while it means pay cut as penalty for firms having negative earnings. If institutional investors can increase pay for performance sensitivity by providing monitoring and improving corporate governance, we should expect stronger effects when firms have negative earnings. Thus, our second hypothesis is as follows.

Hypothesis 2: The positive impacts of institutional investor concentration on firms' non-executive employee pay for performance sensitivity is stronger for firms having negative earnings.

Firm performance can be decomposed into luck and skill component, respectively. For example, firm performance can be largely affected by the macro-economic and industrial factors, considering as the "luck" factors. The performance changes due to luck factors do not reflect firm employees' work efforts and capability. Bertrand and Mullainathan (2001) show that executives tend to enjoy pay for the luck part of performance. Therefore, if institutional investor ownership can enhance corporate governance efficiency, the employee compensation should not be changed based on the changes in firm performance due to the skill factors, rather than the luck factors. Thus, our third hypothesis is as follows.

Hypothesis 3: Institutional investor ownership connection can increase the sensitivity of non-executive pay to the performance explained by the skill factors, but not to the performance explained by the luck factor.

3. The Background of Chinese Labor Markets and Employee Wages

Chinese labor market formed after the reform and opening up (starts in Dec. 1978). Before the reform and opening up, job allocation was decided by the government, people didn't need to search for jobs, and their jobs are assigned by the government. The employee wages were also controlled by the government. The government paid the employees based on their occupations, length of service and skills[3]. After 1958, the People's Commune system was built and the Great Leap Forward period started, the compensation system was badly damaged. The employee compensation was quite evenly distributed, regardless of the employees' efforts and the firms' performance. Thus, many employees slacked at work.

After the reform and opening up, the market economy was introduced into China. The labor market was established due to the need of market economy. According to Li et al. (2016), the development of Chinese labor market can be divided into three stages: First, the beginning of the reform and opening up (1978-1992), in this period, labor contract system was established, however it only applied to new employees, the already hired ones were not restricted by labor contracts. And the government still maintained lots of control over labor allocation[4]. As for the distribution policy[5], the government applied the principal of "distribution according to one's work", and allowed some people to be rich through hard work[6], which meant income inequality was no longer considered to be a violation of socialism. After 1987, the government also allowed for

[3] At the early days of the establishment of China, the government divided the employees (people) into eight grades according to their occupations, length of service and skills. An employee's compensation was based on his or her grade.

[4] For example, the government would assign college graduates occupations.

[5] The distribution policy is about the way to distribute incomes from production to people. It decides the compensation policies of firms , especially SOEs.

[6] Fairness is an essential requirement of socialism, so income inequality was considered to be a violation of socialism before the reform and opening up.

other forms of distribution to be supplement for "distribution according to one's work", which meant the return of other production factors, such as capital and skill, became legal.

Second, the medium-term of the reform and opening up (1993-2001), in this period, China's marketization got deeper and deeper, the labor market also became more mature. The law of labor was enacted in 1995, which made the labor contract system applied to every employee, thus the two-way selection between employees and employers took place of the government allocation. As for the distribution policy, the principal of "distribution according to one's work" was still dominated, but other forms of distribution gradually got more recognition by law.

Third, the deepening period of the reform and opening up (2002 to now), the market plays a more and more important role in this period, for employees, searching in the labor market becomes the typical way to get jobs, job-hopping also becomes very common. The distribution policy also gets more flexible, the government changes the distribution principal to "combining distribution according to one's work and distribution according to other product factors", this change of principal allows the firms to pay for the employees' knowledge, managerial skills and other factors the firms want. The wages are almost fully decide by firms[7]. In this period, the inequality of wages enlarges significantly, the labor market becomes very competitive, the government no longer imposes explicit intervention to the labor market. Thus, after 2002, Chinese labor market and employee compensation system are comparable to the

[7] The government still has many regulations to control top executives' compensation of SOEs, however, it doesn't affect our results since we focus on non-executive employees.

rest of the world, especially to developed countries during our sample period, granting the generality of the conclusion of the paper.

4. Data and Empirical Strategy

4.1 Variables

4.1.1 Institutional Investor Ownership Variables (*InstInv, InstInv_alt*)

RESSET database provides the top ten largest shareholders of each company in each year. We define investment funds, social security funds, fund companies, securities traders, trust companies, insurance companies, venture capital companies, asset management companies, and foreign financial institutions as institutional investors. Following Hartzell and Starks (2003), we use institutional investor ownership concentration to measure the influence of institutional investors, *InstInv*. It is calculated as the summation of the square of the ownership of the institutional investors in the top ten largest shareholder list. Since large institutional investors can play greater roles in intervening firms' decisions and governance, we narrow the institutional investors in top five largest investors from top ten largest investors, and re-construct the institutional investor ownership concentration variable as a robustness check.

4.1.2 Non-Executive Employee Wage Variables (*Ln(TotEmpPay)*, *Ln(AvgEmpPay)*)

We use both the total non-executive employee payroll (*Ln(TotEmpPay)*) and average salary of non-executive employees (*Ln(AvgEmpPay)*)[8] as the dependent variables.

[8] In the following analyses, sometimes we refer non-executive employees as "employees" for simplicity. When we talk about employee in this paper, we don't include executives.

The total non-executive employee payroll is calculated as the cash paid to employees minus executive compensation, then we take the natural logarithm.

$$Ln(TotEmpPay) = \ln(\text{cash paid to employees} - \text{exeutive compensation}) \quad (1)$$

The average salary of non-executive employees is calculated as the total cash paid to non-executive employees divided by the number of non-executive employees.

$$Ln(AvgEmpPay) = \ln\left(\frac{\text{cash paid to employees} - \text{exeutive compensation}}{\text{number of employees} - \text{number of executives}}\right) (2)$$

The data used for computing these two variables comes from RESSET. To guarantee the comparability of this variable during the sample period, we also adjust inflation via CPI. The unit of employee wages is RMB and the base year is 2003. Our variable construction helps us to isolate the effects on executives. Hence we could examine the pure effects on other employees.

4.1.3 Firm Performance Variables (*ROA1, ROA2, ROA3*)

Since the empirical tests focus on pay for performance sensitivity, we need to have a measure of firm performance. We focus on accounting performance rather than stock market performance, since emerging markets like Chinese stock markets are less efficient than developed country stock markets, the stock price couldn't reflect the true value of the firm. We mainly use earnings before interest and tax (EBIT) divided by total assets (*ROA1*) as the measure of firm performance. Firms may manipulate depreciation and amortization to increase their reported performance. To alleviate this concern, we use earnings before interest, taxes, depreciation and amortization (EBITDA) divided by total assets (*ROA2*) as an alternative measure of firm performance in the robustness check section. The major advantage of the measure of

EBITDA is that it is less affected by earnings management, but its disadvantage is that it may not truly reflect firm performance after taking into account all relevant costs. Besides, we use net income divided by total asset (*ROA3*) as another alternative measure of firm performance in the robustness check section. *ROA3* also has pros and cons. Its advantage is that it more precisely reflects firms' earnings; its disadvantage is that it is more affected by earnings management than EBIT and EBITDA.

4.1.4 Control Variables

We need to control for a set of time variant variables that may affect employee salary and also might be related to institutional investor ownership concentration and firm performance.

We control for some firm characteristics including firm size (*Size*), firm age (*Ln(age)*), the ratio of intangible asset (*Intang*), working capital ratio (*WkCap*), sales growth rate (*Growth*), ownership concentration (*OwnerCon*) and state-owned enterprise indicator (*Soe*). Firm size is calculated as the natural logarithm of the firm's market value at the beginning of the year. Firm age is calculated as the natural logarithm of the current year minus established year plus 1. The ratio of intangible asset is calculated as the value of intangible assets divided by total assets. Working capital ratio is measured by the difference between current asset and current liability divided by current asset. It can measure the liquidity of corporate asset. Firm growth rate is measured as the sales growth rate from year t-1 to year t. Since ownership concentration can affect corporate governance by affecting corporate decision making process and monitoring capability from shareholders, we also control for ownership concentration

(*OwnerCon*). It is calculated as the percentage of ownership owned by the largest shareholder. Corporate governance and corporate culture to employees are very different for SOEs and non-SOE firms. Thus, we also control for SOE indicator in the regressions. SOE indicator is set to 1 if the firm's ultimate controlling shareholders is a state-owned organization (e.g. central or local government), 0 otherwise.

The labor regulations also play important roles in employee wages. Thus, we control for province level minimum wage[9]. In the regressions using *Ln(AvgEmpPay)* as dependent variable, we control for the minimum annual wage in the provinces where the firms located (*Ln(MiniSalary)*)[10]. In the regressions using *Ln(TotEmpPay)* as dependent variable, since firms of different scales are differently impacted by minimum wage, we control the scale adjusted minimum annual wage (*Ln(MiniPay)*). The scale adjusted minimum annual wage is calculated as minimum annual wage times the number of non-executive employees in the firm, then take natural logarithm. This variable can reflect the floor of the firm's pay roll.

Detailed definitions of all variables used in the paper are provided in the Appendix.

4.2 Sample Construction

Our primary data sources are RESSET and CSMAR. Since the labor market in China became market oriented since 2002, and the data of executive compensation mostly starts from 2003, we use 2003 to 2014 as our sample period. We delete the firms

[9] These variables are also adjusted by CPI (based on 2003).
[10] The minimum annual wage of a province is calculated as the lowest minimum monthly wage of the province times 12.

in the financial industry defined by the CSRC from the sample. The province level minimum wage data comes from WIND. CPI data comes from the National Bureau of Statistics of China.

To reduce the noise of the data, we delete following observations: (1) it has unreasonable company characteristics or the number of total employees of the firm is less than 100, (2) its working capital ratio or growth is outside the three standard deviations. Besides, we also delete the observations if their average non-executive employee wages are below the 1% quantile or above the 99% quantile. Finally, we construct an unbalanced panel data of 18,673 observations associated with 2,464 unique listed firms from year 2003 to year 2014.

We report the sample description in Table 1. Column (2) shows the growth trend of the number of firms. The number of firm is 1,006 in year 2003, and it increases to 2,310 in year 2014. Besides, columns (3) and (4) show more firms invested by institutional investors, both in absolute levels and proportions, by years.

4.3 Summary Statistics

Table 2 reports the summary statistics of all variables used in the paper for the full sample and key variables for the sub-samples. Panel A focuses on summary statistics for the full sample. The mean of institutional investor ownership concentration is 0.026, the standard deviation (0.070) is about three times of the mean, which suggests that the variation of this variable is large. The total non-executive employee payroll (*TotEmpPay*) has a mean of 324 million yuan RMB (about 49 million US dollars in

current exchange rate). However, it has a large standard deviation, about 6 times of the mean, suggesting the cost of labor varies a lot in different firms. The mean of average non-executive employee salary (*AvgEmpPay*) is 57,304 yuan RMB (about 8682.4 US dollars in current exchange rate). Besides, the range of average salary is from 8,421 to 330,230, indicating the wage inequality between firms is quite large. The mean of *ROA1* is 5%. Similarly, we find that it has big variation, since the standard deviation is larger than the mean. The large variations of our key variables suggest that we have enough power to identify the effects.

Panel B reports the comparison of the key variables between the sub-samples. Column (2) to (4) show the comparison between firms with or without institutional investors. Firms that institutional investors invest in have higher non-executive employee payroll, average non-executive employee salary and better performance.

4.4 Empirical Strategy

4.4.1 Baseline specification

Our baseline regression specification is as follows:

$$Ln(Wages_{it}) = \beta_1 InstInv_{it} + \beta_2 ROA_{it} + \beta_3 InstInv_{it} \times ROA_{it} + \gamma' Control_{it} + \alpha_i + \eta_t + \varepsilon_{it}, \quad (3)$$

Where subscript i represents firm, t represents year, α_i is firm fixed effects, η_t is year fixed effects, and ε_{it} is the residual. Here, $Wages_{it}$ refers to the total non-executive employee payroll (*TotEmpPay*) or average non-executive employee salary (*AvgEmpPay*). $InstInv_{it}$ signifies institutional investor ownership concentration. ROA_{it}

is the firm performance variable, it is *ROA1* in most regressions. $Control_{it}$ contains a vector of time variant control variables, as we describe in pervious section. In an alternative specification, we also allow those control variables have different effects during the sample period. In all the regressions, we use the firm level clustered standard deviation to address the heterskedasticity and autocorrelation problems.

Based on Hypothesis 1, we expect the coefficient of $InstInv_{it} \times ROA_{it}$ to be positive. That is, higher institutional investor ownership concentration increases the sensitivity of the pay for the performance.

4.4.2 Specification for Testing Pay for Gains vs. Pay for Loss

To test Hypothesis 2, we decompose the firm performance variable ($ROA1_{it}$) into two variables, reflecting the positive and negative firm performance, respectively. The first variable is equal to $ROA1_{it}$ only when $ROA1_{it}$ is positive; zero otherwise. The second variable is equal to $ROA1_{it}$ only when $ROA1_{it}$ is negative; zero otherwise. Formally, it is

$$PosROA1_{it} = ROA1_{it} \times 1\{ROA1_{it} > 0\}, \qquad (4)$$

Where $1\{\cdot\}$ is the indicator function. Correspondingly, the second one only keeps the negative values and replaces all positive values with zero. Its formula is

$$NegROA1_{it} = ROA1_{it} \times 1\{ROA1_{it} < 0\}. \qquad (5)$$

The coefficients of the interaction terms $InstInv_{it} \times PosROA1_{it}$ and $InstInv_{it} \times NegROA1_{it}$ are of the interest. Based on Hypothesis 2, we expect the estimate of $InstInv_{it} \times NegROA1_{it}$ is more significant in statistical and economic sense than the estimated parameter of $InstInv_{it} \times PosROA1_{it}$.

4.4.3 Specification for Testing Pay for Skill vs. Pay for Luck

To test Hypothesis 3, we decompose the firm performance into two components, one is called "luck", which is the performance driven by macroeconomic or industrial factors, the other is called "skill", which is the performance mainly driven by the efforts of executives and employees. We use the industrial average of firm performance in year *t* as the proxy of the luck component. For the skill component, we use the deviation of individual performance $ROA1_{it}$ from the industrial average $LuckROA1_{ikt}$. Formally, it is

$$SkillROA1_{it} = ROA1_{it} - LuckROA1_{ikt}. \qquad (6)$$

Where *k* is the industry in which company *i* stays in year *t*, and $LuckROA1_{ikt}$ is the industrial average of firm performance of industry *k* in year *t.* It represents the firm *i*'s performance from luck in year *t*.

According to Hypothesis 3, we expect the estimate of the interaction term $InstInv_{it} \times SkillROA1_{it}$ is positive, and the estimate of $InstInv_{it} \times LuckROA1_{ikt}$ is close to zero or negative. That is, the non-executive employee pay should respond to the performance from skill factors, but not from luck factors.

5. Empirical Results

5.1 Baseline Results

Since the sensitivity of non-executive employee wages to firm performance sensitivity is a key proxy of the efficiency of firm employee compensation policy, we examine the effects of institutional investor ownership concentration on the sensitivity

of total non-executive employee payroll and average non-executive employee salary to firm performance.

Table 3 reports the results. The first two columns display the results using *Ln(TotEmpPay)* as the dependent variable. In Column (1), besides firm and year fixed effects, we control for several firm characteristics, such as firm size, and province characteristics, the minimum wage (scale adjusted)[11]. In Column (2) we allow these control variables to have different effects on employee salary during the sample period by controlling for the interaction term between control variables and year dummies. The interaction term *InstInv*×*ROA1* is positive and significant at 1% in both columns, suggesting that the total non-executive employee payroll is more sensitive to performance in firms with higher institutional investor ownership concentration. The coefficients of the interaction term *InstInv*×*ROA1* are 2.355 and 2.312, respectively, indicating that one percentage point increase in firm performance would result in non-executive employee payroll increasing by 0.23% (which is 745,200 yuan, if the firm has an average *TotEmpPay*), given institutional investor ownership concentration raising ten percentage points. The impact of institutional investor ownership concentration is also very significant in economic sense. This finding is consistent with Hypothesis 1.

The last two columns in Table 3 display the results using *Ln(AvgEmpPay)* as the dependent variable. We also report the results estimated with the similar two

[11] In order to let the minimum wage has the similar magnitude as the total employee payroll, we use the annual minimum wage times the number of non-executive employees in the firm, and take the natural logarithm.

specifications[12]. The interaction term is both positive and significant at 1%, suggesting that the average non-executive employee salary is more sensitive to performance in firms with higher institutional investor ownership concentration. The coefficients of the interaction term are 2.123 and 2.086, indicating that one percentage point increase in firm performance would result in average non-executive employee salary increasing by 0.21% (which is 120.34 yuan, if the firm has an average *AvgEmpPay*), given institutional investor ownership concentration raising ten percentage points. This finding also supports Hypothesis 1.

The estimated results of the control variables also show that firm size and being a SOE are positively correlated to the total payroll and average salary. It's consistent with the notion that wages in big firms or SOEs are higher than those in small firms or private firms. The minimum wage variables, *Ln(MiniPay)* and *Ln(MiniSalary)* are both positive and significant, suggesting the minimum wage policy can increase firms' labor costs.

5.2 Pay for Gains vs. Pay for Loss

By providing monitoring and improving corporate governance, institutional investors can increase the sensitivity of non-executive employee pay to firm performance, but their impacts on the sensitivity of the pay to positive and negative performance may not be the same. In this section, we examine the heterogeneous effects

[12] Here the minimum wage is the annual minimum wage in the province.

of institutional investor ownership concentration on the sensitivity of non-executive employee wage to positive and negative firm earnings, respectively.

Table 4 reports the results. The first two columns display the results using *Ln(TotEmpPay)* as the dependent variable. As we can see from the results, the coefficients of the interaction term *InstInv×PosROA1* are 2.139 and 1.893, significant at 5% and 10% respectively. However, the coefficients of the interaction term *InstInv×NegROA1* are 2.148 and 2.201, both significant at 1%. This result indicates that the impact of institutional investor ownership is more pronounced when the firm suffers a loss, which is consistent with Hypothesis 2.

The last two columns present the results using *Ln(AvgEmpPay)* as the dependent variable. Similar to the previous results, the coefficients of interaction term *InstInv×PosROA1* are 2.178 and 1.852, significant at 5% and 10% respectively. The coefficients of the interaction term *InstInv×NegROA1* are 2.476 and 2.625, both significant at 1%. The result is also consistent with Hypothesis 2.

In sum, these findings all support Hypothesis 2 and confirm that the positive impacts of institutional investor ownership concentration on non-executive employee pay for performance sensitive is more driven by increasing pay cut penalty on employees, when firms are suffering operating loss.

5.3 Pay for Skill vs. Pay for Luck

Firm performance isn't entirely depending on the efforts of employees, the macro economy factors and industrial factors, here we refer these factors as "luck", can play

a big role in firm performance. Since the performance from luck does not reflect employees' efforts or capability, but the skill component does, if institutional investors do play efficient roles in employee pay structure, institutional investors should be less likely to affect pay for luck, but increase pay more for skill. In this section, we examine the heterogeneous effects of institutional investor ownership concentration on the sensitivity of employee wage to the performance explained by the luck and skill factors, respectively.

Table 5 reports the results. The first two columns show the results using *Ln(TotEmpPay)* as the dependent variable. The coefficients of *InstInv×LuckROA1* are all negative but insignificant. The coefficients of *InstInv×SkillROA1* are all positive and significant at 1%. These results suggest that the higher institutional investor ownership concentration is associated with higher total non-executive employee pay for skill, not pay for luck.

The last two columns show the results of using *Ln(AvgEmpPay)* as the dependent variable. Similar to previous results, the coefficients of *InstInv×SkillROA1* are all positive and significant at 1%, the coefficients of *InstInv×LuckROA1* are negative, but only significant at 10% in Column (4). These results also suggest that the higher institutional investor ownership concentration is associated with higher sensitivity of average non-executive employee salary to skill.

Above findings is consistent with Hypothesis 3. These results also suggest that institutional investors can identify the luck and skill component of the firm performance

and help the investee firms adjust the total payroll and average salary according to employees' efforts.

5.4 Heterogeneous Effects

In this section, we conduct further analyses to see whether the impact of institutional investor ownership concentration on employ wages is different in different firms. First, we explore the heterogeneous effects of firms with different intangible asset ratio, and then we exam the heterogeneous effects between firms exposed in different legal environments.

5.4.1 Intangible Asset Ratio

Human resource' importance varies a lot in different firms. Firms that are in high-tech industries or focused on innovation and creation pay more attention to human resource and treat their employees differently from other firms. Firms with large proportion of intangible asset are always the innovative, high-tech firms, so we divide the sample into two sub-samples and rerun the main regressions to see whether the impact of institutional investors is different in firms with different intangible asset ratio.

We use the median value of intangible asset ratio as the cut-off point, if the firm has a higher intangible asset ratio than the median value, then it's defined as a firm with high intangible asset ratio, otherwise it's defined as a firm with low intangible asset ratio.

The results are shown in Table 6. The first four columns report the results of using *Ln(TotEmpPay)* as dependent variable, the estimates of firms with high intangible asset

ratio are displayed in Column (1) and (2), the estimates of firms with low intangible asset ratio are displayed in Column (3) and (4). As we can see, in Column (1) and (2), the coefficients of the interaction term, *InstInv×ROA1,* are 2.835 and 2.792, both significant at 1%. However, in Column (3) and (4), the coefficients of the interaction term, *InstInv×ROA1,* are 1.819 and 1.902, both significant at 10%. The similar pattern also appears when we use *Ln(AvgEmpPay)* as dependent variable. The last four columns report the results. As we can see, the coefficients of interaction term *InstInv×ROA1* are larger and more significant in the sample of firms with high intangible asset ratio.

The results suggest the impact of institutional investors ownership concentration are more pronounced in firms with high intangible asset ratio. These findings can be explained by the reason that employees in firms with low intangible asset ratio often engage in low skilled and routine tasks, such as production workers, assembling worker, etc. It is easier to monitor workers in these jobs. Therefore, enhancing the sensitivity of these workers' pay to their performance may not be important. However, employees in in firms with high intangible asset ratio typically involved in creative and highly skilled work, such as R&D. Monitoring is not efficient in these kinds of jobs. Strengthening the link between their compensation and firm performance would be a more efficient way to enhance the performance of employees.

5.4.2 Legal Environment

The legal environment of where a firm is located may also affect the impact of institutional investor ownership concentration. Many research in law and finance (e.g. La Porta et al., 2002) have shown that law can serve as an external governance

mechanism. Therefore, firms located in provinces with good legal environment tend to have better corporate governance and their employ wages may be less affected by institutional investors.

We use the marketization index developed by Fan et al., (2011)[13] to measure the legal environment of each province in China. The higher marketization index means the local law enforcement is better, and the contract spirits of local people are stronger. If the province gets a higher marketization index than the median value, we define the province as a province with good legal environment, otherwise a province with bad legal environment. In this way, we divide the full sample into two subsamples: firms in good legal environments and firms in bad legal environments.

Using the two subsamples, we rerun the main regressions. Table 7 presents the results. The first four columns present the results of using *Ln(TotEmpPay)* as dependent variable. The regression results of firms in good legal environment are displayed in Column (1) and (2), those of firms in provinces with bad legal environment are displayed in Column (3) and (4). As we can see, in Column (1) and (2), the coefficients of interaction term *InstInv×ROA1* are 1.491 and 1.275, significant at 5% and 10% respectively. However, in Column (3) and (4) the coefficients of interaction term *InstInv×ROA1* are 3.119 and 3.327, significant at 1%. The similar pattern also appears when we use *Ln(AvgEmpPay)* as dependent variable. These results are shown in the last four columns, as we can see, the coefficients of interaction term *InstInv×ROA1* are larger and more significant in the sample of firms in bad legal environments.

[13] The marketization index is only available in 2009, so we only use the index in 2009 to rank the provinces. It's reasonable because the rank of marketization level didn't change a lot in the sample period.

Above results are consistent with what we have expected before. According to the results, institutional investor ownership concentration and legal environment appear to be substitutes, which indicates that institutional investors can play an active role in corporate governance.

5.5 Robustness Check

In this section, we first address the potential endogeneity problem of institutional investor ownership concentration. Then we conduct a battery of robustness checks to the alternative measures of the key explanatory variables.

5.5.1 Endogeneity Issues

There might be some endogeneity of the institutional investor ownership variables. For example, firms with better prospect and more sound management may attract more institutional investors, so that it is not that institutional investors affect governance or firm compensation policies.

To address this endogeneity issue, we use the instrumental variable regression approach. We use the industry average of institutional investor ownership concentration as the instrumental variable. First, this instrumental variable is positively correlated with institutional investor ownership concentration. In addition, the industry average of institutional investor ownership concentration may not directly affect employee wage.

Table 8 reports the regression results of the two-stage least square. Columns (1) and (2) illustrate the first stage results. We find that institutional investor ownership concentration (*InstInv*) and the interaction term (*InstInv*×*ROA1*) response evidently to

the instrumental variable and the corresponding interaction term respectively. Besides, Cragg-Donald Wald F statistics is 195, and it is much larger than the critical value (10) to reject the null hypothesis of weak instrumental variable to alleviate the concern on the weak instrumental variable problem.

Column (3) and (4) report the results of the second stage. We find that the estimate of the interaction term of institutional investor ownership concentration and firm performance is significantly positive in both regressions. The results are consistent with the main results.

5.5.2 Other Robustness Checks

Alternative Institutional Investor Ownership Concentration Variable. Minority stockholders may have little influence on firms. We recalculate institutional investor ownership concentration variable based on the top five largest shareholder list (*Inst_alt*). Column (1) and (4) of Table 9 show the results using *Inst_alt* as the measure of institutional investor ownership concentration. In both regressions, the interaction term *InstInv_alt*×*ROA1* is significantly positive. The magnitude is close to our baseline model. Therefore, our results are robust to this alternative measure of institutional investor ownership concentration.

Alternative Firm Performance Measure. We use EBIT divided by total assets (*ROA1*) as the primary measure of firm performance. But we do not take it for granted that all other researchers agree with our choice. For instance, EBITDA may be preferred than EBIT, since it may be less affected by earnings management on depreciation and amortization. Therefore, we replace our original measure (*ROA1*) with EBITDA

divided by total assets (*ROA2*). The results are report in Column (2) and (5) of Table 9. In both regressions, the interaction term *InstInv*× *ROA2* is significantly positive. The results are consistent with previous results.

Some may also use net income divided by total asset as return on asset. Hence we replace our original measure of firm performance with net income divided by total asset as return on asset (*ROA3*). Column (3) and (6) of Table 9 show the results. We find that the interaction term *InstInv*× *ROA3* is also significantly positive in both regressions. Therefore, our results are robust to these alternative firm performance measures.

6. Conclusions

In this paper, we investigate the relation between institutional investor ownership concentration and non-executive employee wages. Using the data of Chinese publicly listed firms from 2003 to 2014, we find that institutional investor ownership concentration is positively correlated to the sensitivity of total non-executive employee pay roll and average non-executive employee salary to firm performance, which suggests that the involving of institutional investors is a way to improve the efficiency of firm employees' compensation policy. More importantly, institutional investor ownership concentration enhances the relation between earnings and employee wages, especially when firms are suffering profit loss. Institutional investors can increase the pay to the skill part of performance, but not the luck part of performance. Institutional investors play stronger roles in enhancing employee compensation efficiency for firms with high intangible asset ratio and in bad legal environments. Overall, these findings

deepen our understanding of the roles of institutional investors in improving employee compensation policy and their impacts on stakeholders.

So far we focus only on the efficiency of firm compensation policy. Further extensions, such as how institutional investors affect other aspects of labor policies, such as employment, training etc., are all important open questions for further research.

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Table 1: Sample Description.

This table reports, by year, the number of observations for the full sample and sub-samples. Column (2) reports the number of firms for the full sample. Columns (3) and (4) report the number and the fraction of companies with institutional investors. Columns (5) and (6) report the number and the fraction of firms with low labor intensity. Columns (7) and (8) report the number and the fraction of firms located in provinces with low marketization level. Low labor intensity firms are defined as those with below average labor intensity. The marketization level is measured by the marketization index developed by Fan et al. (2011), if the province has a marketization index above the median level, then the province is defined as a low marketization province, firms located in that province is included in the sample of firms in low marketization provinces.

Year	Number of Firms	Firms with Institutional Investors	
		Number	Fraction
(1)	(2)	(3)	(4)
2003	1,006	862	85.69%
2004	1,062	899	84.65%
2005	1,179	1,002	84.99%
2006	1,167	1,009	86.46%
2007	1,252	1,097	87.62%
2008	1,361	1,178	86.55%
2009	1,412	1,304	92.35%
2010	1,565	1,461	93.35%
2011	1,903	1,800	94.59%
2012	2,169	2,027	93.45%
2013	2,287	2,099	91.78%
2014	2,310	2,201	95.28%
Total	18,673	16,939	90.71%

Table 2: Descriptive Statistics.

Panel A reports summary statistics of key variables for the full sample. Panel B compares between sub-samples, such as firms with institutional investors or not, low and high labor intensity enterprises, and located in low marketization provinces or not. Low labor intensity firms are defined as firms with below average labor intensities. Low marketization provinces are defined as provinces with below median marketization index. Definitions of all variables are provided in the Appendix. Coefficients marked with *, **, *** are significant at 10%, 5%, and 1%, respectively.

Panel A: Summary Statistics for the Full Sample.

Variables	Obs	Mean	Std. Dev	Min	Max
(1)	(2)	(3)	(4)	(5)	(6)
TotEmpPay (mil.)	18673	324	1900	0.987	8660
Ln(TotEmpPay)	18673	18.352	1.303	13.802	25.18432
AvgEmpPay (k.)	18673	57.304	40.930	8.422	33.023
Ln(AvgEmpPay)	18673	10.756	0.626	9.039	12.70755
InstInv	18673	0.026	0.070	0.000	0.7215517
ROA1	18673	0.054	0.095	-1.912	2.645649
Size	17852	22.275	1.081	19..469	29.414
Ln(age)	18673	2.530	0.416	0.000	3.610918
Intang	18673	0.047	0.065	-0.020	0.8400189
WkCap	18673	0.146	0.283	-1.828	0.962647
Growth	18673	0.246	1.052	-0.991	33.36953
OwnerCon	18673	0.373	0.157	0.022	0.894086
Soe	18673	0.553	0.497	0	1
Ln(MiniPay)	18645	16.687	1.277	12.858	22.70232
Ln(MiniSalary)	18666	9.090	0.330	8.006	9.667

Panel B: Comparison between Sub-Samples.

Variables	With Institutional Investors		
	Mean		Diff
	Yes (N=16,939)	No (N=1,734)	
(1)	(2)	(3)	(4)
Ln(TotEmpPay)	18.419	17.695	0.724***
Ln(Salary)	10.780	10.527	0.253***
InstInv	0.029	0	0.029***
ROA1	0.056	0.033	0.023***

Table 3: Institutional Investors and Employee Pay for Performance Sensitivity.

This table reports estimation of the effects of institutional investor ownership concentration on the employee pay for firm performance sensitivity. The dependent variable in the Column (1) and (2) is the natural logarithm of total non-executive employee payroll, in Column (3) and (4) is the natural logarithm of average non-executive employee salary. The interaction of institutional investor ownership concentration and firm performance provides key evidence on pay for performance sensitivity. Besides control variables, Column (1) and (3) control for firm fixed effect and year fixed effect. Column (2) and (4) further allow for those control variables have different effects during the sample period, through adding the interactions of control variables and year dummies. The sample period is 2003-2014. Definitions of all variables are provided in the Appendix. Robust standard errors reported in parentheses are clustered at the firm level. Coefficients marked with *, **, *** are significant at 10%, 5%, and 1%, respectively.

	Ln(TotEmpPay)		*Ln(AvgEmpPay)*	
	(1)	(2)	(3)	(4)
InstInv	-0.069	-0.076	0.023	0.012
	(0.138)	(0.134)	(0.146)	(0.148)
ROA1	-0.005	-0.003	-0.001	-0.030
	(0.058)	(0.058)	(0.054)	(0.054)
InstInv×ROA1	2.355***	2.312***	2.123***	2.086***
	(0.486)	(0.505)	(0.447)	(0.459)
Size	0.296***		0.091***	
	(0.013)		(0.013)	
Ln(age)	0.275***		0.089	
	(0.055)		(0.066)	
Intang	0.084		-0.097	
	(0.102)		(0.108)	
WkCap	0.020		0.142***	
	(0.036)		(0.037)	
Growth	0.023***		0.009*	
	(0.005)		(0.005)	
OwnerCon	0.253***		0.086	
	(0.085)		(0.088)	
State	0.114***		0.073**	
	(0.032)		(0.036)	
Ln(MiniPay)	0.566***			
	(0.016)			
Ln(MiniSalary)			0.197***	
			(0.056)	
Constants	1.480***	-0.154	6.333***	3.184***
	(0.305)	(0.627)	(0.576)	(0.899)
Control×YearDum	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observation	17,824	17,824	17,845	17,845
Adj. R-squared	0.960	0.962	0.757	0.762

Table 4: Pay for Gains vs. Pay for Loss.

This table reports the heterogeneous effects, when positive or negative EBIT happens, of institutional investor ownership concentration on employee pay for firm sensitivity. The dependent variable in the Column (1) and (2) is the natural logarithm of total employee payroll, in Column (3) and (4) is the natural logarithm of average employee salary. Comparison between the estimates of these two interaction terms gives key information. Besides control variables, Column (1) and (3) control for firm fixed effect and year fix effect. Column (2) and (4) further allow for those control variables have different effects during the sample period, through adding the interactions of control variables and year dummies. The sample period is 2003-2014. Definitions of all variables are provided in the Appendix. Robust standard errors reported in parentheses are clustered at the firm level. Coefficients marked with *, **, *** are significant at 10%, 5%, and 1%, respectively.

	Ln(TotEmpPay)		*Ln(AvgEmpPay)*	
	(1)	(2)	(3)	(4)
InstInv	-0.057	-0.051	0.023	0.031
	(0.150)	(0.147)	(0.165)	(0.166)
PosROA1	-0.095	-0.092	0.111	0.100
	(0.079)	(0.082)	(0.090)	(0.086)
NegROA1	0.100	0.102	-0.131*	-0.183**
	(0.073)	(0.069)	(0.078)	(0.083)
InstInv×PosROA1	2.139**	1.893*	2.178**	1.852*
	(1.019)	(1.057)	(1.110)	(1.086)
InstInv×NegROA1	2.148***	2.201***	2.476***	2.625***
	(0.548)	(0.566)	(0.561)	(0.583)
Size	0.297***		0.090***	
	(0.013)		(0.013)	
Ln(age)	0.273***		0.093	
	(0.055)		(0.066)	
Intang	0.083		-0.094	
	(0.102)		(0.108)	
WkCap	0.013		0.150***	
	(0.035)		(0.038)	
Growth	0.023***		0.008*	
	(0.005)		(0.005)	
OwnerCon	0.252***		0.088	
	(0.085)		(0.088)	
State	0.112***		0.075**	
	(0.032)		(0.036)	
Ln(MiniPay)	0.565***			
	(0.016)			
Ln(MiniSalary)			0.198***	
			(0.056)	
Constants	1.486***	-0.161	6.327***	3.205***
	(0.305)	(0.626)	(0.576)	(0.899)
Control×YearDum	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observation	17,824	17,824	17,845	17,845
Adj. R-squared	0.960	0.962	0.757	0.762

Table 5: Pay for Skill vs. Pay for Luck.

This table reports estimates of the impacts of institutional investor ownership concentration on the sensitivity of the pay to firm performance from skill and luck. The dependent variable in the Column (1) and (2) is the natural logarithm of total employee payroll, in Column (3) and (4) is the natural logarithm of average employee salary. Comparison between the estimates of these two interaction terms gives key information. Besides control variables, Column (1) and (3) only control for firm, and year fixed effects. Column (2) and (4) allow for those control variables have different effects during the sample period, through adding the interactions of control variables and year dummies. The sample period is 2003-2014. Definitions of all variables are provided in the Appendix. Robust standard errors reported in parentheses are clustered at the firm level. Coefficients marked with *, **, *** are significant at 10%, 5%, and 1%, respectively.

	Ln(TotEmpPay)		*Ln(AvgEmpPay)*	
	(1)	(2)	(3)	(4)
InstInv	0.214	0.162	0.413*	0.406*
	(0.190)	(0.180)	(0.236)	(0.229)
LuckROA1	-0.170	-0.059	-0.129	-0.088
	(0.172)	(0.173)	(0.206)	(0.210)
SkillROA1	0.000	-0.003	0.002	-0.032
	(0.059)	(0.058)	(0.054)	(0.054)
InstInv×	-3.147	-2.311	-5.450	-5.561*
LuckROA1	(2.501)	(2.286)	(3.441)	(3.320)
InstInv×	2.733***	2.630***	2.647***	2.611***
SkillROA1	(0.526)	(0.538)	(0.504)	(0.522)
Size	0.296***		0.091***	
	(0.013)		(0.013)	
Ln(age)	0.271***		0.084	
	(0.055)		(0.066)	
Intang	0.081		-0.101	
	(0.101)		(0.108)	
WkCap	0.021		0.143***	
	(0.036)		(0.037)	
Growth	0.023***		0.009*	
	(0.005)		(0.005)	
OwnerCon	0.257***		0.092	
	(0.085)		(0.088)	
State	0.114***		0.074**	
	(0.032)		(0.036)	
Ln(MiniPay)	0.566***			
	(0.016)			
Ln(MiniSalary)			0.196***	
			(0.056)	
Constants	1.489***	-0.159	6.353***	3.207***
	(0.304)	(0.626)	(0.575)	(0.900)
Control×YearDum	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observation	17,824	17,824	17,845	17,845
Adj. R-squared	0.960	0.962	0.757	0.762

Table 6: Heterogeneous Effects for Firms with High and Low Intangible Asset Ratio.

This table reports the estimates of institutional investor ownership concentration on the sensitivity of the pay to firm performance for firms with high intangible asset ratio and those with low intangible asset ratio. The dependent variable in the Column (1) to (4) is the natural logarithm of total employee payroll, in Column (5) to (8) is the natural logarithm of average employee salary. The results of firms with more college graduates are displayed in Column (1), (2), (5) and (6). The results of firms with less college graduates are displayed in Column (3), (4), (7) and (8). Besides control variables, Column (1), (3), (5) and (7) control for firm, and year fixed effects. Column (2), (4), (6) and (8) further allow for those control variables have different effects during the sample period, through adding the interactions of control variables and year dummies. The sample period is 2003-2014. Definitions of all variables are provided in the Appendix. Robust standard errors reported in parentheses are clustered at the firm level. Coefficients marked with *, **, *** are significant at 10%, 5%, and 1%, respectively.

	Ln(TotEmpPay)				*Ln(AvgEmpPay)*			
	High		*Low*		*High*		*Low*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
InstInv	0.097	0.073	0.010	0.005	-0.038	-0.066	0.213	0.141
	(0.293)	(0.284)	(0.168)	(0.170)	(0.290)	(0.288)	(0.198)	(0.206)
ROA1	-0.034	-0.033	0.000	0.002	-0.070	-0.092	0.053	0.017
	(0.097)	(0.095)	(0.075)	(0.076)	(0.073)	(0.072)	(0.078)	(0.078)
InstInv×ROA1	2.835***	2.792***	1.819*	1.902*	2.641***	2.816***	1.298	1.434
	(0.881)	(0.842)	(0.993)	(1.057)	(0.800)	(0.763)	(0.852)	(0.983)
Control	Yes	No	Yes	No	Yes	No	Yes	No
Control×YearDum	No	Yes	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observation	8,887	8,887	8,937	8,937	8,894	8,894	8,951	8,951
Adj. R-squared	0.966	0.967	0.963	0.964	0.760	0.764	0.792	0.798

Table 7: Heterogeneous Effects for Firms in Good and Bad Legal Environments.

This table reports the estimates of institutional investor ownership concentration on the sensitivity of the pay to firm performance for firms in different legal environments. The dependent variable in the Column (1) to (4) is the natural logarithm of total employee payroll, in Column (5) to (8) is the natural logarithm of average employee salary. The results of firms in better legal environments are displayed in Column (1), (2), (5) and (6). The results of firms in worse legal environments are displayed in Column (3), (4), (7) and (8). Besides control variables, Column (1), (3), (5) and (7) control for firm, and year fixed effects. Column (2), (4), (6) and (8) further allow for those control variables have different effects during the sample period, through adding the interactions of control variables and year dummies. The sample period is 2003-2014. Definitions of all variables are provided in the Appendix. Robust standard errors reported in parentheses are clustered at the firm level. Coefficients marked with *, **, *** are significant at 10%, 5%, and 1%, respectively.

	Ln(TotEmpPay)				*Ln(AvgEmpPay)*			
	Good		*Bad*		*Good*		*Bad*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
InstInv	0.093	0.098	-0.468*	-0.542**	0.138	0.164	-0.327	-0.452
	(0.165)	(0.161)	(0.246)	(0.236)	(0.170)	(0.172)	(0.281)	(0.280)
ROA1	0.057	0.068	-0.094	-0.097	0.056	0.029	-0.076	-0.105
	(0.068)	(0.067)	(0.082)	(0.084)	(0.068)	(0.067)	(0.074)	(0.079)
InstInv×ROA1	1.491**	1.275*	3.119***	3.327***	1.463*	1.230	2.743***	2.892***
	(0.673)	(0.659)	(0.508)	(0.505)	(0.762)	(0.779)	(0.548)	(0.574)
Control	Yes	No	Yes	No	Yes	No	Yes	No
Control×YearDum	No	Yes	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observation	13,708	13,708	4,116	4,116	13,727	13,727	4,118	4,118
Adj. R-squared	0.963	0.964	0.953	0.955	0.760	0.766	0.722	0.723

Table 8: Two-Stage Least Square Estimation with Instrumental Variable.

This table reports the estimates of two-stage least square with instrumental variable. The instrumental variable is the industrial average value of institutional investor ownership concentration. Columns (1) and (2) provide the results of the first stage, and institutional investor ownership concentration and the interaction of institutional investor ownership concentration and firm performance are the dependent variables, respectively. Column (3) and (4) report the results of the second stage using *Ln(TotEmpPay)* and *Ln(AvgEmpPay)* as dependent variable respectively. All columns control for firm and year fixed effects, and allow those control variables have different effects during the sample period. The sample period is 2003-2014. Definitions of all variables are provided in the Appendix. Robust standard errors reported in parentheses are clustered at the firm level. Coefficients marked with *, **, *** are significant at 10%, 5%, and 1%, respectively.

Variables	First Stage		Second Stage	
	InstInv	*InstInv×ROA1*	*Ln(TotEmpPay)*	*Ln(AvgEmpPay)*
	(1)	**(2)**	**(3)**	**(4)**
InstInv			-0.234	0.418
			(0.553)	(0.734)
ROA1	-0.002	-0.003***	-0.026	-0.100*
	(0.006)	(0.001)	(0.061)	(0.058)
InstInv×ROA1			3.161***	4.677***
			(1.102)	(1.298)
InstInv_iv	0.504***	-0.033***		
	(0.027)	(0.004)		
InstInv_iv×ROA1	-0.007	1.055***		
	(0.164)	(0.025)		
Control×YearDum	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Cragg-Donald Wald F	195.42			
With-in/Centered R^2	0.096	0.237	0.811	0.382
Observations	17824	17824	17,783	17,805

Table 9: Other Robustness Checks.

This table reports other robustness checks. Columns (1) and (4) show the results using *Inst_alt* as the measure of institutional investor ownership concentration. Columns (2) and (5) show the results using *ROA2* as the measure of performance. Column (3) and (6) show the result using *ROA3* as the measure of performance. The dependent variable is *Ln(TotEmpPay)* in Column (1) to (3), while it's *Ln(AvgEmpPay)* in Column (4) to (6). All columns control for firm and year fixed effects, and allow those control variables have different effects during the sample period. The sample period is 2003-2014. Definitions of all variables are provided in the Appendix. Robust standard errors reported in parentheses are clustered at the firm level. Coefficients marked with *, **, *** are significant at 10%, 5%, and 1%, respectively.

	Ln(TotEmpPay)			*Ln(AvgEmpPay)*		
	(1)	(2)	(3)	(4)	(5)	(6)
InstInv		-0.141	-0.044		-0.043	0.047
		(0.127)	(0.135)		(0.145)	(0.149)
ROA1	0.008			-0.017		
	(0.058)			(0.055)		
InstInv_alt	-0.043			0.115		
	(0.111)			(0.126)		
InstInv_alt×ROA1	2.129***			1.767***		
	(0.529)			(0.516)		
ROA2		0.054			-0.007	
		(0.064)			(0.056)	
InstInv× ROA2		2.374***			2.091***	
		(0.558)			(0.513)	
ROA3			-0.020			-0.029
			(0.066)			(0.060)
InstInv× ROA3			2.525***			2.128***
			(0.768)			(0.677)
Control×YearDum	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observation	17,824	17,824	17,822	17,845	17,845	17,843
Adj. R-squared	0.962	0.962	0.962	0.762	0.762	0.762

Appendix

Table A1: Variable Definitions and Descriptions

This table provides the definitions of all variables used in this paper. Column (1) provides variable names, and column (2) gives the corresponding notations in mathematical formulas. Column (3) provides the definition for each variable.

Variables	Notations	Definition and Description
(1)	**(2)**	**(3)**
Total Non-executive Employee payroll	*Ln(TotEmpPay)*	The difference between cash paid to or paid for employees and executive annual compensation. Then take natural logarithm. We also adjust inflation to guarantee the comparability of this variable during the sample period. The base year is 2003.
Average Non-executive Employee Salary	*Ln(AvgEmpPay)*	We get the net number of employees after subtracting the number of executives. Then we divide total employee payroll by the net number of employees. Finally, we take natural logarithm. We also adjust inflation to guarantee the comparability of this variable during the sample period. The base year is 2003.
Institutional Investor Ownership Concentration	*InstInv*	Sum of squares of institutional investors' shareholding ratios based on the top ten largest shareholder list.
Firm Performance	*ROA1*	EBIT divided by total assets.
Firm Size	*Size*	Natural logarithm of market value at the beginning of the year.
Firm Age	*Ln(age)*	Current year minus established year, plus 1. Take natural logarithm.
Intangible Asset Ratio	*Intang*	Intangible asset divided by total asset.
Working Capital Ratio	*WkCap*	We first calculate the difference between current assets and current liability, and then divide the difference by current assets.
Sale Growth Rate	*Growth*	The sales growth rate from year t-1 to year t.
Ownership Concentration	*OwnerCon*	The percentage of ownership owned by the largest shareholder.
State-Owned Enterprise Indicator	*Soe*	It is based on the nature of firms' ultimate controller. We assign 1 for SOEs; otherwise 0.
Annual minimum wage in the province, scaled by non-executive employee number	*Ln(MiniPay)*	The monthly lowest minimum wage in the province, times 12 to adjust to annual wage, then times non-executive employee number, finally take natural logarithm. We adjust inflation based on 2003.
Annual minimum wage in the province	*Ln(MiniSalary)*	The monthly lowest minimum wage in the province, times 12 to adjust to annual wage, then take natural logarithm. We adjust inflation based on 2003.
Positive Firm Performance	*PosROA1*	If EBIT is negative, replace firm performance with zero.
Negative Firm Performance	*NegROA1*	If EBIT is positive, replace firm performance with zero.
Performance from luck	*LuckROA1*	Industrial mean of firm performance in year *t*.
Performance from skill	*SkillROA1*	The deviation of firm performance from performance from luck.
IV for Institutional Investor Ownership Concentration	*InstInv_iv*	Industrial mean of institutional investor ownership concentration in year *t*.
Alternative Institutional Investor Ownership Concentration	*InstInv_alt*	Recalculate institutional investor ownership concentration based on the top five largest shareholder list.
Alternative Performance	*ROA2*	EBITDA divided by total asset.

Alternative Performance	*ROA3*	Net income divided by total asset.
Legal Environment		The market index developed by Fan et al. (2011)