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Can Direct Union Elections Increase Workers' Economic Wellbeing in China? Testing Effects and Explaining Mechanisms

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Can Direct Union Elections Increase Workers' Economic Wellbeing in China? Testing Effects and Explaining Mechanisms

Junjie Le, Qiong Liu and Minghai Zhou[1]

Abstract: Direct union elections, a new institutional arrangement in grassroots trade unions in China, have been introduced experimentally in coastal regions since 2000. Using matched employer–employee data, this study examines the effects of direct union elections on workers' economic wellbeing. Results reveal that 1) union members with directly elected leaders receive higher wages than those without and 2) direct union elections are positively correlated with worker satisfaction. Additional evidences suggest that effects of direct elections work through stronger union leadership and harmonious industrial relations, resembling the voice-response face of unionism. The effect of direct elections significantly weakens or disappears when we exclude the large firms from the analysis. Meanwhile, the effect of union membership regains its significance. We argue that direct elections are a government-sponsored experiment in which large firms are selected to form an incentive-compatible framework among local governments, firms, and workers for explaining union effects with Chinese characteristics.

Keywords: direct union elections; workers' economic wellbeing; employer–employee data; firm size; incentive compatible; two faces of unionism

JEL Classification: J51; J53; J32

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1. INTRODUCTION

It is widely accepted that trade unions increase the economic wellbeing of their members at the cost of firms. However, understanding the role of unions is a long-standing and controversial debate among economists since the 1970s. The two faces of unionism, i.e., the monopolistic face and the "collective voice-institutional response face," are two competing theories for analyzing the union effects in the labor market (Friedman 1972; Freeman 1976; Borjas 1979; Freeman and Medoff 1984; Hirsch 2004). Both theories adopt the union-centered approach and elaborate the game played between unions and firms. However, their explanatory powers are seriously restrained in the case of trade unions with Chinese characteristics. In this study, we argue that the role of local governments must be included in the analysis to form a complete picture so as to demystify the effects of direct union elections in China. Specifically, direct union elections are a government-sponsored experiment in which large firms are selected as the main targets for having stronger union leadership and harmonious industrial relations. As a matter of fact, the direct elections form an incentive-compatible framework among local governments, firms and workers. In addition, we assert that the direct union elections are an economic innovation rather than a democratic movement as perceived in the literature of politics and laws (Chen et al. 2004; Wang 2004; Pringle 2011).

One important challenge faced by the empirical literature on union effects is to identify the causal effects or tease out the unobserved differences between union and non-union workers. In the United States, unions tend to win elections either at highly successful firms or vulnerable firms facing difficulties, resulting in selection and omitted variable biases for identifying the union effects. DiNardo and Lee (2004) and Sojourner et al. (2015) address the non-random unionization in the United States by introducing the regression discontinuity design and using close union elections as a natural experiment for manufacturing and service sectors. Interestingly, DiNardo and Lee (2004) find no significant economic impact on the employers in the manufacturing sector, whereas Sojourner et al. (2015) confirm that unionization does increase labor productivity in the service sector, at least in the case of nursing homes. In China, systematic differences

between unionized and non-unionized firms are embedded in the *Trade Union Law*, with firms with more than 25 workers being required to have trade union representation. Unlike the market nature of non-random unionization (i.e., bargaining between unions and firms) in the West, non-randomness in China is imposed by the *All-China Federation of Trade Unions* (ACFTU), a functional department of the central government in China. For example, state-owned and large firms tend to establish unions and provide satisfactory working conditions to workers in compliance with the political requirements from the upper level trade unions and the *Communist Party of China*. Unsurprisingly, unionized firms perform better because of selection in size due to the mandatory feature of unionization in China. Using matched employer–employee data, we examine the effects of direct union elections on workers' economic wellbeing and address the selection biases by using bias-adjusted tests and Propensity Score Matching (PSM) method. This study finds positive effects of direct union elections on workers' economic wellbeing, such as wages and job satisfaction. We also find evidence regarding the positive effects of direct union elections on firm performance, especially labor productivity.

Data constraint, at least for China, is another challenge for identifying the causal impacts of unionization. For instance, Yao and Zhong (2013) can capture merely the positive union effects on firms' average wage and welfare because only firm-level data are used. Given the mandatory feature of unionization in China, unions could organize at state-owned and large firms that can afford to pay higher wages to their workers than other firms. Thus, examining the impacts of unionization by firm-level data may be insufficient and subject to selection bias in the Chinese context. Few studies combine firm-level analysis with worker level effect, and the interpretation of union effects depends crucially on both. Using matched employer–employee data, we can control both firm attributes and worker characteristics in our ordinary least squares (OLS) estimations and examine both firm and worker level effects in our paper rather than the previous papers. We also assess the impacts of unobserved variables on the robustness of our OLS results and adjust self-selection biases by using the PSM method. However, despite our efforts in analyzing the

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treatment effects and identifying causal effects, the estimations are still subjected to biases due to the cross-sectional feature of our data.

In this study, we pay particular attention to the organization of grassroots unions in China rather than to union density, i.e., membership rate, which measures union power in specific industries and local labor markets in the conventional literature (Hirsch and Addison 1986; Stewart 1990; Booth 1995). There are two reasons. The practical reason is that union density is extremely high in China, with nearly full membership rate in unionized firms and the involvement of almost three quarters of urban workers.[2] Discussing whether being a union member matters is not that meaningful because formally employed workers are automatically granted union membership in the unionized firms in China. A more fundamental reason is that the *Trade Union Law* rules out discrimination between union and non-union members for collective bargaining, leaving little advantageous status for enjoying union membership in principle. No prevailing consensus has been reached in the empirical studies in China. Some studies question the genuineness of Chinese trade unions and suggest limited union roles in protecting workers' interests by expanding already high union density (Xia 2004; Zhang 2009), whereas others claim to find evidence that trade unions in China have transformed and indeed can increase workers' average wage as in the West (Ge 2014; Yao and Zhong 2008; Yao et al. 2009; Yao and Zhong 2013). All aforementioned studies use the union membership of workers or union status of firms as key measures of unionization. By contrast, we focus on the effects of a new institutional arrangement, i.e., the direct elections of union chairs which are multicandidate elections for union representative committees and chairs on workers' economic wellbeing. We believe that ascertaining how to effectively organize grassroots unions to protect workers' rights and interests is a relevant and meaningful question in the Chinese context.

The remainder of the paper is set out as follows. Section 2 introduces the rationale and the status quo of the direct elections of union chairs in China. Section 3 formulates three

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[2] In 2015, union membership accounted for 96% of unionized firms' employees and 73% of urban workers (see Appendix Figure A1 for more details on the trend since 2003).

testable hypotheses on the effect and mechanism of direct union elections for protecting workers' rights and interests under the discussions about the two faces of unionism. Section 4 constructs the analytical framework, illustrates the econometric equation, and describes the data and variables. Section 5 presents the results, and Section 6 concludes.

2. DIRECT ELECTIONS OF UNION CHAIRS IN CHINA

The membership of grassroots trade unions in China has increased by more than threefold since 2000. In 2015, union members account for almost all employment in unionized firms and nearly three quarters of urban workers.[3] At the same time, labor conflicts in China have increased and escalated from individual disputes to mass disturbances, e.g., *Honda* wildcat strike in 2010 and *Foxconn* suicides in 2011. Trust toward trade unions was low among migrant workers since union chairs were either appointed by the upper level trade unions or were relatives of private firm managers. Many collective actions, such as wildcat strikes, were spontaneously organized by informal institutions among migrant workers, such as the *Association of Fellow Provincials* or *Fraternity Society* (*Tongxiang Hui* or *Xiongdi Hui*). These actions inevitably increased the governance cost and caused social and political uncertainty for the Chinese government at all levels.

Driven by these events, Chinese governments initiated new institutional arrangements within the union system to gain trust from workers and direct them back to formal institutions. Since 2000, several local federations of trade unions (Zhejiang in early 2000s and Guangdong in early 2010s) actively promoted one innovative institutional arrangement, i.e., the direct elections of the grassroots union chairs. The direct elections of union chairs opened channels for the workers to communicate and bargain with the firms. Consequently, workers' economic wellbeing was improved, labor conflicts were attenuated, and informal and self-organized unions were defused and weakened. The direct elections of union chairs were considered a feasible reform to gain trust from workers at low costs.

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[3] Please refer to Appendix Figure A1 for the number of union members and Appendix Figure A2 for the rate of union density from 2003 to 2015.

Direct elections of union chairs refers to the process in which workers nominate any candidate to stand for them in union positions, such as committee members, vice-chairs, and chairs. Workers then vote directly for their preferred candidates who must have more than half of the votes. Such process is called the "sea elections" method, which is considered the most democratic way of selecting grassroots union leaders (Howell 2006; 2008). In practice, the election process varies across regions. Some have single round elections where workers directly elect the union chairs from multiple candidates, whereas others have two or more rounds of elections. In the latter, the first round is only for nominating and selecting the representative committee separately from different plants and production departments, leaving the selection of chairs from the committee to later rounds. For both cases, nominees must deliver public speeches to propose policy agenda for the workers if elected (Chen et al. 2004; Chan 2009; Pringle 2011; Wen 2014). The list of nominees must be reviewed and approved by the upper level trade unions. More or less, the selection of union chairs, at least on the surface, resembles the conventional democratic elections in the West.[4]

Interestingly, early experiments of union chairs election can be traced back to the mid-1980s. Several experiments were actively conducted in Lishu, Siping, Jilin Province and Shekou, Shenzhen, Guangdong Province. These experiments were interrupted in the late 1980s due to the political turmoil in 1989. They restarted in the late 1990s and early 2000s in Yuhang, Hangzhou and Yuyao, Ningbo, both in Zhejiang Province, where small- and medium-sized firms clustered in the exporting sector at that time (see Pringle 2011 for more details). According to local union leaders, the requirement of foreign clients on labor protection and World Trade Organization (WTO) rules were the major reasons for rebooting the union reform. For example, a shoe-making firm called *Yajia* in Yuhang signed detailed contracts with its American and European clients in compliance with specific standards in labor protection, including workers' age, working time, overtime pay, discrimination, security, and sanitation. To respond to the external

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[4] "Direct election" is interchangeably referred to as "democratic election" in the media. This observation is particularly true for the union reform in the Pearl River Delta of Guangdong Province after 2010. In this paper, we use direct election because the quasi-democratic nature of the union chair election is debatable.

requirements, Yajia initiated union reform by implementing the direct election of a union chair in 2001. The first move after the establishment of the newly elected union was to make collective wage bargaining and implement performance-pay scheme in the firm. By linking wage growth to the growth of firm profits, the union significantly improved labor relations in the firm and successfully enhanced the labor productivity of the firm. Such union reforms were then expanded to other firms in the region, and the share of direct elections among unionized firms in Yuhang was reported to increase from 40% in 2003 to 99% in 2009 and afterward (Xie et al. 2003; Wang 2004; Gao and Tang 2009).

In the early 2010s, a new round of turbulent labor relations that were triggered by the widely-reported *Foxconn* suicides and *Honda* wildcat strike in Guangdong Province ignited the drive for union reform within the region. In 2012, direct election of a union chair in *Ricoh Shenzhen* was set as a role model for other firms by Provincial Governor Wang Yang. Consequently, 163 firms with more than 1000 workers were selected to expand the experiments of direct union elections more widely in Shenzhen. In May 2012, the campaign of direct union elections in *Ohm Shenzhen* drew considerable attention from the media as a breakthrough for establishing a genuine union for electing a union chair who was one of the migrant workers in representing workers' rights and interests. In 2014, 5000 firms conducted direct elections of union chairs in Guangdong, representing 2% of all unionized firms there. Expansion of such experiments were planned to make them common in the following five years in Guangdong (Zhang et al. 2012; Zhang and Zhao 2012; Huang and Yao 2014; Wen 2014).

In a nutshell, rapid growth of the manufacturing sector, continual decline of state-owned firms, and massive flows of rural migrant workers to coastal China over the last three decades are the main driving forces for union reform in the direction of democratic election. Researchers on politics, laws, and industrial relations predominantly approach the issue of direct elections from the perspective of democratic credibility and accountability (Chen et al. 2004; Wang 2004). Pringle (2011) argues that democratization is not the central issue per se and direct union elections serve as an important tool to be more responsive to workers' grievances and more effective in negotiating a peaceful

resolution of those grievances. From the perspective of economics, direct union elections can be considered a successful means of improving labor relations and preventing conflicts (e.g., strikes) in the experimental regions like Zhejiang and Guangdong because directly elected chairs are believed to have stronger incentives to raise union members' economic wellbeing relative to appointed chairs.

3. HYPOTHESES ON THE EFFECTS OF DIRECT UNION ELECTIONS

It is against this backdrop that we test four hypotheses on the effects of direct union elections in China. Our aim is to establish whether direct union elections enhance workers' economic wellbeing, and whether the effects of direct union elections can be explained using insights from the two faces of unionism that dominate the conventional literature on the roles of trade unions. The empirical strategy and data we use to test these hypotheses are described in Section 4.

3.1: Union members with directly elected leaders receive higher wages than those without.
3.2: Direct union elections are positively correlated with workers' other rights and benefits.

The two faces of unionism involve competing theories to explain the feature of trade unions in the West, and they have become the standard analytical framework for studying union effects in the labor market (Hirsch 2004). In the view of the monopolistic face, unions raise the wages of their members but prevent effective allocation of labor market resources and worsen the labor conditions of non-union members (Friedman 1972). In the view of the "collective voice-institutional response" face, unions provide workers with a collective voice that elicits institutional responses from the management and improves labor relations by increasing training of special skills and preventing adverse selection and moral hazards of workers, thereby increasing the levels of productivity and equality between labor and capital (Freeman 1976; Borjas 1979; Freeman and Medoff 1984). Recent studies have focused on the roles of union election for enhancing union power in

the play of collective voice (Miller and Mulvey 1991; Batt et al. 2002; Iverson and Currivan 2003; Addison and Belfield 2004; Gunderson 2005; Lewin 2005; Benson and Brown 2010).

However, the mainstream union-centered approach may be misleading for China. The framework of two faces of unionism to China should not be directly applied without deep understanding of the unique institutional arrangements of Chinese unions. Hui and Chan (2015) argue that the dynamics among the quadripartite actors, i.e., party-state, upper-level trade unions, capital, and labor, shaped the strike-driven direct elections in Guangdong in 2010s. Trade unions at the upper level are functional departments of the government which bear the same hierarchical, personnel, and fiscal system as any other bureaucratic agency. For simplicity, we regard the party-state and upper-level trade unions as a single level which we label "local government." We discuss the direct elections of union chairs under an incentive-compatible framework among local governments, firms (representing capital), and workers (representing labor) in China.

Local governments are key institutional foundations of the economic system of China. Xu (2011) describes the governance structure of the Chinese economy as "regionally decentralized authoritarian," and Cheung (2009) emphasizes the decentralized feature as "county competition." The major goal of the local government is to promote local economic development under the constraint of socio-political stability. The local government supplies firms with cheap land, labor, and infrastructure and in return extracts taxes from successful firms.[5] As firms become larger, the increasing tension between capital and labor poses a greater constraint on the socio-political stability to the locality and its government. For instance, a workers' strike in a large firm, is considered a "mass disturbance" threatening social stability for which local government officials should take full responsibility. Local governments therefore have strong incentives to prevent or mitigate such potential collective actions by introducing direct union elections as a reform measure.

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[5] It is well-known that indirect value-added taxes from firms are the main sources of fiscal revenue of Chinese local governments.

As for profit-maximizing firms, strikes are costly, at least in economic terms. The optimal choice for large firms is therefore to accept the government-sponsored experiment of direct union elections because such election is less costly than potential strikes. By introducing direct union elections, these firms may benefit from better labor relations and higher labor productivity in the long term (Lu et al. 2010; Wei et al. 2013; Ge 2014). Workers can also benefit from direct union elections by increasing workers' economic wellbeing. Therefore, it is also rational for workers to welcome the directly elected chairs who they elect through democratic votes.

In short, direct union elections form an incentive-compatible framework among local governments, firms, and workers. Using this tripartite framework, we anticipate positive effects of direct union elections on workers' economic wellbeing. We first test the positive effects of direct union elections on workers' wages. We then test the positive effects of direct union elections on workers' other rights and benefits, such as labor conditions, worker development, and worker satisfaction.

3.3: The effects work through stronger union leadership and harmonious industrial relations.
3.4: The effects work through large firms for a tripartite incentive-compatible framework.

If direct union elections can help raise the economic wellbeing of union members and workers, we further test the underlying channels through which the effects of direct union elections work. Four channels are possible. First, workers may be more willing to actively participate in union affairs and seek support from unions if the chairs are directly elected instead of appointed. Second, directly elected union chairs are believed to have strong incentives to appeal to their constituencies, which can result in better welfare for workers. As the political economy literature suggests, the working class benefits from organized and competitive electoral politics by enjoying high income growth and generous social welfare (Jennings 1979; Besley et al. 2010). Third, directly elected union chairs better represent the collective voice and therefore exert more bargaining power

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relative to appointed counterparts. Fourth, in the Chinese context, the acceptance of direct union elections by a firm is an indication of positive management response to workers' demands for better economic wellbeing. At the very least, the management acknowledges the role of directly elected union leaders in coordinating labor relations between workers and managers in the hope of increasing labor productivity. The last two channels imply that the voice-response face of unionism may play a role in making direct union elections effective. As we lack data on workers' participation in union affairs and the competitive election process, we can only test the last two channels in which the effects of direct union election work through stronger union leadership and harmonious industrial relations.

However, we must remain cautious when directly applying the two faces of unionism to China for two reasons. First, trade unions in China are known to have insufficient bargaining power from lack of independence (Clarke and Pringle 2009; Sun and He 2012; Ge 2014; Wei et al. 2015). Chinese trade unions are not strong enough to promote democratic local elections. Second, allowing direct union elections is also implausible in China when firms' management is too weak to play the voice-response face of unionism. The drive for direct union elections in China can only be explained as a government-sponsored experiment in which large firms are selected as the main targets to form an incentive-compatible framework among local governments, firms, and workers. By introducing the role of the government, the tripartite framework can better explain both the cause of direct union elections and its effectiveness in a consistent manner.

In this tripartite framework, firm size is an important but possibly overlooked element for explaining the effects of direct union elections. If firm size is not large enough, despite serious tensions between labor and capital, firms will find it easier to handle such conflicts by dismissing undesirable workers, and such action will have no significant social impact to the local city and its government. Therefore, direct union elections were less desirable in 1990s when most firms were relatively small in size. It is not a coincidence that growing firm size played an important role in triggering union

experiments in Zhejiang in the early 2000s due to WTO accession and in Guangdong in the early 2010s due to wildcat strikes.

Workers in large firms have stronger bargaining power through collective actions (e.g., strikes) than those in small- and medium-sized firms. In our tripartite framework, the strong bargaining power of workers will exert pressure on firms and can also threaten the social stability of the locality and its government, which, in turn, places more pressure on firms to accept direct union elections. Direct elections could be effective in improving workers' economic wellbeing in large firms relative to small- and medium sized firms. For the latter, even if they adopt direct union elections, the workers' bargaining power may not be strong enough to trigger the above cycle. In this case, local governments may not be concerned by labor disputes and firms have no incentive to make direct union elections effective. We therefore expect no substantive effects of direct union elections for small- and medium-sized firms. In other words, the positive election effects are mainly driven by large firms.

4. EMPRICAL SPECIFICATION AND DATA DESCRIPTION

4.1 Types of Union Participation and Wage Differences

In Figure 1, we classify three types of union participation for affecting workers' economic wellbeing: union status, union membership, and direct union elections. Union status of firms distinguishes unionized firms with non-unionized ones. Union membership of workers differentiates between union and non-union members. Finally, direct union elections refer to the election of senior union officials by the workforce. These types of union participation inevitably correlate with both observed and unobserved firm and worker attributes which will create endogeneity issues.

[INSERT FIGURE 1 HERE]

We classify workers who are not union members as Type N workers and union members as Type M workers. We further divide unionized firms according to whether the union

chair is directly elected by union members or not (Type 1 equals not directly elected and Type 2 equals directly elected).[6] Therefore, we are able to classify four types of workers by combining union membership and direct union elections information (see Figure 1). Type N1 workers are non-union members whose union chairs are not directly elected. Type N2 workers are non-union members whose union chairs are directly elected. Type M1 workers are union members whose union chairs are not directly elected. Finally, Type M2 workers are union members whose union chairs are directly elected. The main task of the paper is to examine the effects of direct union elections on union members by comparing wage and welfare differences between Types M1 and M2 workers. This work also examines the effects of direct elections on all workers (union and non-union members) by comparing wage and welfare differences between Type (N1+M1) and Type (N2+M2) workers.

4.2 Empirical Strategy

In light of Figure 1 and Table 1, the empirical equation of the union effects can be expressed as follows.

$$Y_{ij} = \alpha + \theta T_k + \beta I_i + \gamma F_j + \mu_i + \mu_j + \mu_{ij} \tag{1}$$

where Y_{ij} is worker i's economic wellbeing in firm j. I_i is a vector of observed workers' individual characteristics. F_j is a vector of observed firm attributes. μ_i is the unobserved worker heterogeneity, and μ_j is the unobserved firm heterogeneity. μ_{ij} is the remaining error term. T_k is a vector of worker type dummies.

As mentioned in the Introduction, systematic differences between unionized and non-unionized firms are endogenously embedded in the *Trade Union Law*, with the mandatory requirement of unionizing firms with more than 25 workers. This situation

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[6] Our survey asks questions about ways of selecting union chairs. Choices include: 1) appointed by upper union or other governmental organization, 2) appointed by the firm owner or managerial board, 3) elected by a worker committee or union members after recommendation by the upper union or governmental organization, 4) elected by a worker committee or union members after competitive and public campaigns, and 5) others. In this paper, we define the fourth option as the "direct and democratic" election of union chairs and the other four options as the "indirect and non-democratic election" of union chairs.

implies that unionized firms are systematically larger than non-unionized firms. Therefore, the estimated unionized effects in the previous studies (e.g., Yao and Zhong 2013) may be biased by unobserved firm heterogeneity, i.e., μ_j. Data used in this study also indicate statistically significant differences between unionized and non-unionized firms in many aspects, including firm ownership, firm size, and labor relations (see Appendix Table B1). If such systematic differences are not taken care of, then a serious endogeneity problem may occur by solely comparing unionized versus non-unionized firms. In the empirical analysis, this work excludes non-unionized firms and examines the union effects by comparing union versus non-union members. Since trade unions in China are organized in a top-down structure rather than the bottom-up structures in western countries, workers' selection into unionized firms is not a serious issue in the Chinese context. Simple exclusion of non-unionized firms will not cause serious selection bias. Thus, the endogeneity issue triggered by firm heterogeneity, i.e., μ_j, will be attenuated and the estimation bias will be smaller.

In China, workers have no choice regarding membership in the trade unions. Once workers are formally employed by unionized firms, they are automatically granted union membership. Only those short-term contract workers or dispatched workers have no union membership in the unionized firms. Therefore, workers' selection into union membership is inapplicable in China. Moreover, we confine our analysis to union members and examine the effects of direct union elections by comparing directly elected union chairs versus non-directly elected counterparts. Therefore, the endogeneity issues triggered by both firm and individual heterogeneity, i.e., μ_i and μ_j, will be attenuated further and the estimation bias will be smaller.

In addition, trade unions in China serve multi-task roles, such as supporting socio-economic development, participating in national affairs as the representative of workers, and educating workers in multi-dimensions (*Trade Union Constitution* 2013). In a multi-task environment, trade unions in China may act under conflicting objectives that are not easy to disentangle. Therefore, comprehensive dimensions such as labor conditions,

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worker development, and worker satisfaction are also examined along with workers' wages.

4.3 Data Collection and Variable Description

Our data are from the 2012 Hangzhou Labor Relations Survey conducted by the former Center for Labor Economics and Public Policy Studies at Zhejiang University. It covers 504 firms in 14 districts of Hangzhou, which includes 9 municipal districts and 5 subordinate counties. This survey combines two sets of questionnaires, including the employer-level questionnaire called *Implementation Status of Firm's Labor Relations* (*Qiye Laodong Guanxi Zhixing Qingkuang*) and the employee-level questionnaire called *Opinion Poll of Harmonious Status of Labor Relations* (*Laodong Guanxi Hexie Qingkuang Minyi Diaocha*).

The survey was conducted as follows. First, we drew a 0.5% random sample of all 100800 firms in 14 districts of Hangzhou on the basis of the sampling number in each district from the ratio of the non-agriculture population in each district to total non-agriculture population in Hangzhou. To consider firm heterogeneity, we stratified firms in each district into four layers according to different firm sizes and then drew systematic sampling from each layer. Second, once decided on the sampling firms, we drew random samples of all workers in each firm. The number of sampling workers was in accord with firm size. Specifically, we sampled 15 workers for firms with more than 200 workers, 10 workers for firms with 50 to 199 workers, 5 for firms with 10 to 49 workers, and 3 workers for firms with 5 to 9 workers. We excluded middle managers and senior managers. The sampling scheme above ensured the randomness of the firm. However, the sampling of workers may continue to be disproportionately represented. We addressed this issue by incorporating sampling weights in later regressions. Specifically, sampling weights were calculated by the ratio of the actual firm size to the sampled size.

The firm-level survey was conducted with the assistance of the *Labor Inspection Team of Hangzhou* (*Hangzhou Laodong Baozhang Jiancha Zhidui*), a governmental department, thereby ensuring high quality of firm-level information. The employee-level survey was

conducted by one-to-one interviews and the questionnaires were filled by student surveyors from Zhejiang University, thereby ensuring high quality of individual level information. Moreover, we separated the employee-level survey from the employer-level survey, which precluded managerial influence and guaranteed independence between the two surveys.

Finally, this survey collected 504 firm questionnaires and 3996 worker questionnaires to form a matched employer–employee data set.[7] As mentioned, we find systematic differences between unionized and non-unionized firms in our data, which may cause a potential endogeneity problem (see Appendix Table B1). Therefore, we excluded the 118 non-unionized firms and the 643 workers in these firms. We further excluded the 107 workers who did not respond or know relevant information such as wages, union membership, gender, *Hukou*, and education. For outliers, we first excluded the 54 workers who are not in the working age (below 16 and above 65). We then excluded the 39 workers who work less than 80 hours (including those less than 9 days) and more than 360 hours per month. Then, we excluded the 14 workers whose hourly wages were lower than 6.5 yuan because the hourly minimum wage in Hangzhou is 10.7 yuan in 2011. Finally, 386 unionized firms and 2857 workers were left for regression analysis.

The main outcome variable of interest is the log of hourly wages, which includes bonuses and stipends in cash but not in kind. Hourly wages are monthly wages divided by the product of the number of working days in a month and the number of working hours in a day. The other outcome variables we examine are: monthly working hours, whether workers receive free checkups, whether workers receive on-the-job training, their satisfaction with social security, and their overall satisfaction. Table 1 presents the definitions of all variables.

[INSERT TABLE 1 HERE]

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[7] Initially, the response rate of firm was 99.4%. We searched additional online information of two firms and recover the response rate to 100%.

We include both individual and firm attributes as control variables in Equation (1). The individual attributes of workers include age, gender, *hukou*, education, political status, seniority, and occupation. Firm attributes include ownership, size, history, location, industry, and skill intensity. Table 2 presents the descriptive statistics of all variables.

[INSERT TABLE 2 HERE]

Furthermore, Table 3 presents the average wage differences among the different types of workers. The wages of union members (Type M) are 10.3% higher than those of non-union members (Type N). Among union members, wages are 8.6% higher for those with directly elected union chairs (Type M2) than those without (Type M1). The wages of union members with directly elected chairs (Type M2) are 17.5% higher than those of non-union members whose union chairs are appointed (Type N1). Union members with directly elected chairs enjoy the highest wages. Moreover, workers whose union chairs are directly elected receive (Type N2+M2) 8.3% higher wages than those workers without directly elected union chairs (Type N1+M1).

[INSERT TABLE 3 HERE]

5. RESULTS AND DISCUSSIONS

Hypothesis *1 – Union members with directly elected leader receive higher wages than those without.*

Table 4 presents the results of the OLS method in estimating the effects of direct union elections on wages after adjusting the sampling weights. Column 1 in Table 4 indicates that union members with a directly elected leader receive 10.1% higher wages than those without. Unsurprisingly, we find no significant union membership effect after controlling the effect of direct union elections. This outcome can be attributed to the high union density in the unionized firms where only those short-term contract workers or dispatched workers have no union membership. From an individual perspective, male workers, those that are highly educated, managers, technicians, and senior workers tend to have

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relatively high wages. From a firm perspective, large firms located in municipal districts, which are not privately owned and have high skill intensity tend to provide relatively high wages to their workers. These results are consistent with the firm and labor theories, and are in line with our expectations. Moreover, the effects of union membership and direct union elections are almost identical when we exclude Type N2 workers, i.e., non-union members with directly elected union chairs (Column 2 in Table 4).[8]

[INSERT TABLE 4 HERE]

Thus far, our analysis is confined to the effects of direct elections on union members. According to the *Trade Union Constitution 2013*, the basic duty of the Chinese trade unions is to protect the legitimate rights and interests of all workers rather than of union members only. Therefore, the wage effects of direct union elections, in principle, should apply to non-union members. Table 5 further compares the wage differences between workers with directly elected union chairs and those without. The average hourly wages of workers whose union chairs are directly elected are 9.6% higher than those without directly elected union chairs.

[INSERT TABLE 5 HERE]

One concern is that direct union elections can be more superficial in state-owned enterprises (SOEs) than in other firms (Nichols and Zhao 2010). If the direct elections of union chairs in SOEs are only political shows, the positive effects in SOEs may be driven by those features associated with state ownership rather than the election itself. To address the potential endogeneity, we simply excluded the sample of SOEs. The estimation results are shown in Column 3 in Table 4 and Column 2 in Table 5. The positive effects of direct union elections still hold (10.6% in both Table 4 and 5). These results can be attributed to the relative scarcity of SOEs in our sample (6.7%) and the low

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[8] Only 68 workers were non-union members with directly elected union chairs. We tested for robustness by excluding them because they are few.

incidence of direct union elections (14.7%) within SOEs.[9] In principle, state ownership implies that a stated-owned firm and all its workers belong to the state, and that the union only serves as a bridge between workers and management. In practice, union chairs in SOEs are communist party cadres who enjoy high hierarchical rankings in the personnel system. The direct elections of union chairs are less desirable in SOEs and thus has less impact on workers' wages.

Another concern is that the effects of direct elections may be captured only through foreign-owned enterprises (FOEs). Many trials of direct union elections in Guangdong may have been implemented in FOEs simply because they had more knowledge and experience in selecting union chairs in a democratic way. If this is the case, we then would observe no effect of direct elections after excluding the sample of FOEs. As shown in Column 4 in Table 4 and Column 3 in Table 5, the positive effects of direct union elections are almost the same for union members (10.4%) and slightly smaller for all workers (9.1%).[10] The results can also be attributed to the relative scarcity of FOEs in our sample (10.7%), although the share of direct union elections is relatively high in FOEs (31.9%). After excluding FOEs, the R-squared decreases from 0.27 to 0.22, indicating some explanatory power for having FOEs. These outcomes imply that unions in FOEs may bear more resemblance to their counterparts in western countries for protecting workers' rights and interests, especially for union members.

Direct union elections may be correlated with unobserved variables, such as a firm's governance structure. Therefore, the estimated effects of direct union elections by OLS may be biased. Although worker and firm attributes are controlled for in our OLS analysis, omitted variable biases may still occur. Following the seminal work of Altonji et al. (2005) (hereafter AET), Oster (2017) develops the approach for evaluating the robustness to omitted variable bias under the assumption that selection on observables is

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[9] The low share of SOEs in our sample is justifiable because private economy dominates in Zhejiang Province where Hangzhou is the capital city.

[10] The low share of FOEs in our sample is justifiable because private economy dominates in Zhejiang Province where Hangzhou is the capital city.

informative about selection on unobservables. We apply their approach and present the results of biased-adjusted treatment effects of direct union elections in Table 6.

[INSERT TABLE 6 HERE]

In Table 6, the controlled treatment effect of direct union elections is 10.1%, which remains significantly positive and is smaller relative to the uncontrolled treatment effect of 17.5% (full specification in Columns 1 and 2). Oster (2017) points out that coefficient stability must be combined with information about R-squared movements to develop an argument. In our case, R-squared increases from 0.037 to 0.274 when the controls are introduced in the full specification.

Following Oster (2017), we conducted two sets of robustness tests. We first calculated the identified set for controlled treatment effects when the relative degree of selection on observed and unobserved variables (δ) was set as one and R-squared from a full set regression of the outcome on treatment and observed and unobserved controls (R_{max}) was set as $1.3R^2$. We find that the lower bounding value of the identified set is still large in size and bigger than zero. Alternatively, we calculated δ when the treatment effect was set as zero. To make the treatment effect zero, δ must be 3.565, which indicates a much larger impact of unobservables than observables. Both tests suggest that selection on unobservables cannot seriously bias the effects of direct union elections on workers' wages in our OLS regressions. Similar results are shown in Table 6 in which we excluded the samples of SOEs and POEs.

By supposing that all the unobserved variables can be captured by the wages of the previous year, we can set the lowest possible value for R_{max} if we regress the workers' monthly wage in 2012 by the monthly wage in 2011. According to the regression result, the lowest possible R-squared is 0.59. Then, we calculated the identified sets and values of δ when R_{max} was set as 0.59. Except for excluding SOEs, all identified sets do not include zero, although the lower bounding values became relatively small. Alternative tests indicate that all values of δ are bigger than one if the treatment effect is set as zero.

These tests further indicate that selection on unobservables does not significantly change our OLS results. We also examined the impacts on the wage differences between workers with directly elected union chairs and those without (Table 7). The results are consistent with those of Table 6, again suggesting the robustness of the effects of direct union elections.

[INSERT TABLE 7 HERE]

Since direct elections are a government-sponsored selection process, the selection could also be jointly determined by firm and worker attributes. These attributes may also affect workers' wages, thereby causing systematic wage differences among the four types of workers. Alternatively, if workers expect wages increase if they directly select their union chairs, they will actively promote the direct elections of union chairs. To further test the robustness of our OLS results, we used PSM method to adjust for the self-selection biases mentioned above.[11] Following Heckman, Ichimura, and Todd's (1997, 1998a, 1998b), we specifically used local linear regression matching to estimate the effects of direct union elections on workers' wages, which involve the average treatment effects on the treated (ATT). Following the PSM method, we first calculated the propensity scores by regressing the probability of direct union elections on firm and worker attributes using a logistic model (Dehejia and Wahba 1999). Then, we compared the wage differences between Type M2 workers (the treatment group) and Type M1 workers (the control group). Table 8 shows the ATT results using local linear regression matching method.

[INSERT TABLE 8 HERE]

All our PSM estimations passed the balance test (see Appendix Figure A3 for more details). The effects of direct union elections remain positive and significant at the 1% level. Specifically, the ATT of the full sample indicates that direct union elections can increase the hourly wages of union members by 6.1%. Similarly, the ATT when

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[11] For more discussion on the effectiveness of the propensity score matching method, please refer to Angrist and Pischke (2009, pp.80–91) and Guo and Fraser (2010).

excluding sample of SOEs and FOEs are 7.5% and 5.4%, respectively. Although the PSM method can eliminate overt bias rather than hidden bias, the PSM effects in our analysis are consistent with OLS estimates but smaller in magnitude.

In a nutshell, we attempted to address the potential endogeneity issue due to unobserved variables and self-selection by using the AET and PSM approaches. The two approaches confirm our OLS results in testing the first hypothesis that union members and workers with directly elected leader receive higher wages than those without.

Hypothesis 2 – Direct union elections are positively correlated with workers' other rights and benefits.

Increasing workers' economic wellbeing should not only be confined to wages because Chinese unions serve multi-task roles. Therefore, we further analyzed the effects of direct union elections on other dimensions, such as labor conditions, the employment system, worker development, and worker satisfaction. We used the monthly working hours of workers and whether or not workers received regular free body checkups as the proxies of the labor conditions. We argue that working hours reflect working intensity and regular free checkups reflect the extent of the firm's focus on labor conditions. We employed satisfaction about social security as a proxy for the employment system.[12] We believe that the satisfaction about social security indicates the overall participation in social security and whether or not a firm contributes sufficient social security payments in accordance with laws and regulations. We utilized the presence or absence of on-the-job training organized by the firm as the proxy of worker development. We assert that firm training is a main way for workers to accumulate human capital. In addition, we employed average satisfaction scores on several indicators (such as the firm's welfare, social security, holiday system, fulfillment of labor contracts, and democratic management) as a proxy for worker satisfaction. Table 9 presents the estimation results of OLS and logit regression.

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[12] We initially intended to use the signing rate of labor contracts and participation rate of social security as proxies. However, near full coverage rates are found in Hangzhou, which present insufficient variations.

[INSERT TABLE 9 HERE]

The results in Table 9 show that after controlling firm and workers' characteristics, the union members work fewer hours, receive more free checkups, and more on-the-job training. These results indicate that joining a union is helpful for improving labor conditions and promoting worker development. But we do not observe significant differences in working hours, free checkups, and on-the-job training between union members with and without directly elected union chairs. However, direct union elections are positively correlated with worker satisfaction. In other words, union members with directly elected chairs are more satisfied with their social security system and other indicators than those without. We find similar results in Table 10 where we compare the differences for all workers rather than only union members.

[INSERT TABLE 10 HERE]

Our results therefore suggest that union membership enhances non-economic welfare, whereas direct union elections play a minor role in further enhancing these benefits. Unexpectedly, the effects of direct union elections mainly concentrate on worker satisfaction. We claim that direct union elections may encourage more worker participation in firm management such that workers have a high level of commitment and satisfaction in their firms. Accordingly, the voice-response face of unionism may play a role in making direct elections effective, which we test directly in the next hypothesis.

Hypothesis 3 – The effects work through stronger union leadership and harmonious industrial relations.

We further tested whether the "collective voice-institutional response" face of unionism can explain the working mechanisms behind the effects of direct union election. Specifically, we checked if the effects of direct union elections work through stronger union leadership and harmonious industrial relations. To do so, we compared the

differences between firms with directly elected chairs and without. Specifically, we compared firm performance, firm governance in labor relations, and individual attributes of union chairs between the two types of firm. The results are reported in Table 11.

[INSERT TABLE 11 HERE]

Firms with directly elected chairs have better performance, better governance in labor relations, and stronger union leaders than those without. Specifically, directly elected firms have significantly higher per capita output. These firms also are more open to publicize firm affairs to workers and more willing to settle labor disputes for workers. The directly elected union chairs are more educated and hold full-time positions rather than part-time ones. In comparing the differences between directly elected and non-directly elected firms, we do not report the regression results by controlling the attributes of the firms and union leaders. Although some of the results are consistent with the simple statistical comparison in Table 11, the regression results are not very robust because the sample size of the firms is relatively small and firm performance variables are subject to many missing values.

Interestingly, these results seem to be consistent with the "collective voice-institutional response" face of unionism. First, the results imply that directly elected union leaders are better at coordinating labor relations between workers and managers as they show full commitment and truly represent the collective voices of workers. Second, understanding that direct union elections can enhance the labor productivity of the firm, firm management is more willing to provide positive responses to workers' demand for better economic wellbeing, e.g., better labor dispute settlements and more public information of firm affairs. Therefore, direct union elections, as an innovative institutional arrangement, provides a working mechanism for increasing workers' economic wellbeing through stronger union leadership and harmonious industrial relations.

Hypothesis 4 – The effects work through large firms for a tripartite incentive-compatible framework.

We have argued that direct elections in China are a government-sponsored experiment in which large firms are selected as the main targets to form an incentive-compatible framework among local governments, firms and workers. Here, selecting large firms is the key prerequisite for making direct union elections effective. In other words, only direct union elections in large firms can form the tripartite incentive-compatible framework.

Anecdotal evidences in the real world practice of the reform on direct union elections also suggest that firm size appears to be an important factor. For example, the chairperson of the *Yuhang Federation of Trade Unions* pointed out that "other than complying with WTO rules, firm growth to a certain size in Yuhang makes direct union elections necessary" (Xie et al. 2003). Such observation is more obvious in that 163 firms with more than 1000 workers were explicitly selected for the second stage of the expansion of the initial experiment of direct union elections in *Ricoh Shenzhen* (Zhang et al. 2012).

One way to test this mechanism is to check whether the effects of direct union elections still hold when excluding large firms with more than 200 workers in our sample. The initial results can be found in Column (5) in Table 4. After excluding the large firms in our sample, the effect of direct union elections decreases from 10.1% to 4.5% and is significant only at the 10% level. On the contrary, the effect of union membership becomes significant, which indicates that union members receive 10.7% higher wages than non-union members for small- and medium-sized firms. This outcome implies that direct union elections are effective mainly for large firms and union membership plays a central role in explaining workers' wage differences for small- and medium-sized firms. Similarly, the average hourly wages of workers whose union chairs are directly elected are only 4.8% higher than those without directly elected union chairs after excluding the large firms (see Column (4) in Table 5). Moreover, bias-adjusted regression results are consistent and very close to OLS estimates (see Tables 6 and 7). If we use PSM method, the effect of direct union elections is no longer significant after excluding large firms. This finding further indicates that firm size is important for explaining the mechanism of

direct union elections on increasing workers' economic wellbeing. A complete picture for explaining the effects of direct union elections is needed to ascertain the role of the local government in selecting large firms as targets for settling labor relations in China.

6. CONCLUSION

Unlike trade unions in western countries, those in China are organized in a top-down structure where grassroots trade unions, the focus of our paper, are positioned at the bottom. The grassroots trade unions are distinctive in the sense that they lack independence, are subject to government regulation, have higher union density, and serve multi-task roles. Despite these differences, trade unions in China are transforming and restructuring their role in response to intense labor relations that began in the new century (Clarke 2005). Direct elections of union chairs are one of the prominent efforts to attenuate conflicts between workers and capitalists and increase workers' economic wellbeing. After reviewing the short history of direct union elections in China, this work argues that rapid growth of the manufacturing sector, continual decline of state-owned firms, and massive flows of rural migrant workers to coastal China over the last three decades are the main driving forces for union reform in the direction of democratic elections.

Using matched employer–employee data, this study examines the effects of direct union elections on workers' economic wellbeing. Union members and workers with directly elected leaders receive higher wages than those without. Moreover, direct elections of union chairs are less desirable in SOEs and have less impact on workers' wages. We argue that unions in FOEs may bear more resemblance to their counterparts in western countries for protecting workers' rights and interests, especially for union members. Bias-adjusted tests further indicate that the selection on unobservables does not significantly change our OLS results. The PSM effects are also consistent with OLS estimates but are smaller in magnitude. Furthermore, direct union elections are positively correlated with worker satisfaction but not with labor conditions and worker development.

Further evidence suggests that the effects of direct elections work through stronger union leadership and harmonious industrial relations, resembling the voice-response face of unionism. However, our empirical results further show that the effect of direct elections significantly weakens or disappears but the effect of union membership recovers its significance when we exclude the large firms in the analysis. These outcomes imply that firm size is the key to understanding the mechanism of direct union elections on increasing workers' economic wellbeing. We assert that direct union elections are a government-sponsored experiment in which large firms are selected as the main targets for explaining the effects direct election with Chinese characteristics. Direct union elections form an incentive-compatible framework among local governments, firms, and workers, which differs from the two faces of unionism.

Fundamentally, this study deepens the understanding of China's trade unions and how institutional arrangements within the union system works to protect and improve workers' economic wellbeing. Direct elections of union chairs are an excellent angle to transcend the two faces of unionism and the mainstream union-centered approach. The cause of the effects of direct union elections is neither from the union's monopolistic power, nor directly from the firm's governance capacity but rather emerges from the government's selection of large firms as targets for implementing the union experiment. Direct union elections are not a sign of grassroots political democracy in China as perceived and suggested by researchers in politics and laws. Rather, such election is an effective innovation to form an economically incentive-compatible framework among tripartite the actors in China.

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Figure 1: Framing Union Effects on Workers' Economic Wellbeing

Table 1: Definition of the Variables

Item	Variable	Unit/Item	Definition
Explained Variables (1): Wage			
	Log of average hourly wage	Yuan	Log(monthly wage/monthly working hours); monthly working hours = monthly working days × daily working hours.
Explained Variables (2): Welfare and benefits			
	Monthly working hours	Hour	Log (monthly working hours); monthly working hours = monthly working days × daily working hours.
	Free checkups	Binary	Binary choice: whether or not receiving free checkups
	On-the-job training with salaries	Binary	Binary choice: whether or not receiving on-the-job training with salaries.
	Satisfaction with social security	Multinomial	Ordinal choice: very satisfied, satisfied, neutral, unsatisfied, and very unsatisfied.
	Overall satisfaction	Score	The average satisfaction of the five systems (which include welfare, social security, holiday arrangement, labor contract, and management systems). Each system is rated as ordinals, with 5 as very satisfied, 4 as satisfied, 3 as neutral, 2 as unsatisfied, and 1 as very unsatisfied.
Key Explanatory Variables: Union related attributes			
	Worker type	1/0	Dummy variables: 1 for the Type N workers who are non-union members and 0 for others; 1 for the Type M1 workers who are union members whose union chairs are not directly elected and 0 for others; 1 for the Type M2 workers who are union members whose union chairs are directly elected and 0 for others. We set the Type M1 workers as the reference group.
	Direct union elections	1/0	Dummy variables: 1 for the Type (N2+M2) workers whose union chairs are directly elected and 0 for the Type (N1+M1) workers whose union chairs are not directly elected.
Control variables: Individual and firm attributes			
Individual attributes	Age	Year	Age of workers.
	Age squared	---	
	Gender	1/0	Dummy variables: 1 for female and 0 for male.
	Hukou	1/0	Dummy variables: 1 for agriculture *Hukou*, and 0 for non-agriculture *Hukou*.
	Education	1/0	Dummy variables: 1 for junior school and below and 0 for others; 1 for high school and 0 for others; 1 for vocational school and 0 for others; 1 for college and above and 0 for others. We set junior school and below as the reference group.

	Communist Party membership	1/0	Dummy variable: 1 for party member and 0 for non-party member.
	Seniority	Month	Working time in the firm.
	Seniority squared	---	
	Position	1/0	Dummy variable: 1 for managers and technician and 0 for others.
Firm attributes	Ownership	1/0	Dummy variables: 1 for state-owned enterprises (SOEs) and 0 for others; 1 for foreign-owned enterprises (FOEs) and 0 for others; 1 for private-owned enterprises (POEs) and 0 for others. We set SOEs as the reference group.
	Firm size	1/0	Dummy variables: 1 for 50 workers or below and 0 for others; 1 for 50–199 workers and 0 for others; 1 for 200 workers or above and 0 for others. We set 50 workers or below as the reference group.
	History	Month	Establishment of the firms in months.
	Region	1/0	Dummy variable: 1 for subordinate counties of Hangzhou, and 0 for municipal districts.
	Industry	1/0	Dummy variable: 1 for manufacturing industry, and 0 for others.
	Skill intensity	Percent	Share of workers with college degree or above from total workers.

Table 2: Descriptive Statistics

Variable/Type		Full	B2	B1	A	A2+B2	A1+ B1
Explained Variables (1): Wage							
	Average hourly wage	16.768	18.963	16.171	15.852	18.827	16.082
	Log of average hourly wage	2.744	2.871	2.709	2.691	2.861	2.705
Explained Variables (2): Welfare and benefits							
	Monthly working hours	183.880	179.323	183.979	191.289	180.460	185.022
	Free checkups	0.594	0.613	0.622	0.422	0.597	0.592
	On-the-job training	0.550	0.582	0.574	0.380	0.570	0.543
	Overall satisfaction	4.314	4.544	4.259	4.182	4.535	4.240
	Satisfaction with social security	4.291	4.501	4.243	4.160	4.490	4.224
Key Explanatory Variables: Worker type							
	Type N workers	0.130					
	Type M1 workers	0.646					
	Type M2 workers	0.224					
	Type N2+M2 workers (direct union elections)	0.248					
Control variables							
Individual Attributes	Age	34.732	33.400	35.702	32.376	33.265	35.222
	Gender (female=1)	0.524	0.495	0.518	0.604	0.504	0.531
	Hukou (agriculture=1)	0.463	0.434	0.460	0.532	0.444	0.470
	Education: Junior school or below	0.234	0.200	0.250	0.212	0.200	0.245
	High school	0.147	0.133	0.155	0.137	0.135	0.152
	Vocational school	0.123	0.116	0.128	0.115	0.116	0.126
	College or above	0.495	0.551	0.467	0.536	0.549	0.478
	CP membership (CP=1)	0.185	0.180	0.203	0.112	0.173	0.189
	Seniority	81.537	61.933	94.994	50.750	60.445	88.580
	Position (manager and technician=1)	0.308	0.303	0.307	0.324	0.302	0.310
Firm Attributes	Ownership: SOEs	0.090	0.056	0.113	0.035	0.058	0.100
	FOEs	0.164	0.256	0.140	0.119	0.244	0.137
	POEs	0.746	0.688	0.746	0.845	0.698	0.762
	Firm size: 50 workers or below	0.072	0.066	0.072	0.086	0.065	0.075
	50–199 workers	0.395	0.337	0.420	0.372	0.353	0.409
	200 workers or above	0.533	0.597	0.508	0.542	0.582	0.517

	History	144.426	143.646	148.997	123.818	143.262	144.814
	Region (subordinate counties=1)	0.231	0.108	0.283	0.193	0.114	0.270
	Industry (manufacturing=1)	0.552	0.556	0.569	0.464	0.554	0.551
	Skill intensity	0.151	0.204	0.137	0.127	0.202	0.134
Sample size		2857	641	1846	370	709	2148

Notes: No significant difference of wages occurs between Types N1 and N2 workers. Moreover, the sample size of Type N2 workers who are non-union members with non-elected union chairs is only 68.

Table 3: Average Hourly Wages and Wage Differences among Workers

Worker type	Sample size	Average wage (yuan/hour)	M vs. N	M2 vs. M1	M2 vs. N1	(N2+M2) vs. (N1+M1)
N: Non-union members	370	14.916				
N1: With non-elected chairs	302	14.881				
N2: With elected chairs	68	15.074	1.534*** (10.29%)	1.389*** (8.63%)	2.601*** (17.48%)	1.328*** (8.34%)
M: Union members	2487	16.451				
M1: With non-elected chairs	1846	16.093				
M2: With elected chairs	641	17.482				

Note: 1) percentage of the wage differences are in brackets; 2) *** p<0.01, ** p<0.05, and * p<0.1.
Sources: Author's calculation from the Hangzhou Labor Relations Survey 2012.

Table 4: OLS Estimates on Workers' Wage (Types N, M1, and M2)

Variable/Model	(1) Full	(2) Excluding A2	(3) Excluding SOEs	(4) Excluding FOEs	(5) Excluding Large Firms
Union: Type M1 workers	ref.	ref.	ref.	ref.	ref.
Type N workers	0.002	−0.005	0.005	0.024	−0.102***
	(0.079)	(−0.172)	(0.168)	(0.931)	(−3.820)
Type M2 workers	0.096***	0.098***	0.101***	0.099***	0.044*
	(3.756)	(3.835)	(3.634)	(4.886)	(1.760)
Age	0.043***	0.043***	0.044***	0.042***	0.036***
	(4.858)	(4.735)	(4.587)	(3.941)	(4.345)
Age^2	−0.001***	−0.001***	−0.001***	−0.001***	−0.000***
	(−4.571)	(−4.462)	(−4.353)	(−3.717)	(−4.308)
Gender (female=1)	−0.148***	−0.148***	−0.145***	−0.144***	−0.158***
	(−5.357)	(−5.198)	(−5.004)	(−4.602)	(−6.361)
Hukou (agriculture=1)	−0.039	−0.042	−0.045*	−0.017	−0.002
	(−1.584)	(−1.718)	(−1.854)	(−0.699)	(−0.118)
Education: Junior school or below	ref.	ref.	ref.	ref.	ref.
High school	0.001	0.005	0.000	0.022	0.027
	(0.047)	(0.185)	(−0.006)	(0.704)	(1.332)
Vocational school	0.023	0.016	0.012	0.027	−0.024
	(0.924)	(0.613)	(0.425)	(0.849)	(−0.778)
College or above	0.127***	0.126***	0.119***	0.134***	0.119***
	(4.698)	(4.655)	(5.097)	(4.764)	(3.287)
CP membership (CP=1)	0.023	0.029	0.012	0.014	0.044*
	(0.773)	(1.018)	(0.353)	(0.388)	(1.811)
Seniority	0.001*	0.001*	0.001**	0.001*	0.001***
	(1.880)	(1.872)	(2.745)	(1.961)	(3.121)
Seniority^2	0.000	0.000	−0.000**	0.000	−0.000**
	(−1.711)	(−1.691)	(−2.801)	(−1.742)	(−2.886)
Position (manager and technician=1)	0.106***	0.104***	0.109***	0.086***	0.093***
	(5.913)	(6.166)	(5.558)	(4.456)	(4.074)
Ownership: SOEs	ref.	ref.	--	ref.	ref.
FOEs	0.043	0.035	ref.	--	−0.026
	(0.684)	(0.543)			(−0.438)
POEs	−0.062	−0.069*	−0.107*	−0.075**	−0.039
	(−1.683)	(−1.870)	(−2.022)	(−2.205)	(−0.806)
Firm size: 50 workers or below	ref.	ref.	ref.	ref.	ref.
50–199 workers	0.027	0.031	0.032	0.032	0.013
	(0.684)	(0.790)	(0.761)	(0.756)	(0.297)
200 workers or above	0.095**	0.094**	0.102**	0.074**	--
	(2.990)	(2.897)	(2.930)	(2.310)	--
History	0.000	−0.000*	−0.001	0.000	0.000
	(−1.640)	(−1.787)	(−1.666)	(−1.182)	(−0.490)
Region (subordinate counties and cities=1)	−0.090**	−0.087**	−0.075	−0.089**	−0.049
	(−2.268)	(−2.212)	(−1.751)	(−2.821)	(−0.880)

Industry (manufacturing=1)	0.025	0.028	0.011	0.008	−0.009
	(0.753)	(0.840)	(0.274)	(0.255)	(−0.169)
Skill intensity	0.423***	0.411***	0.426***	0.404***	0.264**
	(6.743)	(5.872)	(6.948)	(5.511)	(2.254)
Constant	1.841***	1.845***	1.899***	1.886***	1.881***
	(13.067)	(12.500)	(11.547)	(10.772)	(13.694)
Sample size	2857	2789	2609	2457	2055
Adjusted R^2	0.270	0.269	0.279	0.222	0.191

Note: 1) *** p<0.01, ** p<0.05, and * p<0.1; 2) Two-tailed test and t-statistics are in parentheses; 3) Sampling weights are incorporated into the regression analysis in which the weights are estimated by the ratio of actual firm size to the sampled size.

Table 5: OLS Estimates on Workers' Wage (Type N1+M1 and N2+M2)

Variable/Model	(1) Full	(2) Excluding SOEs	(3) Excluding FOEs	(4) Excluding Large Firms
Union: Type (N1+M1) workers	ref.	ref.	ref.	ref.
Type (N2+M2) workers	0.092***	0.101***	0.087***	0.047*
	(4.027)	(4.196)	(3.951)	(1.934)
Ownership: SOEs	ref.	--	ref.	ref.
FOEs	0.045	ref.	--	-0.031
	(0.711)			(−0.521)
POEs	−0.062	−0.108*	−0.072**	−0.04
	(−1.707)	(−2.053)	(−2.169)	(−0.804)
Firm size: 50 workers or below	ref.	ref.	ref.	ref.
50–199 workers	0.025	0.03	0.03	0.016
	(0.653)	(0.724)	(0.697)	(0.384)
200 workers or above	0.096***	0.102**	0.075**	--
	(3.019)	(2.963)	(2.275)	--
Other control variables	Y	Y	Y	Y
Constant	1.841***	1.896***	1.872***	1.961***
	(12.671)	(11.276)	(10.742)	(13.604)
Sample size	2857	2609	2457	2055
Adjusted R^2	0.270	0.280	0.221	0.181

Note: 1) *** $p<0.01$, ** $p<0.05$, and * $p<0.1$; 2) Two-tailed test and t-statistics are in parentheses; 3) Sampling weights are incorporated into the regression analysis in which the weights are estimated by the ratio of actual firm size to the sampled size; 4) Other control variables are the same as those in Table 4.

Table 6: Bias-adjusted Effects of Direct Union Elections (Type M1 and M2)

The Effects of Direct Elections	(1) Uncontrolled Effect (Std.Error), [R^2]	(2) Controlled Effect (Std.Error), [R^2]	(3) Identified Set (R_{max}= 1.3R^2, δ=1)	(4) Delta for Beta=0 (R_{max}=1.3R^2)	(5) Identified Set (R_{max}= 0.59, δ=1)	(6) Delta for Beta=0 (R_{max}= 0.59)
Full	0.161** (0.055) [0.037]	0.097*** (0.025) [0.274]	[0.073, 0.097]	3.565	[0.003, 0.097]	1.025
Excluding SOEs	0.175*** (0.056) [0.044]	0.102*** (0.027) [0.283]	[0.074, 0.102]	3.181	[−0.003, 0.102]	0.972
Excluding FOEs	0.146** (0.046) [0.031]	0.103*** (0.021) [0.223]	[0.087, 0.103]	5.284	[0.013, 0.103]	1.127
Excluding large firms	0.058* (0.030) [0.005]	0.045* (0.025) [0.181]	[0.040, 0.045]	8.080	[0.005, 0.045]	1.118

Note: 1) *** p<0.01, ** p<0.05, and * p<0.1; 2) The treatment variable involves union members with directly elected chairs; 3) The regressions for uncontrolled effects only include the treatment variable while we control for all firm and worker attributes as OLS for evaluating the controlled effects; 4) The lower bounding value of the identified set is the coefficient from the regression with all controlled observables and the upper bounding value of the identified set is the bias-adjusted treatment effect with specific assumption on R_{max} and δ; 5) Columns (3) and (5) list the identified sets for the controlled treatment effects where Column (3) takes $R_{max} = 1.3R^2$ and Column (5) takes $R_{max} = 0.59$ for $\delta = 1$; 6) Columns (4) and (6) report the value of δ, i.e., the relative degree of selection on observed and unobserved variables, when the treatment effects are set as zero and where Column (4) takes $R_{max} = 1.3R^2$ and Column (6) takes $R_{max} = 0.59$; and 7) Sampling weights are incorporated into the regression analysis in which the weights are estimated by the ratio of actual firm size to the sampled size.

Table 7: Bias-adjusted Effects of Direct Union Elections (Type N1+M1 and N2+M2)

The Effects of Direct Elections	(1) Uncontrolled Effect (Std.Error), [R^2]	(2) Controlled Effect (Std.Error), [R^2]	(3) Identified Set (R_{max}= 1.3R^2, δ=1)	(4) Delta for Beta=0 (R_{max}=1.3R^2)	(5) Identified Set (R_{max}= 0.59, δ=1)	(6) Delta for Beta=0 (R_{max}= 0.59)
(1) Full	0.156** (0.055) [0.033]	0.092*** (0.023) [0.270]	[0.070, 0.092]	3.715	[0.003, 0.092]	1.032
(2) Excluding SOEs	0.170*** (0.056) [0.040]	0.101*** (0.024) [0.280]	[0.075, 0.101]	3.473	[0.005, 0.101]	1.046
(3) Excluding FOEs	0.132** (0.047) [0.024]	0.087*** (0.022) [0.221]	[0.072, 0.087]	4.975	[0.000, 0.087]	1.003
(4) Excluding large firms	0.062* (0.030) [0.005]	0.046* (0.024) [0.181]	[0.042, 0.046]	8.314	[0.007, 0.046]	1.149

Note: 1) *** p<0.01, ** p<0.05, and * p<0.1; 2) The treatment variable involves union members with directly elected chairs; 3) The regressions for uncontrolled effects only include the treatment variable while we control for all firm and worker attributes as OLS for evaluating the controlled effects; 4) The lower bounding value of the identified set is the coefficient from the regression with all controlled observables and the upper bounding value of the identified set is the bias-adjusted treatment effect with specific assumption on R_{max} and δ; 5) Columns (3) and (5) list the identified sets for the controlled treatment effects where Column (3) takes $R_{max} = 1.3R^2$ and Column (5) takes $R_{max} = 0.59$ for $\delta = 1$; 6) Columns (4) and (6) report the value of δ, i.e., the relative degree of selection on observed and unobserved variables, when the treatment effects are set as zero and where Column (4) takes $R_{max} = 1.3R^2$ and Column (6) takes $R_{max} = 0.59$; and 7) Sampling weights are incorporated into the regression analysis in which the weights are estimated by the ratio of actual firm size to the sampled size.

Table 8: The Effects of Direct Union Elections by Local Linear Regression Matching

Local Liner Regression Matching	Treatment Group (Sample Size)	Control Group (Sample Size)	ATT (t-value)	Balance Test
(1) Full	M2 N=609	M1 N=1846	0.059***	Balance
			(2.950)	
(2) Excluding SOEs	M2 N=574	M1 N=1651	0.072***	Balance
			(4.235)	
(3) Excluding FOEs	M2 N=484	M1 N=1625	0.053***	Balance
			(2.789)	
(4) Excluding Large Firms	M2 N=411	M1 N=1356	0.015	Balance
			(0.625)	

Note: 1) *** p<0.01, ** p<0.05, and * p<0.1; 2) Two-tailed test and t-statistics are in parentheses with the bootstrap approach repeated 100 times; 3) The logit model in the first stage includes all variables as OLS; and 4) The lowest and highest 5% percentiles of P-values are excluded within the common support region of matching.

Table 9: Estimates on Workers' Rights and Benefits (Type N, M1 and M2)

Variables	(1) Monthly Working Hours	(2) Free Checkups	(3) On-the-job Training	(4) Social Security Satisfaction	(5) Overall Satisfaction
Union: Type M1 worker	ref.	ref.	ref.	ref.	ref.
Type N worker	0.040**	−0.147**	−0.175***	−0.159	−0.128
	(2.339)	(−2.396)	(−3.710)	(−0.733)	(−0.977)
Type M2 worker	−0.016	−0.011	0.013	0.449***	0.226***
	(−1.293)	(−0.227)	(0.262)	(3.452)	(3.205)
Age	−0.006**	0.020*	0.018*	0.004	0.003
	(−2.183)	(2.129)	(2.019)	(0.143)	(0.236)
Age^2	0.000*	−0.000**	−0.000**	0.000	0.000
	(2.131)	(−2.553)	(−2.581)	(0.175)	(0.155)
Gender (female=1)	−0.002	−0.027	−0.068**	−0.018	0.001
	(−0.407)	(−1.457)	(−2.335)	(−0.424)	(0.015)
Hukou (agriculture=1)	0.023**	−0.009	0.008	0.169***	0.099***
	(2.262)	(−0.209)	(0.225)	(3.730)	(4.364)
Education: Junior school or below	ref.	ref.	ref.	ref.	ref.
High school	−0.014**	−0.054	0.113***	−0.137**	−0.062
	(−2.803)	(−1.050)	(3.297)	(−2.540)	(−1.583)
Vocational school	−0.007	−0.077	0.035	−0.063	−0.054
	(−0.629)	(−1.495)	(0.783)	(−0.700)	(−1.381)
College or above	−0.022	−0.067	0.039	0.006	−0.001
	(−1.269)	(−1.061)	(0.778)	(0.091)	(−0.017)
CP membership (CP=1)	−0.011	0.021	0.042	0.071	0.043
	(−1.472)	(0.531)	(1.440)	(0.609)	(0.771)
Seniority	0.000	0.003***	0.002***	−0.001	−0.001
	(1.221)	(4.411)	(3.161)	(−0.425)	(−0.713)
Seniority^2	−0.000*	−0.000***	−0.000***	0.000	0.000
	(−1.773)	(−3.373)	(−3.286)	(−0.662)	(−0.887)
Position (manager and technician=1)	0.008	−0.041	0.032	−0.043	−0.020
	(0.740)	(−1.024)	(1.252)	(−0.579)	(−0.603)
Ownership: SOEs	ref.	ref.	ref.	ref.	ref.
FOEs	0.044*	0.200***	0.110	−0.087	−0.047
	(1.978)	(3.284)	(1.235)	(−0.566)	(−0.690)
POEs	0.018	0.062	0.099	−0.026	−0.004
	(1.309)	(0.783)	(1.246)	(−0.169)	(−0.058)
Firm size: 50 workers or below	ref.	ref.	ref.	ref.	ref.
50–199 workers	0.001	−0.005	0.062	−0.058	−0.058
	(0.196)	(−0.160)	(1.252)	(−0.737)	(−1.523)
200 workers or above	−0.003	0.053	0.053	−0.154	−0.114
	(−0.208)	(1.026)	(1.163)	(−1.149)	(−1.594)
History	0.000	0.000	0.000	0.000	0.000

	(1)	(2)	(3)	(4)	(5)
	(0.795)	(0.979)	(−0.445)	(0.470)	(0.633)
Region (subordinate counties and cities=1)	0.050*	0.051	0.071	−0.134	−0.110
	(2.015)	(0.550)	(0.870)	(−0.763)	(−1.059)
Industry (manufacturing=1)	0.030	−0.086	0.004	−0.062	−0.053
	(1.631)	(−1.400)	(0.119)	(−0.399)	(−0.543)
Skill intensity	−0.010	0.427***	0.091	−0.068	−0.015
	(−0.364)	(3.814)	(0.978)	(−0.169)	(−0.063)
Constant	5.300***				4.127***
	(124.221)				(12.964)
cut1 _cons				−2.790***	
				(−4.621)	
cut2_cons				−2.299***	
				(−3.699)	
cut3_cons				−0.848	
				(−1.358)	
cut4_cons				0.333	
				(0.512)	
Number of obs.	2881	2881	2881	2875	2846
Adjusted R^2	0.153	--	--	--	0.072

Note: 1) *** p<0.01, ** p<0.05, and * p<0.1; 2) Two-tailed test and t-statistics are in parentheses; 3) Sampling weights are incorporated into the regression analysis in which the weights are estimated by the ratio of actual firm size to the sampled size; 4) Columns (1) and (5) are OLS regression results and Columns (2) to (4) are logit regression results. As we adjusted the sampling weights, Stata does not report the log likelihood or pseudo adjusted R-squared for logit regressions.

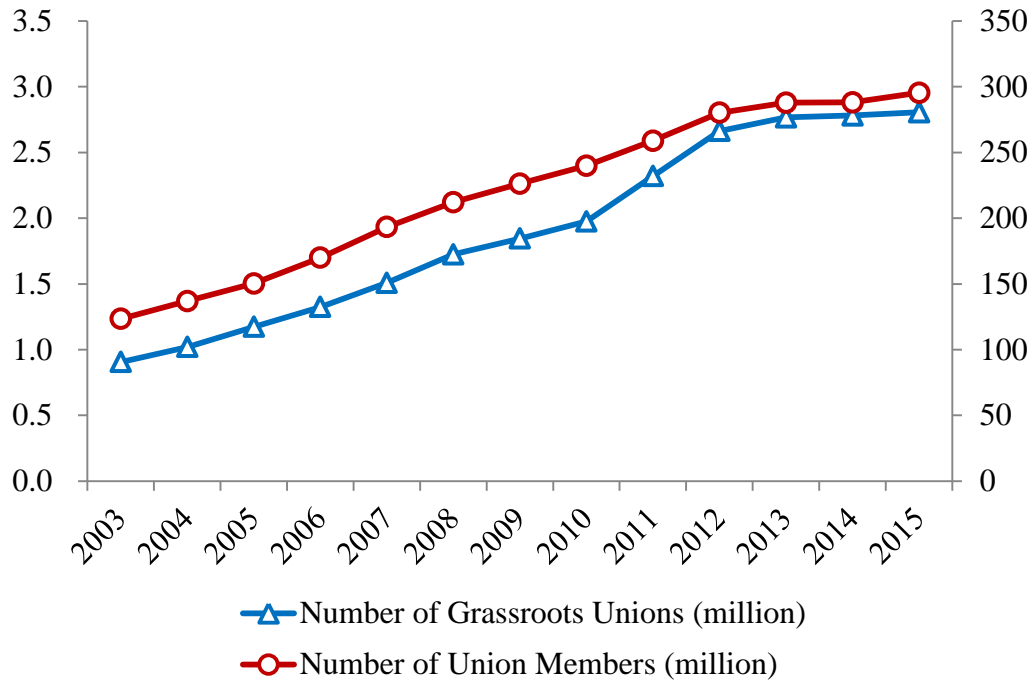**Table 10: Estimates on Workers' Rights and Benefits (Type N1+M1 and N2+M2)**

Variables	(1) Monthly Working Hours	(2) Free Checkups	(3) On-the-job Training	(4) Social Security Satisfaction	(5) Overall Satisfaction
Union: Type N1+M1 worker	ref.	ref.	ref.	ref.	ref.
Type N2+M2 worker	−0.016	0.001	0.033	0.463***	0.241***
	(−1.469)	(0.033)	(0.722)	(3.754)	(3.604)
Other Controls	Y	Y	Y	Y	Y
Number of obs.	2881	2881	2881	2875	2846
Adjusted R^2	0.138	--	--	--	0.067

Note: 1) *** p<0.01, ** p<0.05, and * p<0.1; 2) Two-tailed test and t-statistics are in parentheses; 3) Sampling weights are incorporated into the regression analysis in which the weights are estimated by the ratio of actual firm size to the sampled size; 4) Columns (1) and (5) are OLS regression results and Columns (2) to (4) are logit regression results. As we adjusted the sampling weights, Stata does not report the log likelihood or pseudo adjusted R-squared for logit regressions; and 5) Other control variables are the same as those in Table 9.

Table 11: Comparison between Directly Elected and Non-directly Elected Firms

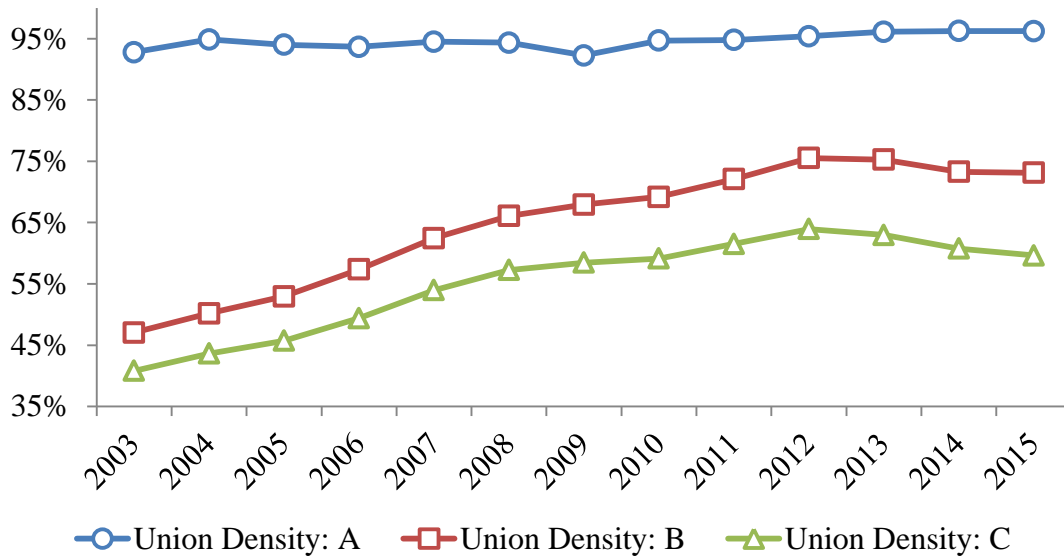| Item	Variables	Directly elected			Non-directly elected			Difference
		Obs.	Mean	S.D.	Obs.	Mean	S.D.	
Firm Performance	Per capita output (10,000 yuan per worker)	39	30.39	47.88	136	16.63	26.48	13.76**
	Per capita sale (10,000 yuan per worker)	77	137.40	234.80	262	114.30	307.70	23.10
Firm Governance in Labor Relations	Proven by pay slip (yes=1)	89	0.91	0.29	297	0.86	0.35	0.05
	With aid system (yes=1)	89	0.84	0.37	297	0.81	0.39	0.03
	Holds workers' congress (yes=1)	89	0.92	0.27	297	0.89	0.32	0.03
	Publicizes firm affairs (yes=1)	89	0.96	0.21	297	0.87	0.34	0.09**
	Settles labor disputes (yes=1)	89	0.98	0.15	297	0.91	0.28	0.07**
	With collective negotiations of wages (yes=1)	89	0.83	0.04	297	0.79	0.02	0.04
	Number of negotiations	71	0.86	0.44	208	0.86	0.55	0.00
Individual Attributes of Union Chairs	Age	88	44.68	9.37	277	44.57	9.57	0.11
	Gender (female=1)	89	0.30	0.46	297	0.38	0.49	-0.08
	Education (colleague and above=1)	89	0.49	0.50	297	0.39	0.49	0.10*
	Full-time (yes =1)	89	0.33	0.47	297	0.24	0.43	0.09*
	With local *Hukou* (yes=1)	89	0.79	0.41	297	0.83	0.38	-0.04

Note: 1) *** p<0.01, ** p<0.05, and * p<0.1; 2) Two-tailed test and t-statistics are in parentheses; and 3) The number of observations vary because of missing values of available variables.

Appendix Figure A1: Grassroots Trade unions and Union Membership in China

Sources: Data are from the *China Statistical Yearbook 2016* and are collected by the National Bureau of Statistics.
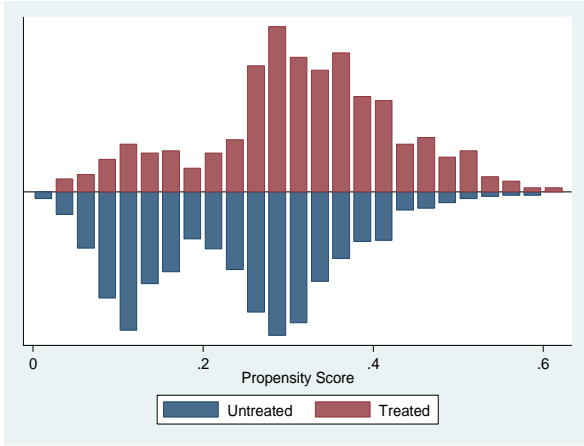Note: The statistical caliber of the number of grassroots unions changed in 2003. For consistency, we only record the subsequent numbers.
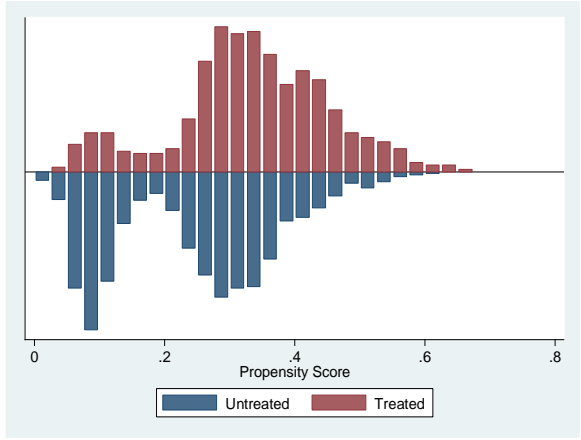
Appendix Figure A2: Union Density in China

Sources: Data are from the *China Statistical Yearbook 2016* and are collected by the National Bureau of Statistics.
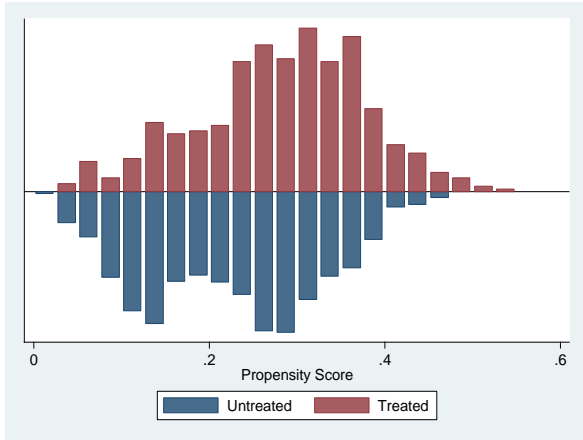
Note: 1) The union density rates were calculated by the authors. All the nominators are numbers of labor union members. Curve A sets the denominator as the number of workers in unionized firms. Curve B sets the denominator as the number of workers in urban area. Aside from urban employment, additional employment in private firms and self-employed business in the rural area are included as the denominator in Curve C; 2) The statistical caliber of the number of grassroots trade unions changed in 2003. For consistency, we only record the subsequent numbers.
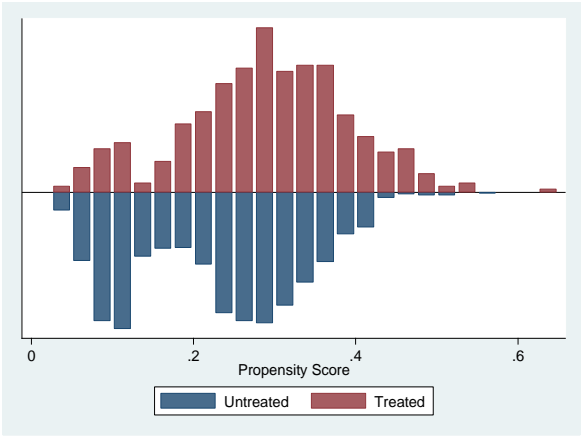
Panel a): Full Sample

Panel b): Excluding SOEs

Panel c): Excluding FOEs

Panel d): Excluding Large Firms

Appendix Figure A3: Balance Test of PSM Estimations (Treated B2 vs. Untreated B1)

Appendix Table B1: Comparison between Unionized and Non-unionized Firms

Variables	Unionized Firm			Non-unionized Firm			Difference
	Obs.	Mean	S.D.	Obs.	Mean	S.D.	
Ownership: SOEs	386	0.080	0.272	118	0.025	0.158	0.05**
FOEs	386	0.122	0.327	118	0.059	0.237	0.06*
POEs	386	0.785	0.411	118	0.873	0.335	−0.09**
Region (subordinate counties and cities=1)	386	0.249	0.433	118	0.203	0.404	0.05
Firm size: 50 workers or below	386	0.360	0.481	118	0.771	0.422	−0.41***
50–199 workers	386	0.466	0.500	118	0.195	0.398	0.27***
200 workers or above	386	0.174	0.379	118	0.034	0.182	0.14***
Industry (manufacturing=1)	386	0.585	0.493	118	0.407	0.493	0.18***
Skill intensity	385	0.151	0.199	117	0.146	0.214	0.01
Firm age (months)	372	134.0	76.49	113	99.45	58.61	34.5***
Share of male workers	383	0.560	0.203	115	0.523	0.208	0.04*
Per capita profits 2011	349	3.978	19.050	92	1.905	8.526	2.07
Per capita capital 2011	227	14.11	23.29	35	18.61	34.34	−4.5
Per capita output 2011	214	71.98	89.76	27	61.71	80.57	10.27
Per capita sales 2011	340	119.7	292.2	90	76.17	220.3	43.53
Firms provide pay slips	386	0.127	0.333	118	0.102	0.304	0.03
Firms establish aid systems	386	0.816	0.388	118	0.585	0.495	0.23***
Firms set up workers' congress	386	0.896	0.305	118	0.517	0.502	0.38***
Firms publicize firm affairs	386	0.886	0.318	118	0.788	0.410	0.10***
Firms settle labor disputes	386	0.927	0.260	118	0.712	0.455	0.22***

Note: 1) *** p<0.01, ** p<0.05, and * p<0.1; and 2) Two-tailed test and t-statistics are in parentheses.