





ARTICLE



<https://doi.org/10.1057/s41599-022-01326-x>

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# Do workers benefit from economic upgrading in the Pearl River Delta, China?

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Economic upgrading (EU) is being undertaken in China to address numerous problems. However, its social consequences have not received considerable attention. This study selects the Pearl River Delta, where EU is prominent, to examine whether and how workers have benefited from EU process. The data used are from the 2012 and 2014 China Labor-force Dynamic Survey and self-conducted interviews, both of which cover measurable standards and enabling rights of workers. Based on the results of direct comparison and linear/logistic regression, this study argues that EU has a positive effect on social upgrading (SU) because state intervention and regulation play a shaping role in balancing the EU and SU. China's state has achieved a good balance among its roles of facilitation, regulation, and distribution. Compared to SU on enabling rights, SU on measurable standards is likely to occur because measurable standards are easily quantified and observed and thus are at the center of workers' occupational conditions at this stage. The state is inclined to pay more attention to measurable standards than enabling rights. The mechanism through which local states interfere with different aspects of SU considerably varies. Local states adopt flexible governance to strike the right balance between EU and SU.

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## Introduction

Since the 2000s, China has encountered numerous problems, such as rising land costs, a deteriorating environment, and shrinking global demand (Wang et al., 2019; Yang et al., 2022). The central and local states have implemented various measures to promote economic upgrading (EU), particularly in the coastal areas of China, to address these problems (Wang et al., 2021).

As EU is currently an urgent issue for China, the majority of scholars have paid considerable attention to how to promote EU instead of its social consequences (Zhu and Pickles, 2014). This phenomenon is pervasive in many other developing countries, where the priority is economic development. Bair and Gereffi (2013) indicated that EU does not necessarily lead to social improvements. Recently, some scholars have been aware of and paid some attention to this issue and coined the term “social upgrading (SU),” which means the process of improving the entitlements and rights of labor and enhancing the quality of employment (Milberg and Winkler, 2011; Gereffi and Lee, 2014). They have attempted to examine whether and under what condition EU leads to SU from the perspective of the global value chain (GVC).

These studies have provided valuable insights; however, certain issues remain. First, some GVC studies focus on one specific value chain instead of one geographical area, in which an essential part of EU (chain upgrading, namely upgrading from one value chain to another) is excluded from these studies (Barrientos et al., 2011; Rossi, 2013; Rossi et al., 2014). However, in reality, chain upgrading is prominent in the process of EU in most developing countries, and numerous workers flow among different chains in the process. Second, studies based on a firm-centric approach normally employ case studies and qualitative research methods that use the aggregate data of firms (e.g., focus group discussion). This feature implies that numerous confounding factors, such as age, gender, and education level, have not been properly controlled (Milberg and Winkler, 2011). Third, the majority of these studies only examine measurable standards (e.g., wages and social insurance) rather than enabling rights (workers’ collective rights, such as freedom of association and collective bargaining) (Bair and Gereffi, 2013). Fourth, many GVC studies stress the role of global firms and trade unions in the processes of EU and SU; however, the role of the state has not attracted sufficient attention (Gereffi and Lee, 2014). Therefore, to fill these research gaps, this study employs data from the China Labor-force Dynamic Survey (CLDS) conducted by Sun Yat-sen University and in-depth interviews conducted by the authors to explore whether and how EU transforms into SU in the Pearl River Delta (PRD) of China. The CLDS data cover measurable standards and enabling rights of SU, while critical confounding factors can be controlled. Qualitative data from the interviews are used to triangulate and interpret the outcome of quantitative analysis.

This study argues that differing from the fact that SU often lagged behind EU in Western countries, the two processes have gone hand-in-hand in China, as the state has played a defining role in balancing facilitation, regulation, and distribution. In recent years, China’s state has gradually moved its focus from economic to social development. This top-down SU has inherent advantages, leading to SU on both measurable standards and enabling rights and compulsory execution effects. As China’s state often pays more attention to measurable standards than enabling rights, this model has resulted in the fact that for workers, the improvement in measurable standards is greater than that in enabling rights.

The remainder of this paper is structured as follows. Section “Economic and social upgrading and governance” provides a literature review of EU and SU and their governance. Section

“Economic upgrading in the PRD” introduces the background of EU in the Pearl River Delta. Section “Data and methodology” introduces the data and methodology of this study. Section “Influences of EU on workers” examines the influences of EU on the wage, social insurance (including medical and pension insurances), and voice of workers. Section “Discussion” discusses the findings. Section “Conclusion” provides the conclusion.

## Economic and social upgrading and governance

**Economic and social upgrading.** The economies of different countries are increasingly interconnected under the background of globalization. Countries undertake different economic activities within value chains, ranging from labor-intensive, low-skilled activities to knowledge-intensive, high-skilled activities. EU means making better products, enhancing production efficiency, or shifting into higher-skilled activities (De Oliveira, 2008). Usually, enterprises on the upper levels of the value ladder can secure additional gains (Gereffi, 1999; Humphrey and Schmitz, 2002; Gereffi, 2005). Firms promote EU to increase their profits by moving from low- to high-value-added activities. In addition, four types of EU occur, namely process, product, functional, and chain upgrading (Gereffi, 2005). However, GVC studies based on a firm-centric approach do not consider the role of workers (Milberg and Winkler, 2011).

In this context, SU is coined and defined as the process of improvement in the rights and entitlements of workers through improving the quality of their employment (Barrientos et al., 2011; Milberg and Winkler, 2011). Recently, scholars in the GVC school have paid increasing attention to workers in the process of EU and attempted to explore the relationship between EU and SU (De Oliveira, 2008; Barrientos et al., 2011; Rossi, 2013; Selwyn, 2013). According to this framework, SU includes two parts: measurable standards and enabling rights. The former consists of employment type, wage, social insurance, and working time and is easily quantifiable and observable. By contrast, the latter includes freedom of association, non-discrimination, voice, empowerment, and the right to collective bargaining, reflecting the entitlements and rights of workers as social agents. Enabling rights involves power relations between employees and employers, which is relatively difficult to quantify. The two parts of SU are not independent. Barrientos et al. (2011) suggested that measurable standards can be the outcome of enabling rights because the latter can provide workers access to building an effective relationship with their employers to improve labor standards (Elliott and Freeman, 2003).

Thus far, empirical studies in developing countries, such as Morocco, South Africa, Vietnam, and India, generally suggest that EU does not automatically lead to SU (Rossi, 2013). In fact, the latter often lags behind the former. Some scholars have gone further to explore how different types of EU influence SU (Barrientos et al., 2011; Rossi, 2013; Rossi et al., 2014). They found that employment status is an important moderator for the outcome, as employers can apply a dual labor force to deal with the pressures of EU. Regular workers who receive training opportunities and are highly valued by employers can experience SU, whereas irregular workers can experience social downgrading. These studies are based on a firm-centric approach from the perspective of the GVC. In other words, their analytical unit is firm. These studies normally decompose SU into certain sub-indexes, such as health and safety provision, working hours, income, insurance, and pension. How EU influences the SU on each aspect is explored. The majority of previous studies adopt a qualitative approach, in which the data are obtained from interviews and focus group discussions (Rossi, 2013).

Another stream of literature from the cluster perspective has explored the social impacts of EU. Particularly, great attention was paid to “tertiarization,” another EU strategy that promotes the replacement of the manufacturing sector with the service sector. According to this stream, tertiarization has resulted in the loss of middle-income manufacturing jobs and the growth of polarized service jobs. In the service sector, the labor market is polarized by low-wage, low-skilled jobs and high-wage professional jobs. Most displaced workers from manufacturing have to be unemployed or be transferred to low-income service jobs, leading to social downgrading. As a result, these vulnerable people cannot share the economic achievement of the country or region. Many empirical studies in Western countries, such as New York, London, Toronto, and Dublin, have supported this statement (Gaspar et al., 1998; Sassen, 2001; Walks, 2001). To a certain extent, these studies can complement GVC studies because cluster studies include chain upgrading in their framework, whereas GVC studies often focus on one specific value chain and exclude chain upgrading. However, previous GVC and cluster studies do not examine how the social factors of workers, such as age, gender, and education levels, have affected their working conditions after EU. Furthermore, the majority of these studies only explore measurable standards rather than enabling rights (Bair and Gereffi, 2013).

**Governance of economic and social upgrading.** National governance institutions have ensured stable labor relations in developed countries as part of the post-war economic order (Ruggie, 1982). However, this system has been destabilized by neo-liberal globalization since the late 1970s, leading to global governance deficits, particularly for developing economies with limited governance capacity (Gereffi and Mayer, 2008). Gereffi and Mayer (2008) mentioned that under globalization, these countries focus on facilitation rather than redistribution or regulation, causing unregulated and undocumented workers to be abused. The global governance deficit can be regarded as a disembedding of the market from governance institutions. Accordingly, the governance deficit warrants a counter-movement that re-embeds the market into governance institutions (Mayer and Pickles, 2014). Governance has been recognized as a key factor in moderating the relationship between EU and SU (De Oliveira, 2008; Gereffi and Lee, 2014).

Governance refers to various institutions constraining or enabling the behaviors of market actors. Actors of governance promoting SU consist of trade unions, the state, firms, and other organizations (Barrientos et al., 2011; Gereffi and Lee, 2014). These actors are striving to create new governance institutions and thus promote SU. Mayer and Pickles (2014) classified governance for EU and SU from three dimensions, namely actor, function, and scale. In terms of actors, governance includes public and private governance. Public governance is instituted by the state, while private governance is established via market actors. Functions of governance include facilitation, regulation, and redistribution. Ranges of governance scale include international, national, local, industry, and firm levels. These three dimensions are associated with each other. Accordingly, on the basis of the key actors of governance, six trajectories of SU have been identified, including a market-driven path, corporate social responsibility-driven (CSR-driven) path, multi-stakeholder path, labor-centered path, cluster-driven path, and public governance path (Gereffi and Lee, 2014).

As trade unions have a strong power in Western countries, when labor rights are threatened, attention is naturally diverted to them (Webb and Webb, 1897). Trade unions are widely considered effective organizations for employees to negotiate

with employers to protect their rights (Alaluf and Prieto, 2001). Due to the influence of a union-centered approach in Western labor studies, scholars incline to focus on trade unions when studying China’s labor issues (Howell, 2008; Chan and Hui, 2014; Vilares et al., 2016). However, subordinate to the party-state and enterprise management, trade unions in China’s enterprises are far different from their counterparts in Western countries (Chan and Nadvi, 2014). Moreover, considerable attention has also been given to private governance (e.g., CSR and third-party monitoring) to promote SU. However, its limitations have been noted because private governance is not mandatory.

Numerous studies assert that public governance is the most influential and far-reaching approach to driving SU (De Oliveira, 2008; Mayer and Pickles, 2014), while other studies call for collaboration among different actors (synergetic governance) (Mayer and Gereffi, 2010). Public governance can function at various levels, including the international, regional, national, and local levels. The state plays a central role in determining the legal and political structure at the national level, possibly enhancing workers’ interests (Selwyn, 2011). However, the mechanism through which the state influences EU and SU remains veiled (Gereffi and Lee, 2014) and requires further investigation.

### **Economic upgrading in the PRD**

Since stepping into the 21st century, China has made great efforts to promote EU. However, China has a vast territory, with different economic situations in different areas. The eastern coastal region is at the edge of China’s economic development and reform, which is at the center of the storm of EU, while other regions strive to catch up. The PRD has been the main hub of China’s economic growth and the core of Guangdong province and has played a pioneering role in China’s reform. As a public policy term, the PRD was officially promulgated in 1994 as a dense network of nine cities. Guangdong province has benefited considerably from China’s post-1978 opening-up and has received large amounts of investment from numerous Hong Kong- and Taiwan-based firms, contributing to its rapid industrial development and economic growth (Chan, 1998). In the 1980s, the PRD was dominated by the light industry; however, at the beginning of the 1990s, the household appliance and building material industries were the driving force of its economic development. From the mid-1990s to 2003, electronics, information technology, and real estate sustained the rapid growth of the region (Liao and Chan, 2011). Although such industries facilitated capital accumulation, these industries were mainly low-skilled and low-value-added, and their proliferation was predominately due to inexpensive laborers and cheap land. Since the 2000s, this development model has faced pressures, such as dramatically increasing labor and production costs and shrinking demand for manufactured goods.

The PRD stood at a crossroads in its industrial development. Consequently, since 2003, central and local states have promulgated various influential policies and planned to cope with these problems (Table 1). For example, the Integrated Plan for the PRD Metropolitan Area promulgated in 2004 encouraged the development of a modern manufacturing base, heavy industries, high-tech industries (e.g., information and biotechnology), and modern services (e.g., finance and logistics). Guangdong’s 11th Five-Year Plan for Social and Economic Development (2006–2010) advocated developing indigenous technology and stimulated firms to set up research and development centers in Guangdong. The year 2008 was a turning point for EU in Guangdong, with the promulgation of the influential policy “double transfers (*shuang zhuan yi*) of industries and laborers.” The policy aimed to shift low-end manufacturing industries from the PRD to Guangdong

**Table 1 List of the main economic upgrading plans in PRD.**

Number	Government documents	Issued date
1	Guangdong's 10th Five-Year Plan for Social and Economic Development (2001-2005)	February 2001
2	The Integrated Plan for the Pearl River Delta Metropolitan Area (2004-2020)	April 2004
3	Decision to Jointly Promote Industrial Transfer by the Pearl River Delta Region and the Other Regions of Guangdong	March 2005
4	Guangdong's 11th Five-Year Plan for Social and Economic Development (2006-2010)	March 2006
5	Guangdong's 10th Five-Year Development Plan for High- and New-Tech Industry	June 2006
6	Plan to Speed Up Industrial Development and Key Projects Construction for the Eastern Region	April 2007
7	Outline of the Development Strategy on Intellectual Property Rights	December 2007
8	Outline of the Plan for the Reform and Development of the PRD Region (2008-2020)	January 2009
9	Comprehensive Strategic Plan for Cooperation Between Guangdong Government and China Academy of Science (2009-2015)	May 2009
10	Integrated Plan of Industrial Layout in the Pearl River Delta (2009-2020)	June 2010
11	Guangdong 12th National Economic and Social Development Five-Year Plan (2011-2015)	January 2011

Source: Adapted by the authors from Yu (2014).

province's underdeveloped periphery and, in turn, release the space and resources to high-end manufacturing and service sectors. In 2009, the Chinese central government issued the "Outline of the Plan for the Reform and Development of the PRD Region 2008-2020," mapping out PRD's EU path. This outline stated that Guangdong aimed to develop a variety of capital- and technology-intensive industries through EU, including high-end equipment manufacturing, steel plants, petrochemical refineries, automobile manufacturing, shipbuilding, and modern services. Under this background, numerous low-end PRD enterprises had four choices: upgrade, westernize, delocalize, and close (Zhu and Pickles, 2014). Some enterprises had to take forceful actions to promote EU (e.g., heavily investing in upgrading machines) to meet the requirements of the government, which include improving production efficiency and reducing environmental pollution; some were encouraged to relocate to West and Middle China, where labor costs were low and environmental regulations were loose; some left China and relocated to other countries, such as India and Cambodia; and the entrepreneurs who could neither upgrade nor relocate had to close their plants.

Previous research has categorized EU in the PRD since 2003 into three stages, namely 2004-2007, 2008-2009, and after 2010. These policies went into effect from 2004 to 2007. However, the plunge occurred from 2008 to 2009 because of the global economic crisis. Economic conditions rebounded after 2010, and Guangdong province stepped into a mature and stable stage of EU.

In this study, three key indicators are selected to explore EU in the PRD from 2012 to 2014, namely the growth of GDP per capita, GDP per km<sup>2</sup>, and granted patents per 10,000 persons, which are the widely-recognized core indicators of EU (Milberg and Winkler, 2011). The three indicators reflect different aspects of EU. The growth of GDP per capita implies the growth of labor productivity. The growth of GDP per km<sup>2</sup> indicates the growth of value added. The growth of patents granted per 10,000 persons indicates the improvement in innovation and creativity. For the 2012-2014 period that this study focuses on, GDP per capita in the PRD increased from 84,172 to 95,489 yuan, an increase of over 13 percent; GDP per km<sup>2</sup> increased by 15 percent, from 8710 to 10,023 yuan; and the number of patents granted per 10,000 population rose from 23.89 to 27.44, more than 14 percent growth. These figures mean that EU has taken place during this period.

**Data and methodology**

The data of this study mainly include two parts: (1) the 2012 and 2014 CLDS and (2) semi-structured interviews conducted by the authors in 2016. The CLDS gathers information about the

**Table 2 Geographical distribution of CLDS samples in the PRD in 2012 and 2014.**

	2012	Male	Female	2014	Male	Female
Guangzhou	301	139	162	416	198	218
Shenzhen	126	75	51	242	120	122
Zhuhai	156	87	69	248	124	124
Foshan	206	101	105	248	123	125
Jiangmen	306	145	161	548	273	275
Zhaoqing	207	113	94	222	112	110
Huizhou	126	63	63	184	85	99
Dongguan	123	63	60	137	68	69
Zhongshan	281	131	150	293	139	154
Total	1832	917	915	2538	1242	1296

Source: Made by the authors.

working conditions of workers in 2012 and 2014 in 29 provinces and municipalities. The CLDS data cover education, employment, public participation, health, and other issues. Samples in the PRD were extracted. We chose to analyze the survey data in 2012 and 2014 (4 and 6 years after the promulgation of the "double transfers" policy) because the majority of EU policies had been implemented in the PRD, and their social effects were mature to be observed. This point has been corroborated by other studies (Hong, 2014).

For 2012 and 2014, there were 1832 and 2538 observations for the PRD, respectively (Table 2). We extracted the samples of employees (or workers) and looked at three aspects of the workers' working conditions, namely wage, social insurance, and voice, to investigate SU. Voice, a subjective indicator, reflects the degree to which workers feel they can express their opinion. These variables are the core indicators of SU and are treated as dependent variables in the following analysis. Among them, wage and voice were continuous variables, and social insurance were dummy variables. Accordingly, linear regression models were estimated for wage and voice, and logistic regression models were developed for social insurance. The control variables included gender, education, age, contract, skill certificate, trade union, hukou, sector, and ownership. The variable hukou can be divided into three groups, namely urban workers, local rural migrant workers (LRMWs), and outgoing (cross-town) rural migrant workers (ORMWs). Urban workers are those with urban household registrations. LRMWs are those whose household registrations are in the countryside but have worked in non-agricultural industries for over 6 months within their towns. ORMWs are those whose household registrations are in the

**Table 3 List of interviewees.**

No.	Type	Industry	Ownership
1	Worker	Transportation, Storage & Postal Services	SE
2	Worker	Wholesale, Retail & Catering Services	PE
3	Worker	Social Services	PE
4	Worker	Wholesale, Retail & Catering Services	IOE
5	Worker	Electrical & Electronic Manufacturing	UCE
6	Worker	Electrical & Electronic Manufacturing	PE
7	Worker	Construction	OE
8	Worker	Construction	SOE
9	Worker	Wholesale, Retail & Catering Services	PE
10	Worker	Electrical & Electronic Manufacturing	UCE
11	Worker	Social Services	SOE
12	Worker	Electrical & Electronic Manufacturing	PE
13	Worker	Machinery Manufacturing	PE
14	Worker	Electrical & Electronic Manufacturing	PE
15	Worker	Electrical & Electronic Manufacturing	PE
16	Worker	Electrical & Electronic Manufacturing	PE
17	Worker	Machinery Manufacturing	PE
18	Worker	Machinery Manufacturing	PE
19	Worker	Machinery Manufacturing	PE
20	Worker	Machinery Manufacturing	PE
21	Worker	Machinery Manufacturing	PE
22	Worker	Machinery Manufacturing	PE
23	Worker	Social Services	PE
24	Worker	Machinery Manufacturing	IOE
25	Worker	Wholesale, Retail & Catering Services	OE
26	Worker	Garment Manufacturing	PE
27	Worker	Machinery Manufacturing	PE
28	Worker	Wholesale, Retail & Catering Services	IOE
29	Worker	Garment Manufacturing	PE
30	Worker	Electrical & Electronic Manufacturing	PE
31	Worker	Transportation, Storage & Postal Services	IOE
32	Worker	Garment Manufacturing	IOE
33	Worker	Garment Manufacturing	IOE
34	Worker	Garment Manufacturing	IOE
35	Worker	Garment Manufacturing	IOE
36	Worker	Garment Manufacturing	SE
37	Worker	Machinery Manufacturing	OE
38	Worker	Transportation, Storage & Postal Services	SE
39	Worker	Transportation, Storage & Postal Services	SE
40	Worker	Transportation, Storage & Postal Services	SE
41	Worker	Electrical & Electronic Manufacturing	OE
42	Worker	Wholesale, Retail & Catering Services	PE
43	Worker	Social Services	PE
44	Worker	Wholesale, Retail & Catering Services	PE

**Table 3 (continued)**

No.	Type	Industry	Ownership
45	Worker	Transportation, Storage & Postal Services	SE
46	Worker	Wholesale, Retail & Catering Services	SE
47	Worker	Electrical & Electronic Manufacturing	UCE
48	Official	-	-
49	Official	-	-
50	Official	-	-
51	Official	-	-
52	Official	-	-
53	Official	-	-
54	Official	-	-
55	Official	-	-
56	Official	-	-
57	Employer	Garment Manufacturing	IOE
58	Employer	Garment Manufacturing	IOE
59	Employer	Machinery Manufacturing	PE
60	Employer	Machinery Manufacturing	PE
61	Employer	Machinery Manufacturing	PE
62	Employer	Wholesale, Retail & Catering Services	IOE
63	Employer	Machinery Manufacturing	IOE
64	Employer	Wholesale, Retail & Catering Services	IOE
65	Employer	Machinery Manufacturing	PE
66	Academic	-	-
67	Academic	-	-
68	Academic	-	-
69	Academic	-	-
70	Academic	-	-
71	Academic	-	-
72	Academic	-	-

Source: Made by the authors.  
 SE self-employment, SOE state-owned enterprise, PE private enterprise, IOE individual-enterprise, CE collective enterprise, and OE other enterprises.

countryside but have worked in non-agricultural industries for over 6 months out of their towns.

Given that EU took place from 2012 to 2014 in the PRD, the EU independent variable equaled 0 and 1 in 2012 and 2014, respectively. Accordingly, the variable EU was integrated into the model to examine the relationship between EU and SU, under the condition that other variables were controlled.

Besides the CLDS data, to obtain an in-depth understanding of the mechanism through which EU influences workers, the authors interviewed 7 scholars, 9 employers, 7 officials, and 47 rural migrant workers (RMWs) in the PRD in 2016 (Table 3). Interviews were conducted with different subjects to provide insights into different research questions, although they overlapped to a certain extent to facilitate triangulation and reduce the possibility of misinterpretation. Officials could provide a wide picture of what happened in this period and elaborate on the background of some important policies promulgated by governments, while scholars could provide theoretical insights. In terms of employers, they were from either large- or small-scale enterprises, including manufacturing, construction, wholesale and retail, residential, and other services.

RMWs may be the primary economic victims in this process. Therefore, to get detailed information on RMWs in the EU process and understand how EU influences workers, many RMWs were interviewed. Two representative cities (Shenzhen and Foshan) were selected to do the interviews, as they represent different types of EU, namely tertiarization (in Shenzhen) and

**Table 4 Description of the variables.**

Variables	Description
Economic upgrading	=1 if the worker experienced EU in 2012-2014, =0 otherwise
Gender	
Male	=1 for male, =0 for female
Age	
15-29	=1 if aged between 15 and 29 years, =0 otherwise
30-39	=1 if aged between 30 and 39 years, =0 otherwise
40-49	=1 if aged between 40 and 49 years, =0 otherwise
50-55	=1 if aged between 50 and 55 years, =0 otherwise
56-65	=1 if aged between 56 and 65 years, =0 otherwise
Education	
Primary school or below	=1 for a worker with primary school education, =0 otherwise
Secondary school	=1 for a worker with secondary school education, =0 otherwise
College or above	=1 for a worker with a college degree or above, =0 otherwise
Ownership of enterprises	
Joint venture/foreign enterprise	=1 if working in a joint venture/foreign enterprise, =0 otherwise
Public sector/SOE	=1 if working in the public sector/SOE, =0 otherwise
Collective enterprise	=1 if working in a collective enterprise, =0 otherwise
Private enterprise	=1 if working in a private enterprise, =0 otherwise
Individual-owned enterprise	=1 if working in an individual-owned enterprise, =0 otherwise
Industry	
Secondary industry	=1 if working in the secondary industry, =0 otherwise
Low-end service	=1 if working in the low-end service, =0 otherwise
High-end service	=1 if working in the high-end service, =0 otherwise
Hukou	
ORMW	=1 for a ORMW, =0 otherwise
LRMW	=1 for a LRMW, =0 otherwise
Urban worker	=1 for an urban worker, =0 otherwise
Contract	=1 if the worker had a contract, =0 otherwise
Skill certificate	=1 if the worker had a skill certificate, =0 otherwise
Trade union	=1 if the worker joined a trade union, =0 otherwise

reindustrialization (in Foshan) (Wang et al., 2020). In this way, the authors could examine how different types of EU influenced RMWs differently. Questions concerning their socioeconomic information (e.g., *hukou* status, family, income, education, age, employment history, working hours, and career plans) were asked. In total, 47 RMWs were interviewed, including 25 in Shenzhen and 22 in Foshan. The interviewees were employed in many popular sectors for RMWs according to the Monitoring Survey on National Rural Migrant Workers conducted by the State Statistical Bureau of China.

Our survey was conducted as follows. First, three typical urban villages (i.e., Bantian, Baishazhou, and Shangsha in Shenzhen and Zhangcha, Donger, and Guangjiao in Foshan) of each city were selected to provide a whole picture and reduce the homogeneity of the interviewees. We decided to do the interviews at their living sites because workers were usually under strict monitoring at work sites. Second, interviewees were selected through convenience sampling. However, since RMWs were fully occupied with work most of the time, including on weekends, the interviews were highly difficult. Most refused to be interviewed, as they viewed the authors as a potential swindler. The authors made appointments with those glad to participate in the interview. Third, after interviewing RMWs, the authors used the snowball method to reach more RMWs or asked interviewees to recommend the RMWs that met the authors' requirements. Fourth, when sufficient information from interviewees was gathered (e.g., gender, education level, age, and sector), the survey was terminated. Each interview lasted from 1 to 2 h. To begin with, the interviewer conducted a semi-structured interview by collecting information on the economic and social development of the hometown, their employment history, social network, etc. Most histories went back to the time the interviewee came to the city (in some cases, up to 20 years ago). A vivid picture of how the

informants developed was provided. However, many people today are reluctant to reveal private information for fear of being defrauded; thus, the interviews often begin with general questions unrelated to such data to strengthen the interviewee's trust in the interviewer. Then, the interviewer focused primarily on the working conditions of interviewees from 2011 to 2016. The questions reflected the research's core interests.

### Influences of EU on workers

Given that EU happened from 2012 to 2014 in the PRD, a question arises: has SU happened simultaneously? Specifically, have workers benefited from EU during this period? As noted, SU can be reflected by measurable standards and enabling rights (Rossi, 2013; Milberg and Winkler, 2011; Bair and Gereffi, 2013). The following analysis in each section contains two parts: (1) direct comparison: the data of 2012 and 2014 are compared to examine whether SU had taken place and understand the general patterns of working conditions for different groups; and (2) regression analysis: as direct comparison fails to isolate or single out the effect of a single variable (e.g., gender, age, education level, industry, and ownership of enterprises), regression analysis is further conducted to examine the (individual or pure) effect of EU on three aspects of SU (i.e., wage, insurance, and voice). The reasons why we focus on the three aspects of workers are that: first, these are employment conditions workers care about most; second, the data of the three aspects are available in CLDS.

Table 4 shows the description of the variables. Table 5 presents the results of direct comparison. Table 6 reveals the results of the regression analysis.

**Wage.** 2014 nominal wages were deflated into real wages via the Consumer Price Index to make the figures in the 2 years

**Table 5 Direct comparison results.**

Variables	Wage			Medical insurance			Pension Insurance			Voice					
	2012 (yuan)	2014 (yuan)	Change (yuan)	2012 (%)	2014 (%)	Change (%)	2012 (%)	2014 (%)	Change (%)	2012	2014	Change	p-value	p-value	p-value
Gender															
Male	34,814.22	41,781.42	6,967.20	41.77	45.40	3.63	35.65	40.72	5.07	3.41	3.45	0.04	0.042**	0.207	
Female	22,949.74	29,601.25	6,651.51	34.50	46.42	11.92	32.88	45.14	12.25	3.35	3.47	0.12	0.000***	0.015**	
Age															
15-29	29,265.96	34,602.82	5,336.86	42.16	47.30	5.14	33.66	38.38	4.72	3.34	3.53	0.19	0.102	0.164	
30-39	33,218.98	40,345.73	7,126.75	41.44	51.45	10.01	45.05	49.20	4.15	3.36	3.45	0.09	0.172	0.523	
40-49	30,056.41	34,770.13	4,713.72	34.33	46.69	12.36	30.35	44.16	13.82	3.32	3.40	0.07	0.001***	0.002***	
50-55	25,396.67	34,550.39	9,153.72	40.32	32.74	-7.58	29.03	38.94	9.91	3.67	3.44	-0.23	0.095*	0.164	
56-65	20,772.08	30,339.23	9,567.15	22.00	25.37	3.37	18.00	29.85	11.85	3.69	3.37	-0.33	0.071*	0.523	
Education															
Primary school or below	20,403.21	24,180.33	3,777.12	9.64	16.20	6.56	8.12	18.44	10.31	3.20	3.30	0.10	0.002***	0.164	
Secondary school	28,244.90	32,530.07	4,285.17	41.26	43.30	2.04	38.21	38.88	0.67	3.42	3.42	0.00	0.406	0.523	
College or above	46,159.86	56,192.14	10,032.28	66.67	73.85	7.18	55.77	70.77	15.00	3.46	3.67	0.21	0.001***	0.002***	
Ownership of enterprises															
State-owned/collective enterprise	39,932.55	47,279.35	7,346.80	60.00	67.46	7.46	52.89	64.68	11.79	3.50	3.48	-0.02	0.004***	0.604	
Private enterprise	25,892.84	33,001.39	7,108.55	31.23	40.09	8.86	25.75	36.69	10.93	3.28	3.45	0.17	0.000***	0.002***	
Joint venture/foreign enterprise	32,874.76	41,757.84	8,883.08	60.95	69.80	8.85	67.62	66.44	-1.18	3.38	3.31	-0.07	0.422	0.738	
Individual-owned enterprise	21,445.85	27,338.79	5,892.94	8.82	13.04	4.22	5.15	10.56	5.41	3.47	3.61	0.14	0.044**	0.094	
Industry															
Secondary industry	26,616.31	32,015.38	5,399.07	32.22	41.20	8.98	31.96	35.86	3.91	3.29	3.35	0.06	0.102	0.138	
Low-end service	30,231.36	36,842.83	6,611.47	37.00	46.43	9.42	34.8	42.26	7.46	3.40	3.55	0.15	0.038**	0.028**	
High-end service	35,008.37	50,488.62	15,480.25	53.49	68.84	15.36	40.47	69.85	29.38	3.52	3.63	0.11	0.000***	0.078*	
Hukou															
LRMW	22,216.84	28,255.30	6,038.46	17.18	30.98	13.81	13.36	30.23	16.87	3.47	3.47	-0.01	0.000**	0.540	
ORMW	25,830.04	33,463.34	7,633.30	30.77	39.28	8.51	30.04	32.53	2.49	3.23	3.35	0.11	0.246	0.056*	
Urban worker	39,210.07	47,650.78	8,440.71	63.55	67.68	4.13	56.13	65.91	9.78	3.44	3.56	0.12	0.004***	0.024**	

\* Significant at the 10% level.  
 \*\* Significant at the 5% level.  
 \*\*\* Significant at the 1% level.

**Table 6 Regression results.**

Variables	Wage		Medical insurance		Pension insurance		Voice	
	Coefficient	p-value	Odds ratio	p-value	Odds ratio	p-value	Coefficient	p-value
<i>Economic upgrading</i>	5471.1	0.000***	1.57	0.000***	1.59	0.000***	0.085	0.052*
<i>Gender (reference: female)</i>								
Male	11,415.43	0.000***	0.96	0.731	0.72	0.013**	0.033	0.445
<i>Age (reference: 15–29)</i>								
30–39	6266.9	0.000***	1.10	0.525	1.93	0.000***	–0.01	0.859
40–49	7753.77	0.000***	1.40	0.047**	2.08	0.000***	0.003	0.964
50–55	7579.98	0.008***	1.25	0.392	2.65	0.000***	0.071	0.440
56–65	3295.01	0.324	1.37	0.315	2.84	0.002***	0.117	0.283
<i>Education (reference: College or above)</i>								
Primary school or below	–23,738.07	0.000***	0.27	0.000***	0.32	0.001***	–0.33	0.002***
Secondary school	–18,528.41	0.000***	0.97	0.876	1.19	0.434	–0.179	0.021**
<i>Ownership (reference: joint venture/foreign enterprise)</i>								
Public sector/SOE	–1804.83	0.516	0.79	0.327	0.49	0.005***	–0.017	0.844
Collective enterprises	–2525.42	0.561	0.25	0.000***	0.16	0.000***	–0.046	0.732
Private enterprises	–5318.57	0.021**	0.52	0.001***	0.36	0.000***	0.052	0.460
Individual-owned enterprise	–7782.92	0.010**	0.23	0.000***	0.11	0.000***	0.173	0.064*
<i>Industry (reference: secondary industry)</i>								
Low-end service	3087.71	0.070*	1.17	0.309	1.08	0.635	0.128	0.018**
High-end service	305.15	0.892	1.29	0.197	1.13	0.553	0.169	0.015**
<i>Hukou (reference: ORMW)</i>								
LRMW	–4510.96	0.013**	0.78	0.123	0.80	0.189	0.121	0.033**
Urban worker	–3890.14	0.093*	1.81	0.003***	2.24	0.000***	–0.025	0.725
Contract	669.16	0.680	3.31	0.000***	4.36	0.000***	0.034	0.502
Skill certificate	4616.96	0.006***	1.71	0.000***	1.47	0.007***	0.077	0.133
Trade union	4670.81	0.008***	2.00	0.000***	2.62	0.000***	0.025	0.648
Intercept	38,824.66	0.000***	0.29	0.000***	0.18	0.000***	3.319	0.000***
Sample size	1677		1712		1712		1571	

The key results are in italic type.  
 \* Significant at the 10% level.  
 \*\* Significant at the 5% level.  
 \*\*\* Significant at the 1% level.

comparable. Wage indicated the income of workers per year. Table 5 reveals that the average wage of almost all the groups (except for the group aged between 50 and 55) was statistically higher in 2014 than in 2012. Workers with a college degree or above enjoyed a wage growth of 10,032 yuan, much higher than the other two groups. Surprisingly, aged workers (56–65) with a lower average wage (20,772 yuan) experienced a larger increase (9.567 yuan) than other groups. Wage growth varied among different types of enterprises. Surprisingly, low-end service workers enjoyed a higher average wage and greater wage growth than those working in the secondary industry. This result contradicts traditional wisdom. The growth in high-end service (15,480 yuan) was higher than in the other two groups. As expected, the wage of urban workers increased more than that of RMWs. Unexpectedly, the situation of ORMWs was much better than that of LRMWs (7633-yuan growth versus 6038-yuan growth).

Table 6 implies that EU had a positive effect on the wage, meaning that EU can translate into wage-related SU. At this stage, wage, to which both workers and the state have attached much attention, is the core of workers’ welfare. In the past several years, the economic development of the PRD has been in good condition. Therefore, local states have improved the Minimum Wage Standard to benefit workers (Chan and Nadvi, 2014). Informant 61 mentioned, “Most employers have to comply with the regulation of the Minimum Wage Standard, even if we do not have contracts with them. This compliance is because both the state and workers are sensitive to the wage. If we do not comply with the regulation, employees will prosecute us, and we will gain severe punishments from the state. Recently, economic upgrading

has taken place in the PRD. Thus, the local state has increased the Minimum Wage Standard accordingly. As a result, the wage of many workers has been increased.”

Table 6 indicates that when EU was controlled, nearly all variables significantly influenced the wage. Although some scholars cast doubt on the effect of China’s trade unions, this study found that trade unions can substantially increase the wage of workers. Moreover, LRMWs’ wages continued to be the lowest, and urban workers’ wages were lower than ORMWs’ wages.

**Social Insurance.** Medical and pension insurance was taken as dummy variables. A score of 0 indicated that workers did not have insurance, and a score of 1 suggested that they had such insurance.

*Medical insurance.* Table 5 presents that younger workers (i.e., those aged between 15 and 49 years) experienced dramatic SU in terms of medical insurance holding, whereas workers aged between 50 and 65 years did not enjoy significant SU. Employees with primary school education or below and those with a college degree or above enjoyed a significant percentage increase in medical insurance holding. However, the p-value for employees with secondary school education was greater than 0.05, indicating that they did not experience a significant increase in medical insurance holding. Workers with low- and high-end service jobs and those working in the second industry experienced significant SU. Urban workers had a high percentage of medical insurance holding in the two years but did not experience a significant increase in this percentage.



Table 6 indicates that the EU increased the possibility of medical insurance holding, and contracts, skill certificates, and trade union membership had significant effects. After the confounding variables were controlled, urban workers still had a higher possibility of having medical insurance than ORMWs, whereas the possibility of ORMWs having medical insurance was not significantly different from that of LRMWs. Compared to workers with a college degree or above, workers with a primary school education or below had a lower probability of having medical insurance; however, no significant difference was observed between workers with secondary school education and those with a college degree or above.

*Pension insurance.* Table 5 shows that males and females witnessed SU in terms of pension insurance holding. The older group (aged 40+ years) experienced SU, but the younger group did not, implying growing attention from governments and employers had been paid to help older workers buy pension insurance. The pension insurance holding of workers with secondary school education remained stagnant over the period, whereas the other two groups witnessed substantial growth. Although only a small percentage of secondary industry workers had pensions at the outset, this group did not experience significant SU. Lastly, although LRMWs had the lowest pension insurance holding rate in 2012, they had witnessed dramatic SU. The analytical outcome for pension insurance was similar to medical insurance.

Table 6 reveals that the EU had a positive effect on SU (pension insurance). Contacts, skill certificates, and trade union membership all had a positive effect on the possibility of workers having pension insurance. Age had a substantially positive effect on the likelihood of workers having pension insurance. That is, the older a worker was, the higher the probability of having pension insurance. Moreover, workers with a college degree or above were more likely to have pension insurance than those with a primary school education or below. However, no substantial differences were found between workers with secondary school education and those with a college degree or above.

*Discussion.* In the process of EU, SU on social insurance has taken place. However, it has increased labor costs. Three employers (informants 57, 58, and 62) maintained, “We are suffering from many pressures. In recent years, the state in the PRD has strengthened the protection of workers. Owing to the state’s strict regulations, labor costs have increased dramatically, particularly for workers’ social insurance.” Informant 58 said, “Most of our peers have run into bankruptcy. So have I. As small businessmen, we are insufficient to cope with the problems. We do not have enough money to advance our machines to improve production efficiency and reduce labor costs. Also, we cannot get the order of high-end products, so it is infeasible for us to upgrade our products. Some of our friends relocated their enterprises to interior areas of China.” Overall, the degree of SU on social insurance is lower than that on the wage. This is primarily because that insurance has not attracted enough attention from workers, and the state has provided some other alternative insurance (e.g., public insurance) for them. Informant 45 mentioned, “Compared with insurance, I care more about wage because, with the cash, I can pay for my son’s intuition fee and our family’s living cost. Furthermore, I have bought insurance for urban and rural residents, although the level of this insurance is not so high.” Informant 55 said, “Compared with wage, the state often takes a loose regulation on insurance, particularly for small-scale enterprises. If local states require small-scale enterprises to buy social insurance for workers, most of these enterprises have to shut down because of the dramatically increased costs, leading to

unemployment. This will jeopardize social instability, which local states need to avoid.” In addition, local states have enforced the laws and regulations flexibly according to the situations to strike a good balance. Informant 8 said, “The state of the area where economic upgrading is higher is more inclined to promote social upgrading, whereas the state of the area where economic upgrading is lower is more inclined to emphasize economic development. This is because the performance evaluation of the local state includes both economic and social aspects. Thus, the local state has to balance all these indicators.”

**Voice.** Voice reflects the degree to which workers felt they could express their opinion. The value of this indicator ranged from 1 to 5. A higher score implied that workers had more freedom of expression. Table 5 shows many positive and negative changes in this variable, and numerous *p*-values were larger than 0.1. The pattern revealed by this indicator (enabling rights) was greatly different from the previous one (measurable standards). Informant 1 said, “There is much room for improving workers’ working conditions. However, due to limited resources, at this stage, the state attaches its attention primarily to some important aspects (e.g., measurable standards). Therefore, the improvement of measurable standards is more prominent than that of enabling rights.” Workers with a college degree or above reported that their voices improved significantly from 2012 to 2014, although their absolute value had been comparatively high in both years (3.46 and 3.67). However, in terms of age, only the reported voice growth was significant for workers between 40 and 49 years. Although the *p*-value for low- and high-end services was less than 0.05, the *p*-value for the secondary industry was not. We can infer that workers in the secondary industry were strictly regulated by their employers, making them feel their voices had not improved significantly. LRMWs did not think their voice had intensified, either; however, ORMWs and urban workers enhanced their voices significantly from 2012 to 2014. The analysis of voice indicated a different pattern than those found in wage and social insurance.

Table 6 indicates that the EU strengthened the voice of workers. However, contracts, skill certificates, and trade unions were insignificant, although they had a positive effect on the wage and social insurance. After these confounding variables were controlled, urban workers did not have a significantly stronger voice than ORMWs, although LRMWs did. The result proved that workers in low- and high-end services enjoyed better conditions for expressing their opinion than those in manufacturing. EU in manufacturing, accompanied by the improvement in the machine, often causes reduced employment and makes the labor force in manufacturing redundant. Therefore, competition in the labor market has intensified, and workers’ bargaining power has been undermined. Informant 27 maintained that “We have to work more diligently and carefully than before because many workers in my factory have become redundant. If we do not do that, we will be replaced by others and laid off soon.” The table also implies that workers with a college degree or above had a stronger voice than those at any other education level.

## Discussion

Some scholars have recently recognized that EU and SU are not identical and thus attempted to explore whether and how EU translates into SU (Rossi, 2013). These GVC studies have not included chain upgrading in their framework. In addition, these studies employed qualitative methods, which cannot provide a comprehensive picture. Empirical studies in some Western countries suggest that SU often lags behind the EU. Much attention has been given to trade unions and collective

bargaining, which are at the center of labor issues, to promote SU (Chan and Hui, 2014). By contrast, our study indicates that China's EU has resulted in SU, and workers have also benefited from the EU. The key is that the state has played an essential role in balancing the relationship between the EU and SU, involving the adjustment of facilitation, redistribution, and regulation (Gereffi and Mayer, 2008). Therefore, the role of the state in the EU and SU should receive more scholarly attention (Gereffi and Lee, 2014).

In the past decades, the various levels of states in China have primarily focused on economic development. That is, they have emphasized facilitation. Since 2003, China's states have gradually moved the attention from economic to social development, endowed citizens with more rights, and transitioned from "putting economic development first" to "putting people first," thereby placing greater emphasis on redistribution and regulation (Saich, 2007; Pongsawat, 2007). The state is a key player in adjusting the relative benefits enjoyed by capitalists and workers (Coe and Jordhus-Lier, 2011; Selwyn, 2013). Owing to strict state regulations, large-scale enterprises in China have rarely used a dual workforce (i.e., regular and irregular workers), which is popular in many developing countries (Rossi et al., 2014).

However, the positive effect of the EU on wage and medical/pension insurance is more significant than that on voice. The patterns of SU showed dramatic divergence in different aspects. Thus, treating SU as a monolithic thing is inappropriate. Our study has demonstrated that SU on measurable standards, such as wage and social insurance, is more likely to occur than SU on enabling rights, such as voice. The improvements in measurable standards and enabling rights do not take place simultaneously. This is different from the finding of previous studies (which adopted a trade union-centered approach) that the improvement in enabling rights is the prerequisite for the improvement in measurable standards (Barrientos et al., 2011). Possible reasons for the outcome are twofold: First, SU on enabling rights is unnecessarily the prerequisite of SU on measurable standards, as the state may focus on the latter. Second, the state is inclined to pay more attention to measurable rights rather than enabling rights. The PRD's local state has attempted to release further enabling rights to workers, for example, trying to promulgate the Shenzhen Collective Consultation Ordinance and the Guangdong Regulations on the Democratic Management of Enterprises to strengthen workers' associational power. However, under pressure from other stakeholders, this attempt was stopped (Hui and Chan, 2016). Although SU on voice is lower than SU on measurable standards, the voice of workers in the PRD has improved significantly in recent years because of the state's intervention. In China, collective negotiation is experiencing a transition from "collective consultation as a formality" through a stage of "collective bargaining by riot" and toward "party state-led collective bargaining" (Chan, 2014).

The mechanisms through which the state moderates the relationship between EU and SU vary in different aspects. Specifically, in terms of the wage, in recent years, the central state has constantly raised minimum wage standards and enforced those standards comparatively strictly, causing workers' wages to increase, particularly among low-end workers who had low wages previously. Thus, in the PRD, low-income workers (e.g., RMWs with primary school education) have witnessed a great degree of wage-related SU, whereas middle-low income workers (e.g., urban workers with secondary school education) have not. Thus, the influence of the state on the wage primarily benefits low-end workers whose wage is around the minimum wage standard. Currently, the enforcement of social insurance is more flexible in the PRD compared with the wage. The state relies on a different

mechanism to moderate the effects of EU and SU on social insurance, the effects of which accrue to all workers rather than only to low-end workers. Additionally, local states take different actions on different types of enterprises; specifically, stricter regulations on large-scale enterprises than small-scale ones because the latter often encounter great pressures in the process of EU, and their profits are much lower than those of the former. Thus, a type of "flexible governance" occurs. It revealed that the local state had imposed strict regulations on enterprises in areas where EU is high, causing the tendency that the greater EU predicts the greater SU on social insurance (Sheldon et al., 2011; Cui et al., 2013).

## Conclusion

This study explores whether workers benefited from EU in the PRD of China (in terms of measurable standards and enabling rights). Its findings revealed that EU had a positive effect on workers' SU (reflected by wage, medical/pension insurance, and voice) in the PRD, differing from the findings in the existing literature that a dual labor force is often employed to cope with the pressures of EU and numerous workers to suffer from social downgrading (Rossi, 2013). We argue that the state plays a critical role in balancing the EU and SU, particularly in an authoritarian country, where social and private governance and workers' bargaining power are comparatively weak (Mayer and Pickles, 2014). Recently, the central state has moved its focus from facilitation to redistribution and regulation through promulgating the transition from "putting economic development first" to "putting people first." This move leads to SU on measurable standards and enabling rights. At this stage, central and local states pay more attention to measurable standards than enabling rights, causing the improvement in measurable standards to be higher than that in enabling rights.

As the executor of laws and policies, local states are inclined to adopt proper strategies to balance EU and SU according to the guidelines of the central state. Under this mechanism, EU and SU go hand-in-hand and sustain each other in a virtuous circle. When economic development is in good condition (EU is high), local states enforce the laws strictly to guarantee workers' benefits. When the EU is low, regulation is loosened to protect the interests of capitalists. In different cities of the PRD, the intensity with which local states implement labor laws corresponds to the state of economic development. Therefore, in terms of spatial aspect, local states have imposed stricter regulations on enterprises in areas where the EU is higher, causing the tendency of a greater EU predicting a greater SU. Local states can also adopt different attitudes toward different enterprises, even in the same area. Occasionally, local states may directly participate in resolving labor disputes to maintain social stability.

Overall, the states work like an acrobat standing on a ball, trying to strike a good balance in all aspects. Owing to its advantages, such as compulsory regulations and straightforward power structures, public governance is effective in addressing the problems caused by the EU. Therefore, governments will continue playing a significant role in promoting SU. However, with the rise of social awareness, workers in China are becoming increasingly active in protecting their rights than before. The role of workers in SU is worth exploring in the future.

## Data availability

The data used in this study are available from the corresponding author upon reasonable request.

Received: 17 March 2022; Accepted: 30 August 2022;

Published online: 13 September 2022

## References

- Alaluf M, Prieto C (2001) Collective bargaining and the social construction of employment. European Trade Union Institute, Brussels
- Bair J, Gereffi G (2013) Better work in Central America: assessing the opportunities for upgrading in Nicaragua's apparel sector. Capturing the Gains Working Paper No. 17. <https://doi.org/10.2139/ssrn.2237473>
- Barrientos S, Gereffi G, Rossi A (2011) Economic and social upgrading in global production networks: a new paradigm for a changing world. *Int Labour Rev* 150(3–4):319–340. <https://doi.org/10.1111/j.1564-913X.2011.00119.x>
- Chan CKC, Hui ESI (2014) The development of collective bargaining in China: from “collective bargaining by riot” to “party state-led wage bargaining”. *China Q* 217:221–242. <https://doi.org/10.1017/S0305741013001409>
- Chan CKC (2014) Constrained labour agency and the changing regulatory regime in China. *Dev Change* 45(4):685–709. <https://doi.org/10.1111/dech.12104>
- Chan CKC, Nadvi K (2014) Changing labour regulations and labour standards in China: retrospect and challenges. *Int Labour Rev* 153(4):513–534
- Chan RCK (1998) Cross-border regional development in southern China. *GeoJournal* 44(3):225–237. <https://doi.org/10.1023/A:1006807716495>
- Coe NM, Jordhus-Lier DC (2011) Constrained agency? Re-evaluating the geographies of labour. *Prog Hum Geogr* 35(2):211–233. <https://doi.org/10.1177/0309132510366746>
- Cui F, Ge Y, Jing F (2013) The effects of the labor contract law on the Chinese labor market. *J Empir Legal Stud* 10(3):462–483. <https://doi.org/10.1111/jels.12016>
- De Oliveira JAP (2008) Upgrading clusters and small enterprises in developing countries: environmental, labor, innovation and social issues. Ashgate Publishing, Farnham
- Elliott KA, Freeman RB (2003) Can labor standards improve under globalization? Institute for International Economics, Washington, DC
- Gaspar J, Henriques EB, Vale M (1998) Economic restructuring, social re-composition and recent urban changes in Portugal. *GeoJournal* 46(1):63–76. <https://doi.org/10.1023/A:1006987705815>
- Gereffi G (1999) International trade and industrial upgrading in the apparel commodity chain. *J Int Econ* 48(1):37–70. [https://doi.org/10.1016/S0022-1996\(98\)00075-0](https://doi.org/10.1016/S0022-1996(98)00075-0)
- Gereffi G (2005) The global economy: organization, governance, and development. In: Smelser, NJ, Swedberg R (eds) *The handbook of economic sociology*, vol 2. Princeton, NJ: Princeton University Press, pp. 160–182
- Gereffi G, Mayer F (2008) Globalization and the demand for governance.” In: Gereffi G (ed) *The new offshoring of jobs and global development*. International Labor Office, Geneva
- Gereffi G, Lee J (2014) Economic and social upgrading in global value chains and industrial clusters: why governance matters. *J Bus Eth* 133(1):25–38. <https://doi.org/10.1007/s10551-014-2373-7>
- Hong Y (2014) Industrial upgrading in Guangdong: how well is it performing? *China: Int J* 12(1):108–131
- Howell JA (2008) All-China Federation of Trades Unions beyond Reform? The slow march of direct elections. *China Q* 196:845–863. <https://doi.org/10.1017/S030574100800115X>
- Hui ESI, Chan CKC (2016) The influence of overseas business associations on law-making in China: a case study. *China Q* 225:145–168. <https://doi.org/10.1017/S030574101500168X>
- Humphrey J, Schmitz H (2002) How does insertion in global value chains affect upgrading in industrial clusters. *Reg Stud* 36(9):1017–1027. <https://doi.org/10.1080/0034340022000022198>
- Liao HF, Chan RCK (2011) Industrial relocation of Hong Kong manufacturing firms: towards an expanding industrial space beyond the Pearl River Delta. *GeoJournal* 76:623–639. <https://doi.org/10.1007/s10708-009-9316-3>
- Mayer F, Gereffi G (2010) Regulation and economic globalization: Prospects and limits of private governance. *Bus Politics* 12:1–25. <https://doi.org/10.2202/1469-3569.1325>
- Mayer F, Pickles J (2014) Re-embedding the market: global apparel value chains, governance and decent work’. In: Rossi A, Luinstra A, Pickles J (eds) *Towards better work. Advances in labour studies*. Palgrave Macmillan, London, 10.1057/97811373775482
- Milberg W, Winkler D (2011) Economic and social upgrading in global production networks: problems of theory and measurement. *Int Labour Rev* 150(3–4):341–365. <https://doi.org/10.1111/j.1564-913X.2011.00120.x>
- Pongsawat P (2007) Border partial citizenship, border towns, and Thai–Myanmar cross-border development: case studies at the Thai Border Towns. *Ann Arbor. ProQuest, MI*
- Rossi A (2013) Does economic upgrading lead to social upgrading in global production networks? Evidence from Morocco. *World Dev* 46:223–233. <https://doi.org/10.1016/j.worlddev.2013.02.002>
- Rossi A, Luinstra A, Pickles J (2014) Towards better work: understanding labour in apparel global value chains. Palgrave Macmillan, Basingstoke
- Ruggie JG (1982) International regimes, transactions, and change: Embedded liberalism in the postwar economic order. *Int Organ* 36(2):379–415. <https://doi.org/10.1017/S0020818300018993>
- Saich T (2007) China in 2006: focus on social development. *Asian Survey* 47(1):32–43. <https://doi.org/10.1525/as.2007.47.1.32>
- Sassen S (2001) Cities in the global economy. In: Browning G, Halcli A, Webster F (eds.) *Understanding contemporary society: theories of the present*. Sage Publications, London, pp. 267–280
- Selwyn B (2011) Beyond firm-centrism: re-integrating labour and capitalism into global commodity chain analysis. *J Econ Geogr* 12(1):205–226. <https://doi.org/10.1093/jeg/lbr016>
- Selwyn B (2013) Social upgrading and labour in global production networks: a critique and an alternative conception. *Competition Change* 17(1):75–90. <https://doi.org/10.1179/1024529412Z.00000000026>
- Sheldon P, Kim S, Li Y, Warner M (2011) China's changing workplace: dynamism, diversity and disparity’. Routledge, Abingdon
- Vilares H, Portugal P, Addison JT (2016) Unions and collective bargaining in the wake of the great recession. *Br J Ind Relat* 55:551–576
- Walks RA (2001) The social ecology of the post-Fordist/global city? Economic restructuring and socio-spatial polarisation in the Toronto urban region. *Urban Stud* 38(3):407–447. <https://doi.org/10.1080/00420980120027438>
- Wang X, Yang L, Ye Y (2019) Contention for urban state space and the rise of society in China: a case study of “Housing Planting” in Hohhot. *Cities* 92:219–229. <https://doi.org/10.1016/j.cities.2019.04.003>
- Wang X, Chan CKC, Yang L (2020) Economic upgrading, social upgrading, and rural migrant workers in the Pearl River Delta. *China Rev* 20(1):51–81
- Wang X, Chan CKC, Yang L (2021) Economic restructuring and migrant workers' coping strategies in China's Pearl River Delta. *Third World Q* 42(4):812–830. <https://doi.org/10.1080/01436597.2021.1873763>
- Webb S, Webb B (1897) *Industrial democracy*. Longmans, Green, London
- Yang L, Liang Y, He B, Lu Y, Gou Z (2022) COVID-19 effects on property markets: the pandemic decreases the implicit price of metro accessibility. *Tunn Undergr Space Technol* 125:104528. <https://doi.org/10.1016/j.tust.2022.104528>
- Yu H (2014) Industrial upgrading in Guangdong: how well is it performing? *China: Int J* 12(1):108–131
- Zhu S, Pickles J (2014) Bring in, go up, go west, go out: upgrading, regionalisation and delocalisation in China's apparel production networks. *J Contemp Asia* 44(1):36–63. <https://doi.org/10.1080/00472336.2013.801166>

## Acknowledgements

This study is supported by the Sichuan Science and Technology Program (No. 2022JDR0178) and the National Natural Science Foundation of China (No. 52278080). We are indebted to Sun Yat-sen University, which provided us with the 2012 and 2014 China Labor-force Dynamic Survey data.

## Author contributions

XW: conceptualization, formal analysis, methodology, and writing—original draft. CKCC: validation, writing—review & editing. LY: validation, methodology, funding acquisition, supervision, writing—review & editing. All authors substantially contributed to the article and approved the submitted version.

## Competing interests

The authors declare no competing interests.

## Ethical approval

The study was approved by the Ethics Committee of the School of Architecture, Southwest Jiaotong University. It was conducted in accordance with the ethical standards defined in the 1964 Declaration of Helsinki and its subsequent amendments.

## Informed consent

Informed consent was obtained from all 72 participants.

## Additional information

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