

# Unions and the productivity performance of multinational enterprises: evidence from China

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**Abstract** This paper uses the economic census data of multinational enterprises (MNEs) in the Chinese manufacturing industry to investigate the effects of Chinese unions on firm productivity. We show that Chinese unions have a significant “collective voice” effect by participating in a wide range of decision-making and production-related activities. The empirical evidence suggests that the presence of Chinese unions in MNEs is positively associated with enterprise productivity. We also find that the union productivity effects are stronger in MNEs than those in domestic private firms and that the effectiveness of unions is more significant in skill-intensive industries.

**Keywords** Multinational enterprises · Unions · Productivity · China

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## Introduction

How does the presence of unions in multinational enterprises (MNEs) affect enterprise productivity? The theoretical prediction on the union–productivity relationship is ambiguous. According to Freeman and Medoff (1984), there are two faces of unionism. First, there is the monopoly face of unions, which might reduce productivity through wage distortion, contractual work rules, reduced work incentives, limited managerial discretion, and reduced capital investment. By contrast, there is the second, collective voice face of unions, which might enhance efficiency by improving internal labor relations, reducing turnover costs, reducing organizational slack, encouraging employee involvement in production, and creating conditions that motivate a greater work effort (Kaufman 2004). Both productivity-enhancing union effects and productivity-detracting union effects can occur simultaneously, and the relative importance of the two effects highly depends on the economic and regulatory environment. The empirical studies since Brown and Medoff (1978) show mixed evidence: the union productivity effects have been found to be positive, negative, small, or insignificant. The results are diverse and far from suggesting a consensus.

This paper contributes to the literature by using the large-scale firm-level data of MNEs in the Chinese manufacturing industry to investigate the impact of unions on enterprise productivity. The case of China is particularly intriguing. China is one of the fastest growing economies and major Foreign Director Investment (FDI) recipients in the world. MNEs account for over half of China's trade and contribute more than twenty percent to China's total GDP (Lemoine and Unal 2017). Thus, it is both interesting and important to investigate how MNEs in China adapt to local labor institutions.

Chinese unions are different from standard Western unions in that they are not independent but rather are organized by the All-China Federation of Trade Unions (ACFTU) through a hierarchical system. The unique function of Chinese unions is to serve as a “transmission belt” between the State-Party and the workers, and to maintain social and political stability. This “State-Party voice” face is rooted in previous central planning economic system and remains effective in the state sector (Chan 2000; Taylor et al. 2003; Metcalf and Li 2006). In non-state sector, Chinese unions have functions similar to their Western counterparts: to represent and protect the interests of employees, and to collaborate with enterprise management to harmonize industrial relations and improve production efficiency (Chen 2003; Metcalf and Li 2006; Taylor and Li 2007).

These multiple purposes of unions can be demonstrated by a social partnership model. There are three major theoretical perspectives or frameworks in industrial relations, namely, the unitarist, pluralist, and critical perspectives (Fox 1966, 1974; Clegg 1975). The case of China is more likely to fall on the unitarist side of the spectrum since the most critical role of Chinese unions is to harmonize the relations among management, employees, and government. The unique roles and multiple functions of Chinese unions provide an interesting context to examine how unions may affect the productivity of MNEs.



The “real” effects of Chinese unions are debatable. Early case studies suggest that Chinese unions cannot effectively protect the rights and interests of employees, especially employees in non-state enterprises (Chen 2003; Metcalf and Li 2006; Taylor and Li 2007). However, empirical studies based on firm-level data have suggested a different pattern. Unions have positive and significant impacts on employee wages and welfare (Anwar and Sun 2015; Ge 2014; Lu et al. 2010; Yao and Zhong 2013). Unions promote enterprises’ innovation (Fang and Ge 2012). Additionally, unions are positively associated with labor productivity (Lu et al. 2010).

Several studies focus on the unions in MNEs. For example, Chan (2010) finds that it was difficult for MNEs to resist the establishment of a workplace union due to government and union pressures. However, MNEs generally sought to co-opt the union to meet organizational needs. Kim et al. (2014) show that union recognition at MNEs is affected by both the industrial system of the home country and the intra-national diversity in the host country environment. However, these studies are case-based and there is no evidence based on large-scale quantitative analysis. Our study fills this gap by examining the channels through which Chinese unions in MNEs contribute to firm productivity by estimating the union productivity effects based on large-scale firm-level data and an instrumental variable approach.

In this paper, we describe various productivity-related activities of Chinese unions and argue that the efficiency-enhancing effects of unions are stronger than the distortion effects of unions for three reasons. First, Chinese unions’ bargaining power is too weak to extract monopoly gains; thus, the efficiency loss caused by the “monopoly face” of unions might not be significant. Second, the “collective voice” face of Chinese unions may have significant efficiency-enhancing effects. Unions provide collective information, harmonize industrial relations, and facilitate the coordination between management and employees. Third, Chinese unions participate in various activities that directly contribute to enterprise productivity, including technology innovation and employee training. As the “transmission belt,” Chinese unions may assist MNEs to overcome the so-called “liability of foreignness” by communicating with local authorities, adapting to local labor and employment practices, and fostering mutual trust and long-term cooperation.

To test our hypotheses (detailed below), we use large-scale firm-level data from the 2004 *Economic Census* to estimate the effectiveness of Chinese unions in MNEs. The empirical results suggest that the presence of Chinese unions in MNEs is positively associated with firm productivity. The positive effects of unions on productivity are stronger in MNEs than in domestic private firms. The effectiveness of unions is also more significant in skill-intensive industries.

This paper is organized as follows. In the next section, we review the literature on the linkage between unions and productivity, describe the activities of Chinese unions, and then develop our research hypotheses. In “[Data and research methods](#),” we discuss the data and empirical models. “[Empirical results](#)” presents the empirical findings. The last section discusses the main findings and concludes the paper.



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## Theoretical background and hypotheses

### Unions and enterprise productivity

There is no consensus about the union–productivity relationship. The standard framework of the two faces of unionism (Freeman and Medoff 1984) suggests that both the productivity-enhancing union effects (collective voice effects) and productivity-detracting effects (monopoly face effects) can occur at the same time and offset one another, and the relative importance of these effects highly depends on the economic and regulatory environment. Therefore, whether unions have a positive or negative effect on enterprise productivity is largely an empirical question.

The empirical evidence on the linkage between unions and productivity is mixed. In the case of the US, the pioneering work of Brown and Medoff (1978) shows that the productivity of unionized establishments is approximately 25% higher than the productivity of non-union plants. This large union effect, however, may be over-estimated, and most empirical studies have suggested that average union productivity effects are small and as likely to be negative as positive (Clark 1984; Hirsch 1991b, 2004, 2007; Turnbull 1991). Doucouliagos and Laroche (2003) surveyed 73 studies on union productivity effects and showed that the simple mean of the estimated union productivity effect was 4% and the weighted average was 1%. Moreover, many studies have found a strong negative association between unionism and firm profitability and investment (Addison and Hirsch 1989; Fallick and Hassett 1999; Hirsch 1991a; Nolan and Marginson 1990). In the case of Japan, the empirical results are also diverse. Some studies find significant and positive union productivity effects (Muramatsu 1984; Morikawa 2010), and other studies show negative impacts of unions on enterprise productivity (Brunello 1992; Tachibanaki and Noda 2000). For developing countries, Fairris (2006) uses a Mexican enterprise survey to explore the impact of unions on employee welfare and productivity and finds that union firms raise fringe benefits, offer more job training, and enhance firm productivity.

### Union activities in China

Chinese unions are not independent but rather are organized by the All-China Federation of Trade Unions (ACFTU) through a hierarchical system. At the top level of the organization is the ACFTU. The bottom level units are the workplace unions. At the intermediate level, there are two strands of unions: industrial unions and regional unions. Compatible with the administrative level of regions, regional unions are categorized at the province, city/county, and town levels (Chan 2000).

The roles of unions are ambiguous because Chinese unions serve the following multiple purposes: (1) to serve the administrative function of the Party-State to maintain social and political stability; (2) to collaborate with enterprise management to harmonize industrial relations and improve production efficiency; and (3) to represent and protect the interests of employees (Chan 2000; Taylor et al. 2003; Metcalf and Li 2006).



First, Chinese unions serve as the “transmission belt” between the State-Party and the majority of workers so that the “Party-State’s voice” can be effectively transmitted from the top to the bottom level of workplaces. In addition to this political function, Chinese unions are also involved in many activities that are related to enterprise productivity and employee welfare. Based on the information from the *Chinese Trade Union Statistics Yearbook 2005* (Research Department of ACFTU 2006), we summarize the activities of Chinese unions in Table 1.

Panel A of Table 1 shows that Chinese unions represent employees in collective consultations/bargaining with management. Chinese Trade Union Laws grant unions the right to collectively consult and sign collective contracts with employers. The ACFTU initiated and promoted collective contracts to protect employees’ rights (Taylor et al. 2003; Clarke et al. 2004). In 2004, approximately 32.5% of unionized workplaces had established an equal consultation and collective bargaining system, and approximately 17.5% of unionized workplaces had established a wage negotiation system.

Panel B of Table 1 reports the activities of unions in harmonizing industrial relations. Unions consult with their members on labor-related issues, accept employees’ grievances, mediate between employees and employers, and monitor/supervise the labor conditions and the implementation of the labor law. Unions coordinate with the branches of the Ministry of Labor and the National Enterprises Association to solve labor disputes and other labor-related issues. Approximately 10.1% of unionized workplaces have established a Labor Dispute Mediation Committee (LDMC) to mediate labor disputes. Of the 192,119 labor dispute cases that were received in 2004, approximately 28.4% were successfully mediated by the LDMC. Unions are also charged with monitoring/supervising the implementation of the labor law in workplaces, for example, the implementation of minimum wage and work safety regulations. Approximately 149,424 workplace unions have established Labor Legal Supervision Organizations. In 2004, 23,482 cases were accepted, and 44.6% were successfully handled by unions. Approximately 182,267 workplace unions have established Labor Protection Supervision and Inspection Committees, and 53,550 cases were accepted in 2004.

Panel C of Table 1 shows various services and welfare benefits provided by unions to their members. Chinese unions retain their traditional role of social welfare provider, for example, unions provide financial support to employees with financial difficulty (or poverty). Unions also establish various employee mutual cooperative insurance programs, such as cooperative medical insurance, pension, and industrial injury insurance programs. Unions serve their members through union-owned cultural and entertainment facilities, such as clubs, cultural palaces, libraries, gyms, and stadiums. Workplace unions organize various cultural and sport events. They also arrange holiday trips for their members and even organize summer camps for the children of their members.

Panel D of Table 1 reports production-related union activities. Technology innovation is an important task of Chinese unions. Workplace unions promote a so-called “rational suggestions” campaign in which employees submit production-related suggestions to management. There are 22,965 workplace unions that have established Technical Cooperation Organizations (TCOs), which have approximately 2.1 million



**Table 1** Activities of workplace unions in China (2004)

<b>Panel A: collective consultation and bargaining</b>	
Unionized workplaces with equal consultation and a collective contract system	628,819
Unionized workplaces with a wage negotiation system	339,379
<b>Panel B: labor and industrial relations</b>	
Labor dispute mediation/arbitration	
Workplaces with a Labor Dispute Mediation Committee (LDMC)	195,403
Number of labor dispute cases accepted by LDMC	192,119
Number of labor dispute cases successfully mediated	54,537
Labor Legal Supervision	
Workplace unions with Labor Legal Supervision Organizations	149,424
Number of cases accepted	23,482
Number of cases handled by unions	10,477
Labor Protection Supervision	
Workplace unions with Labor Protection Supervision and Inspection Committees	182,267
Number of safe production inspections by unions	1,832,181
Number of injuries and accidents handled by unions	69,126
<b>Panel C: employee welfare activities</b>	
Financial support to employees with difficulty	
Workplace unions with a Warmth Delivery Project Fund	36,794
The balance of the fund (million Yuan)	1147.8
Employee mutual cooperative insurance	
Workplace unions with an employee mutual cooperative insurance program	31,280
The number of employees joining the program (million persons)	8.3
Cultural and entertainment facilities for employees	
Union-owned clubs and cultural palaces	23,370
Union-owned libraries	11,648
Union-owned gyms and stadiums	13,376
<b>Panel D: production-related activities</b>	
Employee rationalization proposal activities	
Number of rationalization proposals	6,510,729
Number of rationalization proposals in practice	2,617,430
The value created by implementing rationalization proposals (million Yuan)	25,391.9
Technology innovation	
Workplace unions with TCOs	22,965
Number of innovation projects conducted by TCOs	54,147
Employee training	
Times of technical contests organized by TCOs	43,578
Times of technical training lectures	89,313
<b>Panel E: corporate governance</b>	
Unionized workplaces with a worker congress	305,775
Unionized workplaces with a Supervision Committee	41,910
Union chairmen in the committee	20,907
Unionized workplaces with a board of directors	56,573
Union chairmen on the board	25,268

Source Chinese Trade Union Statistics Yearbook 2005



members (approximately 0.8% of the total urban employees). In 2004, TCOs carried 54,147 innovation projects with an estimated value of approximately 5749 million Yuan, and 3265 industrial and regional unions have established TCOs to promote innovation and adoption of new technology.

Chinese unions also directly provide employee training services. The TCOs of workplace unions have organized 43,578 technical contests and 89,313 training lectures. Industrial and regional unions have independently established 1038 employee education institutions, including colleges, technical secondary schools, spare-time schools, training centers, and re-employment training bases. There were approximately half a million employees enrolled in these institutions in 2004.

Panel E of Table 1 reports the union activities related to corporate governance. The Trade Union Law (2001 Revision) grants unions the right to participate in democratic management on behalf of the workers. Among the 2 million unionized workplaces, approximately 15.8% have established worker congresses. Approximately 2.2% of workplaces have established Supervision Committees, and 1.1% of them have union chairs on the Supervision Committees. Approximately 2.9% of workplaces have established Boards of Directors, and 1.3% of them have union chairs on the Board of Directors.

Accordingly, Chinese unions not only function as a “transmission belt” but also participate in a wide range of activities. They represent their members in collective consultation/bargaining with management, accept employees’ grievances, mediate labor disputes, monitor working conditions and the implementation of labor law, provide various services and welfare benefits to employees, promote technology innovation and employee training, and participate in corporate governance.

However, the statistics in the Union Yearbook might suffer from self-reporting bias in that workplace unions tend to overstate their activities and importance. The real effect of union activities may not be always as great as they are stated in the Yearbook. As such, the effectiveness of Chinese unions needs systematic examination from other independent data sources.

## Hypotheses development

In this study, we exclude state-owned enterprises and focus on non-state enterprises because the functions of traditional unions in state-owned enterprises are mainly political and welfare functions. We argue that the presence of unions in non-state enterprises might have “real” effects on these enterprises’ productivity for three reasons. First, Chinese unions have bargaining power that is too weak to extract monopoly gains; thus, the efficiency loss caused by the monopoly face of unions might not be significant (Warner and Ng 1999; Clarke et al. 2004; Metcalf and Li 2006). For the monopoly face of Chinese unions, although the ACFTU actively promotes collective contracts, the content of collective contracts only includes the minimum terms of employment that are already prescribed by the labor law and thus provides employees with few or no additional benefits. Clarke et al. (2004) described the collective consultation/bargaining process and concluded that “The role of collective consultation in the Chinese enterprise is not



to negotiate the terms and conditions of employment between the employer and employees, but at best to monitor the enforcement of labor law and the implementation of labor regulations” (p. 251). Without the ability to strike, unions are often subordinated to management and are not treated as equal bargaining partners in the collective contract signing process. The wage system in the private sector is usually based on individual labor contracts that consist of “performance related pay, low social welfare and insecure employment” (Metcalf and Li 2006). Given the weak bargaining power of unions and the lack of “real” content in collective contracts, it is fair to say that Chinese unions lack a “monopoly” face.

Second, the “collective voice” face of Chinese unions may have significant efficiency-enhancing effects. The key mechanism of the “collective voice” face is to provide information. A collective voice through unions has advantages because individuals may have too little incentive to reveal their preference regarding employment rights and working conditions. Unions can collect information on workers’ preference and communicate it to management and can help firms to choose more efficient work arrangements and personnel policies (Brown and Medoff 1978; Freeman and Medoff 1984). For the other mechanisms of the “collective voice” face, unions may encourage employees to increase their effort and invest in firm-specific skills. By doing so, unions may reduce the exit behavior of employees, such as quitting, absenteeism, and malingering. Unions may encourage collaborations among employees and introduce better workplace practices (Kuhn 1985). Unions may also be involved in corporate governance, and use grievance and arbitration procedures to mitigate problems and harmonize industrial relations. These effects are closely related to the “upward problem-solving” mechanism as an opportunity for employees to provide feedback or ideas to improve enterprise performance (Marchington and Wilkinson 2005; Wilkinson et al. 2010). The union activities reported in Panels B and E of Table 1 provide supportive evidence for the “collective voice” face of Chinese unions.

Third, Chinese unions participate in various activities that directly contribute to enterprise productivity. One major objective of Chinese unions is to help enterprises to improve production efficiency (Fang and Ge 2012). Panel D of Table 1 shows that Chinese unions promote the “rational suggestions” program, technology innovations and contests, and employee training, which may exert positive impacts on enterprise productivity.

The above discussion leads to our first hypothesis:

**Hypothesis 1** The presence of unions in MNEs is positively associated with enterprise productivity.

The importance of the “collective voice” face of unions might be different between MNEs and private domestic firms. Information is the key in collective voice. Compared to private domestic firms, MNEs have an information disadvantage in the local labor market, local institutions, and operational environment, and may suffer from the “liability of foreignness.” The managers and the employees of MNEs may come from different cultural and institutional





backgrounds. Unions in MNEs provide one channel to facilitate the information exchange and close coordination between managers and employees. Timing (2012) has shown that employee involvement and participation significantly promotes organizational commitment and trust in management. MNEs also have disadvantages in communicating and collaborating with local governments. Local firms not only have better information on the local market but can also establish good relationships with the local authority. Chinese unions have a unique “top-to-bottom” structure and have a strong affiliation with both the ACFTU and government administration. As the “transmission belt,” Chinese unions may assist MNEs in communicating with local authorities, adapting to local labor and employment practices, and fostering mutual trust and long-term cooperation.

There are a few case studies on the effectiveness of Chinese unions in MNEs. For example, Chan et al. (2017) investigate the unions in 12 foreign-invested manufacturing enterprises and find that there is generally some cooperation between management and unions. They show that “enterprise unions were widely involved in a two-way communication between management and workforce, acting as a bridge” (p. 615). These results are consistent with the findings of Liu and Li (2014) that the management of MNEs generally co-opt unions to meet its organizational needs, and managerial strategies play a critical role in both unionization and union effectiveness. The above discussion leads to our second hypothesis:

**Hypothesis 2** The positive linkage between unions and productivity is significantly stronger in MNEs than in private domestic firms.

The effectiveness of unions may vary across the skill composition of an industry. First, the “collective voice” provided by unions, i.e., the information and coordination between management and employees, might be more important for skill-intensive industries. Quitting behavior is an alternative way to provide such information but is quite costly (Freeman and Medoff 1984). MNEs are keen to keep the labor turnover rate low because hiring and training costs are high, especially for skilled labor. The key advantage of MNEs is usually their intangible assets, such as advanced technology, patents, a brand name, or managerial skills. In a skill-intensive industry, MNEs have a strong motive to reduce labor turnover to mitigate the knowledge spillover process.

Second, Chinese unions promote innovation, provide employee training, and improve corporate governance (Fang and Ge 2012). These efficiency-enhancing activities might be complementary with skilled labor. In a more skill-intensive industry, it might be more effective and valuable for a collective organization to promote innovation, increase effort, and invest in firm-specific human capital. This discussion leads to our third hypothesis:

**Hypothesis 3** The positive association between unions and productivity in MNEs is significantly stronger in more skill-intensive industries.



## Data and research methods

### Data

To investigate the union–productivity linkage, we utilize a large firm-level dataset from the first National Economic Census of China that was conducted by the National Bureau of Statistics of China in 2004 (NBSC 2006). To the best of our knowledge, the 2004 Economic Census provides the most comprehensive cross-sectional data for Chinese enterprises.<sup>1</sup> We choose these retrospective data because these are the only available large firm-level data that report the information on the presence of unions in manufacturing enterprises. There are six ownership categories, namely, state-owned enterprises (SOEs), collectively owned enterprises (COEs), domestic firms with mixed ownership (which include domestic cooperative enterprises, domestic joint enterprises, limited liability firms and shareholding firms), private enterprises, multinational enterprises (MNEs), and Hong Kong, Macau and Taiwan-invested enterprises (HMTIEs).<sup>2</sup> Among the total industry enterprises, approximately 2.0% are SOEs, 10.7% are COEs, 65.4% are private firms, 14.0% are domestic firms with mixed ownership, 4.1% are HMTIE firms, and 3.8% are MNEs.

Our study focuses on MNEs. Among the total population of 53,303 MNEs, 14,940 MNEs have established workplace unions, and 38,363 are non-unionized. Because the information of value added is only available for the medium and large non-state enterprises (with total sales roughly above 5 million Yuan), our sample includes in total 26,918 medium and large MNEs.

### Empirical methods

To investigate the linkage between unions and firm productivity, we use the standard Cobb–Douglas production function:

$$Y_i = A_i L_i^{\beta_L} K_i^{\beta_K} \Rightarrow \log(Y_i) = \beta_L \log(L_i) + \beta_K \log(K_i) + \log(A_i). \quad (1)$$

In Eq. (1),  $Y_i$  is the value added of enterprise  $i$ , which is defined as the value of total output minus the cost of intermediate inputs.<sup>3</sup>  $L_i$  is the employment of enterprise  $i$ , which is defined as total number of employees in enterprise  $i$ .  $K_i$  is the capital of enterprise  $i$ , which is defined as the fixed asset of enterprise  $i$ .  $A_i$  is Total Factor Productivity (TFP), which is defined as the portion of output not explained by the amount of inputs used in production. TFP measures how efficiently and intensely

<sup>1</sup> The Census covers 5,168,303 legal entities out of a total of 5,323,235 legal entities in 2004; thus, the coverage rate is approximately 97%. We only have access to the data of manufacturing industries.

<sup>2</sup> State-owned limited liability enterprises are classified into SOEs. The joint enterprises between SOEs are treated as SOEs. The joint enterprises between COEs are treated as COEs.

<sup>3</sup> The information of value added is only available for the limited sample, which includes most of the SOEs and large and medium non-state enterprises (with total sales roughly above 5 million Yuan). The unit of value added and fixed assets is RMB 1000 Yuan.



the inputs are utilized in production. In our study, we assume that TFP is determined by unionization and other firm attributes, and estimate the following augmented log-linear Cobb–Douglas production function<sup>4</sup>:

$$\log(Y_i) = \alpha + \beta_L \log(L_i) + \beta_K \log(K_i) + \lambda \text{Union}_i + \sum \delta_j I_{ij} + \sum \theta_k R_{ik} + \gamma X_i + \varepsilon_i. \quad (2)$$

In Eq. (2), our key variable  $\text{Union}_i$  is measured by two indicators. The first indicator is the union dummy, which is equal to one if the enterprise establishes the union and is zero otherwise. The second indicator is the union density, which is defined as the proportion of union members in enterprise employment. In our sample of MNEs, approximately 42.7% of the firms have established unions, and the average union density is 30.5%. The estimated coefficient  $\lambda$  will indicate the contribution of workplace unions to total factor productivity.

For the control variables,  $I_{ij}$  is the industry dummy variable, which captures the industry-specific productivity differentials.  $R_{ik}$  is the location dummy, which captures the regional-specific productivity differentials. Previous studies show that several factors, such as computer usage and worker composition, are closely related to productivity (Bartelsman and Doms 2000). Firm attributes  $X_i$  include three variables: gender composition, skill composition, and technology usage. Workers' gender composition is measured by the proportion of female workers to total workers. Skill composition is measured by the proportion of workers with different education levels. Graduate share is defined as the proportion of employees with a graduate education (more than 16 years of education). College share is defined as the proportion of employees with a college education (16 years of education). High school share is defined as the proportion of employees with a high school education (12 years of education). Computer usage is measured by the logarithm of one plus the number of computers used in the workplace.  $\alpha$  is a constant, and  $\varepsilon_i$  is the error term.

One empirical issue is the potential endogeneity of unionization. The direction of this endogeneity bias is unclear. If productive firms are more likely to be unionized, then this would lead to reverse causality and an overestimation of the union impact on productivity. By contrast, if firms with poor productivity are more likely to establish unions, then the effect of unions could be underestimated. Moreover, if some (unobservable) firm attributes that are highly correlated with both productivity and unions are omitted from the regression, then it will bias the estimation results.

We adopt the instrumental variable approach to address this endogeneity issue. Unionization in China does not come from employee requests but rather from top-down requests by the ACFTU. China's unions are not independent rent-seeking agencies. Instead, unionization is motivated by the State-Party to maintain the connection with the majority of workers to retain social and political stability. One of the central tasks of the ACFTU is to persuade firms to establish a union, and this top-down request is supported by the administrative power of the bureaucratic

<sup>4</sup> This has been a standard specification in union productivity studies since the pioneering work of Brown and Medoff (1978).



system. Thus, the government's influence on enterprises plays an important role in the unionization process.

One suitable measure of the government's influence is the administrative subordination level of firm. Each firm in China is subordinate to or supervised by a certain level of government that ranges from the central government (top level) to a street/village committee (bottom level). The decentralization of the subordination level implies a weaker influence of the State-Party on firms. The subordination level is determined when an enterprise is established and registers for business. It is exogenous to or at least determined prior to the enterprise's business activities, and thus it will not be affected by firm productivity. We use the administrative subordination level of MNEs as the instrumental variables for unionization. We use seven dummy variables to measure subordination level of MNEs to the central government, the province, the city and prefecture, the county, the township or district, the street/village committee, and the other.

For the union dummy, we follow Wooldridge (2002) and adopt a two-stage least-squares (2SLS) estimator for this dummy endogenous variable model. In the first stage, we estimate a probit model of the determinants of the union recognition probability. We then obtain the fitted probability of unionization and use it as the instrument in the second stage. For union density, a standard 2SLS estimation method is used.

To test Hypothesis 2, we compare the union–productivity linkage in MNEs and private firms. We extend our sample and include both medium and large MNEs, and domestic private firms.<sup>5</sup> The regression is shown in Eq. (3).

$$\begin{aligned} \log(Y_i) = & \alpha + \beta_L \log(L_i) + \beta_K \log(K_i) + \lambda \text{Union}_i + \phi \text{MNE}_i \\ & + \eta \text{Union}_i \times \text{MNE}_i + \sum \delta_j I_{ij} + \sum \theta_k R_{ik} + \gamma X_i + \varepsilon_i. \end{aligned} \quad (3)$$

In Eq. (3),  $\text{MNE}_i$  is the foreign ownership dummy, which is equal to one if firm  $i$  is a multinational enterprise and is zero if firm  $i$  is a domestic private firm. The definition of the other variables is the same as the definitions in Eq. (2). The key variable is the interaction term between  $\text{Union}_i$  and  $\text{MNE}_i$ . The estimated coefficient  $\eta$  indicates the different effects of unions on productivity between MNEs and private firms.

To test Hypothesis 3, we focus on the sample of MNEs and use the following specification:

$$\begin{aligned} \log(Y_i) = & \alpha + \beta_L \log(L_i) + \beta_K \log(K_i) + \lambda \text{Union}_i + \phi \text{Union}_i \\ & \times \text{Skill intensity}_j + \sum \delta_j I_{ij} + \sum \theta_k R_{ik} + \gamma X_i + \varepsilon_i. \end{aligned} \quad (4)$$

In Eq. (4),  $\text{Skill intensity}_j$  is skill intensity, which is defined as the share of employees with a graduate and college education (at least 16 years of education) in their total employment in industry  $j$ . The definition of the other variables is the

<sup>5</sup> In our sample, there are 112,392 private firms, and 39,540 private firms are unionized.



same as the definitions in Eq. (2). The estimated coefficient  $\varphi$  indicates the different impacts of unions on productivity across industries with different skill intensities.

### Sample characteristics

Table 2 reports the summary statistics of the firm attributes in unionized and non-unionized MNEs. Among 26,918 MNEs, 11,498 firms established unions, and 15,430 firms are non-unionized. There is a systematic difference between unionized and non-unionized MNEs. Unionized firms are much larger than non-unionized firms in terms of total employment, fixed assets, and total sales. Unionized firms also report higher wages and a higher value added per worker than their non-unionized counterparts. In addition, unionized firms are more capital-intensive and use more computers than non-unionized firms. There are no significant differences in the gender composition and skill composition between unionized and non-unionized MNEs.

### Empirical results

Table 3 reports the results of the estimation of the augmented log-linear Cobb–Douglas production function, as shown in Eq. (1). Columns 1 and 2 of Table 3 report the OLS estimators for the two measures of unionization: the union dummy and union density. The estimated elasticity of the value added relative to capital and labor is 0.22 and 0.56, respectively. The share of female workers is negatively correlated with productivity. One possible explanation is that this correlation reflects a gender productivity differential. Another possible explanation is systematic variation and

**Table 2** Summary statistics

	Total MNEs	Unionized MNEs	Non-unionized MNEs
Total employment	308 [822]	389 [1048]	247 [593]
Total sale revenue	146,088 [1,142,062]	208,126 [1,499,335]	99,859 [772,130]
Total assets	53,877 [315,042]	78,941 [390,984]	35,199 [241,838]
Average wages	20.9 [130.5]	21.6 [175.4]	20.4 [82.5]
Value added per employee	151.5 [2336.7]	172.7[3176.6]	135.8[1417.5]
Capital–labor ratio	189.9 [428.2]	214.9 [427.1]	171.2 [428.2]
Female share	0.49 [0.26]	0.48 [0.26]	0.49 [0.26]
Graduate share	0.01 [0.03]	0.01 [0.03]	0.01 [0.03]
College share	0.17 [0.20]	0.17 [0.18]	0.18 [0.21]
High school share	0.35 [0.24]	0.35 [0.23]	0.34 [0.24]
Computer	66.8 [4303.6]	111.2 [6582.1]	33.7 [195.6]
Number of MNEs	26,918	11,498	15,430

The standard deviations are reported in parentheses. The sample includes a total of 26,918 medium and large MNEs (with total sales roughly above 5 million Yuan). The unit for employment is person. The unit for sales revenue, assets, and value added is 1000 Yuan. Wages are the annual wage, and the unit is 1000 Yuan



**Table 3** Unions and productivity

Dependent variable	OLS (1)	OLS (2)	1st stage (3)	2nd stage (4)	2SLS (5)
Log (value added)					
Union dummy	0.117*** (9.09)			0.404*** (5.34)	
Union density		0.172*** (10.98)			0.427*** (4.92)
Log (capital)	0.223*** (37.96)	0.220*** (37.27)	0.132*** (19.00)	0.209*** (29.56)	0.207*** (29.79)
Log (labor)	0.560*** (56.82)	0.565*** (57.43)	0.110*** (9.19)	0.548*** (52.93)	0.564*** (62.24)
Female share	-0.404*** (-12.10)	-0.404*** (-12.08)	-0.005 (-0.11)	-0.397*** (-11.75)	-0.398*** (-12.17)
Graduate share	2.116*** (7.16)	2.113*** (7.16)	-0.333 (-1.05)	2.145*** (7.21)	2.128*** (9.20)
College share	1.021*** (20.14)	1.018*** (20.10)	-0.294*** (-5.01)	1.042*** (20.29)	1.027*** (23.49)
High school share	0.189*** (6.52)	0.185*** (6.38)	-0.161*** (-4.32)	0.204*** (6.87)	0.188*** (6.59)
Log (computer)	0.164*** (19.05)	0.162*** (18.88)	0.023** (2.36)	0.162*** (18.52)	0.158*** (20.38)
Administrative subordination					
Province			-0.389** (-2.51)		
City/prefecture			-0.982*** (-6.50)		
County			-1.216*** (-8.01)		
Township/district			-1.283*** (-8.41)		
Street/village committee			-1.327*** (-8.18)		
Other			-1.548*** (-10.55)		
Industry dummies	Yes	Yes	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes	Yes	Yes
Observations	26,904	26,904	26,930	26,903	26,904
R-squared	0.552	0.553	-	0.544	0.548

Columns 1 and 2 report the OLS estimators for the sample of the medium and large MNEs. Column 2 reports the OLS results for the MNEs and private firms. Column 3 reports the 2SLS estimators by using the predicted probability of unionization as the instrument. The robust t-statistics are reported in parentheses \*\* and \*\*\* represent the 5% and 1% significance levels, respectively

endogenous choice in employment gender composition across industry or firms. Skill composition and technology usage have a significant and positive impact on enterprise efficiency. For the effects of unions, the estimated coefficient of the union dummy is 0.117 and is statistically significant at the 1% level, which indicates that the value added per worker is approximately 11.7% higher in unionized MNEs than in non-unionized MNEs. The estimated coefficient of union density is 0.172 and is significant at the 1% level. These results support Hypothesis 1 that the presence of unions in MNEs is significantly and positively associated with MNEs' productivity.

One concern is that the positive link between unions and productivity might be because unions are organized in more productive MNEs. To address this potential endogeneity bias, we use the administrative subordination level of firms as the instruments for unionization. Column 3 and 4 of Table 3 report the results of the Probit-2SLS estimation for the union dummy as the measure of unionization. The results of the first stage probit model are reported in Column 3, and the results indicate that the subordination level is an important determinant of unionization. The decentralization of the subordination level is significantly and negatively related to the probability of union recognition. Column 4 of Table 3 reports the 2SLS estimators, and the results are consistent with the OLS estimators in Column 1. The coefficient of the union dummy is significant and positive, which indicates that workplace unions positively and significantly contribute to the productivity of MNEs. For other firm attributes, the estimation results are similar to the results in Column 1. Column 5 of Table 3 reports the 2SLS estimators when we use union density as the measure of unionization. The results show similar patterns to the results in Column 2 that there is a large and positive union productivity premium.

To investigate the differential effects of unions on productivity between MNEs and domestic private firms, we extend the sample to include all medium and large MNEs and domestic private firms. The results of the regression in Eq. (2) are reported in Columns 1 and 2 of Table 4. Column 1 reports the OLS estimators for the union dummy. The estimated coefficient of the union dummy is 0.026 and is statistically significant at the 1% level. More importantly, the estimated coefficient of the interaction term between the union dummy and the MNE dummy is approximately 0.153 and is statistically significant at the 1% level. These results indicate that the positive link between unions and productivity is significantly stronger in MNEs than in domestic private firms. Column 2 of Table 4 reports the OLS results for union density as the measure of unionization. The results are similar. The estimated coefficient of the interaction term between union density and the MNE dummy is approximately 0.225 and is statistically significant at the 1% level. This evidence supports Hypothesis 2 that unions are more effective in productivity enhancement in MNEs than in domestic private firms.

To investigate the heterogeneous effects of unions across industries with different skill intensities, we focus on the sample of MNEs and add the interaction term between unions and skill intensity in the production function estimation, as shown in Eq. (3). Columns 3 and 4 of Table 4 report the OLS results for two measures of unionization: the union dummy and union density. The estimated coefficients of the interaction term between unions and *industry* skill intensity are 1.095 (for the union dummy) and 1.278 (for union density), and both estimators are significant at the 1%



**Table 4** Heterogeneous effects of unions on productivity

Dependent variable	MNEs and private firms			MNEs		
	(1)	(2)	(3)	(4)	(5)	(6)
Log (value added)						
Union dummy	0.026*** (4.88)		-0.005 (-0.24)		0.059*** (3.64)	
Union density		0.029*** (4.29)		0.021 (0.83)		0.100*** (4.95)
MNEs	-0.009 (-0.89)	-0.011 (-1.20)				
Union dummy * MNEs	0.153*** (11.36)					
Union density * MNEs		0.225*** (13.65)				
Union dummy * industry skill intensity			1.095*** (6.93)			
Union density * industry skill intensity				1.278*** (6.83)		
Union dummy * firm skill intensity					0.334*** (4.86)	
Union density * firm skill intensity						0.374***
Log (capital)	0.210*** (89.29)	0.209*** (88.76)	0.223*** (38.03)	0.221*** (37.40)	0.223*** (37.91)	0.220*** (37.28)
Log (labor)	0.470*** (124.24)	0.473*** (125.37)	0.560*** (57.04)	0.564*** (57.56)	0.560*** (56.95)	0.564*** (57.51)
Female share	-0.352*** (-27.84)	-0.352*** (-27.79)	-0.384*** (-11.46)	-0.386*** (-11.52)	-0.398*** (-11.91)	-0.398*** (-11.90)
Graduate share	1.438*** (8.72)	1.432*** (8.69)	2.081*** (7.06)	2.075*** (7.06)	2.009*** (6.69)	2.003*** (6.69)
College share	0.585*** (24.81)	0.581*** (24.64)	0.991*** (19.52)	0.986*** (19.43)	0.906*** (15.89)	0.918*** (16.48)
High school share	0.097*** (8.35)	0.094*** (8.12)	0.190*** (6.55)	0.188*** (6.47)	0.189*** (6.50)	0.187*** (6.46)
Log (computer)	0.142*** (39.37)	0.142*** (39.17)	0.160*** (18.70)	0.159*** (18.61)	0.162*** (18.91)	0.161*** (18.79)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	139,001	139,001	26,904	26,904	26,904	26,904
R-squared	0.492	0.492	0.553	0.554	0.553	0.553

Columns 1 and 2 report the OLS estimators for the sample of the medium and large MNEs and private firms. Columns 3 and 4 report the OLS estimators of the sample of the medium and large MNEs. The robust t-statistics are reported in parentheses \*\* and \*\*\* represent the 5% and 1% significance levels, respectively



level. This evidence supports Hypothesis 3 that unions are more effective in industries with higher skill intensity.

We also add the interaction term between unions and *firm* skill intensity to the regression. Firm skill intensity is defined as the share of employees with a graduate and college education (at least 16 years of education) in firm employment. The results are reported in Columns 5 and 6. Consistent with the results in Columns 3 and 4, the positive linkage between unions and productivity is much stronger in more skill-intensive MNEs.

Accordingly, our empirical analysis based on economic census data broadly supports the positive effects of unions on the productivity of MNEs in China. The presence of unions in MNEs is positively associated with firm productivity. Union productivity premiums are significantly larger in MNEs than in domestic private firms. The union effects on firm productivity are also much stronger in industries with higher skill intensity.

## Discussion and conclusion

This study is intended to enhance our understanding of the activities and effectiveness of Chinese unions in MNEs. We extend Freeman and Medoff's (1984) two faces of unionism and integrate unique features of Chinese unions into this framework. Different from Western independent unions, Chinese unions have a significant "State-Party voice." They are subordinated to the State-Party and function as a "transmission belt" between the State-Party and workers. Government influence plays an important role in the unionization process (Chan 2000; Taylor et al. 2003; Metcalf and Li 2006). The "State-Party" face is complementary to a traditional central planning system and remains effective in the state sector. Chinese unions also have a "monopoly" face in that they represent employees in collective consultations and bargaining with management. However, this "monopoly" face is weak since the unions have only weak bargaining power in collective consultation/bargaining with management (Warner and Ng 1999; Clarke et al. 2004; Metcalf and Li 2006; Taylor et al. 2003).

Our study focuses on the "collective voice" face of Chinese unions in MNEs. Chinese unions may contribute to the productivity of MNEs through three possible channels. First, as a collective organization, Chinese unions provide information, accept employees' grievances, mediate in labor disputes, monitor the implementation of labor law, encourage employees to increase effort, and harmonize industrial relations. Second, Chinese unions can increase efficiency by promoting technology innovation and employee training, and by participating in corporate governance. Third, with a strong affiliation with the ACFTU and local governments, Chinese unions can assist management to better communicate with local authorities, adapt to local labor institutions, and facilitate mutual trust and long-term cooperation with local authorities. Based on the large-scale firm-level data from the 2004 *Economic Census*, we estimate the union-productivity linkage in MNEs. The empirical evidence in our study suggests that the presence of unions in MNEs is positively associated with enterprise productivity. We further



compare the effectiveness of unions between MNEs and domestic private firms. We argue that the effectiveness of unions is more significant for MNEs than their domestic counterparts because MNEs have an information disadvantage in the local market, and unions may help MNEs to adapt to the local environment and coordinate with the local authority to thus overcome the “liability of foreignness.” The empirical evidence supports this hypothesis.

The effectiveness of unions is heterogeneous across firm attributes, industry attributes, and the local environment. Previous case studies have shown that managerial strategies play a critical role in both unionization and union effectiveness (He and Xie 2011; Fan 2012; Fan and Gahan 2012; Liu and Li 2014). When MNEs agree to establish a workplace union, they recognize that a union is not a major threat to management but might instead deliver an efficiency benefit. These case studies complement our finding of the efficiency-enhancing effects of unions. Our study also suggests that the union productivity effects depend on the industry and firm skill composition. The positive linkage between unions and productivity is stronger in more skill-intensive industries and firms.

The union–productivity linkage in MNEs might change over time. First, unionization in non-state sector might accelerate over time. The ACFTU has actively promoted the unionization campaign in private firms and MNEs. There is also potential bottom-up pressure from the workers to establish unions in MNEs. Second, the “monopoly” face of unions might be enhanced during the economic reforms. Improvements in labor legislation might grant unions a more independent status, to separate unions from State and enterprise management. For example, the labor law was revised in 2006 and 2007, and the Labor Contract Law was issued in 2008, which reinforce the regulations on the negotiation of labor contracts and promote collective contracts. The distortion effects of the monopoly face and the efficiency-enhancing effects of the collective voice face jointly determine the union–productivity linkage in MNEs.

During the progress of economic transitions, it remains a considerable challenge for Chinese unions to find a suitable evolutionary path to secure their independent roles and functions to protect the interests of union members.

We are aware of the limitations of this study. First, due to data limitations, our analysis is based on a cross-sectional analysis. Future studies should call for a firm-level panel dataset to control for unobservable fixed characteristics. Because Census 2004 is the only large firm-level data that report detailed information on workplace unions, we are unable to investigate the dynamic changes of the functions and effects of unions after 2004. Future research based on more recent data may complement our study. Our study only focuses on the manufacturing industry. Union information in the service and public sectors would be a useful supplement to our data.

Second, a positive linkage between unionization and firm performance does not mean unionization can lead (or contribute) to firms’ better performance. We use the administrative subordination level of firms as the instruments of unionization to identify the causal linkages between unions and enterprise productivity. This identification is limited due to the cross-sectional data and limited choice of IV. Studies using panel analysis and some exogenous shocks in unionization might provide a better identification strategy.



Third, this study only focuses on the heterogeneous effects of unions across industry and firm skill compositions. It remains unclear how Chinese unions interact with management strategies and local environments. Future studies need to develop a better understanding of the mechanism through which union productivity effects vary across different management strategies and local regulatory environments. Future research should also examine the regional heterogeneity in the activities and functions of Chinese unions.

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