Employees' negotiating power, leverage, and employee wage: Evidence from China

Guangzhong Li*
Sun Yat-Sen Business School, Sun Yat-Sen University, Guangzhou, PR China, 510275
Armen Hovakimian**
Zicklin School of Business, Baruch College, New York, NY 10010

ABSTRACT

Leverage decreases employee wages through discipline or increases employee wages through risk compensating. Controlling for the endogeneity of leverage, we find a disciplinary role of leverage in firms with overpaid employees. Financial distress and limited employees' negotiating power strengthen the disciplinary role of leverage. For firms with underpaid employees, we find a risk compensating role of leverage in increasing employee wages and the positive effect is only significant for safe firms and when employees have alternative employment opportunities. Our results emphasize the importance of employees' negotiating power in shaping the leverage-wages relationship.

JEL Classification: G32; J39, J63
Keywords: Leverage, employee wages, employees' negotiating power

* Sun Yat-Sen Business School, Sun Yat-Sen University, Guangzhou, PR China, 510275.Tel: +86-20-84112771; E-mail: liguangzhong@mail.sysu.edu.cn. Guangzhong Li acknowledges the financial support from National Natural Science Foundation of China (71372148) and the Major Project of Key Research Institute of Humanities and Social Sciences Education by Ministry of Education (13JJD790038).
** Zicklin School of Business, Box B10-225, Baruch College, New York, NY 10010. Tel: (646) 312-3490; fax: (646) 312-3451; E-mail: armen.hovakimian@baruch.cuny.edu.

1. Introduction

Economists have long been aware of the interaction between labor and capital markets (e.g., Bernanke and Gertler, 1995; Sharpe, 1994; Berk, Stanton, and Zechner, 2010; Benmelech, Bergman, and Seru, 2011; Pagano and Pica, 2011). While the neoclassical view emphasizes that employees should be paid by their marginal products of labor, the implicit contract, incentive contract, principal–agent, and bargaining models all indicate that a firm's capital structure plays an important role in setting the employee wages.[1]

Previous studies have empirically tested the relationship between Leverage and employee wages. Thus far, the empirical findings are at most inclusive because the wage data for a representative sample in the U.S. are not readily available.[2] Using this database, the early literature shows that financial leverage increases a firm's probability of distress and exposes workers to a high wage cut and layoff risk (Cantor, 1990; Ofek, 1993; Asquith, Gertner, and Scharfstein, 1994; Hanka, 1998; Campello, Graham, Harvey, 2010). Recently, Chemmanur, Cheng, and Zhang (2013) and Akyol and Verwijmeren (2013) document a positive relationship between leverage and employee wages among Compustat firms. They interpret the results as evidence that financially risky firms have to pay their employees high wages to compensate for the potential human capital costs induced by bankruptcy (Berk, Stanton, and, Zechner, 2010).

In the real world, employees' negotiating power will play an important role in shaping leverage-wages relation. When firms have all the flexibility, more debt will lead to more layoffs and lower wages to keep the risk of bankruptcy constant. On the other hand, when employees have

[1]An incomplete list of relevant papers includes the works of Jensen and Meckling (1976); Grossman and Hart (1982); Bronars and Deere (1991); John and John (1993); Bronars and Famulari (2001); Chang (1992, 1993); Dasgupta and Sengupta (1993); Jaggia and Thakor (1994); Cadenillas, Cvitanic, and Zapatero (2004); Berk, Stanton, and Zechner (2010); and Matsa (2010).

[2] Chemmanur, Cheng, and Zhang (2013) reveal that only approximately 10% of firms that trade actively on the NYSE, AMEX, or NASDAQ report information on "labor expenses" and "number of employees."

substantial bargaining power (e.g. can credibly threaten the firm to leave it), then more debt may result in more compensation for risk of bankruptcy and higher wages. Kale, Ryan, and Wang (2010) show that the improving employment opportunities weakens the positive productivity-leverage relation for U.S. manufacturing firms, which they interpret as the evidence that outside employment opportunities weaken disciplinary role of leverage.

In this study, we examine how leverage affects employee wages and the role of employees' negotiating power in shaping leverage-wages relation in China, the largest developing country and the second largest economy in the world. In contrast to previous studies that rely on a limited number of firms from developed countries, we believe that the Chinese data can provide us a good opportunity to examine this question. The large sample of Chinese manufacturing firms which represents the entire spectrum of the theoretical elements is well-suited for drawing reliable conclusions and uncovering the underlying channel(s) through which leverage affects employee wages in China, which has more than 100 million employees. Our study is among the few to examine the effect of leverage on employee wage in developing countries where both the labor and capital market are frictional.

We recognize that it is a challenging task to examine the effect of leverage on employee wages for various reasons. First, the existing theory does not provide precise predictions on the leverage-wages relationship. On one hand, the disciplinary role of debt stemming from agency problem or a simple trade-off between financial leverage and operating leverage in the absence of agency costs predicts an inverse relationship between leverage and employee wage, which is referred to as "discipline" in Hanka (1998). On the other hand, employees may require better terms of employment when bankruptcy risk increases (Berk, Stanton, and Zechner, 2010). In China where both labor and capital markets are frictional, the employee wage contract is more likely to

be the outcome of stakeholders' negotiation.

Second, the omitted variables from employee wages equation will bias the estimate of the effect of leverage on employee wages. For example, the non-trivial changes in both the labor and capital markets, including the major progress of labor protection and bargaining power of labor in China in the past two decades, affect the underlying forces driving the observed leverage-debt relations. In addition, a number of firm-level factors that may affect leverage and employee wages simultaneously are unobservable and difficult to measure, such as time-varying external financing costs induced by time-varying access to finance (McLean and Zhao, 2014), firm fundamental risk (Molina, 2005), and managerial entrenchment (Berger, Ofek, and Yermack, 1997; Cronqvist *et al*., 2009), etc.

For identification purpose, the ideal way to examine leverage-wages relationship is to measure how employee wages respond to the exogenous changes in firm leverage which are independent to any factors related to employee wages. But given the fact that wage contract is both *de jure* and *de facto* senior to all other debt contracts, it is difficult to find the exogenous shocks of firms' leverage which are not related to employee wages.

Finally, the reverse causality may also produce a spurious effect of leverage on employee wages. The recent literature on labor and finance notes that labor market frictions and employment treatment can affect corporate financial decisions, not the reverse (Agrawal and Matsa, 2013; Bae, Kang, and Wang, 2011; Kuzmina, 2014; Simintzi, Vig, and Volpin, 2015). Therefore, without carefully controlling for the endogeneity of leverage, the correlation between Leverage and employee wage is subject to numerous interpretations (Verwijmeren and Derwall, 2010; Chemmanur, Cheng, and Zhang, 2013).

To address the econometric issue, we adopt instrumental variable (IV) estimation in the panel

data setting to control for the potential endogenous bias. The IV for leverage used in this study are creditor's valuation of a firm's asset tangibility or expected asset liquidation values proposed by Berger et al. (1996). Compello (2006) used this variable as the IV to investigate the impact of leverage on product market competition. Fresard (2010) also use this variable as the IV to investigate the impact of financial strength on product market performance. We have good reasons to believe that asset tangibility from creditor's point of view can only affect employee wages through its association with leverage. Consistent with our expectation, the IV estimation indicates that OLS estimation overestimates the effect of debt on employee wages. While fixed effects regression finds a positive effect of leverage on employee wages, the IV estimation shows that firms with high leverage are associated with low employee wages. When we add more instrumental variables suggested in the literature to address the endogeneity issue, the results remain unchanged. To address the reserve causality, we add lagged employee wages in the model and estimate the dynamic panel model by GMM estimation. We still find the negative effect of leverage on employee wages.

We next examine how the effects of leverage on employee wage vary with firm characteristics and employees' negotiating power to ensure a clean interpretation. We find that the effect of leverage on employee wages is negative (positive) in firms when employee are overpaid (underpaid), respectively. The negative effect of leverage is more pronounced in distressed firms. The limit outside employee opportunities further strengthen the disciplinary of leverage in reducing employee wages. For firms with underpaid employees, we find that the positive effect of leverage on employee wages is only robust in safe firms with more outside employment opportunities.

Our study contributes to the recent blooming literature on finance and labor in three aspects.

First, while Akyol and Verwijmeren (2013) emphasize the importance of controlling for the firm fixed effects, we show that correcting for the potential endogeneity of leverage is crucial when examining the effect of leverage on employee wages. Our consistent estimation from IV estimation indicates that leverage decreases employee wages, whereas the fixed effects regression finds a positive effect of leverage on employee wages.

Second, contrary to the conventional view that debt may not be an effective disciplinary device in mitigating the managerial agency problem in emerging countries, this study provides robust evidence that capital structure acts as a disciplinary device in reducing employee overpayment problem in China.

Finally, we reveal a substantial heterogeneity in the leverage-wages in developing countries which is consistent with the role of employees negotiating power in leverage-wages relationships. Employees' bargaining power will dampen the disciplinary role of leverage in reducing employee wages and amplify the risk compensating role of leverage in increasing employee wages.

The rest of this paper is organized as follows. Section 2 summarizes related literature. Section 3 describes the institutional background of Chinese labor market. Section 4 describes variables, and econometrics issues. Section 5 reports the empirical findings. Section 6 presents the robustness check. Section 7 concludes the study.

2. Literature Review

While the competitive labor market model predicts that employee wages only depend on workers' marginal products of labor, economic theories indicate that a firm's capital structure plays an important role in setting employee wages. Groshen (1991) proposes that, to better understand employee wages, the future tests require the appropriate uses of corporate finance

variables and probably borrowing techniques developed in studies on the determinants of managerial compensation to distinguish the theories. In this section, we summarize the related literature and develop our testable hypotheses.

2.1 Disciplinary role of leverage in setting employee wages

A disciplinary role of leverage in setting employee wages may follow from agency theories of debt, but also be obtained in the absence of any agency costs. In this paper, the various mechanisms including agency costs, risk aversion, optimal leverage, and costly external finance which predict a negative effect of leverage on employee wages are referred to as "discipline"

When ownership and management are separated, the incomplete nature of contracting and monitoring inevitably creates rooms for managerial opportunism, allowing managers to enjoy a "quiet life," misallocate the resources, or appropriate perquisites out of the firm's resources for his own consumption (Jensen and Meckling, 1976; Fama and Jensen, 1983). Consistent with corporate agency theory, Bertrand and Mullainathan (2003) note that employee wages increase and overall productivity and profitability decrease in response to the adoption of anti-takeover laws. Cronqvist et al. (2009) reveal that entrenched managers are inclined to pay employees a high wage for private benefits, such as reduced effort in wage bargaining and improved social relations with employees. As a disciplining tool for top managers, risky debt serves as an effective tool in reducing free cash flow and the managers' incentive to engaging in empire-building activities, including hiring too many employees and paying them too much wages (Grossman and Hart, 1982; Jensen,1986).

Even without any agency problem, the simple tradeoff between operating and financial leverage will generate a negative leverage-wage relationship as suggested in Simintzi et al. (2015). Since both leverage and wages payment are fixed claims on uncertain firm cash flow, the static tradeoff theory of capital structure implies a negative relationship between leverage and employee

wages, even in the absence of *any* agency problem. The negative relation between leverage ratio and employee wages can be obtained when shareholders and managers are risk averse. To avoid the personal costs of bankruptcy, shareholders and managers have a strong incentive to take preemptive actions such as layoffs or wage cuts (see Sharpe, 1994; Ofek, 1993; Brown et al., 1992; Calomiris et al.,1994; Benmelech, Berman, and Seru, 2011)

2.2 Risk compensating role of leverage in setting employee wages

Leverage reduces accessible cash and exerts a negative effect on employee wages, but also raises employees' reservation wages due to layoff risk induced by high leverage. The optimal compensation contract derived from Berk, Stanton, and Zechner (2010) predicts a positive relationship between leverage and employee wages in a perfectly competitive labor and capital market. Ceteris paribus, a high leverage ratio should be associated with high wages to compensate for a high risk. Supporting this theory, Chemmanur, Cheng, and Zhang (2013) and Akyol and Verwijmeren (2013) find a positive relationship between wages and leverage among Compustat firms. Akyol and Verwijmeren (2013) also note that the positive relationships between firm leverage and employee wages hold for nonpublic firms in the Netherlands.

The two main hypotheses about the leverage-wages relationship have opposing predictions with regard to leverage-wages relationship. However, in the real world, surplus from a firm's operations will be distributed to its investment opportunities and its stakeholders, subjecting to managerial discretion and stakeholder bargaining power. What really drives the difference between the disciplinary role and risk compensating role of leverage in setting employee wages is the extent of employee bargaining power. When firms have all the flexibility, more debt may lead to more layoffs and lower wages to keep the risk of bankruptcy constant. On the other hand, when employees have substantial bargaining power (e.g. can credibly threaten the firm to leave it), then

more debt may result in more compensation for risk of bankruptcy and higher wages. In the end, how leverage affects employee wages should be resolved on empirical grounds.

3. Institutional background

China is one of the largest labor markets in the world. Over the last 30 years, China has experienced a fast economic growth, with an average annual growth rate of about 10 percent from 1980 to 2010. A relatively cheap labor force and reallocation of labor and capital across manufacturing firms are two key factors behind the growth miracle (Song, Storesletten, and Zilibotti, 2011). Despite years of rapid economic growth, the labor protection from the government and the official labor unions are still ineffective during our sample period, 1998-2007 (Pun 2005; Weil 2008). The proportion of labor wage income to the GDP has been declining from 43.82% in 1992 to 39.16% in 2007 (Zhang and Zhang 2010), compared to the nearly 60% share in developed economies such as Germany and the USA in the same period (Karabarbounis and Neiman 2014).

The employee wages vary substantially across different industries and different provinces. In our sample, the two lowest average employee wages are 9,837 RMB (about US&1,195) for recycling and disposal of waste industry and 11,041 (about US$1342) for processing of timbers, wood, bamboo, rattan, palm, and straw products industry, respectively. The two highest average employee wages are 16,192 RMB (about US&1,967) for measuring instrument and machinery for cultural activity and office work industry and 17,101 (about US$2078) for tobacco industry, respectively. The average employee wages in Beijing and Shanghai are 18,550 RMB (about US$2,253) and 18,602 RMB (about US$2,260), respectively, while the average employee wages in Henan and Gansu are 7,367 RMB (about US$895) and 9,261 RMB (about US$1,125), respectively.

Since 2007, the Chinese government speeded up its legislative activities and passed three major pieces of employment related laws to take effect from 2008: the Labour Contract Law of the People's Republic of China (enacted on 1st January 2008), the Employment Promotion Law of the People's Republic of China (enacted on 1st January 2008), and the Labour Dispute Mediation and Arbitration Law of the People's Republic of China (enacted on 1st May 2008). The Contract Labor Law allows labor unions to play a more important role in representing the interests of employees. The key roles of labor unions under the Labor Contract Law include consulting with employers about labor rules and regulations regarding wage, hour, break, leave work safety and hygiene, insurance and benefits, training, and work discipline, etc.

China is often viewed as a country with a quasi-infinite labor supply to the manufacturing sector. However, using the data from 1995 survey of the China Household Income Project (CHIP), Hering and Poncet (2010) find that the relationship between the city's market access and individual Chinese wages is positive and significant. Wages in China actually respond to market access in a surprisingly similar manner to that observed in industrialized countries. They conclude that the Chinese labor market, from this point of view, does not seem fundamentally different. We therefore expect that our findings have general implications for other emerging countries.

4. Data and empirical framework

4.1 Data and summary statistics

Our data is obtained from the Annual Surveys of Industrial Production from 1998 to 2007 conducted by the Chinese NBS. The data include all SOEs regardless of their annual sales and other manufacturing firms reporting more than 5 million Yuan (approximately US$600,000) of

annual sales.[3] The data consist of all mining and manufacturing firms, as well as firms involved in the production and supply of electricity, water, and heat. We only include manufacturing firms in our analysis.

The employee wages and layoff decisions in SOEs are mainly affected by the central administration plan and government policy. During our sample period, working in Chinese SOEs was described as having an "iron rice bowl", which means job and income security (Mengistae, Li, and Xu 2004; Hassard et al. 2007). Therefore, this study only includes non-SOEs as our sample because their employment and wage setting are mainly driven by market force. Our database contains detailed information on firm ownership structures based on the fraction of paid-in-capital contributed by different types of investors, such as the state, individuals, and foreigners. We use the 50% cutoff point to classify different types of ownership structures. Non-SOEs are defined as those with less than 50% state ownership.

To reduce the potential influence of outliers, we exclude firms with missing or negative values of total assets, employees, total wages, total liabilities, sales income, and output. Only firms with a business status of "in operation" are included. Firms with total assets less than 1 million and employees less than 10 are excluded in our analysis to ensure that our results are not driven by economically insignificant small firms with few employees. Ownership structure variables and leverage are trimmed to zero and one, respectively. Other variables are trimmed at 1% of both tails of the distribution. Our final sample has 168,553 firms and 625,611 firm-year observations belonging to 29 industries.[4]

The labor costs measured in Hanka (1998) and Chemmanur, Cheng, and Zhang (2010) is

3 The same data have been used by Hsieh and Klenow (2009) and Li, Yue, and Zhao (2010).
4 The definition of industry in this study is based on the two-digit code of the Classification and Code Standard of National Economy Industry. Detailed information on the definition of industry is provided in Appendix 2.

"labor and related expenses" (data 42) scaled by "the number of employees" (data 29). In our database, the two items related to employee pay are total employee wages and total employee benefits[5], which does not include managerial compensation. The employee wage (***aep***) is the log of average employee wages, defined as total employee wages (***AEP***) scaled by the number of employees adjusted by the province level CPI (2002 = 1). In the robustness check, we measure employee wages as the sum of total employee wages and total employee benefits scaled by the number of employees. Our main conclusions are similar.

Our key explanatory variable is leverage ratio, defined as total liability scaled by total assets. Here total liability mainly includes long term debt, short term debt, and trade credit. Unlike U.S. and some European countries, our measure of liability does not include pension in the sample period. As a robustness test, we also use the ratio of interest payment to total asset as the measure of leverage and find similar conclusions.

In the employee wage equation, we include a battery of control variables, which comprises firm size, growth opportunities, physical capital intensity, firm profitability, sales per employee, and ownership structure variables. We expect that firms with large size, physical capital intensity, high profitability, high growth opportunities, and high sales per employee pay high employee wages. Detailed information on the definitions of all variables is provided in Appendix 1.

Table 1 provides a summary of the main variables used in our regression analysis. The average employee wage is 13,107 Yuan or approximately US$ 1,593, using 8.23 as the exchange rate between RMB and US$. The average employee wages in Chinese manufacturing firms is about 5% of the average employee wage of Compustat firms (US$ 32,760) reported in Chemmanur, Cheng, and Zhang (2013). The sales per employee is 0.295 million RMB, approximately 35.84 thousand

5 The employee benefits usually includes death in service, long-term disability benefits, short-term sickness benefits, medical benefits, workmen's compensation, maternity and paternity benefits, and housing fund.

US$, which is about 21.56% of 166.26 thousand US$ sales per employee reported in Chemmanur, Cheng, and Zhang (2013). It confirms that China has a comparative advantage in labor costs compared to the U.S.. The maximum firm-level average labor costs (64,585 Yuan) are approximately 50 times as high as the minimum firm-level average labor costs (1,316 Yuan). The average leverage ratio of our sample is 55.1%, which is close to the number (56.7%) reported in Panel A of Table 1 by Li, Yue, and Zhao (2009). The average state ownership is about 7%.

3.2 Model and variables

Following the existing literature, the basic regression model to examine the effect of leverage on employee wages is specified as follows:

$$\begin{aligned} aep_{i,t} &= \beta_1 \times Leverage_{i,t} + \beta_2 \times Industry\_aep + \beta_3 \times Size_{i,t} + \beta_4 \times SalesGrowth_{i,t} + \beta_5 \times K/L_{i,t} \\ &+\beta_6 \times Profitability_{i,t} + \beta_7 \times Per\_sales_{i,t} + \beta_8 \times State_{i,t} + \beta_9 \times Foreign_{i,t} + \beta_{10} \times Individual_{i,t} \\ &+\beta_{11} \times Corporate_{i,t} + ProvinceDummy + IndustryDummy + \mu_i + v_t + \varepsilon_{i,t} \end{aligned} \quad (1)$$

The employee wage (***aep***) is the log of average employee wages (***AEP***). Model (1) is running contemporaneous regression to examine the effect of leverage on employee wage. Firm size (***Size***) measured by the log of CPI-adjusted total assets is included as we expect larger firms to pay higher wages than smaller firms. We also control for employee productivity, which is defined as total sales income divided by the number of employees (***Per_sale***). We expect that firms pay higher wages to employees with high productivity. Following Hanka (1998), physical capital intensity is measured by fixed assets divided by the number of employees (***K/L***). Given that more than 99% of our sample is non-listed private firms, we use sales growth (***SalesGrowth***) instead of market-to-book ratio to proxy for growth opportunities. Profitability (***Profitability***) measured by the ratio of total profits to total assets is included to control for the possibility that rent sharing occurs. Ownership variables are included in the full sample regression.

3.3 Econometrics issues

To obtain a consistent estimation of the effect of leverage on employee wages, we need to control for the endogeneity of the leverage in model (1). The endogenous bias can be induced by the omitted variable bias or reverse causality. For example, the firms located in underdeveloped regions with an underdeveloped local financial market tend to have low leverage ratios and low employee wages. As a result, we may observe a positive relationship between debt and average employee wages. The macroeconomic conditions may also affect leverage and employee wages simultaneously. To address this type of omitted variable bias, we include all province dummies and SIC two-digit industry dummies in all regressions. Year dummies are included to absorb the macroeconomic shocks. We include the annual province and industry average employee wages in the regression to absorb the effect of any changes in investment opportunities or other economic conditions at various industries in different provinces on employee wages. Model (1) is estimated by the fixed effects model to control for the effect of unobserved time-invariant firm heterogeneity.

The fixed effects regression cannot perfectly solve the endogenous bias if certain time-varying and firm-varying variables are omitted from model (1). The union/employee bargaining power is a good example. The existing theory proposes that firms increase leverage ratio as union/employee bargaining power increases (Matsa, 2010), and simultaneously, employees tend to receive a high salary if the union/employee bargaining power is high (Lewis, 1986; Yao and Zhong, 2013). Failing to include this variable in model (1) can lead to an overestimation of the leverage effect in the employee wage equation. However, if firms tend to reduce their leverage following the increase in employee bargaining power or labor protection as suggested in Simintzi, Vig, and Volpin (2015) and Woods, Tan, and Faff (2015), then omitting this variable will lead to an underestimation of the leverage effect. The other omitted variables that may also bias the estimate of the effect of leverage on employee wages includes management entrenchment (Berger

et al., 1997; Cronqvist et al., 2009), time-varying access to finance (McLean and Zhao, 2014), and firm fundamental risk (Molina, 2005), etc.

IV estimation can correct the econometric problem and provide a consistent estimator for β_1. However, finding an "instrument" for debt that does not belong in employee wage equations is difficult. Certain extensively used IVs for leverage in the existing literature may not satisfy the exclusion restriction. For example, industry average leverage is a powerful predictor of firm leverage (Frank and Goyal, 2009; Hovakimian et al., 2001), but it is also correlated with the level of unionization in a given industry, which, in turn, affects employee wage (Masta, 2010; Simintzi, Vig, and Volpin, 2015).

Following Campello (2006), the IV we used in this study is asset tangibility, borrows from Berger et al. (1996). It gauges the expected resale value of a firm's assets in liquidation, which is defined as follows:

$$Tangibility = 0.715 \times Receivables + 0.547 \times Inventory + 0.535 \times Fixed\ Capital$$

where $Receivables$ is the accounting receivables. All the variables on the right-hand side are scaled by total assets. Almeida and Campello (2006) suggest that this it is a good empirical proxy for debt capacity, which may affect firms' leverage. We believe the *creditor* valuation of the firm's transferable hard assets in liquidation should not affect employee wages other than through its association with leverage.

3.4 Cross-sectional variation in the relationship between Leverage and employee wages

Although the IV estimation allows for a consistent estimate of the coefficients in model (1), it does not clearly reveal the underlying driving mechanism. The disciplinary role of leverage and risk compensating role of leverage can generate negative or positive effects of leverage on employee wages. In the meanwhile, a stronger employees' bargaining power may attenuate the

disciplinary role of leverage and enhance the risk compensating role of leverage in setting employee wages. We subsequently examine how the effect of leverage on employee wage varies with firm characteristics and employee negotiating power to obtain a clean interpretation on how leverage affects employee wages. More specifically, we examine how the effects of debt on employee wages vary with employees' overpayment/underpayment, financial distress risks, and employees' negotiating power.

3.4.1 Employee overpayment and underpayment

To identify employees' over- and under- payment, we first try a simple identification strategy, i.e. firms with annual province and industry standardized employee wages in the top tertile are identified as firms with employee overpayment. Similarly, firms with standardized employee wages in the bottom tertile are identified as firms with employee underpayment. A more rigorous measure of employees' over- and under- payment is to follow Wade et al. (2006). We run the regression of the annual industry and province standardized employee wages on the annual province and industry standardized profits per employee and sales per employee by each industry. The extent of employee under- or overpayment is measured by taking the residuals from the regressions. A positive residual indicates that the employees are overpaid. Conversely, a negative residual indicates that the employees are underpaid. In robustness check, we add more control variables to determine the expected average employee pay and infer employee overpayment and underpayment. Our findings remain similar.

3.4.2 Financial distress risks

We use two methods to measure firm financial health and to classify distressed firms. The first measure is an index proposed in Wu et al. (2001) which is based on the Logit regression of the probability of financial distress on the firm characteristics using Chinese firm sample. The

definition is as follows:

$$\text{Prob}(distress = 1) = 1/(1+e^{-(-0.867+2.5313*X_1-40.2785*X_2+0.4597*X_3+3.2293*X_4-3.9544*X_5-1.7814*X_6)})$$

Where X_1 denotes profits growth rate. X_2 is ROA. X_3 denotes current ratio. X_4 is the ratio of long term liability to equity. X_5 is the ratio of working capital to total assets. X_6 denotes assets turnover ratio. Firms with $\text{Prob}(distress = 1) > 0.5$ are classified as firms with financial distress risk. The second measure is to identify distressed firms by interest coverage method. Following Fan et al. (2013), we define a company as "distressed" if a company's earnings before interest and tax payment (EBIT) are lower than its interest payment.

3.4.3 Employee negotiating power

Employee negotiating power comes from two sources: collective and non-collective bargaining power. Employees' collective bargaining power is mainly gained through union power and non-collective power is obtained through individual employee's negotiating power. In China, during our sample period, labor unions are mandated in all SOEs and optional and underdeveloped in non-SOEs. All firms' labor unions are members of All-China Federation of Labor which is subordinated to the Communist Party (Ng and Warner, 1998). The unions in China are very unlikely to act as a countervailing force to the employer and are not allowed to organize strikes or to conduct collective bargaining as their counterparts in other parts of the world do (Metcalf and Li, 2006). Thus we only consider individual employee's bargaining power in this study.

Two variables are used to proxy for employee negotiating power, local industry employment growth rate and the labor mobility index provided by the National Economic Research Institute under the China Reform Foundation. According to Bova, Dou, Hope (2015), the local industry employment growth rates can serve as a proxy for individual employee negotiating power. When the local industry employment growth rates is higher, employees possess higher negotiating power.

When the province labor mobility index is lower, employees negotiating power is limited. The employees in industries with above-median local industry employment growth rates are identified as employees with more negotiating power. Similarly, the employees in the province with labor mobility index ranks the top 10 in China are classified as employees with more negotiating power.

4. Empirical Findings

4.1 Evidence from the full sample

We estimate the first-stage regression with all of the explanatory variables in model (1) plus the IV. To save space, we don't report the results and will be available upon request. The coefficient on tangibility is highly significant at the 1% significance level. The positive sign is consistent with our expectation. Firms with high tangibility can have a high leverage. In spirit of 2SLS, the predicted value replaces the actual leverage in the regressions reported in the following analyses.

Table 2 shows the fixed effects and IV regressions results. The fixed effects regression reveals that the effect of leverage on employee wages is positive and significant. We run the Wu–Hausman test in the fixed effects regression. The test formally verifies the hypothesis that the unobserved and omitted variables are correlated with leverage. The Hausman tests reject the hypothesis of the exogeneity of leverage (zero correlation) in favor of the use of IVs.

We next estimate the effects of leverage and employee wages through IV estimation. We find that the OLS estimation overestimates the effect of leverage on employee wages in the full sample. Controlling for the endogeneity of leverage, the effect of leverage on employee wages is negative, -0.244. It implies that, employee wages will reduce by 5.52% when leverage increase by one standard deviation, 0.226. When examining the effect of control variables on employee wages, we

find that firms with large size, high sales growth, high physical capital intensity, high profitability, and high sales per employee pay high employee wages.

One potential drawback of our IV estimation is that, similar to leverage, the control variables including sales per employee, sales growth rate, and profitability may also be endogenous. The estimation also does not address the potential reverse causality problem. To address this issue, we include the lagged wages in our regression model and treat sales per employee, sales growth rate, and profitability as additional endogenous variables. The model then is estimated by system GMM estimation. More specifically, we use five years lagged employee wages, leverage, sales per employee, sales growth rate, and profitability as instrumental variables in our system GMM estimation. Hansen over-identification *J*-statistics fails to reject the validity of the instrument sets we select (p-value=0.247). The tests for serial correlation reject the null hypotheses of no first-order and no second-order serial correlation, but cannot reject the null hypothesis of no third-order serial correlation (p-value=0.299). The GMM estimation reported in Column 3 of Table 3 show that the effect of leverage on employee wages is negative and significant. The magnitude (-0.202) is similar to the coefficient estimated by IV (-0.244).

4.2 Leverage and employee wage: the role of firm characteristics

Since leverage can affect employee wages positively or negatively through different channels, we next turn to examine the effect of leverage on wages for different firm groups featured by employee over- and under-payment and different financial distress risk.

Table 3 reports the effect of leverage on employee wages for firms with employee overpayment and underpayment. When employee overpayment and underpayment are measured by residuals from wages regressions for each industry, Table 4 shows that the negative effect of leverage on employee wages is only observed for firms with employee overpayment (-0.802) . For

firms with employee underpayment, the effect of leverage on employee wages become positive, 0.172. Using annual local industry average employee wages as the measure of expected employee wages, we find similar results.

Table 4 examines how the effect of leverage on employee wages vary in distressed firms and safe firms. When using the probability of financial distress to identify distressed firms, our results show that the negative effect of leverage on employee wages is much stronger in distressed firms, -0.568, compared to its effect on wages for firms with less financial distress risks, -0.195. When distressed firms are identified by interest coverage method, we find similar results.

Table 5 examines how the effect of leverage on employee wages vary with employees' negotiating power. When using labor mobility index to measure employees' negotiating power, our results show that the negative effect of leverage on employee wages is much weaker when employees have negotiating power, -0.161, compared to its effect on wages when employees have alternative outside employment opportunities, -0.474. When employees' negotiating power is measured by local industry employment growth rate, we find that the negative effect of leverage on employee wages becomes insignificant for industries with high employment growth rate where presumably employees have high negotiating power.

4.3. The role of employees' negotiating power in the leverage-wages relation

In this section, we examine the role of employees' negotiating power in shaping the leverage-wages relationship in different firms for the following reasons. First, it can shed light on the effect of employees' negotiating power in attenuating the disciplinary role of leverage in setting employee wages (Kale, Ryan, and Wang. 2008; Akyol and Verwijmeren, 2013). Second, Berk, Stanton, and, Zechner, 2010 (2010) derive the optimal labor contract for a levered firm in an economy with perfectly competitive capital and labor markets. How the leverage-wages

relationship varies with employees' negotiating power is still unclear in theory and has to be resolved on empirical grounds.

5.1 Leverage and employee wage: evidence from double sorting

Table 6 shows the regression results for double sorting groups based on employee overpayment/underpayment and employees' negotiating power. Since the results are similar when we use different measures of employee overpayment/underpayment and employees' negotiating power, we only report results when employee overpayment/underpayment is measured by the residuals from wages regressions and employees' negotiating power measured by labor mobility index. Our results show that, in firms with employee overpayment, the negative effects of leverage is somewhat stronger when employees' negotiating power is lower indicated by the limit outside employment opportunities, -0.951, compared to the effect for employees with more opportunities, -0.756. In firms with employee underpayment, the positive effect of leverage on employee wages is only significant when employees have higher negotiating power indicated by high labor mobility index.

Table 7 shows the regression results for double sorting groups based on financial distress and employees' negotiating power. To save space, we only report results when financial distress risk is measured by the probability of financial distress and employees' negotiating power is measured by labor mobility index. We find that the negative effect of leverage on employee wages is most pronounced in distress firms with lower employees' negotiating power, -0.988. For employees with better outside employment opportunities, the negative effect becomes insignificant in distressed firms. For safe firms, the disciplinary role of leverage in employee wages is also weaker when employees have more outside employment opportunities.

In Table 8, we further examine the marginal contributions of three factors to the leverage-

wages relationship. To that end, we run regressions for firm groups by sorting firms independently by three factors. We find a robust disciplinary role of leverage in firms whose employees are overpaid. The negative effect is strongest in distressed firms whose employees have limited outside employment opportunities, -1.087. It implies that employee wages will reduce by 25.03% if leverage increase by 23.03% (one standard deviation of the sample), representing 37.37% increase in the ratio given the sample mean ratio is 61.62%. Our triple sorting results reveal that the positive effect of leverage on employee wages is only significant in safe firms with underpaid employees who have better negotiating power.

To sum up, our double sorting and triple sorting results suggest that leverage can be an effective disciplinary device in reducing employee overpayment problem. Financial distress and limited employees' negotiating power will strengthen the disciplinary role of leverage. The risk compensating role of leverage in increasing employee wages is only valid when underpaid employees have the bargaining power and firms are not financially distressed.

6. Robustness Check

As the first robustness check, we replace our definition of leverage as the ratio of interest payment to total assets and repeat our analysis. Table 9 finds the similar conclusion as Table 8 documents. The highest negative coefficient is reported in distressed firms whose employees are overpaid and have limit outside employment opportunities, -21.072. It indicates that the employee wages will decrease by 37.3% if the ratio of interest payment to total assets increase by 1.77% (one standard deviation for the sample), representing 131.11% increase in the ratio given the mean ratio is 1.35%. The positive effect of leverage on employee wages is only significant in safe firms with underpaid employees who have better negotiating power.

As the second robustness check, we add the ratio of intangible assets to total assets as an additional instrumental variable. In China, the intangible assets mainly include trade mark right and patent right. As the ratio of intangible assets increase the size of bankruptcy costs, it will adversely affect firms' leverage decision. However, there is no obvious reason why intangible asset would be related to employee wages. Therefore, we expect that the ratio of intangible asset can serve as an additional instrumental variable. Hansen overidentification *J*-statistics verify the validity of our instrumental variables, p-value=0.233. We repeat our analyses and find similar results.

In our multivariate analysis of average employee wages, we do not include managerial agency costs as one of the independent variables. As a last robustness check, following Ang, Cole, and Lin (2000), we include the operating expenses scaled by annual sales in the regression to control for the effect of managerial agency costs on employee wages and leverage. Our results show that including this variable in the analysis does not change our findings.

6. Conclusion

Using a large sample of Chinese non-SOEs manufacturing firms, we examine the leverage–wage relation in China where both labor and capital market are frictional. As China is a representative of many other emerging markets (Allen et al., 2005; Khawaja and Mian, 2005; Lin et al., 2009; Luo et al., 2011), our analysis can shed light on the leverage-wages relation in other emerging markets.

After controlling for the endogeneity of leverage in the panel data setting, we find a negative effect of leverage on employee wages in full sample. The subsample analyses reveal a substantial heterogeneity in the leverage-wages relation. Leverage will adversely (positively) affects

employee wages if employees are overpaid (underpaid). We also find the evidence that the financial distress and limited alternative employment opportunities will strengthen the disciplinary role of leverage in curtailing the employee overpayment problem. Our results show that, in emerging countries, the risk compensating hypothesis is only valid in safe firms where employees are underpaid and the local labor market is less frictional. Our study emphasizes the role of employees' negotiating power in shaping leverage-wages relation.

References:

Agrawal, A. K., and D. A. Matsa, 2013. Labor unemployment risk and corporate financing decisions. *Journal of Financial Economics* 108 (2):449-470.

Akyol, A. C., and P. Verwijmeren, 2013. Human capital costs, firm leverage, and unemployment rates. *Journal of Financial Intermediation* 22 (1):464-481.

Almeida, H., and M. Campello, 2007. Financial constraints, asset tangibility, and corporate investment, *Review of Financial Studies* 20 (5):1429-1460.

Ang, J. S., R. A. Cole, and J. W. Lin, 2000. Agency costs and ownership structure. *Journal of Finance* 55(1):81-106.

Asquith, P., R. Gertner, and D. Scharfstein, 1994. Anatomy of financial distress: An examination of junk-bond issuers. *Quarterly Journal of Economics* 109:625–658.

Bae, K. H., J. K. Kang, and J. Wang, 2011. Employee treatment and firm leverage ratio: A test of the stakeholder theory of capital structure. *Journal of Financial Economics* 100 (1):130-153.

Benmelech, E., N. K. Bergman, and A. Seru, 2011. Financing labor. NBER working paper 17144, http://www.nber.org/papers/w17144.

Berger, P. G., E. Ofek, and D.L. Yermack, 1997. Managerial entrenchment and capital structure decisions. *Journal of Finance* 52: 1411–1438.

Berger, P. G., E. Ofek, and I. Swary, 1996. Investor valuation and abandonment option, *Journal of Financial Economics* 42: 257-287

Berk, J. B., R. Stanton, and J. Zechner, 2010. Human capital, bankruptcy and capital structure. *Journal of Finance* 65 (3):891-926.

Bernanke, B. S., and M. Gertler, 1995. Inside the blackbox: the credit channel of monetary policy transmission. *Journal of Economic Perspectives* 9:27-48.

Bertrand, M., and S. Mullainathan, 2003. Enjoying the quiet life? Corporate governance and managerial preferences. *Journal of Political Economy* 111:1043-1075.

Bova, F., Y. Dou, and H. Ole-Kristian, 2013. Employee Ownership and Firm Disclosure, *Contemporary Accounting Research* 32 (2):639-673.

Bronars, S. G., and Donald R. Deere, 1991. The threat of unionization, the use of debt, and the preservation of shareholder wealth. *Quarterly Journal of Economics* 56 (1):231-254.

Bronars, S. G., and M. Famulari, 2001. Shareholder wealth and wages: Evidence for white-collar workers. *Journal of Political Economy* 109 (2):328-354.

Brown, D., C. James, and M. Ryngaert, 1992. Does leverage impede recovery from an earnings shock? An analysis of firms' responses to poor performance. Working paper, University of Florida.

Cadenillas, A., J. Cvitanić, and F. Zapatero, 2004. Leverage ratio decision and manager compensation with choice of effort and volatility. *Journal of Financial Economics* 73:71-92.

Calomiris, C., A. Orphanides, and S. Sharpe, 1994. Leverage ratio as a state variable for employment, inventory accumulation, and fixed investment. Board of Governors of the Federal Reserve System Finance and Economics Discussion Series 94-24.

Campello, M., J. R. Graham, and C. R. Harvey, 2010. The real effects of financial constraints: Evidence from a financial crisis. *Journal of Financial Economics* 97:470–487.

Campello, M, 2006. Debt financing: Does it boost or hurt firm. *Journal of Financial Economics* 82:135-172.

Cantor, Richard, 1990. Effects of leverage on corporate investment and hiring decisions. *Quarterly Review* (sum):31-41.

Chang, Chun, 1992. Capital structure as an optimal contract between employees and investors, *Journal of Finance* 47, 1141-1158.

Chang, Chun, 1993. Payout policy, capital structure, and compensation contracts when managers value control. *Review of Financial Studies* 6:911-933.

Chemmanur, T. J., Y. Cheng, and T. Zhang, 2013. Human capital, capital structure, and employee pay: An empirical analysis. *Journal of Financial Economics*110:478–502.

Cronqvist, H., F. H. M. Nilsson, H. Svaleryd, and J. Vlachos, 2009. Do entrenched managers pay their workers more? *Journal of Finance* 64 (1):309-339.

Dasgupta, S., and K. Sengupta, 1993. Sunk investment, bargaining and the choice of capital structure. *International Economics Review* 3:203-220.

Fama, E. F., and M. C., Jensen, 1983. Separation of ownership and control. *Journal of Law and Economics* 26:301–325.

Fan, J. P.H., J. Huang, and N. Zhu, 2013. Institution, ownership structures, and distress resolution in China, *Journal of Corporate Finance* 23, 71-87.

Frank, M. Z., and V. K. Goyal, 2009. Capital structure decisions: which factors are reliably important. *Financial Management* 38 (1):1-37.

Groshen, E. L., 1991. Five reasons why wages vary among employers? *Industrial Relations* 30 (3): 350-381.

Grossman, S. J., and O. D. Hart, 1982. Corporate financial structure and managerial incentives. The Economics of Information and Uncertainty, University of Chicago Press, Chicago, 107-137.

Hanka, Gordon, 1998. Debt and the terms of employment, *Journal of Financial Economics* 48:245-282.

Hassard, J., J. Sheehan, M.X. Zhou, J.T. Tong, J. Morris, and J.T. Tong. 2007. China's State Enterprise Reform: From Marx to the Market. London: Routledge.

Hering, L., and S. Poncet, 2010. Market access and individual wages: evidence from China. *Review of Economics and Statistics* 92 (1):145-159.

Hovakimian, A., T. Opler, and S. Titman, 2001. The debt-equity choice. *Journal of Financial and Quantitative Analysis* 36:1-24.

Hsieh, C. and P. J. Klenow, 2009. Misallocation and manufacturing TFP in China and India. *Quarterly Journal of Economics* 124 (4):1403-1448.

Jaggia, P. B., and A. V. Thakor, 1994. Firm-specific human capital and optimal capital structure, *International Economic Review* 35:283-308.

Jensen, M., 1986. Agency costs of free cash flow, corporate finance, and takeovers, *American Economic Review* 76 (2), 323-329.

Jensen, M. C., and W. H. Meckling, 1976. Theory of the firm: Managerial behavior, agency costs and capital structure. *Journal of Financial Economics* 3(4):305-360.

John, T. A., and K. John, 1993. Top management compensation and capital structure. *Journal of Finance* 48: 949-974.

Kale, J.R., H.E., Ryan, and L., Wang, 2008. Debt as a disciplining mechanism: evidence from the relations between employee productivity, capital structure, and outside employment Opportunities. Working Paper, Georgia State University.

Karabarbounis, L., and B. Neiman, 2014. The global decline of the labour share. *Quarterly Journal of Economics* 129 (1): 61_103.

Kuzimina, O., 2014. Operating flexibility and capital structure: evidence from a natural experiment. AFA 2014 Philadelphia Meeting Paper.

Lewis, H.G. 1986. Union Relative Wage Effects: A Survey. University of Chicago Press, Chicago.

Li, K., H. Yue and L. Zhao, 2009. Ownership, institutions, and capital structure: Evidence from China. *Journal of Comparative Economics* 37:471-490.

Matsa, D. A., 2010. Capital structure as a strategic variable: evidence from collective bargaining,

Journal of Finance 65 (3):1197-1232.

Metcalf, D. and J. Li, 2006. Chinese unions: an Alice in wonderland dream world, *Advances in Industrial and Labor Relations* 15, 213-268.

Mengistae, T., X. Li, and C. Xu, 2004. Agency theory and executive compensation: The Case of Chinese State-owned Enterprises. *Journal of Labour Economics* 22 (3): 615_637.

McLean, R. D. and M. Zhao, 2014. The business cycle, investor sentiment, and costly external finance. *Journal of Finance* 69 (3):1377-1409.

Molina, C. A., 2005. Are firms underleveraged? An examination of the effect of leverage on default probabilities. *Journal of Finance* 60:1427–1459.

Ng, Sek Hong and Malcolm Warner, 1998. China Trade Unions and Management London: Macmillan.

Ofek, E., 1993. Capital structure and firm response to poor performance: an empirical analysis. *Journal of Financial Economics* 34 (1): 3-30.

Pagano, M., and G. Pica, 2011. Finance and employment, CSEF Working Paper No.283.

Pun, N., 2005. Made in China: Women factory workers in a global workplace. Duke University Press Books.

Sharpe, S. A., 1994. Financial market imperfections, firm leverage and the cyclicality of employment. *American Economic Review* 84 (4):1060-1074.

Simintzi, E., V. Vig and P. F. Volpin, 2015. Labor protection and leverage. *Review of Financial Studies* 28(2): 561-591.

Song, Z., K. Storesletten, and F. Zilibotti, 2011. Growing like China, *American Economic Review* 101 (February): 196‑233

Verwijmeren, P., and J. Derwall, 2010. Employee well-being, firm leverage, and bankruptcy risk. *Journal of Banking and Finance* 34: 956‑964.

Wade, J.B., C.A. O'Reilly, and T.G. Pollock, 2006. Overpaid CEOs and underpaid managers: fairness and executive compensation, *Organization Science* 17 (5): 527-544.

Weil, R., 2008. City of youth: Shenzhen, China. Monthly Review 60 (2) June.

Woods, K. L., K. J. K. Tan, and R. W. Faff, 2016. Labor unions and corporate financial leverage: the bargaining device versus crowding-out hypotheses, http://ssrn.com/abstract=2497823.

Wu, S., and X. Lu, 2001. A study of models for predicting financial distress in China's listed

companies, *Economic Research Journal* 6:46-55.

Yao, Y., and N.H. Zhong, 2013. Unions and workers' welfare in Chinese firms. *Journal of Labour Economics* 31 (3): 633-667.

Zhang, J.W., and S.B. Zhang, 2010. Changes in primary income distribution and resulting problems: a view of labour share in GDP. *Chinese Journal of Population Science* 5 (1): 25-35.

Appendix A: Definition of Variables

This appendix details the variable construction for analysis in this paper.

AEP = total wages/number of employees, where total wages are deflated by the province-level CPI deflator (2002 = 1)

Industry_aep = the logarithm of annual province and industry average wages per employee

Leverage = total liability/total assets

Levergae_Int = the interest payment/total assets

Size = the logarithm of total assets, where total assets are deflated by the province-level CPI deflator

SalesGrowth = sales growth rate

K/L = net fixed assets/number of employees

Per_sales = sales income/number of employees

Profitability = total profits/total assets

Tangibility = 0.715* (account receivable/total assets) + 0.547* (inventory/total assets) + 0.535* (net fixed assets /total assets)

Per_Profit = total profits/number of employees

Employee = the number of employees

Distress = an indicator variable equals to one if a firm's earnings before interest and tax are lower than its interest payment

State = (paid-in-capital contributed by the state)/paid-in-capital

Foreign = (paid-in-capital contributed by foreign investors and Chinese foreign investors from Taiwan, Hong Kong, and Macau)/paid-in-capital

Private = (paid-in-capital contributed by individual investors)/paid-in-capital

Corporate = (paid-in-capital contributed by corporate investors)/paid-in-capital

Collective = (paid-in-capital contributed by collective investors)/paid-in-capital

Appendix B: Industry Definition

1	Processing of Food from Agricultural Products
2	Foods
3	Beverage
4	Tobacco
5	Textile
6	Textile Wearing Apparel
7	Leather, Fur, and Feather Products, Footwear, and Caps
8	Processing of Timbers, Wood, Bamboo, Rattan, Palm, and Straw Products
9	Furniture
10	Paper and Paper Products
11	Printing and Reproduction of Recording Media
12	Articles for Culture, Education, and Sport Activity
13	Processing of Petroleum, Cooking, and Processing of Nucleus Fuel
14	Chemical Raw Material and Chemical Products
15	Medicines
16	Chemical Fiber
17	Rubber
18	Plastic
19	Nonmetallic Mineral Products
20	Manufacture and Processing of Ferrous Metals
21	Manufacture and Processing of Nonferrous Metals
22	Metal Products
23	General Purpose Machinery
24	Special Purpose Machinery
25	Transport Equipment
26	Electrical Machinery and Equipment
27	Communication Equipment, Computer, and Other Electronic Equipment
28	Measuring Instrument and Machinery for Cultural Activity and Office Work
29	Artwork, Other Manufacture n.e.c.
30	Recycling and Disposal of Waste

Table 1 Sample statistics

AEP is the wages per employee, adjusted for province-level CPI (2002=1). ***Leverage*** is defined as the total liability scaled by the total assets. ***Leverage_Int*** is defined as the interest payment scaled by the total assets. ***SalesGrowth*** is the sales growth rate. ***K/L*** is defined as net fixed assets scaled by the number of employees. ***Profitability*** is defined as total profits scaled by total assets. ***Tangibility*** is the asset tangibility, measured by 0.715*(account receivable/total assets)+0.547*(inventory/total assets)+0.535*(net fixed assets /total assets). ***Per_sales*** is the sales per employee. ***Per_profit*** is the profits per employee. ***Employee*** is the number of employees. ***State*** is the state ownership defined as the fraction of paid-in-capital contributed by the state. ***Foreign*** is the foreign ownership defined as the fraction of paid-in-capital contributed by foreign investors or Chinese foreign investors from Taiwan, Hong Kong, and Macro. ***Individual*** is the individual ownership defined as the fraction of paid-in-capital contributed by individual investors. ***Corporate*** is the fraction of paid-in-capital contributed by corporate investors. ***Collective*** is the collective ownership defined as the fraction of paid-in-capital contributed by collective investors.

	Mean	**St Dev**	**Min**	**Max**	**Obs**
AEP (thousands)	13.107	8.270	1.316	64.585	625,611
Leverage	0.551	0.227	0.002	1.000	625,611
Leverage_Int	0.013	0.021	0.000	1.000	625,611
Size	9.913	1.310	6.779	17.692	625,611
K/L(millions)	0.063	0.079	0.001	0.643	625,611
Profitability	0.076	0.109	-0.147	0.817	625,611
Tangibility	0.415	0.119	0.078	0.658	625,611
Per_sale (millions)	0.295	0.314	0.011	2.535	625,611
SalesGrowth	0.275	0.598	-0.752	5.448	625,611
Per_Profit (millions)	0.014	0.032	-0.340	1.296	625,611
Employee	288	852	10	188151	625,611
State	0.007	0.050	0.000	0.500	625,611
Foreign	0.200	0.367	0.000	1.000	625,611
Private	0.455	0.472	0.000	1.000	625,611
Corporate	0.230	0.384	0.000	1.000	625,611
Collective	0.107	0.285	0.000	1.000	625,611

Table 2 Leverage and employee wage: full sample

The table reports the estimation results from the following model:

$$aep_{i,t} = \beta_1 \times Leverage_{i,t} + \beta_2 \times Industry\_aep + \beta_3 \times Size_{i,t} + \beta_4 \times SalesGrowth_{i,t} + \beta_5 \times K/L_{i,t}$$
$$+\beta_6 \times Profitability_{i,t} + \beta_7 \times Per\_sales_{i,t} + \beta_8 \times State_{i,t} + \beta_9 \times Foreign_{i,t} + \beta_{10} \times Individual_{i,t}$$
$$+\beta_{11} \times Corporate_{i,t} + ProvinceDummy + IndustryDummy + \mu_i + v_t + \varepsilon_{i,t}$$

The dependent variable is the log of average employee wages. The t-statistics reflect White (1980) robust standard errors adjusted for heteroskedasticity and firm-level clustering. Coefficient estimates significantly different from zero at 10%, 5%, and 1% level are marked +, * and **, respectively.

	Fixed Effects	**IV**	**GMM**
Leverage$_{i,t}$	0.013**	-0.244**	-0.202*
	(2.69)	(-4.28)	(-2.19)
aep$_{i,t-1}$			0.609**
			(7.02)
Industry_aep$_{i,t}$	0.522**	0.516**	0.352**
	(59.99)	(58.70)	(6.70)
Size$_{i,t}$	0.029**	0.039**	0.019*
	(14.01)	(13.33)	(2.49)
SalesGrowth$_{i,t}$	0.003**	0.004**	0.158**
	(2.86)	(4.05)	(2.84)
K/L$_{i,t}$	0.943**	0.882**	0.402**
	(45.98)	(36.71)	(3.94)
Profitability$_{i,t}$	0.135**	0.078**	-0.26
	(14.27)	(4.96)	(-0.94)
Per_sales$_{i,t}$	0.450**	0.455**	0.04
	(82.71)	(81.76)	(0.70)
Ownership	Yes	Yes	Yes
Province	Yes	Yes	Yes
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Firm	Yes	Yes	Yes
Wu-Hausman Test (p value)	0.000		
Hansen J Test (p value)			0.096
Observations	625,611	625,611	423,416
R^2	0.232	0.225	

Table 3 Leverage and employee wage: the role of employee overpayment and underpayment

The table reports the fixed effects regression results from the following model for firms with overpaid and underpaid employees:

$$aep_{i,t} = \beta_1 \times Leverage_{i,t} + \beta_2 \times Industry\_aep + \beta_3 \times Size_{i,t} + \beta_4 \times SalesGrowth_{i,t} + \beta_5 \times K/L_{i,t}$$
$$+\beta_6 \times Profitability_{i,t} + \beta_7 \times Per\_sales_{i,t} + \beta_8 \times State_{i,t} + \beta_9 \times Foreign_{i,t} + \beta_{10} \times Individual_{i,t}$$
$$+\beta_{11} \times Corporate_{i,t} + ProvinceDummy + IndustryDummy + \mu_i + v_t + \varepsilon_{i,t}$$

The dependent variable is the log of average employee wages. Leverage is the predicted value from first-stage regression. The t-statistics reflect White (1980) robust standard errors adjusted for heteroskedasticity and firm-level clustering. Coefficient estimates significantly different from zero at 10%, 5%, and 1% level are marked +, * and **, respectively.

	Positive Residuals	**Negative Residuals**	**Wages in top tertile**	**Wages in bottom tertile**
Leverage$_{i,t}$	-0.802**	0.172**	-0.780**	0.344**
	(-11.33)	(3.00)	(-9.88)	(4.42)
Industry_aep$_{i,t}$	0.656**	0.449**	0.727**	0.446**
	(60.50)	(49.73)	(59.14)	(36.28)
Size$_{i,t}$	0.037**	0.022**	0.024**	0.006+
	(10.34)	(7.79)	(6.14)	(1.65)
SalesGrowth$_{i,t}$	0.009**	0.005**	0.004*	0.003+
	(6.19)	(4.60)	(2.32)	(1.89)
K/L$_{i,t}$	0.538**	0.582**	0.412**	0.567**
	(19.64)	(23.65)	(14.47)	(15.69)
Profitability$_{i,t}$	-0.031	0.241**	-0.150**	0.181**
	(-1.56)	(15.20)	(-7.03)	(8.38)
Per_sales$_{i,t}$	0.568**	0.319**	0.308**	0.203**
	(70.27)	(61.10)	(47.23)	(24.91)
Ownership	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes
Observations	252,020	373,591	208,536	208,537
R^2	0.379	0.287	0.354	0.275

Table 4 Leverage and employee wage: the role of financial distress

The table reports the 2SLS results from the following model for firms with different financial distress risks:

$$aep_{i,t} = \beta_1 \times Leverage_{i,t} + \beta_2 \times Industry\_aep + \beta_3 \times Size_{i,t} + \beta_4 \times SalesGrowth_{i,t} + \beta_5 \times K/L_{i,t} + \beta_6 \times Profitability_{i,t} + \beta_7 \times Per\_sales_{i,t} + \beta_8 \times State_{i,t} + \beta_9 \times Foreign_{i,t} + \beta_{10} \times Individual_{i,t} + \beta_{11} \times Corporate_{i,t} + ProvinceDummy + IndustryDummy + \mu_i + v_t + \varepsilon_{i,t}$$

The dependent variable is the log of average employee wages. Leverage is the predicted value from first-stage regression. The t-statistics reflect White (1980) robust standard errors adjusted for heteroskedasticity and firm-level clustering. To save the space, the coefficients on control variables are not reported. Coefficient estimates significantly different from zero at 10%, 5%, and 1% level are marked +, * and **, respectively.

	Prob(*distress* = 1) > 0.5	Prob(*distress* = 1) < 0.5	**Distressed**	**Safe**
***Leverage*$_{i,t}$**	-0.568**	-0.195**	-0.368**	-0.192**
	(-2.60)	(-3.11)	(-2.68)	(-2.87)
***Industry_aep*$_{i,t}$**	0.367**	0.525**	0.400**	0.540**
	(13.31)	(53.74)	(22.02)	(50.38)
***Size*$_{i,t}$**	0.038**	0.037**	0.037**	0.037**
	(3.72)	(11.42)	(5.38)	(10.81)
***SalesGrowth*$_{i,t}$**	0.014**	0.002	0.009**	0.002
	(3.59)	(1.43)	(3.42)	(1.29)
***K/L*$_{i,t}$**	0.831**	0.906**	1.024**	0.861**
	(11.58)	(32.69)	(19.42)	(29.29)
***Profitability*$_{i,t}$**	0.182**	0.067**	0.04	0.069**
	(2.88)	(3.86)	(0.76)	(3.80)
***Per_sales*$_{i,t}$**	0.569**	0.449**	0.531**	0.439**
	(23.86)	(74.42)	(35.18)	(69.11)
Onwership	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes
Observations	98,837	526,774	159,382	463,539
***R*^{2}**	0.263	0.230	0.213	0.231

Table 5 Leverage and employee wage: the role of employees' negotiating power

The table reports the 2SLS results from the following model for firms with different relative wages:

$$aep_{i,t} = \beta_1 \times Leverage_{i,t} + \beta_2 \times Industry\_aep + \beta_3 \times Size_{i,t} + \beta_4 \times SalesGrowth_{i,t} + \beta_5 \times K/L_{i,t} + \beta_6 \times Profitability_{i,t} + \beta_7 \times Per\_sales_{i,t} + \beta_8 \times State_{i,t} + \beta_9 \times Foreign_{i,t} + \beta_{10} \times Individual_{i,t} + \beta_{11} \times Corporate_{i,t} + ProvinceDummy + IndustryDummy + \mu_i + v_t + \varepsilon_{i,t}$$

The dependent variable is the log of average employee wages. Leverage is the predicted value from first-stage regression. The t-statistics reflect White (1980) robust standard errors adjusted for heteroskedasticity and firm-level clustering. Coefficient estimates significantly different from zero at 10%, 5%, and 1% level are marked +, * and **, respectively.

	High Labor Mobility	Low Labor Mobility	High Employment Growth Rate	Low Employment Growth Rate
Leverage$_{i,t}$	-0.161*	-0.474**	-0.105	-0.286**
	(-2.52)	(-3.92)	(-1.21)	(-3.06)
Industry_aep$_{i,t}$	0.582**	0.444**	0.545**	0.462**
	(49.76)	(32.06)	(38.65)	(34.36)
Size$_{i,t}$	0.036**	0.047**	0.039**	0.030**
	(10.97)	(7.61)	(8.86)	(6.46)
SalesGrowth$_{i,t}$	0.005**	0.003	0.000	0.009**
	(3.89)	(1.26)	(-0.12)	(4.74)
K/L$_{i,t}$	0.866**	0.932**	0.814**	0.912**
	(31.47)	(19.25)	(22.68)	(23.65)
Profitability$_{i,t}$	0.087**	0.043	0.143**	0.059*
	(4.83)	(1.32)	(5.94)	(2.30)
Per_sales$_{i,t}$	0.443**	0.494**	0.417**	0.471**
	(69.96)	(43.07)	(51.21)	(52.65)
Ownership	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes
Observations	468,357	157,254	312,797	312,814
R^2	0.236	0.22	0.231	0.24

Table 6 Leverage and employee wage: double sorting I

The table reports the 2SLS results from the following model for different firm groups:

$$aep_{i,t} = \beta_1 \times Leverage_{i,t} + \beta_2 \times Industry\_aep + \beta_3 \times Size_{i,t} + \beta_4 \times SalesGrowth_{i,t} + \beta_5 \times K/L_{i,t}$$
$$+\beta_6 \times Profitability_{i,t} + \beta_7 \times Per\_sales_{i,t} + \beta_8 \times State_{i,t} + \beta_9 \times Foreign_{i,t} + \beta_{10} \times Individual_{i,t}$$
$$+\beta_{11} \times Corporate_{i,t} + ProvinceDummy + IndustryDummy + \mu_i + v_t + \varepsilon_{i,t}$$

The dependent variable is the log of average employee wages. Leverage is the predicted value from first-stage regression. The t-statistics reflect White (1980) robust standard errors adjusted for heteroskedasticity and firm-level clustering. To save the space, the coefficients on control variables are not reported. Coefficient estimates significantly different from zero at 10%, 5%, and 1% level are marked +, * and **, respectively.

	Positive Residuals		**Negative Residuals**	
	High labor mobility	**Low labor mobility**	**High labor mobility**	**Low labor mobility**
Leverage$_{i,t}$	-0.756**	-0.951**	0.253**	-0.022
	(-9.58)	(-6.06)	(3.84)	(-0.19)
Industry_aep$_{i,t}$	0.688**	0.608**	0.522**	0.365**
	(49.68)	(33.44)	(43.01)	(25.92)
Size$_{i,t}$	0.034**	0.048**	0.021**	0.024**
	(8.49)	(6.10)	(6.33)	(4.07)
SalesGrowth$_{i,t}$	0.008**	0.012**	0.006**	0.003
	(4.72)	(3.95)	(4.49)	(1.30)
K/L$_{i,t}$	0.550**	0.500**	0.562**	0.655**
	(17.82)	(8.52)	(19.77)	(13.39)
Profitability$_{i,t}$	-0.017	-0.068	0.245**	0.219**
	(-0.80)	(-1.54)	(13.26)	(6.89)
Per_sales$_{i,t}$	0.568**	0.560**	0.309**	0.355**
	(62.44)	(32.02)	(51.79)	(32.57)
Ownership	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes
Observations	189,491	62,529	278,866	94,725
R^2	0.379	0.375	0.291	0.275

Table 7 Leverage and employee wage: double sorting II

The table reports the 2SLS results from the following model for different firm groups:

$$aep_{i,t} = \beta_1 \times Leverage_{i,t} + \beta_2 \times Industry\_aep + \beta_3 \times Size_{i,t} + \beta_4 \times SalesGrowth_{i,t} + \beta_5 \times K/L_{i,t}$$
$$+\beta_6 \times Profitability_{i,t} + \beta_7 \times Per\_sales_{i,t} + \beta_8 \times State_{i,t} + \beta_9 \times Foreign_{i,t} + \beta_{10} \times Individual_{i,t}$$
$$+\beta_{11} \times Corporate_{i,t} + ProvinceDummy + IndustryDummy + \mu_i + v_t + \varepsilon_{i,t}$$

The dependent variable is the log of average employee wages. Leverage is the predicted value from first-stage regression.The t-statistics reflect White (1980) robust standard errors adjusted for heteroskedasticity and firm-level clustering. To save the space, the coefficients on control variables are not reported. Coefficient estimates significantly different from zero at 10%, 5%, and 1% level are marked +, * and **, respectively.

	Prob(*distress* = 1) > 0.5		Prob(*distress* = 1) < 0.5	
	High labor mobility	**Low labor mobility**	**High labor mobility**	**Low labor mobility**
Leverage$_{i,t}$	-0.391	-0.988*	-0.146*	-0.332*
	(-1.51)	(-2.40)	(-2.07)	(-2.43)
Industry_aep$_{i,t}$	0.483**	0.254**	0.582**	0.461**
	(12.66)	(6.17)	(45.11)	(29.35)
Size$_{i,t}$	0.036**	0.040*	0.035**	0.041**
	(2.93)	(2.03)	(9.74)	(5.85)
SalesGrowth$_{i,t}$	0.010*	0.019**	0.003+	-0.001
	(2.22)	(2.71)	(1.82)	(-0.37)
K/L$_{i,t}$	0.805**	0.916**	0.883**	0.987**
	(9.41)	(6.89)	(28.08)	(16.87)
Profitability$_{i,t}$	0.179*	0.176	0.073**	0.039
	(2.40)	(1.45)	(3.72)	(1.06)
Per_sales$_{i,t}$	0.548**	0.629**	0.439**	0.483**
	(19.06)	(14.77)	(64.05)	(37.80)
Onwership	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Firm	Yes	Yes	Yes	Yes
Observations	70,424	28,413	397,933	128,841
R^2	0.268	0.262	0.234	0.216

Table 8 Leverage and employee wage: triple sorting

The table reports the fixed effect regressions results from the following model for firms with different firm characteristics and employees negotiating power.

$$aep_{i,t} = \beta_1 \times Leverage_{i,t} + \beta_2 \times Industry\_aep + \beta_3 \times Size_{i,t} + \beta_4 \times SalesGrowth_{i,t} + \beta_5 \times K/L_{i,t}$$
$$+\beta_6 \times Profitability_{i,t} + \beta_7 \times Per\_sales_{i,t} + \beta_8 \times State_{i,t} + \beta_9 \times Foreign_{i,t} + \beta_{10} \times Individual_{i,t}$$
$$+\beta_{11} \times Corporate_{i,t} + ProvinceDummy + IndustryDummy + \mu_i + v_t + \varepsilon_{i,t}$$

The dependent variable is the log of average employee wages. Leverage is the predicted value from first-stage regression. The firm characteristics and province, industry, year, and firms dummies are included in all regressions. The t-statistics reflect White (1980) robust standard errors adjusted for heteroskedasticity and firm-level clustering. To save the space, the coefficients on control variables are not reported. Coefficient estimates significantly different from zero at 10%, 5%, and 1% level are marked +, * and **, respectively.

	Low Labor Mobility	***High Labor Mobility***
Prob(*distress* = 1) > 0.5 and ***Positive Residuals***	-1.087*	-0.587+
	(-2.04)	(-1.74)
Prob(*distress* = 1) > 0.5 and ***Negative Residuals***	-0.036	0.258
	(-0.08)	(0.87)
Prob(*distress* = 1) < 0.5 and ***Positive Residuals***	-0.691**	-0.743**
	(-3.84)	(-8.45)
Prob(*distress* = 1) < 0.5 and ***Negative Residuals***	-0.077	0.219**
	(-0.58)	(2.99)

Table 9 Leverage and employee wage: triple sorting with alternative measure of leverage

The table reports the fixed effect regressions results from the following model for firms with different firm characteristics and employees negotiating power.

$$aep_{i,t} = \beta_1 \times Leverage\_Int_{i,t} + \beta_2 \times Industry\_aep + \beta_3 \times Size_{i,t} + \beta_4 \times SalesGrowth_{i,t} + \beta_5 \times K/L_{i,t}$$
$$+\beta_6 \times Profitability_{i,t} + \beta_7 \times Per\_sales_{i,t} + \beta_8 \times State_{i,t} + \beta_9 \times Foreign_{i,t} + \beta_{10} \times Individual_{i,t}$$
$$+\beta_{11} \times Corporate_{i,t} + ProvinceDummy + IndustryDummy + \mu_i + v_t + \varepsilon_{i,t}$$

The dependent variable is the log of average employee wages. ***Leverage_Int*** is defined as the interest payment scaled by the total assets. ***Leverage_Int*** used in the following regressions is the predicted value from first-stage regression using the ratio of interest payment to total assets as the measure of leverage. The t-statistics reflect White (1980) robust standard errors adjusted for heteroskedasticity and firm-level clustering. To save the space, the coefficients on control variables are not reported. Coefficient estimates significantly different from zero at 10%, 5%, and 1% level are marked +, * and **, respectively.

	Low Labor Mobility	***High Labor Mobility***
Prob(*distress* = 1) > 0.5 and ***Positive Residuals***	-21.072*	-3.973
	(-2.19)	(-0.66)
Prob(*distress* = 1) > 0.5 and ***Negative Residuals***	3.414	-2.655
	(0.39)	(-0.48)
Prob(*distress* = 1) < 0.5 and ***Positive Residuals***	-6.431*	-10.286**
	(-1.96)	(-6.62)
Prob(*distress* = 1) < 0.5 and ***Negative Residuals***	-0.761	2.243+
	(-0.31)	(1.67)