

Unions and Workers' Welfare in Chinese Firms^{*}

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Abstract: Based on a survey of 1,268 firms in 12 cities, this paper empirically studies unions' effects on worker welfare in China. Regressions carried out on a rich set of specifications show that unionization is significantly associated with higher hourly wages and larger pension coverage and weakly associated with lower monthly working hours. Further econometric analysis finds that unions promote individual and collective contracts which in turn improve workers' welfare. Collective wage contracts are found to be not as effective as individual contracts and their effects vanish when unions are present; unions become more effective when they lead to individual contracts.

Key Words: Unionization, workers' welfare, Chinese firms

JEL Classification: J3 J51

1. Introduction

Labor unions in China have made major progresses in recent years. By the end of 2009, there were 1.845 million grassroots labor unions, more than doubled over 2003; and union membership reached 226 million, or 53% of urban workers, with an increase of 93 million in the previous five years.¹ Despite this growth doubts are conventionally raised about whether unions really improve workers' welfare in China. At the firm level, unions are often headed by people from the management; at the national level, the All-China Federation of Trade Unions (ACFTU) is a semi-governmental organization under tight control of the government. Hence, it is commonly held that Chinese unions may not represent workers' interests at either the local or the national level.

However, dramatic changes have happened on China's labor market in the past two decades, which have challenged and in the meantime offered opportunities to ACFTU. The enterprise reform has privatized most state-owned enterprises (SOEs); the private economy now contributes to two-thirds of China's industrial value-added. Concurrently, a large number of migrant workers --- 140 million today by official statistics --- have entered urban employment, changing the outlook of the Chinese worker. Those changes have led to the informalization of the workplace;² even in the remaining SOEs the "iron bowl" has been replaced by more flexible employment contracts.

Against this background, several forces are calling for better labor protection. One is growing domestic and international media coverage on the exploitative working conditions, especially in the export sector.³ The second is the slowdown of labor supply. It is estimated that the growth of labor supply was peaked in 2010 and

¹ If not otherwise specified, data in this section come from the National Bureau of Statistics (NBS) official website at www.stats.gov.cn.

² "Informalization" refers to the phenomenon of substituting informal employment --- temporary, seasonal, casual, part-time or hourly-paid work --- for formal employment. Since the early 1990s, it has been a strategy to absorb workers laid off by SOEs as well as rural migrants (Ding, Lung, Song, Hammer, and Xu, 2001; Cook, 2008).

³ For example, David Barboza. "U.S. Group Accuses Chinese Toy Factories of Labor Abuses." *New York Times*, August 2, 2007. Howard W. French "Fast-Growing China Says Little of China Slavery's Role." *New York Times*, June 21, 2007.

would decelerate in the coming years (Cai, 2008). Wages of migrant workers were increased by 20% in 2009 (Knight, Deng, and Li, 2010). Tightened labor supply would give workers more bargaining power. The third force is the government. Partly out of its concern of social instability,⁴ partly a strategy to preempt the development of an independent labor movement, the government has started to promote ACFTU's efforts of harmonizing the labor relation in the workplace. To the extent that ACFTU serves as a handler of the government, ACFTU-backed labor unions also enhance government control of enterprises.

These changes open a possibility for unions to play a positive role in improving workers' welfare. With cross-sectional firm-level data from a 2006 survey of 1,268 enterprises in 12 cities, this paper tries to provide an econometric study on whether unionization is associated with better worker welfare in China, and if the answer is "yes", by what mechanisms. We acknowledge the fact that Chinese unions are not independently established by workers and operate in a constrained institutional environment so it is difficult to establish a clear causality between unionization and workers' welfare. Instead, we work with a rich set of econometric specifications to explore different aspects of the relationship between unionization and workers' welfare.

Our main concern is unions' effects on three firm-level indicators of worker welfare, namely, hourly wage, monthly working hours, and pension coverage.⁵ We obtain our baseline results for unions' effects by estimating a SUR model controlling a set of baseline control variables that are strongly correlated with both unionization and worker welfare. Then we run several additional specifications to take care of the potential problems that our baseline estimation does not consider.

⁴ According to statistics from the Ministry of Public Security, the number of public protests rose dramatically, from 15,000 in 1990 to 74,000 in 2007 (Wang et al., 2009).

⁵ While wages and working hours are the most frequently studied welfare indicators in the literature on unionization, fringe benefits are also included in some studies. In particular, Freeman (1981) and Freeman and Medoff (1984) argue that, in non-unionized firms, the entry and exit of workers act as the main adjusting mechanism; as a result, employment and workers' welfare are determined by young and mobile "marginal" workers. In contrast, in unionized firms, unions would take into account older workers' preferences, and improve the "fringe benefits" through collective bargaining. Their empirical studies (and some subsequent studies such as Lewis, 1990 and Buchmueller et al., 2002) find significant and large effects of unions on workers' fringe benefits.

The first problem is related to the cross-sectional nature of our data. One issue is that our baseline results may be driven by the existence of some groups of firms that are better unionized and in the same time treat workers better. Existing studies (such as Ge, 2007 and Lee, 2009) find that labor relations at the enterprise level show a great degree of diversity related to their localities and types of ownership. To deal with this issue, we estimate the SUR model for three subsamples: domestic private enterprises (DPEs), manufacturing firms, and firms in Guangdong province. Firms in all three subsamples are more homogenous than in the whole sample. In addition, they have other distinctive features. DPEs are less likely to establish unions and labor protection is weaker than either SOEs or foreign invested enterprises (Ge, 2007; Shen and Yao, 2009). Manufacturing is more competitive in the product market than other sectors, and competition may force firms to cut workers' benefits. Lastly, Guangdong province accounts for one third of China's export and has the largest presence of migrant workers. As a result, informalization may be more severe there than in other parts of the country. Furthermore, two notable labor events happened in Guangdong in 2010. One was the Honda plant strike (Cunningham and Wasserstrom, 2011), and the other was a series of suicides at Foxconn, one of the world's largest OEM producers of electronics. All these make it worthwhile to take a look at the union effects in that province.

The second problem we want to deal with is the consistency of the union effects. It would be natural to expect that unions help improve other aspects of workers' welfare if they improved the three major welfare indicators. For that, we run separate regressions for five sets of additional indicators covering insurance, training and accidents, severance benefits, amenities, and job tenure.

The third problem is the endogeneity of unionization. Most recent studies have tried to deal with this issue (e.g., Booth and Chaterji, 1995; Lanot and Walker, 1998; Budd and Na, 2000; DiNardo and Lee, 2004; and Gittleman, 2007). In this paper, unionization can be endogenous for two reasons. One is the simultaneity between unionization and workers' welfare, and the other is missing variables. The ideal

method to deal with these two issues is to find a proper instrumental variable for unionization. Yet it is difficult to find a credible instrumental variable at the firm level that affects unionization but does not directly affect workers' welfare. To solve the problem, we realize that unionization is a slow-changing variable more related to firms' longer-term capabilities than their short-term profitability. As a result, simultaneity can also be treated as a missing variable issue. We add three sets of additional controls to deal with the missing variable issue. The first set contains variables measuring market conditions and supply-chain pressures on labor protection. The second set covers a diverse range of measures of firms' own awareness of labor unions including perceived peer pressures, political connections, and CSR performance. The third set includes three variables describing firms' financial performance. To the extent that worker welfare and unionization are both correlated with firm performance, controlling firm performance allows us to obtain more accurate estimates for the union effects. To take care of the simultaneity between financial performance and worker welfare, we also estimate a specification with lagged values of financial performance.

We also explore two channels for unions to improve workers' welfare, one through individual written contracts, and the other through collective wage contracts. Collective contracts are one of the main functions for the union to improve worker welfare in advanced economies. ACFTU sets promoting collective and individual contracts as one of its core mandates. These two kinds of contracts do not necessarily provide better terms to workers than required by law, but would increase firms' expected costs in case they violated these contracts. We conduct two sets of analyses to find out the relationships between unionization, contracts and worker welfare. In the first set of analyses, we try to establish positive links running from unionization to the two kinds of contracts, and then to better worker welfare. In the second set of analyses, we explore the interactions between unionization and the two kinds of contracts. Specifically, we want to answer two questions. First, do unions have extra effects on workers' welfare in addition to through the two kinds of contracts? Second,

are the two kinds of contracts decisive for unions to exert impacts on workers' welfare?

Studies on the role of unions are relatively new in China although the literature on advanced countries is abundant. Most existing studies on China are case studies. A common theme discovered by these studies is the changing role and an opportune time for China's unions (i.e., Clarke, 2005; Clark and Pringle, 2009; Friedman, 2009; Friedman and Lee, 2010). Specifically, Friedman and Lee (2010) regard the transition of China's official unions as being a contribution to the state's effort of individualizing and institutionalizing labor conflict resolution through labor law and arbitration mechanisms. Unions' role in organizing welfare programs, providing training services to employee, and mediating and arbitrating disputes are well documented (Ding et al., 2002; Metcalf and Li, 2005; Ge, 2007; Zhang, 2009). Mechanisms for labor relations, in particular the tripartite consultation scheme, are also noticed (Shen and Benson 2008; Lee, 2009).⁶ However, it is a debated issue whether unions are effective in protecting workers' rights. On the one hand, many studies regard unions' functions as essentially "managerial" (Nichols and Zhao, 2010; Chan et al., 2006; Chan, 2009), or peacemaking (Zhang, 2009), or serving as mediators rather than workers' representatives or "protectors" (Clark and Pringle, 2009; Lee, 2009). On the other hand, some studies have found that depending on their organizing structures and strategies (Clark and Pringle, 2009; Lee, 2009; Liu, 2010)⁷ as well as workers' awareness (Chan, 2009) and activism (Clark and Pringle, 2009), unions are searching the way towards real effectiveness. In addition, Zhang (2009) finds that workers do utilize both unions and official channels for their own gains; and Lee (2009) provides evidence suggesting that unions and collective bargaining are starting to exert impact on labor market outcomes.

⁶ The tripartite consultation scheme involves the union, the enterprise, and the government in labor relations. Both Shen and Benson (2008) and Lee (2009) view it as a first step towards more genuine and new practices of collective bargaining.

⁷ Liu (2010) finds that some local and regional unions were effectively using collective bargaining to advance workers' interests. He suggests that "union associations organized through this [regional and industrial level bargaining] pattern can replace employer-controlled grassroots unions as workers' bargaining representatives, transform the unions' administrative power and state support into substantive bargaining power, and gain certain benefits for workers."(p. 44)

Ge (2007) and Lu, Tao, and Wang (2010) offer two quantitative studies on unions' effects on a wide range of employee benefits and firm performance. Ge (2007)'s study is based a dataset of over one million firms obtained from the First National Economic Census conducted by China's National Bureau of Statistics (NBS) in 2004. In addition to providing a rich description of unions' role, Ge finds that unionism is positively related to workers' wages and benefits, labor productivity, R&D and human capital investment, but negatively related to firm profitability. Lu et al. (2010) use a 2006 sample of 3,837 private firms to study unions' impacts on labor productivity and profitability as well as the union effects on wages and other benefits. They find in various specifications including an instrumental variable estimation that unions significantly increase labor productivity but do not have any significant impact on profitability. A strong result they have obtained is that unions do not increase wages although unions promote a wide range of other benefits such as pension and medical and unemployment insurance. Lastly, they find that unions promote individual and collective contracts.

Our study improves on Ge (2007) and Lu et al. (2010) in two areas. First, we study wages, working hours, and pension in a SUR model in addition to studying a wide range of other employee benefits. This not only improves the estimation efficiency, but also allows us to conduct a more careful study on the union's wage effect. Both Ge (2007) and Lu et al. (2010) measure wages by dividing the total payroll by employment, though neither of them studies working hours. However, Andrews, Stewart, Swaffield, and Upward (1998) find that union wage differentials are higher when measured in terms of hourly earnings than when measured in terms of weekly earnings. This is because union workers work fewer hours per week than non-union workers on average. Therefore, it is important to take into account of working hours when wages are studied. Second, we take a serious step to study unions' effects on individual and collective contracts and their interplays influencing worker benefits. Lu et al. (2010) have studied unions' effects on individual and collective contracts, but do not treat the contracts as a channel for unions to influence

worker benefits.

The rest of the paper is organized as follows. In Section 2, we describe the institutions within which Chinese unions operate. In Section 3, we introduce our data and present detailed comparisons of unionized firms and non-unionized firms on a wide range of indicators. In section 4, we first present the baseline results of the SUR model, and then deal with the three issues that may confound the baseline results. In Section 5, we test two channels, individual written contracts and collective wage contracts, and their interactions with unions to affect worker welfare. Finally in Section 6, we conclude the paper by way of discussing its implications for China's union development.

2. Institutional Background

In China's planning era (1952-1978), urban employment was dominated by the state sector although a marginal employee-run collective economy existed. The government provided workers in the state sector an "iron bowl", namely, guaranteed life-time employment, generous fringe benefits, housing, and children's education. Since the 1980s, life-time employment was terminated, and more flexible, market-based employment contracts were introduced. In the 1990s, two concurrent events changed employment relations in China. One was the fast development of the private sector, and the other was vast privatization of SOEs. Figure 1 shows the shares of employment in the private sector, collective sector, and state sector in the period 1988-2008. In this period, the positions of the state sector and the private sector had a dramatic switch. While the state sector's share was 70% in 1988, the private sector's share became 77% in 2008. The influx of migrant workers from the countryside has further changed the employment relations in the urban sectors (Figure 2). Since 1998, on average 8.7 million migrant workers were added to the urban labor force each year. Migrant workers do not have the local *hukou*, or residential registration, and thus are often treated with inferior conditions than local workers. For this reason, companies may use migrant workers to substitute for local workers.

[Figure 1 and Figure 2 about here]

Accompanying the above dramatic changes was a period of informalization of the workplace. For example, pension coverage increased for both employees and urban residents as a whole before 1995, but was kept below the 1995 level in the rest of the 1990s (Figure 3). The recovery in the 2000s was relatively quick for employees; by 2008, 73% of them were covered. The recovery was much slower for urban residents; it waited until 2005 for their pension coverage to resume its 1995 level.

[Figure 3 about here]

In the last two years since China began a strong recovery from the financial crisis, labor shortage has become a concern of employers, especially in the export sector. An indicator is that migrant wage rates began to increase with a fast pace after sluggish growth in the previous decade (Knight et al., 2010). Although the stock of migrants is still increasing, its growth will decelerate in the next few years according to most predictions (e.g., Cai, 2008). This provides a favorable condition for labor protection to be improved.

Using the rich information provided by his large dataset, Ge (2007) provides a detailed description of what unions do in China. Here we focus on the legal environment for worker protection and union activities, an area less discussed by Ge (2007). In this regard, we first notice that China has a rather complete set of written laws regulating labor relations. Appendix 1 provides a list of the laws and regulations related to labor protection. The most important are the *Labor Law*, *Labor Contract Law*, and *Union Law*.

The *Labor Law* and *Labor Contract Law* set up a legal framework to regulate labor relations. The *Labor Law* provides general guidance, and the *Labor Contract Law* provides more specific criteria. It is interesting to find that both laws are set to advance economic growth. At the outset of the *Labor Law*, it is declared that the law is enacted for the purposes “to protect the legal rights of workers, regulate labor

relations, establish and maintain the labor institutions that are suitable for the socialist market economy, and promote economic development and social progresses.” (Article 1) That is, the law gives equal weights to the protection of employees’ legal rights and the promotion of economic growth. In the words of an ACFTU official, the law “establishes the market mechanism for labor relation adjustments with the basic means of legalized minimum standards and contractual freedom.” (Guo, 2006). Because of that, the law also gives asymmetric rights to employers and workers when it comes to the termination of an employment contract, terms of contract, and dispute settlement (Shen and Yao, 2009).

Despite their deficiencies, the *Labor Law* and *Labor Contract Law* would provide a fair amount of protection to workers if they were seriously implemented. After it was first introduced in 1994, the *Labor Contract Law* has been revised three times (Dec. 2006, Apr., 2007, and Jun. 2007). Its newest version took effect in January 2008. One of its new aims is to perfect the labor contract system by formalizing workers’ rights with written contracts and collective bargaining. Specifically, it requires that “a written labor contract should be signed within one month after the date the employer starts using the worker” (Article 10); and “a collective contract, one applying to all workers in an enterprise, can be signed by the labor union after bargaining on an equal basis with the employer” (Article 51). In addition, “special collective contracts can be signed addressing certain specific issues, such as labor safety and hygiene, the protection of the rights and interests of female workers, as well as wage adjustment mechanisms” (Article 52).

The *Union Law* is meant to set up the legal framework for unions. According to this law, “all manual and brain workers in enterprises, institutions and government departments within the territory of China who rely on wages or salaries as their main source of income, irrespective of their nationality, race, sex, occupation, religious belief or educational background, have the right to organize or join trade unions according to law” (Article 3, 2001 revision). The law stipulates the rights of workers in unions as well as procedures to establish a union. It also requires that unions be

independent of enterprise management but participate in the management on workers' behalf.

Nevertheless, the law puts constraints on unions to advance workers' welfare. For instance, it requires that part of the funding of the union come from the company. To be exact, unionized firms have to pay 2% of its payroll to the local ACFTU chapter and the government and 0.2% of its payroll to finance its own union.⁸ In practice, the union chairman is an employee and paid by the company. Therefore, it needs the consent of the management to set up a union in a company. In addition, the law does not stipulate explicitly that strikes are legal means for workers to seek their benefits although it (and other laws) does ban strikes.

At the function level, ACFTU is the only officially recognized labor organization. The control of ACFTU is hierarchical. At the national level, ACFTU directly controls 10 national industrial unions and 31 provincial unions. The hierarchical structure is replicated in those subordinate unions by administrative jurisdictions until it reaches the firm. Any grassroots union must be approved by and put under the leadership of ACFTU's local chapters. This means that all labor unions are effectively put under the control of the government.

The encouraging development is that the central government has begun to encourage ACFTU to play a larger role in protecting workers' rights, largely out of its concern for social instability. One signal of this is that the recent strike in the Guangdong Honda parts factory was tolerated and received wide media coverage domestically and internationally. To protect workers' interests, one of ACFTU's major tasks is to promote collective wage bargaining and written contracts (ACFTU, 2006). Collective wage bargaining produces collective wage contracts. ACFTU's aim is to have every unionized company sign up a collective wage contract with its

⁸ Ge (2007) finds that enterprises' overall union contribution as a share of payment is 1.6% for state-owned enterprises, 1.5% for domestic private enterprises, 0.8% for Hong Kong, Macao, and Taiwanese enterprises, and 1.3% for other foreign-invested enterprises.

workers by 2012.⁹ In a typical collective wage contract, the company and workers agree on terms of wage standards, wage growth, and procedures for making changes.¹⁰ In the absence of collective wage contracts, written contracts for individual workers are promoted. Neither collective contracts nor individual contracts necessarily provide workers more favorable terms than those specified by the *Labor Law* and *Labor Contract Law*. However, the contracts do increase companies' expected costs of contract violations because the contracts imply legal consequences.¹¹ One obvious area that contracts would help workers is wage payment. Wage arrears are common, especially for migrant workers, and often lead to open street protests. Premier Wen Jiabao even personally helped a woman worker to get her wages back.¹² Written contracts do not preempt wage arrears, but as a legal constraint they may oblige companies to behave differently.¹³

3. Data and Descriptive Analysis

3.1 The Data

The data we use come from a survey conducted by the International Finance Corporation (IFC) on the corporate social responsibility (CSR) of Chinese firms in the spring of 2006. The survey was conducted on 1,268 firms in 12 Chinese cities (from north to south): Changchun, Dandong, Chifeng, Beijing, Shijiazhuang, Xi'an, Zibo, Chongqing, Shiyuan, Wujiang, Hangzhou, and Shunde. The choice of the 12 cities was based on the principle of representation rather than on a random basis.

⁹ <http://sports.eastday.com/eastday/finance1/m/20100702/u1a5306051.html>.

¹⁰ As an example, see the template provided by the Xinjiang Autonomous Region government: http://www.xjrs.gov.cn/show_files.asp?ArticleID=4092. Liu (2010) documents a case of Zeguo Water Pump Industry Union Association, which produced a wage agreement for firms in the industry, specifying detailed minimum pay scales and minimum monthly wages. The agreement increased workers' monthly wages by 5-8% and decreased the turnover rate and relaxed labor shortage in the industry (Liu, 2010, p. 46).

¹¹ Although the legal system is still weak, recent studies have found that firms take a serious view on the court. For example, Shen and Yao (2009) find that 72% of their sample firms chose the court as the means to settle commercial disputes (p. 191).

¹² To avoid protests is one of the reasons that the government pays attention to wage arrears. See State Council document 2010 [No. 4] at http://www.gov.cn/zwggk/2010-02/05/content_1529273.htm.

¹³ In several cases documented in the literature, lack of written contracts is often associated with arbitrary reduction of workers' wages (i.e., Liu, 2010), and quite a few stories showed that workers lost their cases in arbitration because there were no contracts signed between their employers and themselves (Zhang, 2009). In contrast, in the three companies documented by Metcalf and Li (2005, part 3 in Section III), where labor disputes were rare, the importance of individual contracts were all emphasized. Friedman (2009) highlights unions' success in retrieving unpaid wages, especially for construction workers.

Beijing and Chongqing are two provincial-level cities. Changchun, Shijiazhuang, Xi'an, and Hangzhou are provincial capitals of Jilin, Hebei, Shannxi, and Zhejiang, respectively. Wujiang and Shunde are county-level cities. The other cities are medium-sized prefecture-level cities.¹⁴ Beijing, Wujiang, Hangzhou, and Shunde are located on the coast; Chifeng, Xi'an, Shiyan, and Chongqing belong to the country's western region; and the rest belong to the central region. Changchun, Xi'an and Chongqing used to be among China's industrial powerhouses, but had to go through a painful transformation in the last two decades because of the shifting of the economic gravity from the hinterland to the booming coastal regions. Beijing, Hangzhou, Wujiang, and Shunde are experiencing fast growth in industries and services. Zibo is catching up in industrial development, but its service sector is relatively lagging behind.

The NBS was commissioned to carry out the survey. In each city, 100 firms were planned to be randomly selected from firms that had an annual sales volume larger than 5 million Yuan.¹⁵ But some cities surveyed more than 100 firms. A stratified sampling strategy was adopted to select the sample firms. The first stratum was firm ownership. Firms were divided into three categories: state-owned enterprises (SOEs), domestic private enterprises (DPEs), and foreign-invested enterprises (FIEs).¹⁶ The shares of these three categories of firms in a city were used in the sampling. The second stratum was firm size, which also included three categories: large, medium, and small firms. The definitions of these three size categories were the same as those used by NBS in its routine statistics, which were defined by the State Economic and Trade Commission (SETC, 2003). The shares of firms of these three size categories in a city were used in the sampling. With this sampling strategy, we got a representative sample for the 12 cities. Our analysis is confined to the 12 cities and is not intended to make inferences for the whole country

¹⁴ There are three categories of cities in China: provincial level, prefectural level, and county level. Shunde is currently a district in Foshan city, but was an independent county-level city until 2003.

¹⁵ This is because the NBS only maintains a database for firms with a sales volume larger than this level.

¹⁶ SOEs were firms in which the state had controlling shares. DPEs included companies with mixed ownerships but with majority private shares as well as purely privately owned firms. FIEs were firms that had foreign shares including shares held by Hong Kong, Macao, and Taiwanese businesses. There were also collectively owned enterprises, but their number was relatively small, so they were combined with SOEs.

because these cities were not randomly selected.

A questionnaire was administered by NBS's local offices on the firm managers. Training was provided before the survey. The questionnaire asked questions related to firms' CSR awareness and performance in labor protection, quality control, corporate governance, and environmental protection. It also asked questions about market conditions, management composition, and external finance. In addition, the NBS provided data for the sample firms' annual financial performance between 2001 and 2005.

3.2 Unionization and Workers' Welfare in the Sample

Because we do not have data on individual workers, "unionization" is defined by the observation that a firm has a union, and workers' welfare is measured by firm-level aggregate indicators. In the sample, 854 firms are unionized. They account for 69% of the whole sample. This density is higher than documented in Ge (2007), mainly because our sample includes only firms with an annual sales volume larger than 5 million Yuan, so small private factories are not covered.

The *Labor Law* has detailed stipulations on regular working hours, overtime, and wage payments for overtime. Article 36 stipulates that regular working hours should not be more than eight hours a day and 44 hours a week. Article 41 stipulates that overtime normally should not exceed one hour a day; under special circumstances when production is in urgent needs, overtime can be extended to three hours a day, but should not exceed 36 hours a month. Finally, Article 44 defines that overtime wages should not be less than 150%, 200%, and 300% of the normal wages on a week day, a weekend, and a national holiday, respectively. Despite of these stipulations, large variations exist in the sample firms. Our survey asked managers the average monthly wages (total income including salaries, bonuses, and overtime payments) of white-collar and blue-collar workers and their monthly working hours. In this paper, we only study the wages and working hours of the blue-collar workers because they consist of the bulk of the employees. We obtain hourly wages by

dividing average monthly wages by monthly working hours. The lowest average hourly wage paid by the sample firms is merely 1.19 Yuan. The highest, in contrast, reaches 51.25 Yuan while the average hourly pay is 5.90 Yuan.¹⁷ As for working hours, the average working hours in the sample is 181 hours a month.¹⁸ However, the most demanding firm asks its employees to work for 336 hours a month, or more than 80 hours a week.¹⁹ In contrast, the lowest requirement in the sample firms is just 80 hours of work in a month.²⁰

Firms provide pension and other fringe benefits to selective employees although the law requires them do that for every employee. Pension coverage was recorded in the survey by a variable whose values range from 1 to 5, representing a coverage of less than 20%, 20%-40%, 40%-60%, 60%-80%, and 80-100%, respectively. The average pension coverage in the sample is 3.89, or about 77.8%.²¹ It is noteworthy that the proportion of local workers getting pensions is much higher than migrant workers. The ratio of firms paying most (more than 60%) of the local workers' pensions is 63.7%, while only 47.6% of the sample firms do so for migrant workers.

[Table 1 about here]

In Table 1 we compare workers' welfare of unionized firms and non-unionized firms in terms of seven sets of indicators. The first set contains the three major welfare indicators, namely, hourly wage, monthly working hours, and pension coverage. The average wage offered by unionized firms is 17.3% higher than by

¹⁷ The national average of annual urban employee salary was 23,969 Yuan in 2006 (the NBS official website: <http://www.stats.gov.cn/tjsj/ndsj/2006/indexch.htm>). If we assume 26 working days in a month and eight working hours a day, i.e., 208 hours a month, the maximum regular working time stipulated by the *Labor Law*, and exclude national holidays, then the national average hourly wage was 9.65 Yuan, much higher than that in our sample. This gap may be caused by the fact that our sample firms are mainly in the manufacturing sector, which pays lower wages than other sectors.

¹⁸ We study monthly working hours because many firms arrange their production cycles by months and give workers the number of days that they are allowed to take breaks.

¹⁹ This high number is not abnormal. Chan and Siu (2010) conduct surveys in 2006 in a toy factory and a garment factory that provide supplies to War-Mart and find that the average monthly working hours of their sample workers are 302 hours.

²⁰ This is a smelting plant in Jining. It is not like an idle plant because its monthly wage is 900 Yuan/worker, which is 85% of the average monthly wage in the sample.

²¹ In Figure 3, the national coverage of 2006 was 66%. However, according to CNpension.net, the national figure was 76% (http://www.cnpension.net/index_lm/2010-01-26/1034775.html).

non-unionized firms, while the average monthly working hours in unionized firms are 9 hours less. The gap for pension coverage is even larger. Table 1 shows that it is one unit, which is 20 percentage points when it is translated into percentage. The second set of indicators concerns three other kinds of insurance covering unemployment, general medical expenditure, and accidents. Unionized firms lead non-unionized firms in all the three indicators.

The rest four sets of indicators cover training and accidents, severance benefits offered to fired workers, amenities (clinics and childcare centers), employee tenure, and bargaining and contracts. While it is clear that unionized firms perform uniformly better than non-unionized firms across all the indicators, three points are worth emphasizing. First, in 2005 the number of accidents in unionized firms was only half the number of non-unionized firms. Second, workers stay in a unionized firm more than twice longer than in a non-unionized firm. Third, while unionized firms are more likely to allow collective wage contracts than non-unionized firms, the gap between these two groups of firms is much smaller when it comes to individual written contracts. That is, many non-unionized firms also offer individual written contracts. It is interesting to see in Section 5 how unions, individual contracts, as well as collective contracts play out in affecting workers' welfare.

3.3 Other Union Characteristics

Unionized firms differ from non-unionized firms in other aspects; those differences may affect workers' welfare. In our econometric exercises, we always control three sets of dummies: city, industry, and ownership (which we will refer to by "control dummies" subsequently). They are meant to capture inherent regional, industrial, and historical differences among the sample firms. For industry, we have five groups: agriculture, mining, manufacturing, utilities, and services. For ownership, we have four groups: SOEs, DFEs, HMTs (Hong Kong, Macao, and Taiwanese firms) and other FIEs.²²

²² HMTs are separated from other FIEs because the literature finds that they perform systematically differently from other FIEs (see Ge, 2007; Shen and Yao, 2009). For more results on the different performances across

Table 2 then presents four other sets of variables that set unionized firms apart from non-unionized firms. The first set contains the following variables describing a firm's basic characteristics: capital intensity, employment, management education, employee education, and the share of migrant workers. The last three variables are constructed from questions with categorical answers coded by cardinal values with higher values indicating better management education, better employee education, and higher shares of migrant workers, respectively. The notes for Table 2 present the exact definitions of these values and the values of other categorical variables. In our econometric exercises, we simply use these cardinal values when the categorical variables are included as independent variables.

Subsequently, we will call the above group of variables and the three sets of dummies for cities, industries, and ownership "the baseline controls". We understand that many variables in this group may be simultaneously determined with workers' welfare. For example, firms may be simply price takers in the labor market, so they have to treat wages as given and decide how many workers to hire and how much investment to make. We nevertheless treat this group of variables as the baseline control variables for the following reasons. The equations we estimate for our baseline SUR model represent the first-order conditions in a firm's profit maximization problem. That is, we are effectively estimating the marginal product of labor and its auxiliary marginal contributions (fringe benefits). Therefore, it is essential to control the stocks of capital and labor, or alternatively, like we do, to control capital intensity and labor. Then management and employee education are meant to accomplish two things. One is to measure the quality of the labor force, and the other is to capture the management and employees' awareness of labor protection --- better educated managers may incline to offer workers better treatments (Liu, 2010; Mengista and Xu, 2004) and better educated employees are more aware of their rights (Liu, 2010). Lastly, the share of migrant workers takes into account the institutional setting that migrant workers are discriminated in the labor market (Zhu,

ownerships, see Dong and Xu (2008) and Liu, Sun, and Woo (2007).

2004; Wang, et al., 2009; Friedman and Lee, 2010). In addition, migrant workers are less likely to join the union. By the end of 2009, 41 million out of the total of 226 million union members were migrants, although migrants' share in total urban labor force was 34% in the same year.²³

The second set contains six variables describing firms' external market conditions. They are provincial market share, government restriction on entry in the industry, share of export, customer requirement of labor standards, the status of listing, and external auditing. The first two variables measure a firm's market power. Supposedly, a better position in the market allows the firm to have more room to treat its workers better. The third and fourth variables are indicators for external pressures coming from the value chain. Exporters may be more likely to comply with labor standards because they are subject to international pressures (Greenhill et al., 2009). However, in China's case, exporters are more labor intensive than other firms and tend to hire workers with less education, so they may not offer as much to workers as other firms do. Indeed, some people believe that China as the "world's factory" is the main driver for the "race to the bottom" of global labor standards (Chan and Ross, 2003; Chan, 2009). In contrast, customer requirements have unambiguous effects on firms to improve labor standards because in a highly competitive market like the one in China clients have considerable leverage over their suppliers (Ngai, 2005). For example, Chan (2009) reports a case in which Reebok lunched a pilot though finally failed project to hold workplace union elections as a means to improve labor conditions in its suppliers. Lastly, listing and external auditing measures market pressures from third parties.²⁴ Although it is up to firms themselves to decide whether to get listed or audited, their decisions are unlikely to be correlated with their offers of welfare to their workers, but more likely to be related to their long-term business plans and desires to get external finance.

²³ Data come from official website of Xinhua Press:
http://news.xinhuanet.com/ziliao/2004-11/15/content_2220527.htm

²⁴ A number of auditing firms such as Ernst and Young Global Ltd. have begun to offer services in labor rights auditing (Athreya, 2004). However, Chan and Siu (2010) find in their surveys general failures of auditing to detect violations of key labor standards.

The third set of variables accounts for firms' self-awareness of labor protection. The first two variables describe firm managers' perception of unions' role in nearby firms. The first variable "*union versus management*" is based on a question asked on the manager about the relative importance of management, union, government, external arbitration agencies, and court in solving labor disputes in other local firms of the same industry. The manager was asked to give a score ranging from 1 to 3 on the five actors with higher values indicating higher degrees of importance. We create the "*union versus management*" variable by dividing the score assigned to the union by the score assigned to the management so its values range from 1/3 to 3. The second variable is the manager's perceived percentage of nearby firms that offer individual written contracts to their workers. The third variable is a dummy indicating whether any member in the management holds a position in the People's Congress (PC), China's legislative body, or People's Political Consultation Conference (PPCC), a sort of house of nobility in the Chinese system. Holding a position in those two political bodies brings tangible gains to firms, especially to private firms (Chan, 2000). However, becoming a public figure, the manager also has to care about the firm's public image to which establishing a union and treating workers better both add credits (Liu, 2010). The last two variables are about firms' CSR awareness and donations, respectively. Firms that are more aware of CSR and donate more often may treat their workers better and are more likely to establish unions.

The last set of variables describes firms' financial performance, pre-tax profit rate (profits/sales), per-worker sales, and overdue loans. The last variable is a dummy and comes from the question: "Has your firm been unable to pay back loans in due time at least once in the last three years?" There are two different arguments for the relationship between unionization and firms' financial performance. One follows from the fact that unions are only possible if the firm managements approve them. So by this argument, unionization should be positively correlated with firms' financial performance. The other argument asserts that unions hurt firm profitability because they increase wages and other labor related expenditures. In our sample,

unionized firms have lower per-workers sales but a higher average profit rate. In addition, unionized firms have a default rate almost twice the rate of non-unionized firms.²⁵ No matter what the relationship is, however, it is natural in the Chinese context to expect that workers' welfare be positively correlated with firms' financial performance. Indeed, they can be determined simultaneously. To avoid this problem, we will also try lagged values of the three financial variables.

4. Results of the SUR Model

Before presenting the results of the SUR model, we first provide a rough idea on how unionism is associated with firm characteristics by running a probit regression of the unionization dummy on all the control variables we discussed in the previous section. Employment, share of migrant workers, provincial market share, manager's perception of union versus management, and manager's perceived share of nearby firms offering individual contracts are all highly significant. Larger firms are more likely to have unions, a result consistent with the literature (e.g., Andrews et al., 1998; Ge, 2007). As expected, firms with more migrant workers are less likely to have unions, but firms with larger market shares are more likely to have unions. Lastly, the two perception variables are positively correlated with firms' own status of unionization. There could be two interpretations for this result. One is that peer pressures or demonstration induce firms to have unions. The other is simply that managers were thinking about their own firms when they answered the relevant questions so they would have positive perceptions of nearby firms if their own firms had unions. In addition to the above highly significant variables, two variables are weakly significant. One is political connection, and the other is overdue loans. Both are positively correlated with unionization. The result of political connection is expected, and the result of overdue loans may be caused by unionized firms' larger bargaining power. Among the insignificant variables, it is interesting to find that

²⁵ Instead of the argument that unionization hurts profitability, there is another possible explanation. That is, unionized firms usually enjoy strong relations with the government so they have certain bargaining power in the firm-bank relations. They may also conduct strategic defaults, waiting for the government to write off their debts.

unionism is not significantly correlated with firm profitability and per-worker sales. The first result agrees with Lu et al. (2010)'s finding and is different from Ge (2007)'s result that unionism is negatively associated with firm profitability. The second result is different from both Ge (2007) and Lu et al. (2010) who both find significant correlation between unionism and labor productivity. We warn the reader, though, that the above results are all indicative than deterministic.

4.1 The Econometric Model

Let W_i , H_i , and P_i be the average hourly wage (Yuan), monthly working hours (hours), and pension coverage of firm i , respectively. Taking the natural logarithm for wages and working hours, we estimate the following SUR model of three equations for the baseline effects of unionization:

$$\log(W_i) = \beta_{w1} + \beta_{w2} U_i + \beta_{w3} Z_i + \beta_{w4} D_i + \varepsilon_{wi} \quad (1)$$

$$\log(H_i) = \beta_{h1} + \beta_{h2} U_i + \beta_{h3} Z_i + \beta_{h4} D_i + \varepsilon_{hi} \quad (2)$$

$$P_i = \beta_{p1} + \beta_{p2} U_i + \beta_{p3} Z_i + \beta_{p4} D_i + \varepsilon_{pi} \quad (3)$$

Where U_i is a dummy variable for unionization (unionized = 1, otherwise = 0), Z_i are the baseline controls, D_i are the extra control variables discussed in the previous section, β 's are parameters to be estimated, and ε 's are error terms that are distributed by a trivariate normal with mean zero.

We should point out that equation (1) is not a conventional wage equation because the left-hand side variable is the average wage in a firm, not individual workers' earnings. In the same vein, equations (2) and (3) cannot be interpreted at the individual level. Admittedly, this ignores the individual variations within a firm. However, a worker becomes unionized as long as his firm is unionized. Therefore, we would anyway estimate the average effect of unionization at the firm level even if we had individual-level data. Focusing on firm-level aggregate indicators thus does not cause large distortions to our estimates of the union effects as long as we have good firm-level controls.

4.2 Baseline Results

In R1 reported in the first three columns of Table 3, we report the results of the SUR model with only the unionization dummy and the three sets of control dummies of cities, industries and ownership as the right hand side variables. Unions' effects on the three welfares are all significant at the 1% level, with their magnitudes being 12.6% in raising the hourly wage, 2.9% in reducing monthly working hours, and 16.8% (converted scale) in raising pension coverage. Then in the next three columns we report the results of R2 that adds the other five baseline control variables. Unions' effects are considerably reduced: 8.7% on wages, -1.6% on working hours, and 14.9% on pension coverage. In comparison, Ge (2007) finds an estimate of unions' effect on wages at 10.4%, and Lu et al. (2010) obtains a 12.4% union effect on pension coverage.

As for the control variables, higher capital intensities, higher education levels of the management and workers are all associated with better worker welfare whereas a large share of migrant workers has exactly the opposite effects. In addition, a larger firm measured by employment offers higher wages although the effect is rather small: an addition of 100 workers is only associated with 0.1% increase of hourly wages.

[Table 3 about here]

For R2, the correlation matrix of the residuals of the three equations is:

$$\begin{bmatrix} 1.0000 & & \\ -0.4357 & 1.0000 & \\ 0.2085 & -0.2472 & 1.0000 \end{bmatrix}$$

All the three correlation coefficients are statistically significant, indicating that the SUR model does improve asymptotic efficiency. Wages and pension coverage are positively correlated,²⁶ but both are negatively correlated with working hours. Thereafter, we treat R2 as the baseline regression for the SUR model.

²⁶ The theoretical framework of Rosen (1986) suggests that workers receiving more generous fringe benefits are paid lower wages than comparable workers who prefer fewer fringe benefits. But later empirical findings are mixed (Currie and Madria, 1999). Using the husband's union status, firm size and health coverage as instruments, Olson (2002) identifies a negative correlation between the fringe benefits wives receive and their wages.

4.3 Issues Related to Cross-sectional Data

Table 4 presents two sets of results on three sub-samples, DFPs, manufacturing, and Guangdong to deal with the issues related to cross-sectional data that we discussed in the introduction. The first set of results, presented in the upper portion of the table, are obtained with only the union dummy and the three sets of baseline dummy controls and the second set of results, presented in the lower portion of the table, are obtained with the additional baseline controls added. Only the estimates for unionization are presented, though, to save space.

[Table 4 about here]

DPEs accounts for about 68.7% of our sample firms. This percentage is quite close to what found in Ge (2007)'s large sample of 1.3 million firms, which is 65.4%. In this sub-sample, unions' effect on working hours is no longer significant when all the baseline controls are present in the regression. According to the regression with all the baseline controls, the effect on wage is 6.9%, smaller than in the whole sample, but the effect on pension coverage is 17.5%, larger than in the whole sample.

Ge (2007) finds that effects of unionization vary across industries. Metcalf and Li (2005) find that about one third of Chinese union members work in the manufacturing sector. In our sample, the manufacturing sector accounts for 47% of the sample firms among which 71% are unionized. Table 4 shows that unions' effect on working hours is insignificant in this sub-sample even when only the dummy controls are included. When all the baseline controls are included, unions' effect on wages is 11.5%, and their effect on pension coverage is 15.3%, both larger than obtained in the whole sample.

According to Metcalf and Li (2005), union membership is concentrated in the east and central regions of China, but Jiansu, Jianxi and Guandong, all belonging to eastern and central regions, have relatively low union densities. In our sample, 56% of firms in Guangdong are unionized as compared with 69% in the whole sample. The regression results of the Guangdong subsample are presented in the last three

columns of Table 4. The union effect is significant for all three welfare indicators regardless which group of the baseline controls is included in the regressions. The union effect is more pronounced on wages and working hours in the Guangdong subsample than in the whole sample while it is as good as in the whole sample for pension.

4.4 Consistency of the Union Effects

[Table 5 about here]

Table 5 provides estimation results of unions' effects on the 13 other welfare-related indicators discussed in Section 3. Unionization is shown to play a positive and significant role on all indicators when only the dummy baseline controls are included. It remains so when all the controls are included except for the four indicators related to training and job tenure. That is, unions do have quite consistent effects on workers' welfare.

4.5 Additional Control Variables

Table 6 examines the inclusion of the six variables reflecting potential market pressures a firm is exposed to. Unions' effect on wages declines from 8.7% in the baseline regression to 6.5%; unions' effect on monthly working hours turns insignificant; yet the effect on pension coverage increases to 15.8%. As for the new control variables, higher provincial market shares are correlated with higher wages and higher pension coverage. In comparison, firms operating in industries with government restrictions on entry also have higher pension coverage, but require workers longer working hours. More exports in total sales are associated with worse workers' welfare. This finding shows that the labor-intensive nature dominates potential international pressures in exporting firms.²⁷ Requirements from customers

²⁷ This result also raises doubts why Guangdong firms do better in wages and working hours than firms in other provinces. One thing to notice is that non-unionized firms in Guangdong perform worse in wages and working hours than their counterparts in other provinces. In non-unionized Guangdong firms, the average wage is 5.66 Yuan and the average monthly working hours are 198 hours, whereas the average wage is 6.22 Yuan and the average monthly working hours are 186 hours in non-unionized firms of other provinces. That is, unions' role in Guangdong is more to correct the inferior treatments workers otherwise would have to face than to raise workers' welfare above the national average.

on labor standards have a significant impact on pension coverage, but its magnitude is very small. Public listing shows no effects on welfare; however, external auditing shows significant effects.

[Table 6 about here]

Table 7 tries the set of control variables reflecting firms' self-awareness of labor protection. Compared with the baseline results, the union effects on wages and pension coverage decline by about two-thirds. In addition, unions' impact on monthly working hours turns insignificant. Those results can be contrasted with the results of the two variables measuring managers' perceptions of the union's role in other firms. *Union versus management*, a measure for the union's popularity against the management in resolving labor disputes, is significantly associated with the improvements of all three welfare indicators. And, if it were common for other local firms to sign contracts with their employees, a firm would provide higher pension coverage and require fewer working hours to its own workers. Better political connections of the manager do not improve workers' welfare, but the manager's better awareness of corporate social responsibility is associated with higher pension coverage and lower working hours, and a firm making charity donations requires lower working hours.

[Table 7 about here]

The results of the manager's perceptions deserve more discussions. Our results suggest that the second interpretation of the two perception variables --- i.e., they capture the manager's perceptions on the roles of the union and written contracts in his own firm --- is more relevant for our sample firms. In this case, the presence of the union is less important than the manager's perception of the role of unions because perception is likely to be formed on the effectiveness of the union. That is why the perceived role of the union relative to the management has higher prediction power than the presence of union itself. The same explanation can be applied to written contracts, albeit to a lesser extent.

[Table 8 about here]

Table 8 examines the impacts of firms' financial performance on our baseline results. It contains the results from two regressions. The first regression uses the 2005 values of the three financial performance variables, and second regression uses their 2004 values to reduce their simultaneity with the dependent variables. Both regressions show that unions improve wages and pension but do not affect monthly working hours. It is noteworthy that the union effects on wages and pension are about the same sizes obtained for the baseline results. One of the doubts on unions' effects is that financially better performing firms are more likely to establish unions so the union effects simply pick up the effects of better firm performance. Our result disproves this doubt.

Higher pre-tax profit rates are shown to substantially increase wages in both regressions. This could be a result of profit sharing, but could also be a result of better technology, better products, or better markets that all lead to higher shares of value-added. In contrast, labor productivity measured by per-worker sales does not have any significant impact on any welfare indicator. Lastly, overdue loans are correlated with lower wages, but longer working hours.

[Table 9 about here]

Finally, we put all the control variables into the union-welfare equations and present the new results in the first three columns of Table 9. Unionization is shown to be only significantly associated with pension coverage. Some of the results of the control variables are also changed. However, once the two variables of the manager' perceptions, *Union versus management* and *Contracts in nearby firms*, are removed, unionization turns significant for wages although its effect is still insignificant for working hours.

Summarizing the above results, we have the following conclusions. First, the union effect on pension coverage is quite robust. It is statistically significant in all regressions, and its magnitudes are economically meaningful. Second, the union effect on wages is confounded by the manager's perception of the role of the union.

Regression 1 in Table 9 suggests that the manager's perception is a better predictor for wages than the presence of the union. In a sense, this is an expected result because the manager's perception reflects the effectiveness of the union in his firm. Third, the union effect on working hours is not robust and is not economically significant even when it is statistically significant. Therefore, unions increase workers' hourly wages not by shortening their working hours. At the current stage, most workers are young and their income is low. Therefore, they may prefer working longer hours if they get extra income.²⁸ Fourth, the above results are repeated in the DPF and manufacturing subsamples, but unions also significantly shorten working hours in Guangdong where workers work substantially longer in a month than workers in other provinces. Lastly, unions are found to have positive effects on most other workers' welfare indicators.

5. Individual Contracts and Collective Contracts

The results of the above analysis support the thesis that unions improve workers' welfare in China. In this section we study two channels, individual written contracts and collective wage contracts, by which unions exert their impacts. We also study their interactions with unions in improving worker welfare. In developed economies collective bargaining is regarded as one of the most important ways for unions to increase workers' wages (e.g., Leontief, 1948; Blair and Crawford, 1984). Early works (such as Gustman and Segal, 1976; and Chambers, 1981) have also studied the wage gap due to written contracts in the United States. As our review in Section 2 showed, the ACFTU is actively promoting collective bargaining and written contracts in China. Although they are not the only channels for unions to improve workers' welfare, these two channels are likely to be the two most important in current China because other union activities (such as strikes) are severely limited by the government (Metcalf and Li, 2005).

²⁸ A somewhat extreme claim is made by Chan and Siu (2010) assessing working hours in their two sample factories that "only when they (workers) work for more than forty hours a week can they make any money beyond the amount needed for survival, to begin to save or share it with their family members. That is why most of these workers are 'willing' to labor far longer than forty hours a week." (p. 171)

5.1 Baseline Results

Among our sample firms, there are 29.6% allowing collective wage contracts, 73% signing individual written contracts with all workers, 23% signing written contracts with some workers, and 4% not signing written contracts with any workers. Three things are worth discussion before we head for regression analysis.

First, not all unionized firms have collective contracts. In fact, only 34.4% of them do so. In contrast, 18.9% of non-unionized firms also reported to do so. Conversely, among the firms offering collective contracts, 79.8% are unionized and the rest 20.2% are not. While it is curious to know why a non-unionized firm wants to offer collective contracts, the higher percentage among unionized firms seems to suggest that unions do promote collective wage contracts.

Second, unionized firms are more likely to offer their workers individual written contracts than non-unionized workers. In the survey, collective wage contracts were recorded as a binary variable of “yes” and “no” answers, but written contracts were recorded as a variable with three ordered answers: no (= 0), for some workers (= 1), and for all workers (= 2). The average score of written contracts is 1.81 among unionized firms and 1.54 among non-unionized firms.

Third, it is logic to expect that firms allowing collective wage contracts would offer their workers written contracts. Except four firms, this is indeed the case in the sample. Therefore, the reference group for inferences on collective contracts is the firms offering individual written contracts when the two variables are put in the same regression.

In Table 10, we examine two sets of relationship. The first is how the two kinds of contracts are correlated with unionization, and the second is how they affect workers' welfare. Regressions 1 and 2 are for the first relationship, and Regressions 3, 4, and 5 are for the second relationship. An ordered probit model is used for individual contracts in Regression 1 and a probit model is used for collective contracts in Regression 2; their results are reported in Columns 1 and 2 in Table 10.

Unionization is found to significantly increase firms' probabilities to sign individual contracts with their employees and to allow collective contracts.

[Table 10 about here]

The next three columns of Table 10 reports the results of Regression 3, which is a SUR model regressing the three workers' welfare indicators on individual contracts alone. In this regression, the variable "individual contracts" simply takes values 0, 1, and 2. It is shown that individual contracts significantly improve all the three welfare indicators. Then the next three columns report the results of Regression 4 that regresses the three welfare indicators on the presence of collective contracts (entering as a dummy variable), also in a SUR model. Collective contracts show positive effects on wages and pension coverage, but their magnitudes are smaller than those of individual contracts. In addition, collective contracts do not have a significant effect on working hours. That is, collective contracts are less effective than individual contracts to provide protection to workers. This may be related to the fact that most firms allowing collective wage contracts have already offered individual written contracts, which have already provided workers reasonable protection. This conjecture is confirmed by the results of Regression 5 presented in the last three columns of Table 10. They are produced by a SUR model putting both individual and collective contracts on the right hand side. The coefficient of collective contracts now should be interpreted as their added impacts on top of the impacts of individual contracts. While the coefficients of individual contracts do not change much, the coefficients of collective contracts are further reduced. This suggests that the impacts of individual contracts are quite robust and largely independent of the presence of collective contracts. Nevertheless, collective contracts still have added impacts, especially on wages and pension, for which their effects are significant at the 10% significance level.

5.2 Interactions between Unionization and Individual and Collective Contracts

The above exercise has established the relationship between unionization and

workers' welfare through individual and collective contracts. However, we do not know whether unions exert influences by other channels. In addition, the results do not tell us whether the two kinds of contracts are necessary for unions to improve workers' welfare. The four regressions reported in Table 11 are meant to answer these two questions.

[Table 11 about here]

In Regression 1, we put unionization together with individual and collective contracts on the right hand side to see whether on average those three variables have significant marginal effects on workers' welfare. The first result we notice is that unionization remains significant on wages and pension although it is no longer significant on working hours. That is, on average unions improve workers' wages and pension independent of the status of contracts in a firm. Another result is that individual contracts and collective contracts show a sharp contrast: while individual contracts are still significant on all three welfare indicators, collective contracts turn insignificant on each of them. There are two explanations for the insignificant results of collective contracts. The first is that the added impacts of collective contracts over individual contracts are small. But Regression 5 in Table 10 rejects this explanation. The second explanation is that collective contracts do not have any impacts independent of unions. This explanation makes sense because collective contracts need the support of some kind of workers' organization, and the union is just one kind of it.

Next in Regressions 2, 3, and 4, we examine unions' interactions with individual and collective contracts. In Regression 2, we look at the interactions between unionization and individual contracts. In addition to these two variables entering the regression alone, we include their interaction term. With this setup, the coefficient of unionization is interpreted as unions' contribution when individual contracts are not offered, the coefficient of individual contracts is interpreted as their contribution when the union is absent, and the coefficient of the interaction term is interpreted as the enhancement effect when individual contracts are complemented by the presence

of the union. The estimation results are surprising: unionization does not have any significant effect on any welfare indicator, but individual contracts significantly reduce working hours and increase pension coverage. However, unionization and individual contracts have mutually enhancing effects; their interaction term is significant for wages and pension coverage.

In Regression 3, we repeat the exercise for collective contracts. Because individual contracts are not included in the regression, the comparison group when we make inferences on collective contracts is the firms without collective contracts including some firms offering individual contracts. This time, unionization has significant coefficients for wages and pension coverage but is insignificant for working hours. However, neither collective contracts nor their interaction term with unionization has any significant coefficient.

In Regression 4, we put individual and collective contracts together to study their interactions with unionization. Now the union coefficient is interpreted as unions' contribution when neither kind of contracts is present. The coefficients of individual contracts and their interaction term with unionization have the same interpretations as those in Regression 2. The interpretations of the coefficients related to collective contracts are a bit tricky. As in Regression 5 of Table 10, the coefficient of collective contracts measures their added impacts with respect to individual contracts. In accordance, the coefficient of their interaction term with unionization measures unions' enhancement effects for the subgroup of firms with collective contracts relative to the larger group of firms offering individual contracts.

The results are a collection of the two previous regressions. As in Regression 2, none of the coefficients of the union dummy is significant, and as in Regression 3, none of the coefficients of collective contracts is significant. In contrast, the coefficients of individual contracts and their statistical significances remain almost the same as in Regression 2. Among the coefficients of the interaction terms, there is only one significant result. This is the interaction term between unionization and individual contracts in the wage equation.

The above results tell us a rich story. First, collective contracts only improve workers' welfare with the support of unions. In other words, collective contracts in non-unionized firms are either an ornament or simply misreported by their managers in the survey. This result makes sense. Without the presence of the union, a collective contract, even if it is real, is at best a goodwill gesture offered by the management. For a collective contract to improve the welfare of workers as a whole, it has to be a product of serious negotiations between the management and the workers organized as a collective, to which the union provides a vehicle. Second, individual contracts not only improve worker welfare on the average, but also reduce working hours and increase pension coverage even without the presence of unions. Third, individual contracts are necessary for unions to improve workers' welfare. Combined with individual contracts unions substantially increase workers' wages and weakly increase their pension coverage. In summary, individual contracts are essential to improving workers' welfare; unions promote individual contracts and enhance their positive effects; and collective contracts have to be supported by unions to have positive effects on workers' welfare.

6. Conclusions

This paper offers a set of empirical results showing that the presence of unions is significantly associated with workers' higher wage rates and pension coverage as well as a wide range of other fringe benefits. In addition, we find that the presence of union significantly increases a firm's probability to offer its workers individual and collective contracts, which in turn improve worker welfare. Further exploration finds delicate interactions between unionization and individual and collective contracts. Individual contracts are the most reliable means to improving workers' welfare; without individual contracts, unions do not provide workers noticeable benefits. In contrast, collective contracts only play a minor role; their functions are shadowed by those of the union.

In addition to contributing to the literature of unionism, our findings offer strong implications for union development in China. While lending supports to the thesis

that unions improve workers' welfare, our findings also indicate ways for unions to act more effectively. Collective contracts provide workers protection in areas that affect all workers, e.g., minimum wages, rules for wage adjustment, holidays, workplace safety and amenities, and so on. Those areas are unions' main battlefield. A new message of our findings, however, is that the union can be more effective if it puts more efforts in promoting individual contracts. Compared with collective contracts, individual contracts are more likely to take into account individual workers' heterogeneities in education, experience, and skills, so they are more likely to improve workers' wages and other benefits. Individual contracts also provide workers better legal protection as labor violations are more likely to involve individual workers instead of workers as a whole.

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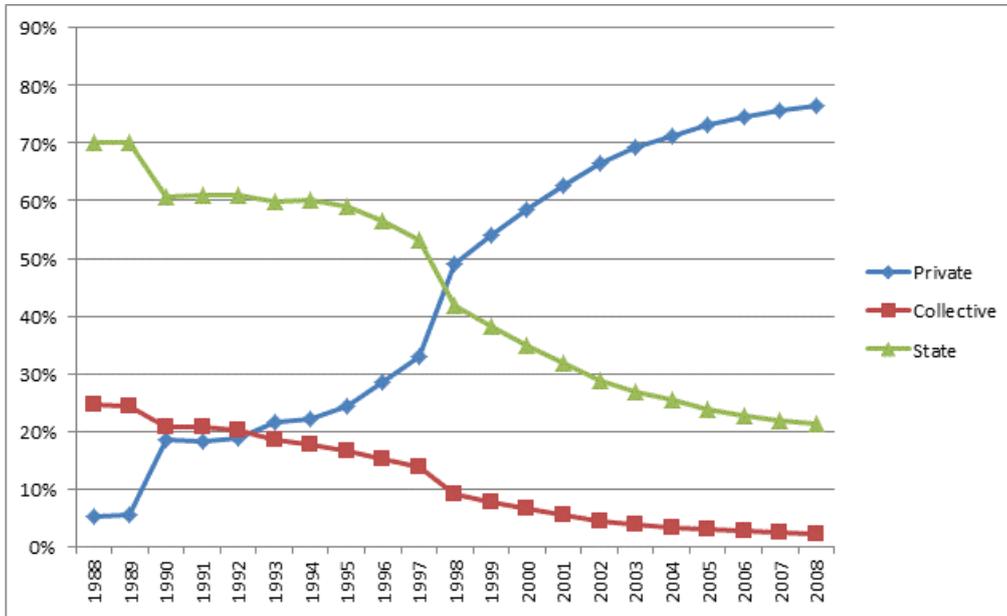
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Figure 1
Urban Employment in China: 1988-2008

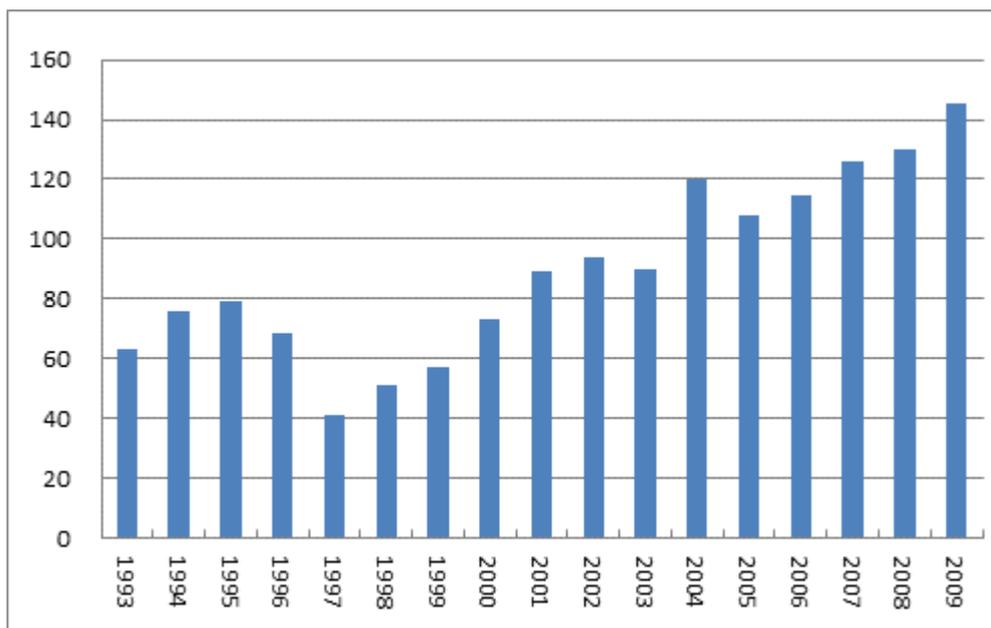


Notes:

Employment does not include self-employed persons but include migrant workers.

Source: MLSS (2009).

Figure 2
Migrant Workers (million)



Source: NBS (2010).

Figure 3

Pension Coverage in Urban China



Notes: Both employees and residents include migrant workers.

Source: MLSS (2009).

Table 1.**Unionized Firms and Non-unionized Firms: Welfare Indicators**

Items	Obs.	Unionized firms	Non-unionized firms
<i>Unionization</i> (0, 1)	1236	0.69	0.31
1. Main welfare indicators			
Average hourly wage (Yuan)	1203	6.2***	5.2
Average monthly working hours (hours)	1221	178***	187
Pension coverage (1 - 5)	1134	3.8***	2.8
2. Other insurance coverage			
Unemployment insurance coverage (1-5)	1072	3.5***	2.3
Government-sponsored medical insurance coverage (1-5)	1041	3.4***	2.4
Workplace accident insurance coverage (1-5)	1086	4.1***	3.5
3. Trainings and accidents			
Pre-post training on workplace safety (0, 1)	1222	0.98***	0.95
Workplace accidents/thousand workers in 2005	868	5.7***	10.9
Training plans (0, 1)	1204	0.88***	0.78
Number of trainings organized last year	1117	5.1	3.5
4. Severance benefits			
Severance payment in the share of monthly wage (1-4)	1034	2.74***	2.45
Time of advance informing (1-4)	1181	2.62***	2.29
5. Amenities			
A clinic in the factory (0, 1)	1228	0.28***	0.10
A child care center in the factory (0, 1)	1221	0.08***	0.01
6. Workers' tenure			
Average tenure of blue-collar workers (years)	1204	7.7***	3.4
Average tenure of clerks (years)	1200	8.5***	4.1
7. Bargaining and contracts			
Number of negotiations on wages in the past three years	998	0.81	0.44
Allowing collective wage bargaining (0, 1)	1150	0.56***	0.47
Allowing collective wage contracts (0, 1)	1158	0.34***	0.19
Signing written contracts with individual workers (0-2)	1222	1.81***	1.54

Notes:

Pension and other insurance coverage is a variable whose values range from 1 to 5, representing a coverage of less than 20%, 20%-40%, 40%-60%, 60%-80%, and 80-100%, respectively. The severance payment is reported as a share of monthly salary, with 1-4 denoting, respectively, 0-20%, 20-50%, 50-100%, and over 100%. Time of advance informing is reported on the following scale: 1_a week, 2_two weeks, 3_a month, 4_over a month. Written contracts is constructed from the question: Does your company sign written contracts with workers? 2_All workers; 1_Some workers; 0_No. ***, **, *denotes the average is significantly different from the other group at the 1%, 5% and 10% level, respectively.

Table 2.**Unionized Firms and Non-unionized Firms: Control Variables**

Items	Obs.	Unionized firms	Non-unionized firms
1. Baseline control variables			
Capital intensity (million Yuan/worker)	1151	0.20***	0.12
Employment (100 persons)	1151	9.81***	2.20
Management education (1 - 4)	1223	2.38**	2.23
Employee education (1 - 4)	1229	1.50	1.44
Migrant workers (1 - 5)	1169	1.88***	2.49
2. Market conditions			
Provincial market share (1 - 6)	1095	4.07***	3.30
Government restrictions on entry (0, 1)	1176	0.35	0.34
Export (1 - 6)	1172	0.92	1.06
Customer requirement of labor standards	1236	0.72	0.70
Listing (1 - 4)	1236	1.46***	1.33
External auditing (0, 1)	1193	0.80***	0.69
3. Self-awareness			
Union versus management (1/3 - 3)	881	1.02***	0.70
Contracts in nearby firms (1-3)	1085	2.45***	2.16
PC or PPCC membership (0, 1)	1219	0.46***	0.23
CSR awareness (1-3)	1154	1.92***	1.74
Charity donation (0, 1)	1152	0.34***	0.24
4. Financial performance			
Pre-tax profit rate (%)	1151	7.5	7.2
Per-worker sales (million Yuan)	1151	0.45	0.48
Overdue loans (0, 1)	1137	0.10***	0.06

Notes:

Capital intensity is per-worker fixed capital (1,000 Yuan). *Employment* is the number of workers (100 persons). *Management education* takes values 1 – 4 indicating the share of management with college or higher diplomas of 0-20%, 20-40%, 40-60%, and above 60%, respectively. *Employee education* is constructed in the same way. *Migrant workers* is the share of migrant workers, with 1-5 denoting respectively, lower than 20%, 20%-40%, 40%-60%, 60%-80%, and 80-100%. *Provincial market share* comes from the six categorical answers provided by the questionnaire and takes values of 1 - 6 representing, respectively, the shares of 0-1%, 1-3%, 3-5%, 5-10%, 10%-20%, and above 20%.

Restrictions on entry is firm's answer to the question "whether the government sets some restrictions on entering into the market where you are operating in". *Export* comes from the question asking a firm's share of export in its sales, with 1-6 meaning 0%, 0-20%, 20-40%, 40-60%, 60-80%, and 80-100%. *Customer requirement of labor standards* comes from a question asking a firm whether most of certain types of their client companies make requirement on labor standard. There are six types given by the question, including: domestic SOE, DPE, middle-and-small scale FIE, multinational FIE, exporting companies in developed countries, and exporting clients in developing countries. A firm gets score 1 if it answers "Yes" for one type, and value of the variable is the sum of all six types. *Listing* comes from a question giving the sample firms four choices of answers regarding their status of public listing and takes values 4 to 1 representing respectively, already listed, in the process of listing, plan to be listed, and no such a plan. *External auditing* comes from the question "Does your company hire external auditors?" 0_No; 1_Yes (dummy variable). *Union versus management* comes from a question: "Among other local firms in your industry, how often are the following ways used to deal with labor disputes: management deliberation, the union, local labor arbitration commission, other local government agencies, and the court?" 1_rare, 2_moderate, 3_often; it is constructed by dividing the answer on "the union" by that on "management deliberation". *Contracts in nearby firms* comes from a question asking a firm: "Among other local firms in your industry, is it common for them to sign contracts with their employers?" 1_few; 2_some; 3_very common. *CSR awareness* is response by the manager to the question: Are you aware of any standard on corporate social responsibility such as SA8000?" 1_No; 2_Have heard of it, yet not known it well; 3_know it. *Charity donation* is answer to the question: "Has your company made any donation to charity institution or organization in the past three years?". 0_No; 1_Yes (dummy variable). *Per-worker sales* is sales (1 million Yuan)/ employment. *Pre-tax profit rate* is (profits + tax)/sales. *Overdue loans* is the answer to the question: "Has your firm been unable to pay back loans in due time at least once in the last three years?" 0_No; 1_Yes (dummy variable). ***, **, *denotes the average is significantly different from the other group at the 1%, 5% and 10% level, respectively.

Table 3
Baseline Results

	R1			R2		
	Log (Wage)	Log (Hours)	Pension coverage	Log (Wages)	Log (Hours)	Pension coverage
Unionization	0.126*** [0.024]	-0.029*** [0.009]	0.841*** [0.105]	0.087*** [0.023]	-0.016* [0.009]	0.746*** [0.105]
Capital intensity				0.091*** [0.017]	-0.032*** [0.007]	0.149* [0.076]
Employment				0.001*** [0.000]	-0.000 [0.000]	0.002 [0.002]
Management education				0.031*** [0.009]	-0.011*** [0.004]	0.235*** [0.041]
Employee education				0.117*** [0.015]	-0.028*** [0.006]	0.179*** [0.068]
Migrant workers				-0.030*** [0.009]	0.015*** [0.004]	-0.117*** [0.043]
City dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Ownership dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,037	1,037	1,037	1,000	1,000	1,000
Pseudo R-square	0.319	0.174	0.226	0.435	0.242	0.282

Standard errors are in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4**Results of Sub-samples**

	DFPs			Manufacturing			Guangdong		
	Log (Wage)	Log (Hours)	Pension coverage	Log (Wage)	Log (Hours)	Pension coverage	Log (Wage)	Log (Hours)	Pension coverage
Unionization	0.090*** [0.026]	-0.026** [0.011]	0.944*** [0.128]	0.152*** [0.035]	-0.018 [0.012]	0.845*** [0.153]	0.131** [0.064]	-0.061** [0.026]	0.646*** [0.241]
Dummy controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	700	700	700	494	494	494	102	102	102
Pseudo R-square	0.289	0.107	0.204	0.344	0.212	0.241	0.143	0.092	0.116
Unionization	0.062** [0.025]	-0.012 [0.011]	0.845*** [0.126]	0.115*** [0.033]	-0.005 [0.012]	0.767*** [0.152]	0.129** [0.058]	-0.065** [0.026]	0.735*** [0.227]
All baseline controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	678	678	678	476	476	476	101	101	101
Pseudo R-square	0.395	0.193	0.282	0.466	0.267	0.312	0.350	0.165	0.280

The regressions in the upper portion of the tables are conducted with only the baseline dummy controls, and the regressions in the lower portion are conducted with all the baseline controls. Standard errors are in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5
Other Welfare Indicators

	1	2	3	4	5	6	7	8	9	10	11	12	13
	Unemployment insurance	Medical insurance	Accident insurance	Pre-post training	Workplace accident	Training plans	No. of training	Severance payment	Inform in advance	Clinic	Child care center	Tenure of workers	Tenure of clerks
	Ordered probit	Ordered probit	Ordered probit	Probit	OLS	Probit	OLS	Ordered probit	Ordered probit	Probit	Probit	OLS	OLS
Unionization	0.689*** [0.083]	0.571*** [0.086]	0.416*** [0.088]	0.418*** [0.154]	-3.625** [1.589]	0.370*** [0.107]	0.999* [0.560]	0.208** [0.082]	0.248*** [0.078]	0.649*** [0.109]	0.810*** [0.285]	2.956*** [0.265]	3.079*** [0.285]
Dummy controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,001	972	1,012	1,131	868	1,123	1,049	968	1,100	1,146	1,034	1,122	1,120
(Pseudo) R-square	0.12	0.11	0.08	0.10	0.107	0.07	0.017	0.05	0.07	0.10	0.28	0.375	0.363
Unionization	0.640*** [0.088]	0.485*** [0.088]	0.354*** [0.092]	0.285 [0.173]	-3.772** [1.742]	0.261** [0.121]	0.164 [0.657]	0.172* [0.088]	0.158* [0.081]	0.517*** [0.116]	0.691** [0.291]	0.142 [0.105]	0.062 [0.108]
All baseline controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	962	940	977	1,057	826	1,054	985	918	1034	1070	963	990	987
(Pseudo) R-square	0.15	0.14	0.10	0.12	0.12	0.14	0.053	0.07	0.09	0.17	0.35	0.05	0.03

The regressions in the upper portion of the tables are conducted with only the baseline dummy controls, and the regressions in the lower portion are conducted with all the baseline controls. Standard errors are in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6
Results Controlling Market Conditions

	Log (Wage)	Log (Hours)	Pension coverage
Unionization	0.065** [0.025]	-0.005 [0.010]	0.791*** [0.110]
Provincial market share	0.013** [0.006]	-0.003 [0.002]	0.060** [0.026]
Restrictions on entry	0.022 [0.023]	0.024*** [0.009]	0.164* [0.098]
Export	-0.022*** [0.008]	0.006* [0.003]	-0.110*** [0.034]
Customer requirement	0.004 [0.008]	-0.001 [0.003]	0.098*** [0.033]
Listing	0.010 [0.015]	-0.002 [0.006]	-0.037 [0.065]
External auditing	0.056** [0.027]	-0.031*** [0.011]	0.569*** [0.117]
Observations	851	851	851
Pseudo R-square	0.462	0.263	0.364

The baseline controls are included in all three equations. Standard errors are in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%;

Table 7.**Results with Firms' Self-awareness**

	Log (Wage)	Log (Hours)	Pension coverage
Unionization	0.059** [0.030]	-0.001 [0.012]	0.573*** [0.135]
Union versus management	0.050** [0.021]	-0.015* [0.009]	0.253*** [0.095]
Contracts in nearby firms	0.019 [0.017]	-0.019*** [0.007]	0.354*** [0.077]
PC or PPCC membership	-0.003 [0.027]	0.015 [0.011]	0.161 [0.122]
CSR awareness	0.020 [0.018]	-0.026*** [0.007]	0.188** [0.079]
Charity donation	0.020 [0.029]	-0.020* [0.012]	-0.033 [0.129]
Observations	651	651	651
Pseudo R-square	0.463	0.257	0.330

The baseline controls are included in all three equations. Standard errors are in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%;

Table 8.**Results with Firms' Financial Performance**

	Current financial performance			Lagged financial performance		
	Log (Wage)	Log (Hours)	Pension coverage	Log (Wage)	Log (Hours)	Pension coverage
Unionization	0.082*** [0.023]	-0.016 [0.010]	0.768*** [0.109]	0.093*** [0.025]	-0.012 [0.010]	0.733*** [0.115]
Pre-tax profit rate	0.375*** [0.109]	0.094** [0.045]	0.039 [0.507]	0.267*** [0.095]	0.015 [0.038]	0.078 [0.430]
Per-worker sales	0.025 [0.016]	0.01 [0.006]	-0.021 [0.072]	0.025 [0.021]	0.006 [0.009]	0.025 [0.097]
Overdue loans	-0.123*** [0.036]	0.046*** [0.015]	0.226 [0.168]	-0.112*** [0.039]	0.026* [0.016]	0.213 [0.175]
Observations	934	934	934	822	822	822
Pseudo R-square	0.455	0.251	0.288	0.465	0.239	0.279

The baseline controls are included in all three equations. Standard errors are in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 9.**Results with All Control Variables**

	1			2		
	Log (Wage)	Log (Hours)	Pension coverage	Log (Wage)	Log (Hours)	Pension coverage
Unionization	0.027 [0.033]	0.004 [0.014]	0.673*** [0.146]	0.060** [0.028]	-0.006 [0.011]	0.794*** [0.121]
Capital intensity	0.275*** [0.059]	-0.041* [0.024]	0.584** [0.262]	0.070*** [0.018]	-0.034*** [0.007]	0.137* [0.077]
Employment	0.001* [0.001]	0.000 [0.000]	0.001 [0.003]	0.002*** [0.001]	0.000 [0.000]	0.000 [0.002]
Management education	0.026** [0.012]	-0.003 [0.005]	0.217*** [0.055]	0.024** [0.011]	-0.006 [0.004]	0.223*** [0.048]
Employee education	0.090*** [0.020]	-0.030*** [0.008]	0.156* [0.089]	0.075*** [0.018]	-0.025*** [0.007]	0.167** [0.077]
Migrant workers	-0.034*** [0.013]	0.023*** [0.005]	-0.081 [0.058]	-0.031*** [0.011]	0.019*** [0.005]	-0.069 [0.050]
Provincial market share	0.014* [0.008]	-0.003 [0.003]	0.087*** [0.033]	0.012* [0.007]	-0.003 [0.003]	0.080*** [0.029]
Restrictions on entry	-0.009 [0.028]	0.040*** [0.012]	0.104 [0.124]	0.016 [0.024]	0.028*** [0.010]	0.156 [0.107]
Export	-0.012 [0.010]	0.004 [0.004]	-0.091** [0.043]	-0.018** [0.008]	0.005 [0.003]	-0.083** [0.037]
Customer requirement	0.002 [0.009]	0.003 [0.004]	0.065 [0.041]	0.002 [0.008]	0.000 [0.003]	0.078** [0.036]
Listing	0.001 [0.019]	-0.001 [0.008]	-0.023 [0.083]	0.007 [0.016]	-0.002 [0.006]	-0.042 [0.070]
External auditing	0.037 [0.034]	-0.027* [0.014]	0.312** [0.149]	0.036 [0.030]	-0.025** [0.012]	0.406*** [0.130]
PC or PPCC membership	-0.017 [0.030]	0.015 [0.012]	0.031 [0.131]	-0.026 [0.025]	0.017* [0.010]	-0.018 [0.112]
Union versus management	0.069*** [0.025]	-0.022** [0.010]	0.235** [0.108]			
Contract in nearby firms	0.011 [0.019]	-0.015* [0.008]	0.273*** [0.082]			
CSR awareness	0.015 [0.019]	-0.028*** [0.008]	0.064 [0.085]	0.034** [0.017]	-0.022*** [0.007]	0.137* [0.073]
Charity donation	0.005 [0.032]	-0.019 [0.013]	-0.151 [0.139]	0.016 [0.027]	-0.015 [0.011]	-0.079 [0.120]
Pre-tax profit rate	0.318** [0.146]	0.059 [0.060]	-0.356 [0.644]	0.347*** [0.128]	0.089* [0.052]	-0.321 [0.562]
Per-worker sales	0.006 [0.025]	0.014 [0.010]	-0.105 [0.109]	0.011 [0.018]	0.017** [0.007]	-0.101 [0.080]

Loan default	-0.125***	0.056***	0.152	-0.136***	0.050***	0.163
	[0.043]	[0.018]	[0.191]	[0.039]	[0.016]	[0.169]
Constant	1.737***	5.237***	1.440***	1.861***	5.155***	2.266***
	[0.101]	[0.042]	[0.447]	[0.076]	[0.031]	[0.331]
Ownership dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
City dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	549	549	549	727	727	727
(Pseudo) R-square	0.4899	0.2945	0.3745	0.4829	0.2877	0.3671

Standard errors are in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%

Table 10

Collective Contracts and Written Contracts

	1	2	3			4			5		
	Written Contracts	Collective contracts	Log (Wage)	Log (Hours)	Pension coverage	Log (Wage)	Log (Hours)	Pension coverage	Log (Wage)	Log (Hours)	Pension coverage
	Ordered probit	Probit									
Unionization	0.596*** [0.098]	0.407*** [0.104]									
Individual contracts			0.072*** [0.020]	-0.037*** [0.008]	0.777*** [0.089]				0.069*** [0.020]	-0.037*** [0.008]	0.777*** [0.091]
Collective contracts						0.052** [0.022]	-0.013 [0.009]	0.332*** [0.103]	0.038* [0.022]	-0.006 [0.009]	0.181* [0.101]
Observations	1,066	1,019	1,012	1,012	1,012	972	972	972	965	965	965
Pseudo R-square	0.14	0.06	0.43	0.26	0.30	0.42	0.24	0.25	0.428	0.261	0.308

The baseline controls are included in all three equations. Standard errors are in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 11

Interaction between Unionization and Wage Contracts

	1			2			3			4		
	Log (Wage)	Log (Hours)	Pension coverage	Log (Wage)	Log (Hours)	Pension coverage	Log (Wage)	Log (Hours)	Pension coverage	Log (Wage)	Log (Hours)	Pension coverage
Unionization	0.075*** [0.024]	-0.004 [0.010]	0.624*** [0.107]	-0.069 [0.069]	0.023 [0.028]	0.022 [0.309]	0.080*** [0.026]	-0.007 [0.011]	0.763*** [0.121]	-0.069 [0.070]	0.03 [0.028]	0.145 [0.312]
Individual contracts	0.057*** [0.021]	-0.035*** [0.008]	0.667*** [0.092]	0.019 [0.028]	-0.027** [0.011]	0.487*** [0.126]				0.017 [0.029]	-0.027** [0.012]	0.525*** [0.129]
Collective contracts	0.026 [0.022]	-0.007 [0.009]	0.126 [0.100]				-0.001 [0.047]	0.01 [0.019]	0.222 [0.214]	-0.007 [0.047]	0.018 [0.019]	0.095 [0.210]
Unionization × Individual contracts				0.082** [0.038]	-0.017 [0.016]	0.333* [0.172]				0.080** [0.039]	-0.016 [0.016]	0.280 [0.175]
Unionization × Collective contracts							0.047 [0.053]	-0.028 [0.022]	0.021 [0.242]	0.021 [0.053]	-0.031 [0.021]	0.031 [0.238]
Observations	948	948	948	992	992	992	955	955	955	948	948	948
Pseudo R-square	0.442	0.262	0.331	0.445	0.265	0.333	0.441	0.257	0.325	0.445	0.265	0.333

The baseline controls are included in all three equations. Standard errors are in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%.

Appendix 1. Laws and Regulations for Labor Protection

(1) Laws passed by the National People's Congress:

- The Union Law (1992)
- The Labor Law (1994)
- Law for Prevention of Work-related Diseases (2001)
- Law of Work Safety (2002)
- The Labor Contract Law (2008)
- The Labor Disputes Mediation and Arbitration Law (2008)

(2) Regulations issued by the State Council

- Regulations for Work Protections for Female Employees (1988)
- Regulations for Enterprise Labor Dispute Settlements (1993)
- Revision of Working Hours (1995)

(3) Regulations issued by ministries

- Tentative Stipulations for Labor Management in Private Enterprises (MLSS, 1989)
- Tentative Stipulations for Wage Payments (MLSS, 1995)
- Announcement on Several Issues in the Implementation of Labor Contracts (MLSS, 1996)
- Tentative Methods for Collective Wage Negotiations (MLSS, 2000)
- Stipulations for Forbidding Child Labor (MLSS, 2002)
- Directive Suggestions for Establishing and Improving the Tri-party Coordination Mechanism in Labor Relations (MLSS, ACFTU, ACFOE, 2002)
- Stipulations on Collective Contracts (MLSS, 2003)
- Stipulations on the Minimum Wage (MLSS, 2004)
- Regulations for Labor Protection Inspections (MLSS, 2004)

Appendix 2. Determination of Unionization

Capital intensity	0.464 [0.393]	Perception on union versus management	0.746*** [0.172]
Employment	0.069*** [0.020]	Contracts in nearby firms	0.190** [0.096]
Management education	-0.08 [0.071]	CSR_awareness	0.109 [0.103]
Employee college	0.045 [0.104]	Charity donation	-0.117 [0.175]
Migrant workers	-0.225*** [0.064]	Pre-tax profit rate	0.005 [0.918]
Provincial market share	0.096** [0.038]	Per-worker sales	-0.137 [0.119]
Restrictions on entry	-0.063 [0.147]	Loan default	0.425* [0.243]
Export	-0.056 [0.049]	Constant	-0.299 [0.565]
Customer_requirement	-0.034 [0.045]	Ownership dummies	Yes
Listing	0.055 [0.108]	Industry dummies	Yes
External auditing	0.09 [0.170]	City dummies	Yes
PC or PPCC membership	0.307* [0.162]	Observations	534
		(Pseudo) R-square	0.2872

Standard errors are in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%