# Firm-Size Effect on Wages:
# Evidence from China's Competitive Labor Market

Hong Cheng Hongbin Li Hui Wang Li-an Zhou[1]

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**Abstract**

This paper uses employer-employee matched data collected from China in 2015 and 2016 to understand the puzzle of firm-size wage premium. In contrast to the conventional findings in the literature, we do not find wage income of the low skill workers, who account for the majority of the manufacturing employment in China, vary across firms with different sizes. As a comparison, the firm-size effect remains positive for skilled workers even after controlling for various firm attributes and relevant factors. By examining the labor market related institutions, the nature of workers' job contents, as well as their work contracts, we argue that the unskilled workers in China are more likely to face a competitive labor market. This is the main reason why firm size premium are not prevalent in China as opposed to other developed countries.

**Keywords:** Firm Size Premium, Competitive Labor Market, Chinese Manufacturing Industry

**JEL codes:** J21, J31, J41, J51, J61

[1] Hong Cheng, Institute of Quality Development Strategy at Wuhan University, China; Hongbin Li, Stanford Institute for Economic Policy Research (SIEPR), Stanford University, Email: hongbinli@stanford.edu ; Hui Wang, Guanghua School of Management, Peking University, Email: jackie.wang@gsm.pku.edu.cn; Li-an Zhou, Guanghua School of Management, Peking University, Email: zhoula@gsm.pku.edu.cn

## 1. Introduction

Theoretically, in a perfect competitive labor market, firms maximize profits at the equilibrium point where the real wage rate equals to the marginal product of labor, and identical workers should receive the same wage rate regardless of the size of firms. However, increasing empirical studies have found that larger firms tend to provide higher wages (Brown and Medoff, 1989; Dunne and Schmitz, 1992; Hamermesh, 1993; Bronars and Famulari, 1997; Oi and Idson, 1999; Troske, 1999; Agell, 2004; Belfield and Wei, 2004; Milliment, 2005; Lallemand, Plasman, and Rycx, 2007; Gibson and Stillman, 2009). The wage gap between large and small firms is approximately equal to the gender wage gap, and larger than that associated with labor union or race (Oi and Idson, 1999). This heterogeneous labor market outcome, which might indicate inefficient labor allocation, has puzzled a great many researchers for several decades. Although various studies use cross-sectional, panel or longitude data to search for possible explanations, the firm-size wage premium still cannot be fully explained.

Up to now, studies have provided alternative hypotheses. Firstly, large firms provide high wages since they want to employ high quality and skilled workers to match the firms' capital intensity, represented by a relative high capital/labor ratio, better production inputs, and more investment in research and development (Hamermesh, 1993; Dunne and Schmitz, 1992; Dunne and Schmitz, 1995; Bayard, and Troske, 1999). Secondly, higher wages might be required to compensate the undesirable working conditions in large firms, such as more rules, less autonomous and more impersonal work atmosphere and so forth (Todd Idson, 1996; Schaffner, 1998; Winter-Ebmer and Zweimuller, 1999). Thirdly, large firms may have high payment ability, and tend to provide high wages to reduce workers' shirking (Brown and Medoff, 1989; Schaffner, 1998). Fourthly, large firms are more likely to be old, since they might have high survival rates, productivity and payment ability (Brown and Medoff, 1997; Oi and Idson, 1999; Troske, 1999). Last but not least, union avoidance and compliance with minimum wage legislation can be institutional explanations. It might be that large firms are inclined to provide high wages to avoid workers to join in the unions and form powerful opponents. Moreover, large firms might be more restricted to abide by the

minimum wage law, and thus have to raise workers' wages to a certain level (Brown and Medoff, 1997; Schaffner, 1998).

However, none of aforementioned hypotheses can completely explain the wage premium due to firm size. After controlling for all the factors mentioned in the above hypotheses, there still remains a significant positive relationship between firm size and wage rate. In addition, there are mainly two problems in existing empirical studies, especially ones in developed countries.

The first problem is that the data used in most studies came from imperfectly competitive labor markets. The key proposition in economic theory that identical workers should receive the same wage rate relies on the assumption that firms operate in a competitive labor market. However, the existence of powerful labor unions and the strict implementation of the minimum wage law in the labor market dissatisfy this assumption.

Labor union has a spillover effect on the labor market. Usually, labor unions have strong bargaining power to force employers to raise wage rates above the market rates. The presence of labor unions influences not only the wage rates and employment of union members, but also those of non-union members. For example, a labor union raises current wage through powerful negotiation. After facing a new and higher wage rate, the employer may decide to fire some workers whose marginal productivity is lower than the increased wage rate. These laid-off workers very likely move to the non-union sector to find a job, which results in the excess labor supply in that sector. Thus, in the non-union sector, the wage rate will be compelled to decrease to reach a new equilibrium (Ehrenberg and Smith, 1997). Therefore, in the entire labor market, wage rates of workers and firm size will be simultaneously influenced by the behavior of labor unions.

Similarly, the establishment and implementation of the minimum wage law in many countries is another factor to which makes unrealistic the assumption of a competitive labor market. Both wage rates and employment will be affected by the implementation of the law. If the law raises the wage of low-income workers in the sector where the law is covered, firms will then make a new decision of employment

based on this new wage rate. Consequently, unskilled workers will be fired at first, and they may choose to find jobs at the sector without implementing this law. It will lead to a wage decline in the sector (Ehrenberg and Smith, 1997).

Therefore, any change of labor union behavior and the minimum wage law will affect labor demand on one hand and labor supply on the other, resulting in heterogeneous labor outcomes. In empirical studies, if researchers use any data from this kind of labor market, the wage rates of workers and firm size will simultaneously affected by the labor union behavior or the minimum wage law, and the estimated results will be biased.

The second problem is that most studies lack information on both firms and workers. Wage differential across firms implies that hourly wages are determined by both worker's characteristics and firm's attributes, as well as their matching and interactions. However, most previous empirical studies rely on surveys only with detailed information on workers but little on firms, or vice versa (Troske, 1999). Although Troske (1999) has made great effort to create an employer-employee matched data by using informative worker census and the survey of manufactures, this data were collected from United States, where has powerful labor unions and well-implemented minimum wage law. His estimated results might be biased.

In this paper, we examine the firm size wage premium among Chinese manufacturing firms, using a newly available employer-employee matched data collected in Guangdong and Hubei province in year 2015 and 2016. This unique and representative dataset allow us to examine a rich set of firm level and worker level characteristics in determining the worker level firm size wage premium. In addition, we take seriously the perfect competition assumption underlying the notion of equal wages for identical workers, and argue that Chinese competitive labor market provides a unique opportunity to test the firm-size effect on wages.

Our empirical work show that, among the Chinese manufacturing firms, all observable firm size wage premiums are concentrated on the skilled worker sample, which includes workers with college and above education. For the unskilled workers with high-school and below education levels, who account for three quarters of the total

employment, there are literally no correlation between workers' wage and firm size. These results are robust across different specifications, with and without controlling for workers' characteristics and a rich set of firm level attributes.

To interpret these empirical findings, we argue that the labor markets faced by these two types of workers are quite different in their nature of competition. Specifically, the major labor market faced by the skilled workers are non-competitive and subject to formal regulations. By contrast, the secondary labor market faced by unskilled workers closely resembles a spot-market, which is why the law of one price can apply for them. To support this statement, we leverage the rich survey data at the worker and job task level to provide the following evidence.

Firstly, we found that jobs performed by the unskilled workers involve mainly manual and routine tasks. Job descriptions are very concrete and the skill requirements are low and simple. From the firms' point of view, the unskilled workers are homogenous once they fulfill the job requirements, and can be easily substituted.

Second, we show that firms are more likely to use a piece-rate compensation scheme among the unskilled workers. This means that the product outputs are easy to measure, and firms do not need to pay incentive wages to overcome the asymmetric information problems in order to boost performance.

Thirdly, most of the unskilled workers are rural migrants into the cities. Most of them find their jobs through informal channels such as relatives or friends, or self-recommendations. Firms maintain a flexible labor relationships with them by signing fixed term contracts and providing limited social benefits and insurance coverage.

Fourthly, there are very few regulation that can systematically affect the secondary labor market, leaving very little distortion in price and quantity. Unlike most of the western societies, minimum wages in Chinese cities are set at very low levels and they are hardly binding for most of the labor contracts especially in the manufacturing industries. In addition, the labor unions in China also have little bargaining power so that they could hardly play a role in employment and wage decisions of firms.

Fifthly, migrant workers have very low transaction costs across cities or industries. Because of the *hukou* system, rural migrant workers usually do not have access to many

social benefits programs, such as medical or public schools. Therefore they usually travel along and leave their spouses and children at rural villages. This effectively reduce the migration costs. In addition, most of the jobs performed by the unskilled workers do not require long time of training or adaptation period, making it easy to switch across firms or even industries.

These findings enrich our understanding of the competitiveness in Chinese manufacturing industries. Conventional studies have been focused on the cheap labor advantage, but very few pay attention to the institutional and environmental details in the labor market. Apparently, having a flexible labor relationship and competitive labor market can help firms in many ways. Firstly, it can help firms to lower payroll costs due to regulations, or monitoring/managing cost due to asymmetric information. Secondly, it make firms very flexible in one of the important factor inputs, so that they can adjust production capacity in time to cope with demand shocks. Thirdly, when workers' transaction costs across cities and industries are low, labor allocation efficiency might be improved as well.

On caveat is that many of these flexibility in labor relationship are due to poorly implementation of labor contract law, and unequal treatment of local residents and migrant workers. In addition, it might be misleading to argue that the labor market should be as flexible and competitive as it can be. Our purpose in this paper is not to evaluate whether the current labor market situation is good or bad. Rather, we want to provide careful documentations and detailed descriptions of the labor markets faced by Chinese manufacturing industry, which can help us better understand its current position and the related issues.

The rest of this paper proceeds as follows. Section 2 briefly introduces Chinese labor market; Section 3 describes the survey data; Section 4 presents empirical results on the firm size premium; Section 4 presents evidence on the competitiveness of unskilled labor market; and the last section concludes.

## 2. Institutional Background: Chinese Labor Market

In this section, we briefly introduce the development of Chinese labor market to present

the market environment of our study: the competitive labor market consisting of unskilled workers and the uncompetitive labor market consisting of skilled workers.

Before 1978, in the planning economic system, there was actually no conventional labor market in China. In urban areas, labor assignment system is much rigid. Labors were arranged to a certain job no matter whether they were matched with. Their wages were determined by central government, not related with their productivities and human capitals. In the rural area, limited arable lands and increasing rural population led to the marginal product of labor on the farms declining to zero. The strict household registration system (*hukou*) made it even worse that excessive labors in the rural area were prohibited to migrate to cities or towns to do any job. Although in the beginning of 1970s, some early village plants emerged, absorbing part of excessive agricultural labors, they still had no autonomy to make any decision on the plants, including wages and employment.

Market-oriented reforms on factor market were a little bit later than those on product market. From 1983, state-owned and collective enterprises in urban areas started to introduce labor contract system rather than previous life-time employment. Enterprises also had some autonomy to float the total wage bill determined by central government, employ bonus and other material benefits to improve workers' efforts. The income that workers received became related with their abilities and working performance. In addition, later, urban workers were allowed to shift their jobs from one firm to another. In rural areas, after introducing household responsibility system, agricultural labor productivity has been largely increased, resulting in more excessive rural labors with nearly zero marginal productivity. The emergence and growth of township and village enterprises (TVEs) had absorbed a part of excessive rural labors. With the abundant labor force in rural area, TVEs have more flexible employment policies, pricing their workers according to their marginal product.

At the same time, *hukou* system also experienced gradual reforms from completely forbidding rural people moving to cities to allowing a portion people to move with some administration fees. At the end of 2001, *hukou* system at small cities and towns was opened to all persons from rural areas as long as they have stable jobs at the cities or

towns. Meanwhile, these migrants could also remain the rights to manage their arable lands in counties if they were willing to. Moreover, more and more employment policies, which remove various administration restrictions on employment requirements of firms and eliminate unreasonable fees on rural labors, have implemented to encourage rural people to work off the land. These policies have increased labor migration from rural to urban areas, providing large excessive rural labor force to urban labor market.

Gradually, with increasing labor mobility and more embedded market-oriented reforms, Chinese labor market has presented segmentation. In the secondary labor market, labors usually have low wages, low skills, few job ladders and unstable working status (Reich, Gordon and Edwards, 1973). This kind of labors includes the laid-offs from State-owned Enterprises and rural migrants with low education and skills. Since the beginning of privatization on SOEs in the early 1990s, tens of millions low-skilled workers have been forced to be laid off. From 1997 to 2003, more than 28 millions persons have to leave their SOEs and look for jobs in the labor market. Meanwhile, about 150 millions rural labor forces have flooded into urban labor market with the low wage and low skills (Mo et.al, 2004). Mobility of rural labor force is much high. When economy develops fast, new job opportunities surge in urban areas, and rural people will leave their lands and enter the urban labor market to obtain new jobs with relative low wages which are still higher than agricultural income. When firms encounter difficulties and have to reduce employment, workers from rural areas are usually among the first to be fired. These unemployed rural people can search for another job in other cities or just go back to countryside to manager their lands. Therefore, it is a prevalent phenomenon in the secondary labor market that labor supply far exceeds labor demand. Employers are relative easy to recruit people with the same skills to instead of their fired or quitted workers, and provide the market-clearing wage. Therefore, this kind of labor market is relative competitive.

However, in the primary labor market, characterized by stable jobs, relatively high wages and presence of promotions (Reich, Gordon and Edwards, 1973), labor supply falls short of labor demand. With technological progress, more and more high-educated

and skilled workers are required. However, until the year of 2003, high-level skilled workers only account for 4% of total worker force, and could not satisfy the requirement of economic development (Mo et al., 2004). In addition, managers play an increasing important role of operating enterprises, making crucial decisions on firm's development, production, marketing, investing, payroll system, recruiting and so on. Capable managers could bring high performance and profits to their firms. They usually have specific abilities or the entrepreneurship which are pivotal but scarce for enterprise growth. Therefore, the labor market consisting of high-level skilled workers and managers is relatively not so much competitive.

China has one of the most restrict labor contract law in the world. The labor contract law passed in 2008 mandates a written contract to be signed at the commencement of a labor relationship. Firms are obliged to provide open-ended contracts to workers, once they complete two fixed-term contracts, or finish ten years of employment with the firm. In addition, China's employer-side payroll tax for social insurance is extremely high by international standard. According to Guotai Junan Securities, a Chinese investment bank, the average rate in China was 29% of payroll in 2015, compared to 8% in the US. The inflexible labor contract and the high social insurance rates undoubtedly squeeze profit margins for firms and slowdown business development. Therefore, the labor contract law was poorly implemented in practice, especially among the rural migrant workers. According to a Bureau of Statistics report in 2016, the contract rate among the rural migrant workers is only about 35.1%. In fact, many migrant workers actually prefer a flexible labor relationship and a higher cash payment over the provision of the social insurance benefits from their employers, so that they can send money back to home town to support their families.

China also has union organizations. However, they have little bargaining power so that they could hardly play a role in employment and wage decisions of firms. In 2000, Ministry of Labor and Social Security enacted "Temporary Provisions on Collective Negotiating Wage (*Guanyu Gongzi Jiti Xieshang Zanxing Guiding*)". Next year, a revised "Union Law (*Gonghui Fa*)" further amended provisions on collective negotiation and collective contract (Mo, 2004). Both of them want to encourage unions

to develop strong power to negotiate with employers for better welfare and higher wages, as other unions did in many developed countries. However, these provisions were not well implemented, and labor unions still could not substantially represent workers (Mo, 2004). Therefore, wages are hardly influenced by labor unions in China.

In 1993, the Ministry of Labor issued "Minimum Standard of Wage (*Qiye Gongzi Zuidi Biaozhun*)", which set the standards of the minimum wage. Local governments then further set local minimum wages based on regional living standards. However, due to the absence of strict monitoring of local labor governments and weak labor unions, firms actually do not implement the minimum wage provision. Moreover, there are large unemployed people waiting in the queue, firms have no incentive to raise current wages. Thus, the minimum wage provision also hardly affects wages in the labor market. Du and Pan (2009) and Jia (2014) find that minimum wage policy in China is not effective since many workers, especially the migrant ones, tend to work longer hours. In addition to the wages, Wang and Gunderson (2012) find that minimum wages have limited effects on employment level as well.

It is an advantage that the characteristics of Chinese labor market can facilitate us to study the size premium puzzle without the aforementioned problems. We can compare the results derived from the competitive and less competitive labor markets by using worker and manager samples, respectively. In addition, our estimates have less possibility to be biased by the existence of labor contract regulations, unions, and the minimum wage law.

## 3. Data description

### 3.1 Dataset

The data utilized by this study is called China Employer-Employee Survey (CEES). It is an employer-employee matched data collected in two provinces of China, among which Guangdong was surveyed in both 2015 and 2016, while Hubei was added in 2016. Guangdong is China's most important industrial province, located on China's south-eastern coast near Hong Kong. In 2015, Guangdong had the most manufacturing firms (0.3 millions in number, 13.4% of national totals) and manufacturing workers (9.3

million in number, 19.4% of the national totals) in China. Hubei is a representative province in central China. In 2015, it produce 4% (or $708 billion) of the national gross industrial output and employed 6.6% (3.4 million) of the national total employment.

One of the distinct features of CEES is that it contains detailed information on both the firms and their employees. It elaborately recorded the firms' governance structure, top manager's human capitals and earnings, enforcement of product contracts, government support, corporate finance, sales and customers, which are hardly accessible in previous empirical studies. Managers and workers' attributes include compensation (monthly wages, bonus, fringe benefit, stock dividend and other qualitative welfare received), demographic characteristics, education, work experience, working conditions, job contents, job satisfaction, interpersonal relationship and so forth. Therefore, this rich structure of the dataset helps us to examine the hypotheses of size wage premium by controlling for attributes on both the firm and individual level.

In each province, 20 county-level districts in 13 cities are sampled, covering both the poor and the rich areas, reflecting different living standards. The sampled cities account for 90% of gross industrial output and 90% of employment in both provinces. Within each district, firms are randomly selected, with probabilities proportionated to employment.[2] In each firm, 10 employees and 3 middle and high managers were random chosen. Altogether, CEES covers 160 manufacturing industries and 26 cities or townships, with 1208 firms and 11366 employees in total. All analyses in this study adjust for the sampling weights at the firm or the individual level in order to make the results population representative.

### 3.2 Summary Statistics

Table 1 presents summary statistics for firm level attributes. As most previous studies, we use total employment as a measure of continuous firm size. In the table, we also compare the smaller half of the sample with the larger half of the sample in terms of firm size. On average, firms in our sample have 943 employees.[3] Apparently, larger

[2] The sampling frame is taken from the 3rd National Economic Census conducted in 2014.

[3] On average, the firm size in our data is much larger than that in other developing countries like Zimbabwe with

firms are older and more likely to be state-owned than the smaller ones. They also tend to have more complex management structures. They have higher rate of unionization, are more likely to have board, and have more levels of hierarchies. As to employee compositions, larger firms tend to have a younger worker force and higher proportion of workers with college and above education.

[Table 1 is about here]

There are 10,495 workers in our sample. Table 2 reports summary statistics for these workers. As in Table 1, we also report the statistics separately for small and larger firms. For each workers, we divide their monthly income, including regular wage income, over-time payments, and annual salary (divided by 12), by workers' monthly working hours to calculate their (bonus and overtime adjusted) hourly wage rates. On average, workers in these manufacturing firms earn 19.4 yuan (about $2.7) per hour. Workers in larger firms indeed earns more those in smaller ones.

[Table 2 is about here]

Other than wages, workers are also different in many other attributes across firm sizes. Workers in large firms are younger, less likely to be married, and have longer years of schooling, but less years of working experience. 56% of workers in large firms are migrants from other places, while the proportion of migrants for small firms is only 37%. On average, 67% of the workers has agricultural *hukou*.

## 4. The Firm-Size Premium in China's Manufacturers

In this section, we report estimated firm-size wage premium based on the CEES sample. We first report results using the whole sample and then for skilled and unskilled workers separately. All regressions are weighted using individual sampling weights. Our conclusions are also robust for unweighted regressions. Standard errors are clustered at the firm level.

### 4.1. Is there a Firm-Size Premium in China?

Earnings indeed increase with firm size. In column 1 of Table 3, we present a

the mean 335 (Velenchik, 1997) and developed countries like USA with the mean 425 (Troske, 1999).

simply regression with log (monthly) earnings of a worker as the dependent variable and log employment of the firm as the only independent variable. (The corresponding scatter plots are shown in Figure 1.) The coefficient on log employment is positive and statistically significant at the one percent level. The size of the coefficient is 0.046, indicating that ceteris paribus, workers in firms with logarithm employment one standard deviation above the mean receive 14% higher monthly earnings than workers in firms with logarithm employment one standard deviation below the mean.[4] Although we have not controlled for any individual or firm characteristics, it is still interesting to compare our raw estimate to those in the prior literature. Both the estimate of the coefficient and the magnitudes of the marginal effects (for the change of firm size by one standard deviation) fall in the range of estimates in the literature (Brown and Medoff, 1989; Troske, 1999).[5]

[Table 3 is about here]

[Figure 1 is about here]

Firm size and wages could vary across year, city and industry. It is likely that both firm size and wages grow over time, and thus we cannot compare earnings (and firm size) at different time period. To make within-year comparison, we control for the year effects. Wages and firm size may also co-vary across location and industry, and these variations could be results of sorting. Firms in certain cities (industries) could be more successful and grow larger due to endogenous factors, such as efficiency pay, management, human capital, and these factors could all be correlated with wages. There are also exogenous shocks such as local institutional changes e.g. the minimum wage law that affect both wages and firm size. The purpose of this paper is not to address this sorting or selection issue; rather, we hope to find factors that could explain the raw correlation between firm size and wages. Towards this end, we simply control for

[4] Given a standard deviation of 1.5 for the variable ln(employment) A worker at a firm with ln(employment) one standard deviation above average can be expected to earn 0.046*1.5*2 = 14% more than a worker at a firm with ln(employment) one standard deviation below average.

[5] In Brown & Medoff (1989) and Troske (1999), the estimated coefficients on ln(employment) are in the range of 0.015-0.047 and the marginal effects for a change of ln(employment) by two standard deviations are 6-15%.

potential factors that might be correlated with both firm size and wages.

Regression results indeed show that both city and industry matter for the firm-size wage premium. In column 2 of Table 3, we add the year fixed effects into our simple regression, and find that the year effect does not affect our estimated firm-size premium as the coefficient on log employment stays the same. In column 3, we include both year and city fixed effects, and this time the coefficient on log employment drops by one third to 0.030 and it remains statistically significant at the one percent level. Similarly, we have both year and industry fixed effects in column 4, the firm size premium also drops significant compared to that in column 2. These results suggest that both location and industrial sectors are important explanations for the firm-size premium. In other words, firms in certain cities and industries are bigger and at the same time pay more. By including all three sets of fixed effects, i.e., year, city and industry fixed effects, in column 5, we find that the coefficient on log employment drops further to 0.025, suggesting that these fixed effects can explain 46% of the raw correlation between earnings and firm size.

### 4.2. Skilled versus Unskilled Workers

In the above analysis, we pooled all workers, including both skilled and unskilled workers, together. It is likely that skilled and unskilled labor markets are segregated from each other such that there is a firm-size premium in one market but not the other. Thus, we follow the literature (e.g., Acemoglu and Autor, 2011; Brown and Medoff, 1989)[6] and estimate the firm-size wage premium separately for skilled (college educated) and unskilled (below college education) workers. We use the same econometric model specifications as those in Table 3 except for splitting the sample.

Indeed, there is a sharp difference between skilled and unskilled workers in terms of the estimated firm size wage premium. As shown by Panel A of Table 4, for skilled workers, the estimated coefficient for log employment is positive and statistically

[6] Brown and Medoff (1989) separate the sample by occupation and the union status, i.e., white collar workers, non-union blue collar workers, and union blue collar worker, while we follow Acemoglu and Autor (2011) to separate the sample by college education (skilled if college educated and unskilled otherwise) as education is pre-determined..

significant at the one percent level in all five specifications. The raw correlation is as high as 8.8%, but the magnitude declines once we control for city and/or industry fixed effects in columns 3-5. After we control for all three fixed effects (column 5), the estimated firm size premium drops to 3.5%, which is still quite large compared to the findings in the literature (with a caveat that we have not controlled for individual characteristics).

[Table 4 is about here]

The most interesting finding is that, in stark contrast to the results for skilled workers, the estimated firm-size wage premium for unskilled workers is zero. This is different from all findings of the previous literature. As shown by Panel B, column 1, even before we control for any fixed effects, the estimated coefficient for the raw correlation between firm size and wage is an insignificant 0.012, which is only about 1/7 of the estimated coefficient for skilled workers. The coefficient becomes literally zero (with an absolute value at the level of 0.001 to 0.002), once we control for city fixed effects in columns 3 and 5. These results mean that in China's manufacturing firms, unskilled workers essentially have the same earnings in larger and smaller firms. We will explain in the next section why the market for unskilled Chinese workers is so unique that there is no firm-size wage premium.

## 5. China's Competitive Labor Market

A competitive market has many unique features such as numerous buyers and sellers (each with a small market share) who can buy and sell freely, homogenous products, symmetric information between sellers and buyers about the product, no transaction costs, no market distortions. In terms of the labor market, there are indeed numerous buyers (firms or employers) and sellers (workers), but normally the other assumptions of a competitive market would not hold in most industrial countries. In this section, we attempt to show that China's market for unskilled workers has many of the features of a competitive labor market, because of its unique institutional features.

### 5.1 Homogenous Labor

One important condition of a competitive market is that the products in the market are homogenous, and this means that, in the case of labor market, labor productivity is homogenous. Empirically, it is difficult to measure the productivity of each worker, and thus economists use proxies of labor productivity. In this paper, we focus on measures of three dimensions of labor productivity, including their human capital attributes, tasks carried out by workers, and a measure of overall labor productivity of a firm.

***Worker human capital attributes.*** Economists have shown that human capital attributes are the most important factors for wage differentials across firms, although they could not fully explain the premium puzzle (Abowd, Kramarz and Margolis, 1999; Troske, 1999). In fact, we have already used one important measure of human capital, college education, to divide our sample into skilled and unskilled workers. The finding that the firm-size premium is different for skilled and unskilled workers itself suggests that human capital indeed is an important factor in explaining the premium. In this section, we investigate further the human capital attributes of both skilled and unskilled workers. We will have a finer breakdown of education levels (years of schooling) and explore other dimensions of human capital such as workers' age, gender, working experience,[7] migrant experience and marital status.

We first examine whether the human capital attributes are similar (or different) across firms of different sizes. In Table 5, we report the mean and standard deviation of the human capital attributes of workers in our sample by their skill levels (skilled and unskilled) and their firms' sizes (smaller or larger than the median firm size). Indeed, for the sample of skilled workers, workers in larger firms are more educated than those in smaller firms, with the difference of 0.018 in the years of schooling statistically significant at the one percent level. Note also that the education gap between larger and smaller firms for unskilled workers is even larger, 0.037, which is also statistically significant at the one percent level. Workers in larger and smaller firms are also different

[7] Work experience is the number of years that the worker works for the current firms. Its correlation with age and years of schooling in our sample is 0.43 and 0.01, respectively.

in other attributes. Workers in larger firms are younger, less likely to be married and more likely to be migrants, and these are true for both skilled and unskilled workers. We will next examine whether these differences in human capital attributes across firms can explain the firm-size wage premium.

[Table 5 is about here]

These human capital attributes can indeed explain partially the firm-size wage premium for skilled workers, but a sizable premium remains for them after we hold the human capital attributes constant (Table 6). In column 2, Panel A of Table 6, we include the years of schooling as a covariate, which has a positive impact on earnings as expected. As everyone in the sample of skilled workers has at least a technical college degree, their education difference depends on whether they go to a technical college, academic college, or graduate school. Indeed, after controlling for years of schooling, the coefficient on ln(employment) drops by about one third to 2.3%, suggesting that part of the premium is caused by sorting between education and firm size. When we include other human capital attributes one-by-one for the sample of skilled workers, the coefficient on ln(employment) barely changes, suggesting that these human capital attributes (other than years of schooling) do not matter much for the size premium. As a comparison, we also conduct the same set of regressions for the sample of unskilled workers, and the coefficient on ln(employment) remains zero throughout Table 6 (Panel B).

[Table 6 is about here]

**Job tasks and computer usage.** Workers with identical human capital attributes may not have the same productivity if they perform different tasks, and past studies have already shown that job or task contents of workers are important deterministic factors of wages (Autor et al 2003, Autor and Handel 2013). It is like that job tasks are different across firm sizes. If larger firms require their workers to perform more complicated tasks than smaller firms do, then differences in task contents may help to explain the wage differences of workers across firms of different sizes. Unfortunately, none of the previous studies estimating the firm-size premium examines job tasks due to the limitation of their data.

One unique feature of the CEES data is that we collected detailed information on job tasks, following the work by Autor et al. (2003). Specifically, there are seven task measures: 1) the longest document one has to read; 2) the frequency of using mathematics; 3) time spent on complicated problems; 4) time spent on supervision duties; 5) the frequency of face-to-face communications with others; 6) time spent on repetitive tasks; 7) time spent on manual tasks. The survey questions and their choice sets are reported in Table A1.

To summarize the multi-dimension aspects of the workers' tasks and simplify our analyses, we also follow Autor (2003) to convert the task measures into three indices. Each index is a (standardized) prediction from a principal component analysis on several of the seven task measures. The three indices are: "abstract", constructed based on tasks 1) to 4), capturing abstract problem solving, organizational and managerial decisions; "routine", constructed based on tasks 5) and 6), designed to capture routine and repetitive tasks; and "manual", based on task 7) that requires skills other than physical strength and adaptability. The three task measures are standardized so that their means are zero for the whole sample.

As expected, skilled workers perform more abstract tasks and less routine and manual tasks. In Table 7, we report summary statistics of these task measures by skill and firm size. Note first that the mean of abstract task measure is positive and those of manual and routine tasks are negative for skilled workers, but the opposite is true for unskilled workers. Their differences (between skill levels) are all statistically significant at the one percent level (though we do not report them due to space limitations). These differences suggest that tasks for skilled workers are more abstract but less manual or routine.

[Table 7 is about here]

It also seems that for both skilled and unskilled workers, tasks in larger firms differ from those in smaller firms. In particular, for skilled workers, tasks are more abstract, less manual or routine, and these differences are significantly different from zero; for unskilled workers, tasks at larger firms are also more abstract and less routine, but there is no statistical difference in terms of manual tasks. How these differences affect the

firm size wage premium depends on how wages vary across tasks. Workers with more abstract and less manual tasks supposedly have higher productivity and should have higher wages. However, the effects of routine tasks on wages might be ambiguous. On one hand, workers with routine tasks might have lower productivity and should be paid less; on the other hand, workers with routine tasks might demand higher pay to compensate for the bore of jobs. Therefore, it is an empirical question how controlling for tasks affect our estimates of the firm size wage premium.

Workers may also be different across firm sizes and skill levels in their computer usage for work, and computers may increase productivity of workers (Autor et al., 2003). Previous literature finds mixed results on how computer usage affects firm size wage premium.[8] As expected, in our sample (Table 7), the probability of using computers is over 90% for skilled workers for both small and large firms, but the probability drops below 50% for unskilled workers. In addition, for both skill levels, workers in the larger firms are more likely to use computers.

We next test how tasks affect our estimates of the firm size wage premium by including them into our regressions and find that they hardly affect the premium. In Table 8, we add the three task indices and the computer usage dummy in our wage regressions, first one-by-one (column 1 to column 4) and then altogether (column 5). Coefficients on these indices all have the expected signs and are also statistically significant in most cases, suggesting that workers with more abstract, less routine or manual tasks, using computers are paid more. However, including them as covariates does not change much the coefficients on firm size for either skilled or unskilled workers. The firm size premium remains for the skilled sample, while that for unskilled sample continue to be zero. Therefore, tasks cannot explain the observed firm size wage premium.

[Table 8 is about here]

[8] In the literature, Reilly (1995) found that the establishment size wage premium disappear after controlling for if a worker has access to computer. However, the same results do not hold in Troske (1999) who found size wage premium is robust even controlling for computer usage.

### 5.2 Information Asymmetries and Incentives

An important feature of a competitive market is that the quantity and quality of products can be well defined and measured. For labor, the best measure of quantity would be working hours, but it is very difficult to directly measure the quality of labor input. We will show below that because for China's unskilled workers, it is easier to link products (outputs) of labor to a specific worker and thus employers can derive the quality (and quantity) of labor inputs from outputs.

**Easy-to-measure Output.** The routine, manual, and repetitive nature of their jobs makes it easy to measure their production qualities and productivities. This reduces the uncertainty and asymmetric information in their labor ability and productivities. Table A2.3 reports that 22% the unskilled workers' compensation contains some piece-rate components. By contrast, merely 3% of the skilled workers report that part of their wage income as determined by piece-rate. Figure 2 reports the adoption of the piece-rate payment across more detailed education categories. It shows that piece-rate payments are strongly negative correlated with workers' education. For low skilled workers with less than middle school education, the adoption rate can be up to 30%.

[Figure 2 is about here]

Because output and performance is hard to measure, firms need to pay efficiency wage to boost efforts from the workers. Such a problem is more evident in larger firms, which might be part of the reasons why larger firms tend to pay higher wages. However, according to our results, this is not the case for the unskilled labor market in China. Piece rates are prevalent among unskilled workers in China's manufacturing firms. Outputs from these workers are therefore countable and observable, making it easier to evaluate and supervise their performance. Contracts for the unskilled workers can therefore be simple and straight-forward. Compensation scheme can also be more transparent and standardized.

**Payment ability and rent sharing.** As we discussed in section 1 that large firms may have high payment ability. On the one hand, large firms may have monopoly power in product market, and thus have excess profits to share with their workers for many

purposes such as deterring shirking. On the other hand, the failure of capital-labor complementarity hypothesis implies that small firms, which are more likely to be capital intensive, may have more capital constraint problems. They also concern their survival and long-term development. Therefore, small firms have relative lower ability to pay extra premium to their workers.

Since the payment ability is related with firm's monopoly power, previous studies usually test whether large firms have high monopoly power. However, it is difficult to measure the monopoly. Brown and Medoff (1989) used demand elasticity estimated by managers. Troske (1999) employed the proportion of the total value of a seven-digit product produced by a worker's firm, and the Herfindahl index of concentration for the five-digit product produced by a firm, as the proxies of monopoly. In our case, since differences in market concentration have been controlled by the industry fixed effects, we employ profit per employee to capture differences in firm payment ability. The results are reported in column 2 of Table 7. For the ease of comparison, column 1 in Table 9 is the baseline regression with all the fixed effects and worker demographics (i.e., the last column of Table 6).

[Table 9 is about here]

Results in column 2 of Table 9 show that profit per employee is significantly and positively related with hourly wages of workers, suggesting that the higher the payment ability of firms have, the higher the hourly wages the workers can get. However, compared with the result in column 1, there is no change in the firm-size effect. The main reason is that, in our dataset, payment ability varies little across firm size. The correlation coefficient between profit per worker and log employment is only 0.05.

In addition, past studies also suggest that firms that survive long enough tend to have higher potential profitability, therefore have better ability to afford higher incentive payment (e.g., Brown and Medoff, 1989). We therefore also include firm age into our baseline regression. The results are reported in column 3 of Table 9. The results show that firm age does not significantly affect workers' wages.[9] Magnitude of the

[9] In an unreported regression, we also try quadratic functional form in firm ages and find no significant results either.

coefficient on firm size is not affected at all with the inclusion of firm age as a control variable.

Therefore, the payment ability hypothesis also fails in our sample. There is still a large size-wage premium among the skilled worker sample that could not be explained.

### 5.3 Freedom to Buy and Sell

The labor market for factory workers resembles a free spot market. Most unskilled workers are migrant workers who have rural *hukou*. In our sample, 50% of the unskilled workers are migrant workers and 74% have rural *hukou*. Normally, factory workers work for 11 months according to the Lunar Calendar, and take a month-long break and return to their home in the rural area during the Chinese New Year (normally in January or February). After the break, they come out to work again but they may not go back to the same factories. In our sample, about 30% of the unskilled workers leave the factory every year. During the break, migrant workers also share information about and compare their jobs, and they go to the better ones with the introduction of relatives and friends. In our sample, about half (46%) of the workers find their jobs through the network of relatives and friends. A lot of the workers literally walk into factories to find a job. They walk from one factory gate to another to ask about job availability. Factory managers come out to talk to them and possibly make an offer. The workers then decide whether to take the offer or move on to see another factory before making a decision. In our sample, 38% of the unskilled workers walked in to find their current jobs.

Although the labor contract laws in China are very strict and protective of workers, implementation is loose. Overall, the practices of firms and workers are flexible to facilitate the free flow of workers. Contracts are required by law, but in our sample a significant proportion of unskilled workers (28%) do not sign a labor contract. Among those unskilled workers who do sign a contract, 23% sign a contract with a labor service company which dispatch workers to the factory. By doing this, employers can lower the costs of layoff, in particular avoid signing an open-ended contract with a worker after two contract terms (required by law). Among those who do sign contracts

with the "true" employer, the average contract term length is 27 month and 40% have a contract of a year or shorter. Normally, employers can fire the workers with 1 month of notice or pay 1 month salary ahead,[10] and workers can leave the firm with 1 month of notice.[11]

**Another piece of evidence for contractual flexibility is that a lot of workers do not have pension or insurances.** By law, firms should provide a package of benefits including pension, medical insurance, unemployment insurance, work injury insurance, maternity insurance, and housing fund. This package is similar to the payroll tax in the US, but the tax rate of 29% in China is much higher than the 8% rate in the US.[12] In fact, China ranks the third in the whole world in the payroll tax rate, only after France and Slovakia.[13] Exactly because of the high payroll tax rate, implementation is poor. In our sample, only 16% of firms provide the full package to unskilled workers.[14] Local governments, who care about local economic development and employment, normally reach an agreement to levy the "minimum required" social security rates from local firms.[15] Workers, especially unskilled migrant workers, prefer cash income to these benefits because they cannot carry these benefits across provinces and because they need cash to support their family now.

### 5.4 No Price or Quantity Distortions (Prices Determined by the Market)

**Minimum Wage**. In a competitive labor market, wages should be determined solely by the demand and supply conditions, and are not influenced by regulations or institutions that distort market prices or quantity. The minimum wage and union are two examples of such regulations and institutions. In this section, we examine whether these institutions have any influence on wages of Chinese workers. Normally, the minimum

[10] Article 40 of Labor Contract Law.
[11] Article 38 of Labor Contract Law.
[12] Social Security Programs Throughout the World (2015) by Guotai Junan Securities.
[13] Next to France and Slovakia. Data and ranking is available at https://tradingeconomics.com/country-list/social-security-rate.
[14] By contrast, 41% of the skilled workers receive full package of social benefits. According to Table A2.3, the lowest coverage of the social benefits is the housing fund, which is provided to only 17% of the unskilled workers. Regardless the housing fund, the percentage of unskilled workers who received the full five insurances is actually 44%. The number for the skilled workers is 72%.
[15] Refer to a report by China Labor Bulletin, 2012, available at https://clb.org.hk/content/china%E2%80%99s-social-security-system

wage and union are more likely to affect wages of unskilled workers, and the finding of zero firm-size premium for unskilled workers suggests that the minimum wage and union are unlikely to be important factors determining wages and employment in China's labor market.

The minimum wages in China are normally set at a level far below the market-clearing wages and even such low levels of minimum wages are not binding. Like most other institutions, minimum wages are relatively new to the Chinese labor market. In 1993, the Ministry of Labor issued a document entitled "Minimum Standard of Wage", which sets the standards of the minimum wage. But the implementation was poor until 2004 (Du and Pan, 2009), when the Ministry of Labor and Social Security issued *Minimum Wage Regulations*, which is a landmark document signaling the overall implementation of the minimum wage system in the Chinese labor market. According to the 2004 regulations, each provincial government should determine its minimum wage standard based on local living costs and local labor market conditions.[16] Cities in each province can then make adjustments based on their own social economic conditions, while taking the provincial level minimum wage as a benchmark. Minimum monthly wage is applied to fulltime workers, while minimum hourly wage is applied to part-time workers (Wang and Gunderson, 2012). Minimum wages should be adjusted at least once every 2 years (Jia, 2014).

Indeed, our data show that the minimum wages are hardly binding in China's manufacturers. Table A3 lists the monthly minimum wages for all cities in Guangdong and Hubei in our sample in 2016. The magnitude is quite low. For example, monthly minimum wage in Guangdong is 1,895 RMB ($270), where the median monthly wage for an unskilled worker in our sample is 4,408 RMB ($630). Figure 3 plots the monthly wage income normalized by the local minimum wage (or the ratio of wage over minimum wage) by the worker skill level, with a vertical line indicating the minimum wage level. If the minimum wage is binding, one should expect some clustering of workers at or slightly above the minimum wage level in the distribution.

[16] The conditions include lowest living expenses of workers and the average number of dependents they support, local average wages, labor productivity, local employment, and levels of economic development across regions.

However, we do not see such kind of clustering at all in Figure 3. [17] The density curve around the minimum wage level is smooth without any clustering. This is true for both skilled and unskilled workers. Moreover, only about 2% of workers in the sample report a monthly income lower than government-set minimum wage. [18] [19] For most workers, wages are way higher than the minimum wage level. For a median worker, the monthly wage is 260% of the minimum wage level in the city. Even the bottom 5 percentile of workers earn 50% more than the minimum wage.[20] It is therefore evident that the minimum wage hardly plays any role in our setting.

[Figure 3 is about here]

**The Labor Union**. China has only one labor union, and it is organized and managed by the Chinese Communist Party. The headquarter of the union is called the All-China Federation of Trade Union (ACFTU), which itself is a ministerial level government organization in Beijing. ACFTU follows the party/government hierarchical structure and has a representation at each level of the local governments. Unions in China have multiple objectives: to help the State-Party to maintain social and political stability, to improve production efficiency in collaboration with the management, and to protect the interests of employees. In reality, these objectives become increasingly contradictory, as the interests of workers (better compensation, security and work environments) differ from those of the party (social stability) and employers (profitability) (Ge and Fang, 2014). By the Union Law, officials of the union should be elected by workers, but in many cases in our data (36% of the firms), they are actually appointed by the upper level union organization or firm management.

There is a lot of variation in both unionization and the union's role in wage setting in China. According to the Union Law, which was passed in 1992 and recently amended

[17] In fact, we can reject the discontinuity at the value of 1 at 5 percent significant level, using the local polynomial density estimators proposed in Cattaneo, Jansson and Ma (2017).

[18] Our monthly income measure includes the basic salary plus the bonus and over-time payment.

[19] This number is lower than what is reported in Du and Pan (2009), who find about 10% of the workers in their sample earning less than the MW level. But one should notice that, first, their sample is on all industries, including both manufacturing and service sector, while our sample include only the industries sector. This means that workers in our data might earning more in general. Second, their data is 2005 and we are looking at 2015. It is a common finding that the MW adjustment is much slower than the increase in wage rate, therefore the proportion of workers who earn less than MW is expected to decrease over time.

[20] These results are comparable to recent studies of China's minimum wage (e.g., Jia, 2014).

in 2016, all state firms and institutions with more than 25 employees should have a union organization. For private firms, unions are voluntary, but in many cases, its formation is subject to the pressures from the local governments (Gunderson et al, 2016). In our data, 61% of the firms have labor unions (Table 1). As shown by Figure 4, unionized firms tend to be larger. Our data also suggest a mixed role of unions in employment and wage bargaining.[21] Although 73% of the unionized firm report to have some bargaining power for wages, only 2% (Table 10) play a decisive role in the personnel and human resource related decisions. The unimportant role of labor union can also be seen from workers' perceptions about them. In our data (Table A2.2), 45% of the unskilled workers do not know whether the firm has a union.

[Figure 4 is about here]

[Table 10 is about here]

Regression results also show that labor union has a mixed role for wages, and more importantly for our purpose, it is not an important factor for explaining the firm-size premium (for skilled workers). In Table 11 we control for different measures of union status and see if they affect the coefficients on the firm size. Regression result in column 1 shows that unionized firms pay similarly as non-unionized firms for both skilled and unskilled workers. In column 5, we take advantage of our dataset and include the worker level union member status as an independent variable,[22] [23] and find that being a union member actually increases a worker's earnings. The union member premium is 8% for skilled workers and 7% for unskilled workers. Importantly, including these union variables does not change our conclusion on the firm size wage premium.

[21] Past studies on the role of labor unions in China yield mixed results. Some studies (Ge, 2007; Yao and Zhong, 2013) show that unions in China play an important role in collective bargaining and wage setting, but others (e.g., Mo, 2004) find that labor unions have little bargaining power and they could hardly play any role in employment and wage decisions of firms.

[22] One of the major limitation in the literature is that, few of them actually observes the individual union status and explore its variations in studying its effects on wages.

[23] One thing to notice that for firms without union, workers are not designed to answer their union member status question. Therefore, we create an individual level union status dummy that is equal to 1 if the worker is a union member, and 0 otherwise. We add this variable together with the firm level union dummy into the regression. In such a specification, the base group for comparison are workers in firms without unionization. Coefficient on firm union dummy identifies wage of workers who work for unionized firms but are not union member, relative to the workers in the base group. And coefficient on the individual union dummy identifies wages of workers who work for unionized firm and are union member, relative to the workers in the base group.

[Table 11 is about here]

### 5.5 No Transaction Costs

Other than selling their labor in the labor market, workers also need to live nearby the workplace and raise a family. This normally would generate a huge transaction cost for them to move from one location to another.

China's unique institutions make such transaction costs non-existence for migrant workers. Most of the unskilled workers actually travel further from their *hukou* location to their current working cities. Half of the unskilled workers migrated from other places, and 40% of unskilled workers actually migrated from other provinces. (See Table A2.1. If we focus on those unskilled workers with agricultural *hukou*, 50% of them actually come from other provinces.) A significant proportion of their housing expenses are shouldered by their employers. Among the unskilled workers, 37% of them live in subsided (10%) or free (27%) dormitory provided by the employers. (50% of them live in rental apartments, 13% of them own private housing.)

Because of this, family members are normally not with the worker. In China, residence without local *hukou* typically do not have access to the social benefits, such as medical insurance and local public schools. Migrant workers from the villages therefore do not carry their children with them into their working cities. Our data show that unskilled workers are much more likely to have children, partly because they are older (Table A2.1). But conditional on having a child, the unskilled workers are more likely to not living their children, compared to the skilled workers. This is more evident among the migrant workers (whose *hukou* not in the current city). More than half of the migrated unskilled workers do not carry their children with them in their working city. The corresponding number for the skilled migrant workers is only 30%. This is consistent with the "left-behind" children phenomenon documented in the literature. On one hand, this may lower the cost of migration for these workers, which increase their mobility to work in distant cities. On the other hand, this creates family and social cost since many of these children have issues due to the lack of accompany and supervision from their parents during their childhood period.

Unskilled workers also move across industries easily, as most jobs do not need much training. Less than one fifth of the unskilled ever receive training longer than 10 days; the corresponding number for the skilled workers is 31% (see Table A2.1). In addition, in the questionnaire, each worker reports the length of "time required to be qualified for the current position". This can serve as a measure of complication and training cost of a worker's job. Figure 5 reports distribution of the answers by types of workers and firm size. Half of the jobs performed by unskilled workers only require less than a month for a freshman to reach full productivity; by contrast, almost 40% of skilled workers' jobs need more than half a year before full qualification. This is true among both small and large firms. With proper imputation, our data reviews that the qualification days for skilled workers (about 120 days) is 50% longer than their unskilled counterparts (about 80 days).

[Figure 5 is about here]

Reflecting the flexibility in the labor market, we indeed find unskilled workers in our sample are very mobile. An average unskilled worker in our sample, who is 37 years old, has worked in 2.3 cities, for 3.4 jobs and 2.7 occupations (Refer to Table A2.2).

**Section 6. Conclusion**

In this paper, we use a unique Chinese employer-employee matched data collected from both competitive and less competitive labor markets to understand the puzzle of firm-size wage premium, i.e., why larger firms tend to pay their workers higher.

The most important finding is that in a competitive labor market consisting of *low-skilled workers*, there is no systematic wage difference across firms with different sizes. This result is in sharp contrast to the past studies conducted in contexts with many non-competitive components in the labor market. It is also significant for China since almost three quarters of the manufactural employment consists of unskilled workers. This main finding is robust to different concerns and specifications. We also test the alternative channels shown by the literature that might be able to explain the size wage premium puzzle, including city and industry fixed effects, firm capital labor ratio, payment ability, firm age and productivities. Including them as controls does not alter our results.

Based on a text-book list of the definition for a competitive market, we provide various evidence why low-skilled labor market in China can satisfy the "law of one price". First, most of their jobs are characterized by routine, repetitive, and manual works, making these workers highly substitutable and replaceable. Second, outputs produced by low-skilled workers are in large observable and countable, making the compensation scheme simple. Third, labor contracts signed by the unskilled workers are mostly fixed and in short terms. The employment relationship are very flexible as indicated by the fewer obligations of the firms and higher turnover rates among the low-skilled workers. Fourth, institutional constraints leading to non-competitive labor market, including minimum wage and union, are less likely to have influences on these workers. Fifth, the transaction cost across locations and industries are low because workers do not carry families with them when they migrate and most jobs they perform do not need much training and adaptation time.

The evidence provided in this study deepens our understanding of the Chinese manufacturing labor market. Facing a competitive labor market, firms not only enjoy cheap workers, but also flexible labor contract relationship. These features in fact contribute to the international competitiveness of the Chinese manufacturing firms.

So far, we establish the case that in an environment with an arguably competitive labor market, the law of "one price" can hold. But we still cannot unravel the black box for the skilled workers, among whom the size wage premium are both economically and statistically significant, a robust results in both our context and previous literature. Further studies are needed to solve this puzzle.

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Table 1. Summary Statistics, Firm Level Attributes

| | Overall | Small (emp<=200) | Large (emp>200) | Diff L-S |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Number of Firms | 1695 | 857 | 838 | |
| Size of Employment | 907 | 77 | 1799 | 1722 |
| | (2987) | (54) | (4120) | [143]*** |
| Employee Composition | | | | |
| % age<=30 | 35.68 | 28.12 | 43.65 | 15.53 |
| | (24.00) | (23.12) | (22.29) | [1.12]*** |
| % female | 45.46 | 43.77 | 47.26 | 3.49 |
| | (24.42) | (27.14) | (21.02) | [1.21]*** |
| % college/univ. | 17.45 | 14.45 | 20.61 | 6.16 |
| | (18.46) | (17.54) | (18.88) | [0.93]*** |
| Capital per labor | 88.38 | 85.08 | 91.95 | 6.87 |
| | (383.93) | (283.05) | (469.21) | [19.82] |
| Profit per labor | 6.57 | 8.18 | 4.84 | -3.34 |
| | (204.14) | (282.89) | (20.79) | [10.14] |
| Firm Age | 12.06 | 10.05 | 14.18 | 4.12 |
| | (7.66) | (5.96) | (8.64) | [0.39]*** |
| SOE | 0.09 | 0.05 | 0.12 | 0.07 |
| | (0.28) | (0.23) | (0.33) | [0.01]*** |
| Total Factor Productivity | 0.00 | -0.01 | 0.01 | 0.02 |
| | (0.91) | (0.95) | (0.87) | [0.05] |
| Union | 0.61 | 0.42 | 0.80 | 0.38 |
| | (0.49) | (0.49) | (0.40) | [0.02]*** |
| When union = 1 | | | | |
| Union leader is appointed by | | | | |
| Board/Manager | 0.20 | 0.28 | 0.15 | -0.12 |
| | (0.40) | (0.45) | (0.36) | [0.03]*** |
| Upper level of union | 0.16 | 0.19 | 0.14 | -0.04 |
| | (0.37) | (0.39) | (0.35) | [0.02] |
| Election by employees | 0.62 | 0.50 | 0.68 | 0.18 |
| | (0.49) | (0.50) | (0.47) | [0.03]*** |
| Collective bargaining in wage | 0.73 | 0.71 | 0.74 | 0.03 |
| | (0.44) | (0.46) | (0.44) | [0.03] |

Table 2 Worker Level Attributes

| | Overall | Small (emp<=200) | Large (emp>200) | Diff L-S |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Wage | 19.43 | 17.55 | 21.58 | 4.03 |
| | (23.79) | (18.37) | (28.61) | [0.503]*** |
| Age | 36.00 | 37.54 | 34.24 | -3.29 |
| | (9.84) | (10.42) | (8.80) | [0.432]*** |
| Female | 0.49 | 0.49 | 0.49 | 0.00 |
| | (0.50) | (0.50) | (0.50) | [0.020] |
| Married | 0.76 | 0.78 | 0.73 | -0.06 |
| | (0.43) | (0.41) | (0.45) | [0.020]*** |
| Years of schooling | 11.34 | 10.94 | 11.79 | 0.85 |
| | (3.07) | (3.03) | (3.06) | [0.083]*** |
| Training (>10 days) | 0.21 | 0.21 | 0.21 | -0.01 |
| | (0.41) | (0.41) | (0.41) | [0.012] |
| Certificate | 0.17 | 0.16 | 0.18 | 0.02 |
| | (0.38) | (0.37) | (0.38) | [0.010] |
| Working experience | 14.14 | 15.77 | 12.29 | -3.48 |
| | (10.08) | (10.89) | (8.69) | [0.440]*** |
| Agr. Hukou | 0.67 | 0.68 | 0.65 | -0.03 |
| | (0.47) | (0.47) | (0.48) | [0.015] |
| Hukou location | | | | |
| This city | 0.54 | 0.63 | 0.43 | -0.19 |
| | (0.50) | (0.48) | (0.50) | [0.023]*** |
| This province | 0.12 | 0.10 | 0.14 | 0.04 |
| | (0.32) | (0.30) | (0.35) | [0.009]*** |
| Other province | 0.34 | 0.27 | 0.42 | 0.15 |
| | (0.47) | (0.44) | (0.49) | [0.026]*** |

Table 3: OLS Regressions Estimating the Firm-Size Earnings Premium in China Using the CEES Data

| | Dependent variable: log monthly earnings | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| ln(Employment) | 0.046 | 0.046 | 0.030 | 0.033 | 0.025 |
| | [0.014]*** | [0.014]*** | [0.008]*** | [0.010]*** | [0.008]*** |
| Year FE | | Y | Y | Y | Y |
| City FE | | | Y | | Y |
| Industry FE | | | | Y | Y |
| Obs | 10493 | 10493 | 10493 | 10493 | 10493 |
| R-squared | 0.02 | 0.02 | 0.11 | 0.13 | 0.18 |

Table 4: OLS Regressions Estimating the Firm-Size Earnings Premium for Skilled and Unskilled Workers in China Using the CEES Data

| | Dependent variable: log monthly earnings | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| ***Panel A: Skilled*** | | | | | |
| ln(Employment) | 0.088 | 0.089 | 0.044 | 0.061 | 0.035 |
| | [0.014]*** | [0.014]*** | [0.013]*** | [0.013]*** | [0.012]*** |
| Year FE | | Y | Y | Y | Y |
| City FE | | | Y | | Y |
| Industry FE | | | | Y | Y |
| Obs | 2849 | 2849 | 2849 | 2849 | 2849 |
| R-squared | 0.06 | 0.06 | 0.16 | 0.23 | 0.28 |
| ***Panel B: Unskilled*** | | | | | |
| ln(Employment) | 0.012 | 0.012 | -0.001 | 0.012 | 0.002 |
| | [0.015] | [0.014] | [0.007] | [0.009] | [0.007] |
| Year FE | | Y | Y | Y | Y |
| City FE | | | Y | | Y |
| Industry FE | | | | Y | Y |
| Obs | 7644 | 7644 | 7644 | 7644 | 7644 |
| R-squared | 0 | 0 | 0.09 | 0.1 | 0.16 |

Table 5. Summary Statistics by Skills and Firm Sizes

| Worker type | Skilled | | | Unskilled | | |
|---|---|---|---|---|---|---|
| Firm size | Small | Large | L-S | Small | Large | L-S |
| Years of schooling | 15.34 | 15.52 | 0.18 | 10.05 | 10.42 | 0.38 |
| | (0.62) | (0.73) | [0.035]*** | (2.49) | (2.31) | [0.093]*** |
| Worker's Age | 32.42 | 31.12 | -1.30 | 38.46 | 35.03 | -3.44 |
| | (8.42) | (6.60) | [0.440]*** | (10.36) | (9.16) | [0.495]*** |
| Male | 0.51 | 0.55 | 0.04 | 0.51 | 0.50 | -0.01 |
| | (0.50) | (0.50) | [0.027] | (0.50) | (0.50) | [0.022] |
| Married | 0.65 | 0.60 | -0.05 | 0.81 | 0.77 | -0.05 |
| | (0.48) | (0.49) | [0.026]** | (0.39) | (0.42) | [0.022]** |
| Experience | 4.87 | 5.48 | 0.61 | 6.15 | 6.23 | 0.08 |
| | (5.01) | (5.28) | [0.256]** | (6.23) | (6.30) | [0.220] |
| Rural Hukou | 0.41 | 0.39 | -0.01 | 0.74 | 0.75 | 0.01 |
| | (0.49) | (0.49) | [0.026] | (0.44) | (0.43) | [0.015] |
| Migrant | 0.31 | 0.44 | 0.13 | 0.43 | 0.63 | 0.21 |
| | (0.46) | (0.50) | [0.025]*** | (0.49) | (0.48) | [0.023]*** |

Note:

Standard deviations are reported in brackets.

The results are weighted using the worker level sampling weights

Skilled workers are workers with college and above level of education; unskilled workers are those with high school, technical school, or below level of education.

Large firms are firms with employment higher than the median level (270 employees); small firms are firms with employment below the median level.

Experience is the number of years working in the current firm.

Migrants are workers whose hukou is not in the current city.

"P-value" is the P value of the t-statistics in comparing between the large firms and small firms.

L-S: difference between the large firms and small firms.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6. Wage Regressions with Demographic Controls

| | Dependent variable: log monthly earnings | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| ***Panel A: Skilled*** | | | | | | |
| ln(Employment) | 0.035 | 0.023 | 0.023 | 0.02 | 0.021 | 0.021 |
| | [0.012]*** | [0.011]** | [0.011]** | [0.011]* | [0.011]* | [0.011]* |
| Yrs of Schooling | | 0.189 | 0.177 | 0.179 | 0.173 | 0.173 |
| | | [0.019]*** | [0.019]*** | [0.019]*** | [0.019]*** | [0.019]*** |
| Age | | | 0.095 | 0.09 | 0.086 | 0.086 |
| | | | [0.013]*** | [0.013]*** | [0.014]*** | [0.014]*** |
| Age2 | | | -0.001 | -0.001 | -0.001 | -0.001 |
| | | | [0.000]*** | [0.000]*** | [0.000]*** | [0.000]*** |
| Male | | | 0.149 | 0.15 | 0.151 | 0.15 |
| | | | [0.025]*** | [0.025]*** | [0.025]*** | [0.026]*** |
| Married | | | 0.041 | 0.042 | 0.043 | 0.043 |
| | | | [0.030] | [0.030] | [0.030] | [0.030] |
| Experience | | | | 0.006 | 0.006 | 0.006 |
| | | | | [0.004]* | [0.004]* | [0.004]* |
| Agr. Hukou | | | | | -0.077 | -0.08 |
| | | | | | [0.027]*** | [0.027]*** |
| Migrant | | | | | | 0.016 |
| | | | | | | [0.030] |
| Year FE | Y | Y | Y | Y | Y | Y |
| City FE | Y | Y | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y | Y | Y |
| Obs | 2849 | 2849 | 2849 | 2849 | 2849 | 2849 |
| R-squared | 0.28 | 0.32 | 0.4 | 0.4 | 0.41 | 0.41 |
| ***Panel B: Unskilled*** | | | | | | |
| ln(Employment) | 0.002 | -0.003 | -0.006 | -0.008 | -0.008 | -0.009 |
| | [0.007] | [0.006] | [0.007] | [0.007] | [0.007] | [0.006] |
| Yrs of Schooling | | 0.049 | 0.043 | 0.042 | 0.041 | 0.042 |
| | | [0.003]*** | [0.003]*** | [0.003]*** | [0.003]*** | [0.003]*** |
| Age | | | 0.037 | 0.034 | 0.034 | 0.033 |
| | | | [0.005]*** | [0.005]*** | [0.005]*** | [0.005]*** |
| Age2 | | | -0.001 | -0.001 | -0.001 | 0 |
| | | | [0.000]*** | [0.000]*** | [0.000]*** | [0.000]*** |
| Male | | | 0.193 | 0.191 | 0.191 | 0.183 |
| | | | [0.015]*** | [0.015]*** | [0.015]*** | [0.015]*** |
| Married | | | 0.068 | 0.066 | 0.066 | 0.065 |
| | | | [0.020]*** | [0.020]*** | [0.020]*** | [0.020]*** |
| Experience | | | | 0.007 | 0.007 | 0.007 |
| | | | | [0.002]*** | [0.002]*** | [0.002]*** |
| Agr. Hukou | | | | | -0.022 | -0.033 |
| | | | | | [0.018] | [0.018]* |
| Migrant | | | | | | 0.108 |
| | | | | | | [0.020]*** |
| Year FE | Y | Y | Y | Y | Y | Y |
| City FE | Y | Y | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y | Y | Y |
| Obs | 7644 | 7644 | 7644 | 7644 | 7644 | 7644 |
| R-squared | 0.16 | 0.21 | 0.25 | 0.25 | 0.25 | 0.26 |

Table 7. Worker Tasks by Skills and Firm Sizes

| Worker type | Skilled | | | Unskilled | | |
|---|---|---|---|---|---|---|
| Firm size | Small | Large | L-S | Small | Large | L-S |
| Task Indices (standardized value): | | | | | | |
| Abstract | 0.29 | 0.40 | 0.11 | -0.45 | -0.28 | 0.17 |
| (PCA based on task 1 to 4 listed in Table A2) | (0.87) | (0.77) | [0.045]** | (0.90) | (0.95) | [0.031]*** |
| Routine | -0.32 | -0.40 | -0.08 | 0.42 | 0.26 | -0.17 |
| (PCA based on task 5 and 6 listed in Table A2) | (0.79) | (0.69) | [0.039]** | (1.08) | (1.02) | [0.049]*** |
| Manual | -0.52 | -0.59 | -0.07 | 0.33 | 0.32 | -0.01 |
| (PCA based on task 7 listed in Table A2) | (0.74) | (0.70) | [0.037]* | (1.04) | (1.00) | [0.054] |
| Usage of computer | 0.93 | 0.97 | 0.04 | 0.40 | 0.49 | 0.10 |
| (=1: Some usage of computer; =0 o.w.) | (0.26) | (0.18) | [0.014]*** | (0.49) | (0.50) | [0.024]*** |
| Time of training needed to qualify current job | 2.94 | 3.13 | 0.19 | 2.48 | 2.50 | 0.02 |
| (Value 1-5: the higher the longer) | (1.17) | (1.10) | [0.062]*** | (1.22) | (1.15) | [0.036] |

Note:

Standard deviations are reported in brackets.

The results are weighted using the worker level sampling weights

"P-value" is the P value of the t-statistics in comparing between the large firms and small firms.

PCA: Principal Component Analysis

L-S: difference between the large firms and small firms.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8. Wage Regressions with Workers' Tasks as Controls

| | Dependent variable: log monthly earnings | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| ***Panel A: Skilled*** | | | | | |
| ln(Employment) | 0.02 | 0.019 | 0.02 | 0.019 | 0.018 |
| | [0.011]* | [0.011]* | [0.011]* | [0.011]* | [0.011]* |
| Task: Abstract | 0.085 | | | | 0.064 |
| | [0.018]*** | | | | [0.018]*** |
| Task: Routine | | -0.106 | | | -0.07 |
| | | [0.017]*** | | | [0.018]*** |
| Task: Manual | | | -0.127 | | -0.101 |
| | | | [0.018]*** | | [0.019]*** |
| Computer Usage: | | | | 0.255 | 0.066 |
| | | | | [0.064]*** | [0.067] |
| Year FE | Y | Y | Y | Y | Y |
| City FE | Y | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y | Y |
| Demographics | Y | Y | Y | Y | Y |
| Obs | 2849 | 2849 | 2849 | 2849 | 2849 |
| R-squared | 0.42 | 0.42 | 0.42 | 0.41 | 0.44 |
| ***Panel B: Unskilled*** | | | | | |
| ln(Employment) | -0.01 | -0.011 | -0.004 | -0.008 | -0.007 |
| | [0.006] | [0.007] | [0.006] | [0.006] | [0.006] |
| Task: Abstract | 0.082 | | | | 0.051 |
| | [0.008]*** | | | | [0.008]*** |
| Task: Routine | | -0.062 | | | -0.02 |
| | | [0.007]*** | | | [0.008]** |
| Task: Manual | | | -0.076 | | -0.05 |
| | | | [0.008]*** | | [0.008]*** |
| Computer Usage: | | | | 0.173 | 0.097 |
| | | | | [0.016]*** | [0.016]*** |
| Year FE | Y | Y | Y | Y | Y |
| City FE | Y | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y | Y |
| Demographics | Y | Y | Y | Y | Y |
| Obs | 7644 | 7644 | 7644 | 7644 | 7644 |
| R-squared | 0.27 | 0.27 | 0.27 | 0.28 | 0.29 |

Note:

All specifications include our baseline control variables: city, industry, and year fixed effects, employee's age, age squared, male dummy, marital status, years of schooling, working experience, agricultural hukou, and migrant dummy. Standard errors are clustered at the firm level. Sampling weights at the worker level are used.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 9. Regressions with Firm Attributes as Controls

| Dependent variable: log monthly earnings | | | |
|---|---|---|---|
| | (1) | (3) | (4) |
| ***Panel A: Skilled*** | | | |
| ln(Employment) | 0.021 | 0.021 | 0.024 |
| | [0.011]* | [0.011]* | [0.011]** |
| Profit/L | | 0.001 | |
| | | [0.001]** | |
| Firm Age | | | -0.017 |
| | | | [0.020] |
| Year FE | Y | Y | Y |
| City FE | Y | Y | Y |
| Industry FE | Y | Y | Y |
| Demographics | Y | Y | Y |
| Obs | 2849 | 2849 | 2849 |
| R-squared | 0.41 | 0.41 | 0.41 |
| ***Panel B: Unskilled*** | | | |
| ln(Employment) | -0.009 | -0.002 | -0.008 |
| | [0.006] | [0.007] | [0.007] |
| Profit/L | | 0.001 | |
| | | [0.000]*** | |
| Firm Age | | | -0.017 |
| | | | [0.015] |
| Year FE | Y | Y | Y |
| City FE | Y | Y | Y |
| Industry FE | Y | Y | Y |
| Demographics | Y | Y | Y |
| Obs | 7644 | 7644 | 7644 |
| R-squared | 0.26 | 0.26 | 0.26 |

Note:
All specifications include our baseline control variables: city, industry, and year fixed effects, employee's age, age squared, male dummy, marital status, years of schooling, working experience, agricultural hukou, and migrant dummy. Standard errors are clustered at the firm level. Sampling weights at the worker level are used.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 10. Union's Role in Firm Decisions

| | M&A | Training | KPI | Payment | HR | Health |
|---|---|---|---|---|---|---|
| Never participate | 25% | 8% | 14% | 9% | 14% | 6% |
| Rarely participate | 21% | 14% | 21% | 14% | 23% | 10% |
| Have a certain influence | 28% | 36% | 32% | 34% | 33% | 29% |
| Co-determination | 24% | 37% | 32% | 40% | 28% | 45% |
| Decisive role | 1% | 5% | 2% | 3% | 2% | 10% |
| Total | 100% | 100% | 100% | 100% | 100% | 100% |

Note:

This table shows the distribution of union role in firm's decision making process. The table summarizes answers to the question: How does the labor union participate in the following operating decisions?
1) M&A: Staffing plan during the merger and acquisition, reorganization and relocation of the enterprise;
2) Training: Staff learning and training plan
3) KPI: Firm's performance management plan
4) Payment: Employee compensation and other well-being
5) HR: Plan of staff recruitment, reduction and promotion
6) Health: Plan of staff sanitation, health and safety security

Table 11. Effects of Union

| Dependent variable: log monthly earnings | | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| ***Panel A: Skilled*** | | | | |
| ln(Employment) | 0.026 | 0.022 | 0.026 | 0.031 |
| | [0.012]** | [0.011]** | [0.012]** | [0.013]** |
| Unionization (Firm) | -0.04 | | -0.054 | -0.028 |
| | [0.041] | | [0.055] | [0.044] |
| Collective Bargaining | | -0.014 | -0.027 | |
| | | [0.031] | [0.059] | |
| Unionization (Firm) | | | 0.029 | |
| x Collective Bargaining | | | [0.069] | |
| Union Member (Individual) | | | | 0.075 |
| | | | | [0.032]** |
| Obs | 2849 | 2849 | 2849 | 2447 |
| R-squared | 0.41 | 0.41 | 0.41 | 0.41 |
| ***Panel B: Unskilled*** | | | | |
| ln(Employment) | -0.01 | -0.009 | -0.01 | -0.006 |
| | [0.007] | [0.006] | [0.007] | [0.009] |
| Unionization (Firm) | 0.008 | | 0.025 | 0.026 |
| | [0.019] | | [0.029] | [0.027] |
| Collective Bargaining | | 0.005 | 0.021 | |
| | | [0.018] | [0.029] | |
| Unionization (Firm) | | | -0.031 | |
| x Collective Bargaining | | | [0.036] | |
| Union Member (Individual) | | | | 0.069 |
| | | | | [0.025]*** |
| Obs | 7644 | 7644 | 7644 | 5695 |
| R-squared | 0.26 | 0.26 | 0.26 | 0.26 |

Note:

All specifications include our baseline control variables: city, industry, and year fixed effects, employee's age, age squared, male dummy, marital status, years of schooling, working experience, agricultural hukou, and migrant dummy. Standard errors are clustered at the firm level. Sampling weights at the worker level are used.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table A1. Task Measures

| | | | Skilled | | | Unskilled | | |
|---|---|---|---|---|---|---|---|---|
| | | | Small | Large | L-S | Small | Large | L-S |
| Task1 | Q: | Sometime you need to read documents (like an instruction book) at work, how much page does the longest work-related document you usually read have? | 3.66 | 4.01 | 0.35 | 2.17 | 2.48 | 0.30 |
| (b39) | A: | 1. No need to read materials at work; 2. Within a page; 3. Two to five pages; 4. Six to ten pages; 5. Eleven to twenty five pages; 6. Over twenty five pages | (1.58) | (1.47) | [0.088]*** | (1.34) | (1.44) | [0.058]*** |
| Task 2 | Q: | How often do you need to use higher mathematics (e.g., linear algebra, geometry, calculus, probability and the like), physics, chemistry? | 1.81 | 1.76 | -0.04 | 1.40 | 1.49 | 0.09 |
| (b38) | A: | 1. Never; 2. Less than once in a month in average; 3. At least once in a month; 4. At least once in a week; 5. More than once per day in average | (1.20) | (1.11) | [0.059] | (0.98) | (1.06) | [0.031]*** |
| Task 3 | Q: | Have you ever met any new situation or knotty problem at work, requiring at least 30 minutes to find a good solution? | 3.19 | 3.24 | 0.05 | 2.47 | 2.65 | 0.18 |
| (b37) | A: | 1. Never; 2. Less than once in a month in average; 3. At least once in a month; 4. At least once in a week; 5. More than once per day in average | (1.08) | (1.05) | [0.058] | (1.29) | (1.32) | [0.039]*** |
| Task 4 | Q: | In you daily work, how much time do you spend managing or supervising other employees? | 1.70 | 1.75 | 0.05 | 1.61 | 1.65 | 0.04 |
| (b36) | A: | 1. Barely; 2. Most of time (more than half a day); 3. Part of the time (within half a day); 4. Nearly all the time | (0.78) | (0.81) | [0.041] | (0.88) | (0.92) | [0.030] |
| Task 5 | Q: | How often do you need face-to-face communication at your work? | 3.51 | 3.65 | 0.14 | 3.06 | 3.25 | 0.19 |
| (b41) | A: | 1. Scarcely; 2. A few times; 3. Sometimes; 4. Often | (0.70) | (0.60) | [0.034]*** | (1.05) | (0.95) | [0.056]*** |
| Task 6 | Q: | In you daily work, how much time do you spend performing repetitive tasks? | 2.23 | 2.27 | 0.04 | 2.85 | 2.80 | -0.04 |
| (b34) | A: | 1. Barely; 2. Part of the time (within half a day); 3. Most of time (more than half a day); 4. Nearly all the time | (0.82) | (0.77) | [0.044] | (0.96) | (0.95) | [0.033] |
| Task 7 | Q: | In you daily work, how much time do you spend on manual tasks (like standing, carrying things, operating machinery or vehicles, or making or fixing things by hand)? | 1.60 | 1.53 | -0.07 | 2.50 | 2.48 | -0.02 |
| (b35) | A: | 1. Barely; 2. Part of the time (within half a day); 3. Most of time (more than half a day); 4. Nearly all the time | (0.78) | (0.74) | [0.039]* | (1.10) | (1.06) | [0.058] |

Table A2.1 Worker Level Attributes: Demographics and Living Arrangements

| | Overall (1) | Skilled (2) | Unskilled (3) | S-U (4) |
|---|---|---|---|---|
| Wage | 19.43 | 28.45 | 16.89 | 11.55 |
| | (23.79) | (37.11) | (17.57) | [0.800]*** |
| Age | 36.00 | 31.73 | 37.20 | -5.47 |
| | (9.84) | (7.54) | (10.07) | [0.352]*** |
| Female | 0.49 | 0.47 | 0.49 | -0.02 |
| | (0.50) | (0.50) | (0.50) | [0.018] |
| Married | 0.76 | 0.62 | 0.80 | -0.17 |
| | (0.43) | (0.48) | (0.40) | [0.018]*** |
| Years of schooling | 11.34 | 15.44 | 10.19 | 5.25 |
| | (3.07) | (0.68) | (2.43) | [0.055]*** |
| Training (>10 days) | 0.21 | 0.31 | 0.18 | 0.12 |
| | (0.41) | (0.46) | (0.39) | [0.014]*** |
| Certificate | 0.17 | 0.33 | 0.13 | 0.21 |
| | (0.38) | (0.47) | (0.33) | [0.013]*** |
| Working experience | 14.14 | 9.45 | 15.47 | -6.03 |
| | (10.08) | (7.82) | (10.24) | [0.364]*** |
| Agr. Hukou | 0.67 | 0.40 | 0.74 | -0.34 |
| | (0.47) | (0.49) | (0.44) | [0.015]*** |
| Hukou location | | | | |
| This city | 0.54 | 0.63 | 0.51 | 0.12 |
| | (0.50) | (0.48) | (0.50) | [0.018]*** |
| This province | 0.12 | 0.15 | 0.11 | 0.04 |
| | (0.32) | (0.35) | (0.32) | [0.010]*** |
| Other province | 0.34 | 0.22 | 0.38 | -0.16 |
| | (0.47) | (0.41) | (0.48) | [0.018]*** |
| Housing | | | | |
| Own | 0.49 | 0.58 | 0.47 | 0.11 |
| | (0.50) | (0.49) | (0.50) | [0.019]*** |
| Rental | 0.26 | 0.17 | 0.29 | -0.11 |
| | (0.44) | (0.38) | (0.45) | [0.017]*** |
| Dormitory - paid | 0.06 | 0.07 | 0.06 | 0.01 |
| | (0.24) | (0.26) | (0.24) | [0.007]* |
| Dormitory - free | 0.16 | 0.14 | 0.17 | -0.02 |
| | (0.37) | (0.35) | (0.37) | [0.011]** |
| Others | 0.02 | 0.03 | 0.02 | 0.01 |
| | (0.14) | (0.17) | (0.13) | [0.007]* |
| Spouse | | | | |
| Local resident | 0.57 | 0.63 | 0.56 | 0.07 |
| | (0.50) | (0.48) | (0.50) | [0.022]*** |
| Has a job | 0.79 | 0.87 | 0.77 | 0.10 |
| | (0.41) | (0.33) | (0.42) | [0.014]*** |
| Co-habit | 0.86 | 0.88 | 0.85 | 0.03 |
| | (0.35) | (0.32) | (0.36) | [0.013]** |
| Has a kid | 0.74 | 0.53 | 0.80 | -0.27 |
| | (0.44) | (0.50) | (0.40) | [0.019]*** |
| Co-habit with kid(s) | 0.65 | 0.82 | 0.62 | 0.20 |
| | (0.48) | (0.39) | (0.49) | [0.019]*** |

Note:
All statistics are calculated with the adjustment for the individual sampling weights.

Table A2.2 Worker Level Attributes: Jobs

| | Overall | Skilled | Unskilled | S-U |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Method of finding the current job | | | | |
| Directly to the firm | 0.35 | 0.24 | 0.38 | -0.14 |
| | (0.48) | (0.43) | (0.49) | [0.017]*** |
| Recruitment agencies | 0.01 | 0.01 | 0.01 | 0.00 |
| | (0.10) | (0.11) | (0.10) | [0.003] |
| Relaives | 0.18 | 0.12 | 0.19 | -0.07 |
| | (0.38) | (0.33) | (0.39) | [0.013]*** |
| Friends | 0.25 | 0.18 | 0.27 | -0.09 |
| | (0.43) | (0.39) | (0.44) | [0.015]*** |
| Talent markets | 0.04 | 0.05 | 0.04 | 0.01 |
| | (0.20) | (0.21) | (0.20) | [0.019] |
| Job fairs | 0.04 | 0.10 | 0.02 | 0.08 |
| | (0.19) | (0.30) | (0.13) | [0.008]*** |
| Online | 0.09 | 0.24 | 0.05 | 0.19 |
| | (0.29) | (0.43) | (0.21) | [0.022]*** |
| Others | 0.04 | 0.05 | 0.04 | 0.01 |
| | (0.20) | (0.22) | (0.20) | [0.008] |
| Speak Native Dialect during | | | | |
| Working time | 0.26 | 0.16 | 0.29 | -0.13 |
| | (0.44) | (0.37) | (0.45) | [0.015]*** |
| Non-working time | 0.39 | 0.31 | 0.42 | -0.11 |
| | (0.49) | (0.46) | (0.49) | [0.018]*** |
| Other than the current job, the # of ____ ever worked | | | | |
| City | 1.26 | 1.07 | 1.31 | -0.24 |
| | (1.47) | (1.24) | (1.52) | [0.052]*** |
| Job | 2.29 | 1.81 | 2.42 | -0.61 |
| | (1.98) | (1.70) | (2.03) | [0.057]*** |
| Occupation | 1.54 | 1.13 | 1.65 | -0.53 |
| | (1.53) | (1.34) | (1.56) | [0.052]*** |

Table A2.3 Worker Level Attributes: Contracts and Benefits

| | Overall | Skilled | Unskilled | S-U |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Nature of contract | | | | |
| Signing a labor contract | 0.75 | 0.83 | 0.72 | 0.11 |
| | (0.43) | (0.38) | (0.45) | [0.015]*** |
| Labor dispatching | 0.22 | 0.17 | 0.23 | -0.06 |
| | (0.41) | (0.38) | (0.42) | [0.021]*** |
| Fixed term contract | 0.72 | 0.74 | 0.71 | 0.03 |
| | (0.45) | (0.44) | (0.45) | [0.017] |
| Contract term less than 12 months | 0.34 | 0.24 | 0.38 | -0.14 |
| | (0.48) | (0.43) | (0.49) | [0.024]*** |
| Contract term less than 24 months | 0.46 | 0.36 | 0.49 | -0.13 |
| | (0.50) | (0.48) | (0.50) | [0.028]*** |
| % of having piece-rate in compensation | 0.18 | 0.03 | 0.22 | -0.20 |
| | (0.38) | (0.16) | (0.42) | [0.008]*** |
| Employer Provided | | | | |
| Medical Insurance | 0.80 | 0.90 | 0.77 | 0.13 |
| | (0.40) | (0.30) | (0.42) | [0.014]*** |
| Pension | 0.84 | 0.94 | 0.80 | 0.14 |
| | (0.37) | (0.24) | (0.40) | [0.020]*** |
| Insurance | | | | |
| Work Injury | 0.73 | 0.83 | 0.71 | 0.12 |
| | (0.44) | (0.38) | (0.46) | [0.015]*** |
| Unemployment | 0.59 | 0.78 | 0.54 | 0.24 |
| | (0.49) | (0.42) | (0.50) | [0.018]*** |
| Maternity | 0.43 | 0.68 | 0.36 | 0.32 |
| | (0.50) | (0.47) | (0.48) | [0.017]*** |
| Supplementary Pension | 0.12 | 0.19 | 0.09 | 0.10 |
| | (0.32) | (0.39) | (0.29) | [0.011]*** |
| Other | 0.10 | 0.13 | 0.09 | 0.04 |
| | (0.30) | (0.34) | (0.28) | [0.010]*** |
| Housing Fund | 0.23 | 0.44 | 0.17 | 0.27 |
| | (0.42) | (0.50) | (0.38) | [0.014]*** |
| Awareness of Union | | | | |
| Not knowing union status | 0.27 | 0.19 | 0.29 | -0.11 |
| | (0.44) | (0.39) | (0.46) | [0.017]*** |
| Not knowing union status + Wrong | 0.42 | 0.30 | 0.45 | -0.15 |
| | (0.49) | (0.46) | (0.50) | [0.018]*** |

Table A3. City Level Minimum Wage, 2016

| Province | Cities | Monthly MW (Full-time, RMB/month) | Hourly MW (Part-time, RMB/hour) |
|---|---|---|---|
| Guangdong | Guangzhou, Shenzhen | 1895 | 18.3 |
| | Dongguan, Foshan, Zhongshan, Zhuhai | 1510 | 14.4 |
| | Huizhou, Jiangmen, Zhaoqing | 1350 | 13.3 |
| | Chaozhou, Jieyang, Yangjiang, Zhanjiang | 1210 | 12 |
| Hubei | Wuhan | 1550 | 16 |
| | Xiangyang, Yichang | 1320 | 15 |
| | Ezhou, Huanggang, Huangshi, Jingzhou, Qianjiang, Shiyan, Suizhou, Tianmen, Xiaogan, Xiantao | 1225 | 14 |

Figure 1. The Positive Relationship between Log Hourly Wage and Log Firm Size

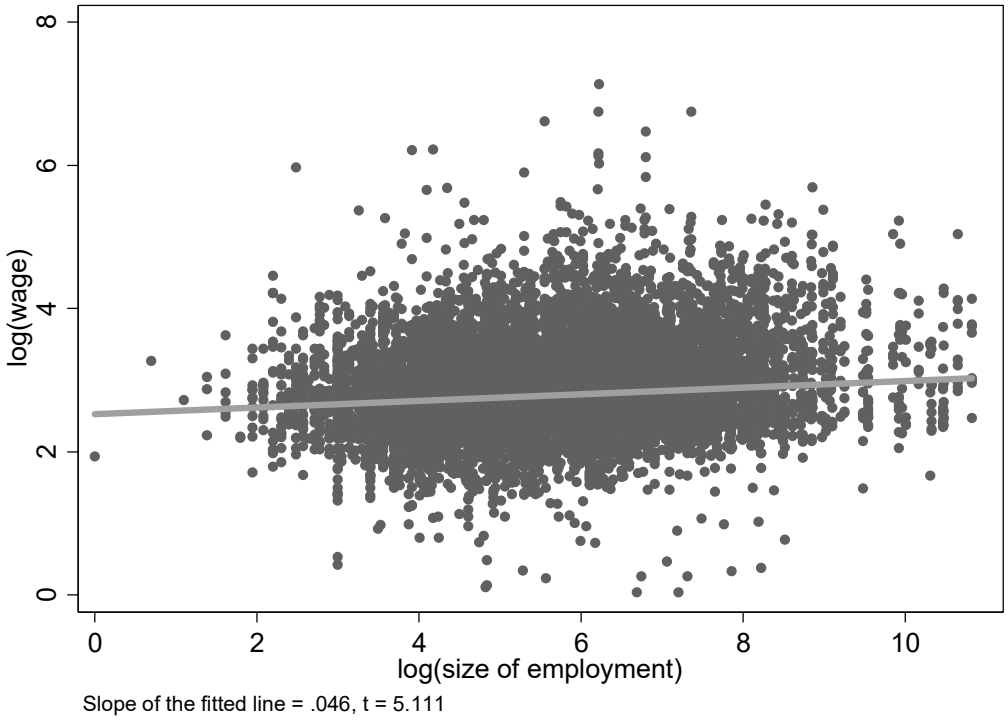



Figure 2. Percentage of Piece Rate Compensation by Workers' Education

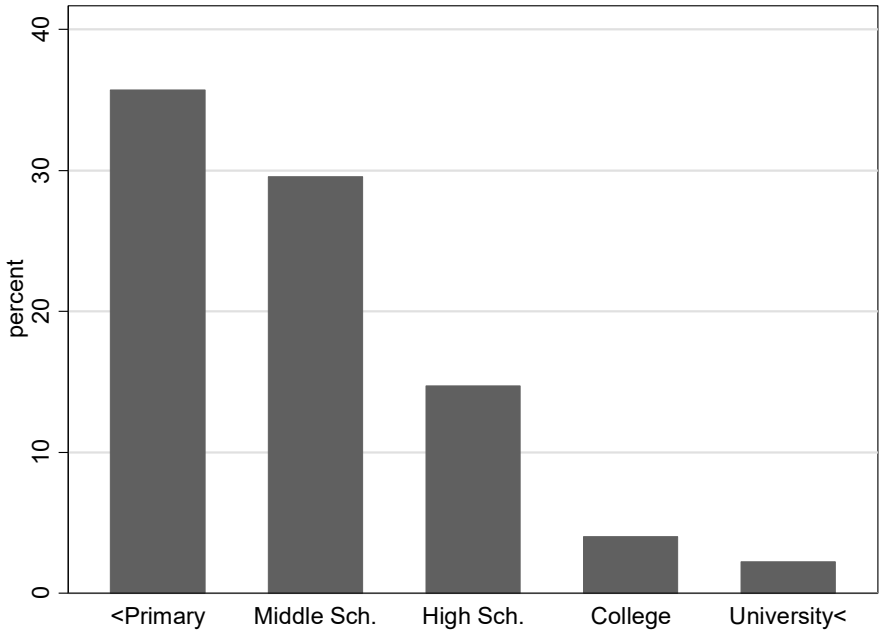


Figure 3. Kernel Density of Wage to Minimum Wage Ratio

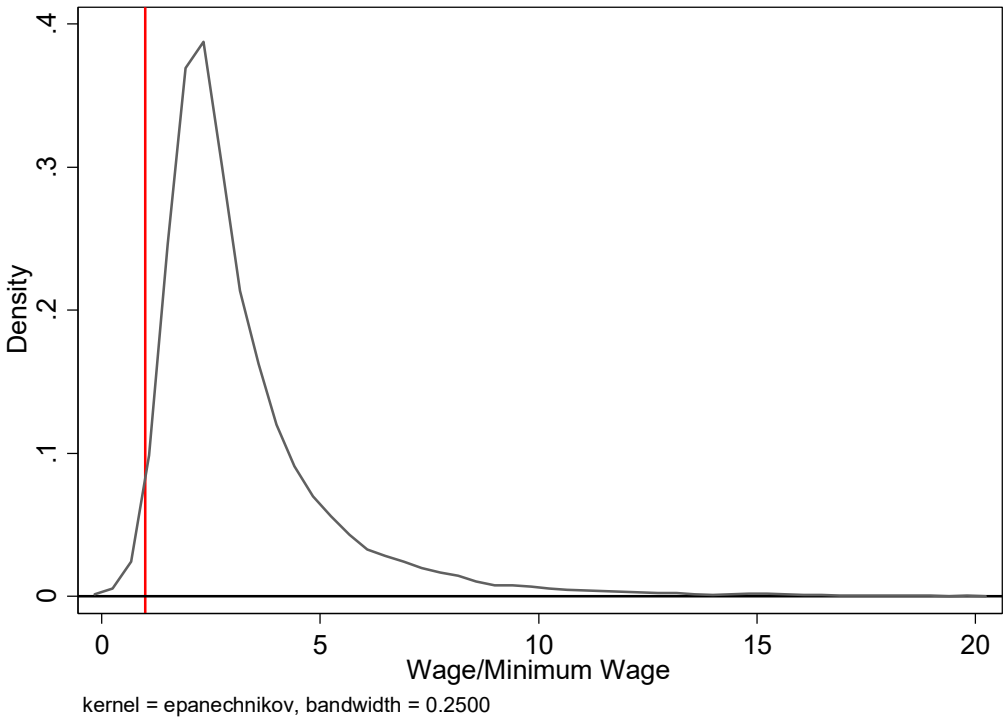



Figure 4. Firm Size Distribution (in logs): Union vs Non-union Firms

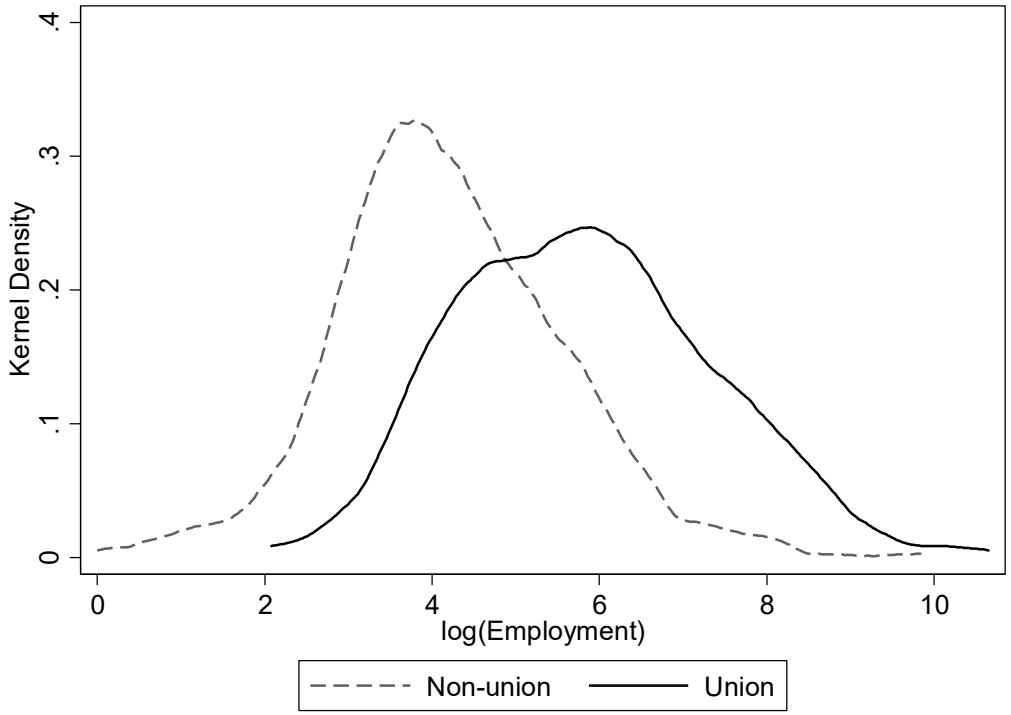
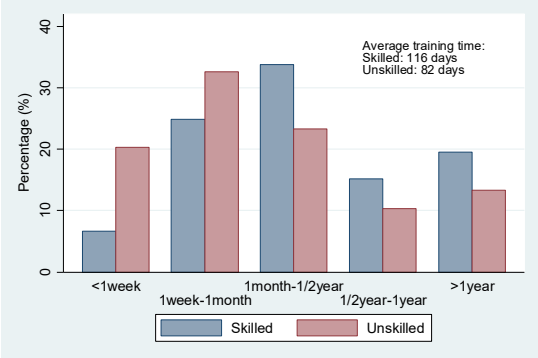
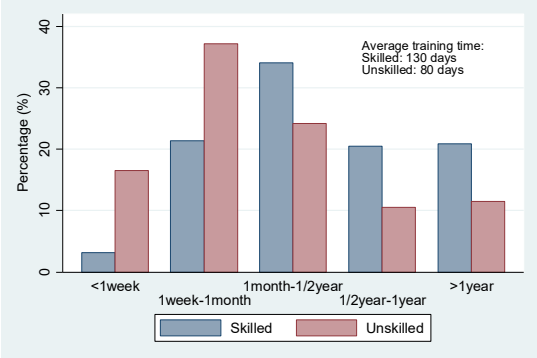


Figure 5. The distribution of training time by skill and firm size




Panel A. Small Firms




Panel B. Large Firms

Note:

1. “Small” firms are firms with employment below the median (271 workers); “Large” firms are firms with employment above the median.

2. The number of training days is imputed by taking the median value of each answering category. E.g., training day is 4 if the answer is “below a week”; training day is 180 if the answer is “more than half a year and less than one year”. We assign 365 days to answer “more than a year”.