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Power relations and the labour share of income in China

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The labour share of income in China substantially declined from the mid-1990s to the late 2000s. We analyse the effect of power relations among the state, workers and managers on the labour share, during China's economic transition from a state–socialist economy to a market economy. We take a Marxian approach in variable selection to reflect power relations over the two stages of China's reform era. The econometric analysis shows that two major changes in power relations—the social contract between the state and workers disappeared and workers' power relative to management declined—have a significant effect on the labour share. Furthermore, sectoral changes have no significant effect on the labour share between 1999 and 2010.

Key words: Labour share of income, Power relations, Social contract, Marxian economics, Chinese economy
JEL classifications: B51, J30, J53

1. Introduction

China's labour share declined substantially between mid-1990s and the late 2000s. Looking at a conventional measure—namely, the employee compensation as a percentage of GDP, as shown in Figure 1—China's labour share declined from 51.4% in 1995 to 43.7% in 2008. The other two measures in Figure 1 show that the labour share started to fall in 1998. With the economic slowdown following the global crisis, the labour share began to recover and returned to 46.5% in 2014. Labour's share in China was not only lower than that in major developed economies such as the USA, UK and Germany, but also lower than that in large developing economies such as India and Brazil.[1]

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[1] The employee compensation as a percentage of GDP in 2014 was on average 53.2% for G20 countries and 51.9% for BRICS. China's labour share in 2014 was lower than labour's shares in the USA (58.6%), UK (58.5%) and Germany (60.7%); it was also lower than labour's shares in India (51.6%) and Brazil (59.4%). However, it is noteworthy that China's labour share in 2014 was higher than the levels in smaller developing economies such as Bangladesh (43.3%), Mexico (34.3%) and Vietnam (42.7%). Source: ILO.

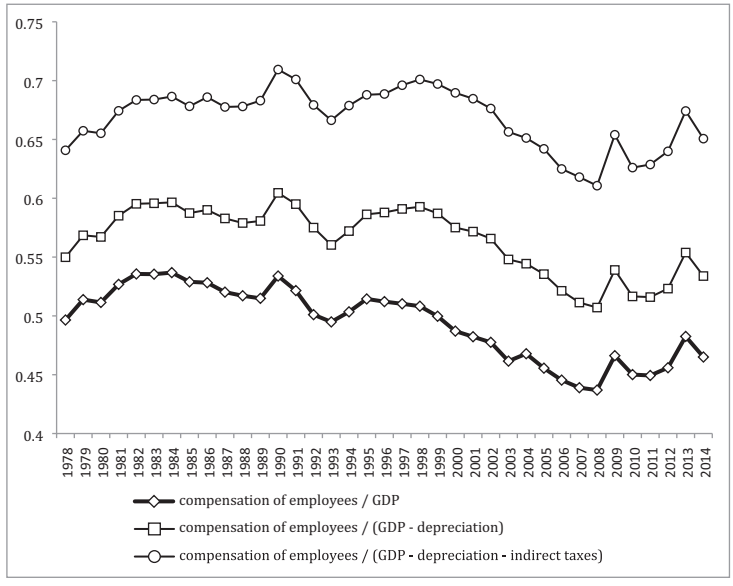

Fig. 1. *Labour share in China, 1978–2014.*
Source: Data for 1978–91 are from Hsueh and Li (1999), and data for 1999–2014 are from NBS (2007) and various issues of the *China Statistical Yearbook* (*CSY*; 2006–15).

How have power relations affected China's labour share? We seek to answer this question. From a Marxian perspective, China's economic transition from a state–socialist economy to a market economy substantially reshaped power relations among the state, workers and managers (i.e. cadres in state-owned firms and capitalist owners or managers in private firms). One of Marx's key insights is that distribution between capital and labour is determined in the production process, where 'between equal rights, force decides' (Marx, 1976, p. 344). From this perspective, labour supply and demand do not directly determine wages and profits; instead, they affect them through power relations on the shop floor. Since the 1980s, the labour extraction model has applied Marx's theory to empirical research (Weisskopf et al., 1983; Schor and Bowles, 1987; Bowles, 1991). The underlying logic of the model is: In capitalist production, wages play a disciplinary role for workers because workers suffer from an income loss after being fired. Firms determine the wage level in order to extract labour effort, which is positively associated with the cost of job loss—namely, the difference between the wage level and the expected income for the worker after being fired. Recently, Piovani (2014) applies the labour extraction model to explain the reduction of workers' bargaining power in China and the decline in the wage share in the industrial sector.

The recent orthodox and heterodox literature generally emphasises three factors in determining labour share: globalisation, technology and labour market institutions. Many studies confirm that trade and capital account openness generally have adverse effects on labour share (Diwan, 2001; Harrison, 2002; Guscina, 2006; Jayadev, 2007; Oyvat, 2010; Hogrefe and Kappler, 2013; Elsby et al., 2013; Stockhammer, 2017). Most orthodox studies analyse the effects of technology within an assumed production function (e.g. Bentolila and Saint-Paul, 2003; Karabarbounis and Neiman, 2013). Finally, some studies discuss the effects of unionisation, informalisation, bargaining

power and labour market deregulations on labour share (Wallace et al., 1999; Bental and Demougin, 2010; Kristal, 2010; Fichtenbaum, 2011; Deakin et al., 2014). Besides, relevant studies have also examined the effects of government expenditure (Harrison, 2002), sectoral structure (Young, 2006; Elsby et al., 2013), privatisation (Torrini, 2005) and financialisation (Stockhammer, 2017).

Studies on China's labour share appeared quite recently. These studies follow the orthodox approach and explain labour share in terms of sectoral structure (Bai and Qian, 2010a, 2010b), technology (Huang and Xu, 2009), privatisation (Bai and Qian, 2010a; Luo and Zhang, 2010; Chang and Wang, 2011) and globalisation (Luo and Zhang, 2010; Shao and Huang, 2010; Zhang et al., 2012). While the effects of technology, globalisation and privatisation are ambiguous, these studies suggest that sectoral changes—namely, the falling share of agriculture in GDP—have adverse effects on labour share. As one of the earliest and most influential studies in this area, Bai and Qian (2010b) use Robert Solow's decomposition method (Solow, 1958) to evaluate the contribution of sectoral changes in driving the decline in labour share. They argue that sectoral changes explain 61% of the decline between 1995 and 2003, thus implying that the decline was a neutral process irrelevant to power relations.

We adopt a Marxian approach to explore the role of power relations among the state, workers and managers in affecting distributive shares in the national income. The main findings are as follows. First, a social contract between the state and workers that wages growing with labour productivity existed in the first stage of the reform era, from 1978 to the early 1990s, but disappeared in the second stage, from the mid-1990s to the 2000s. Second, a U-shaped relationship existed between labour share and bonuses per worker in the first stage of the reform era; this indicates that production management centred on material incentives in the first stage led to a fall in labour share when bonuses were small, but an increase in labour share as they grew. Third, management–worker inequality, the reserve army of labour and replacement income had a significant effect on labour share in the second stage of the reform era; this indicates management–worker conflicts commonly seen in capitalist firms have emerged in China's production process.[2] Moreover, unlike Bai and Qian (2010b), we find that sectoral changes had a significant effect only in the first stage, and not in the second one.

We contribute to the literature in three respects. First, contemporary studies are overly arbitrary in periodisation and treat the reform era as a homogenous period. Based on historical analysis, we argue that labour share in China should be analysed differently between the first and second stages of the reform era. Second, we construct theoretically consistent variables to reflect power relations among the state, workers and managers. Finally, we use both region- and firm-level panel data to examine the results' robustness.

This paper is organised as follows. Section 2 provides a historical review of power relations. Section 3 establishes the empirical model. Section 4 discusses variable selection and data sources. Section 5 discusses results and robustness. Section 6 concludes the paper.

[2] It is noteworthy that management–worker conflicts and labour extraction are not equivalent to capitalism because they exist in various forms of society. The nature of the Chinese economic system and its transition should be analyzed with more evidence and from a broader view that takes into account China's position in global capitalism.

2. Power relations during China's economic transition

2.1 Economic reform and power relations

Economic reform in the past four decades substantially changed the institutions in China's economy. The underlying logic of reform is to promote economic development through the state's restructuring of institutions. In the reform era, the state adopted a path of development that was distinct from the one adopted in the state–socialist era before 1978: It stressed economic growth, established material incentives in factories and rural collectives, allowed the development of private firms and gradually introduced markets to the economy.

However, economic reform also substantially changed power relations among social groups (peasants, workers, intellectuals, cadres and managers in state-owned firms). In general, reform was associated with power relations in two ways. First, carrying out a reform tended to need the support from some of the social groups; thus, the state might strengthen the social positions of some groups who supported the reform, inducing changes in the power relations among groups. The state in the initial stage of the reform era not only raised farming income for peasants but also relaxed restrictions on firm-level distribution and raised wages for urban workers for their support for reforms. Due to relaxed restrictions and job security, urban workers in that period gained more bargaining power relative to managers and the state. Second, reform was aimed at promoting accumulation; however, capital accumulation had its contradictions that might generate economic problems or even crises, and those contradictions might be associated with the power relations among social groups. In order to resolve the problems and promote accumulation, the state might initiate reforms that restructured power relations. For instance, the reform on state-owned enterprises in the late 1990s massively laid off workers, which substantially released the social burden of those enterprises and lowered the labour costs for capital accumulation. As discussed below, reforms in the first stage mostly belong to the first pattern, while those in the second stage mostly belong to the second pattern.

2.2 First stage of the reform era (1978 to early 1990s)

We divide the whole reform era into two stages based on institutional differences. It is generally recognised in the literature that there were significant institutional differences before and after the early 1990s in China's reform era (e.g. Naughton, 2007; Bramall, 2009). The first stage of the reform era began in 1978 and ended in the early 1990s. State-owned firms still dominated the urban economy in this stage. During the state–socialist era before 1978, China attempted to build an incentive system that highlighted politics and nonmaterial incentives. However, in 1978, the state encouraged firms to use material incentives.[3] The share of bonuses and piece wages in total wages increased dramatically, from 2% in 1978 to 20% in 1991.[4] The reform strengthened the rights of cadres (i.e. managers in state-owned firms) in management, although workers and cadres were still economically similar. A 1990 survey shows that

[3] See Bureau of Labour of Sichuan Province, *Selected Documents on Labour Issues From April 1978 to August 1980*, p. 1023.

[4] Source: *China Statistical Yearbook*, various issues.

cadres in state-owned firms earned only 12% more than workers.[5] Workers were still powerful due to job security and the benefit system, and cadres tended to increase both their interests and those of workers. As Walder (1987, 1991) suggests, workers' ability to influence the wage bill increased in the 1980s, and cadres became representatives of their firm's interests, including to a considerable extent the interests of their workers.

The incentive system of the first stage relied heavily on the 'carrot' strategy of material incentives, without the complement of an unemployment 'stick'. Workers did not need to respond to material incentives with sufficient effort, and the state tended to lose control of wage growth. A former Ministry of Labour official said that 'In the past decade, total wages stipulated in the state's plan were surpassed by the distributed wages by nearly 100 billion yuan' (He, 1993, p. 277); nonetheless, he adds, 'Wages have to be raised; otherwise, the production has to be paralyzed'. Continuous material incentives, however, had only a temporary effect on production. Another Ministry of Labour official said that 'A round of wage adjustment is only effective [in promoting production] for half a year—from the time when the wage adjustment is announced to begin to the time when the adjustment completed' (Wang, 1998, p. 196).

During the first stage, to obtain workers' support to reforms and maintain work incentives, the state established a 'social contract' with workers: wages stipulated by the state grew with labour productivity. In the pre-reform era, from the 1956 wage reform to 1976, workers' wages were raised by the state only twice (1963 and 1971). Thus, workers had few opportunities to have their wages adjusted as their work experience accumulated. By contrast, the state raised wage standards almost every year in the first stage of the reform era. However, due to cadres' reliance on material incentives in management and the cadre-worker coalition, actual wages always surpassed the state's plan, and wage growth surpassed profit growth.[6]

2.3 Second stage of the reform era (mid-1990s to the 2000s)

In the second stage, the state imposed a series of reforms that significantly reshaped the power structure, which prepared conditions for the rapid accumulation in the 2000s. The reform transformed cadres into managers with their interests to pursue, and economic conditions separate from those of workers. Economic inequality within enterprises expanded after the reform emphasised that distribution should reflect managers' contributions. Take Tonghua Steel Company, a state-owned firm in Jilin Province, as an example. In 2005, the company established an annual basic salary system for middle-level managers, according to which middle-level managers would be paid a wage six times the average company wage.[7] In the same year, top managers were awarded company shares, equivalent to 100 million yuan.[8] A survey from the All-China Federation of Trade Unions (ACFTU) shows that in 2010, the average wage of top management across 208 state-owned firms reached 18 times that of frontline workers.[9] Increased management–worker inequality can also be observed among listed companies, comprising both state-owned and private companies. A 2011 report from the Ministry of Human Resources and Social Security shows that among listed companies, the wages

[5] Source: Feng and Xu (1993).
[6] See figure 3 in Qi (2018).
[7] Source: Tonggang History 1958–1985.
[8] Source: *Tonggang Yearbook*, various issues.
[9] See http://news.xinhuanet.com/politics/2010-03/09/content_13129777.htm.

of top management on average increased by 337,000 yuan within five years, whereas those of employees increased by merely 30,000 yuan within 10 years.[10]

With the influx of migrant workers from rural areas and layoffs from state-owned firms, a reserve army of labour emerged, repressing the power of all workers. In the early 1990s, rural migrant workers were allowed to seek jobs in urban areas. Meanwhile, the private sector was rapidly expanding in the second stage. Private firms used harsh management practices and mainly hired migrant workers, who had much less job security than workers in state-owned firms and suffered from long working hours and poor working conditions.[11]

Another source for the emerging reserve army was laid-off workers from state-owned firms. In 1997, the Fifteenth Congress of the Chinese Communist Party (CCP) launched drastic reforms for the state-owned sector, aimed at 'increasing efficiency by reducing employment'. From the mid-1990s to the early 2000s, state-owned firms laid off more than 30 million workers.[12] The mass layoff set the scene for the reserve army to affect workers; thus, it implied a regime shift. The mass layoff destroyed the job security of the workers of state-owned firms. Competition among workers—particularly between urban workers and migrant workers—began to affect wages. The social contract that linked wages and labour productivity vanished.

In summary, power relations considerably changed in the second stage. The state no longer stipulated wage standards of state-owned firms. The cadre-worker coalition broke down as the economic gap between managers and workers substantially expanded. With the internal shift in the management–worker relation, state-owned firms became profit-oriented, and the social contract of the first stage vanished. With the influx of migrant workers, an increase in layoffs and expansion of the private sector, the reserve army of labour began to play a role in disciplining workers.

3. Empirical models

3.1 First stage

We start with the enterprise sector of the first stage when state-owned firms dominated the sector. Labour share of a firm is defined as:

$$z = \frac{w}{eq} \tag{1}$$

w and e are the real wage and labour effort of an average worker, respectively. q is labour productivity, that is, the real output of each unit of labour effort. We ignore the difference between the price levels of consumption goods and output.[13] Suppose w is the sum of w_0 and b, the social contract between the state and workers means that the state stipulates w_0, according to labour productivity; thus, w_0 is a function of q.

[10] See http://news.china.com/domestic/945/20121018/17481477.html.
[11] See http://www.stats.gov.cn/tjfx/fxbg/t20100319_402628281.htm.
[12] The number is estimated by the reduction in the employment of the state-owned sector from 1995 to 2000. Data is from *China Statistic Yearbook 2012*.
[13] We use the ratio of the consumption goods' price level to the output's price level in the econometric analysis and find it has no statistically significant effect.

$$w_0 = f(q), f' > 0 \tag{2}$$

b is the wage that is distributed by managers and out of control of the state. Note that b is not necessary to be bonuses since the state only allowed firms to reward workers with a certain amount of bonuses; however, we may assume b is proportional to bonuses. b reflects the degree that managers relied on material incentives. Managers' objective was not profit maximisation. Managers aimed at realising certain levels of worker effort to fulfil production goals. Given that managers had only the 'carrot' strategy, but no unemployment 'stick', they use b to obtain a satisfactory level of e; thus, e is a function of b.

$$e = h(b), h' > 0, h'' < 0 \tag{3}$$

We assume $h'' < 0$ because workers might grow accustomed to b, and tend to expend less extra labour effort in response to an increase in b. Therefore, equation (1) is rewritten as:

$$z = \frac{f(q) + b}{h(b)q} \tag{4}$$

Take the logarithm of both sides of equation (4) and obtain the following partial derivatives:

$$\frac{\partial \ln z}{\partial \ln q} = \frac{f'}{[f(q) + b]/q} - 1 \tag{5}$$

$$\frac{\partial \ln z}{\partial \ln b} = \frac{b}{f(q) + b} - \frac{h'}{h(b)/b} \tag{6}$$

In equation (5), f' is the change in w_0 brought by one-unit change in q. Given that b is unrelated to q, $\frac{f'}{[f(q)+b]/q}$ can be understood as the elasticity of w_0 to q. Due to the social contract, this elasticity should be no less than unity. Thus, $\frac{\partial \ln z}{\partial \ln q}$ should be non-negative.

In equation (6), $\frac{h'}{h(b)/b}$ is the elasticity of e to b. Suppose that $h(b)/b$ is maximised when $b = b^\star$, it is easy to see that $\frac{h'}{h(b)/b} = 1$ when $b = b^\star$, $\frac{h'}{h(b)/b} > 1$ when $b < b^\star$ and $\frac{h'}{h(b)/b} < 1$ when $b > b^\star$. Given that $\frac{b}{f(q)+b} < 1$, $\frac{\partial \ln z}{\partial \ln b}$is very likely to be negative when b is small and positive when b is sufficiently large. In the empirical model, we assume there is a U-shaped relationship between labour share and bonuses per worker. This means, when material incentives were introduced, they were initially effective in promoting labour effort, considering the pre-reform historical context of workers receiving almost no bonus; with the overreliance on material incentives, however, material incentives became less effective, and labour share tended to increase.

Therefore, we establish the baseline empirical model for the first stage, as follows:

$$\ln (LS)_{it} = \alpha_0 + \alpha_1 \ln (KL)_{it} + \alpha_2 BONUS_{it} + \alpha_3 BONUSQ_{it} + \sum_j \alpha_j X_{j_{it}} + \gamma_i + \mu_t + \varepsilon_{it} \tag{7}$$

Equation (7) highlights the role of the social contract and material incentives in affecting labour share. $\ln(LS)$ is the logarithm of labour share; $\ln(KL)$ is the logarithm

of fixed capital per worker (capturing labour productivity); *BONUS* and *BONUSQ* are bonuses per worker and its square; X represents control variables. The subscript i and t represent region and year, respectively; γ_i and μ_t are region and time dummies, respectively; ε_{it} is the error term.

3.2 Second stage

In this stage, the management–worker division reshaped power relations on the shop floor, the formation of a reserve army substantially suppressed workers' bargaining power, and the social contract between the state and workers vanished. As private firms dominated the enterprise sector, and state-owned firms became more similar to their private counterparts in terms of employment and management practices, we apply the labour extraction model to this stage.

In both state-owned and private firms, managers use wages as rewards for extra labour effort, and unemployment as punishment for shirking. Bowles (1985) shows that under quite general assumptions, the optimal effort–wage ratio is determined by three factors—namely, the effectiveness of management, the unemployment rate (the reserve army of labour) and the nonwage replacement income. If management is effective, the unemployment rate is high, and the nonwage replacement income is low, then the effort–wage ratio will be high, thus contributing to lower labour share.

In principle, the effectiveness of management in a capitalist firm is captured by the ratio of supervisory employment to production workers; unfortunately, there is no available data on this ratio. Considering the management–worker division made managers' interests linked to profits, we use management–worker inequality as a proxy of management effectiveness. This inequality reflects how wide the divide is between managers and workers. In the second stage, the state as the shareholder incentivised managers to pursue profits and other economic goals, and required managers to carry out more effective practices to monitor workers and extract labour. Thus, we expect to see the management–worker inequality is negatively associated with labour share. This resembles the change in the shareholder–management relationship in major capitalist economics under financialisation; in both scenarios, managers are incentivised to pursue the shareholders' goals at the expense of labour.

Please note that the two variables—the labour share and the management-worker inequality—are not measuring the same thing; put differently, the management–worker inequality has independent information that helps to explain the labour share. For instance, assume that the shareholders of a firm negotiate a labour share with the management, and further the managers decide how to distribute the total labour compensation between the workers and themselves. It is safe to assume that the negotiated labour share depends on the collaboration between managers and workers, which can be reflected by the management–worker inequality: The higher the inequality, the lower the degree of collaboration. In this context, some opportunistic behaviours of the managers may increase their pay relative to workers but undermine their collaboration and thus lower the negotiated labour share.

Therefore, the baseline empirical model for the second period is:

$$\ln(LS)_{it} = \beta_0 + \beta_1 \ln(KL)_{it} + \beta_2 INEQ_{it} + \beta_3 RAL_{it} + \beta_4 RI_{it} + \sum_j \beta_j X_{j\,it} + \gamma_i + \mu_t + \varepsilon_{it} \quad (8)$$

ln(*KL*) remains in equation (8); as the social contract vanished and wages delinked from labour productivity, labour productivity might be negatively affecting labour share. Equation (8) is different from equation (7) in the variables reflecting workers' power relative to managers: *INEQ* (management–worker inequality), *RAL* (reserve army of labour effect), and *RI* (replacement income). Note that we emphasise periodisation and establish empirical models with different variables for different historical contexts; it is impossible to capture qualitative changes in power relations with quantitative changes in the same group of variables. There was a change in the rules of the game; the qualitative differences between the two stages make a variable of one stage meaningless for the other stage: For instance, given that workers had almost full job security in the first stage, the reserve army has no impact on workers.

4. Variables and data sources

Our econometric analysis uses regional panel data covering 29 regions (i.e. a province, autonomous region or municipality). Chongqing and Sichuan are combined, and Tibet is excluded due to data availability. To be consistent with the historical periodisation, while considering data availability, we apply equation (7) to the 1978–91 period, and equation (8) to the 1999–2010 period. We choose 1991 as the last year of the first period for econometric analysis because China's reform towards marketisation accelerated after Deng Xiaoping's Southern Tour in 1992. We choose 1999 as the first year of the second period for econometric analysis because the key variable management–worker inequality is available only after 1999; besides, there is a noteworthy transition between the first and second stage. Our analysis takes 2010 as the last year because since then the economic growth has slowed down due to both external and internal causes, and probably entered into a new stage that is different from the second stage. Below, we discuss variable selection in the models.

4.1 Labour share of national income

The dependent variable ln(*LS*) is measured as:

$$\ln(LS) = \ln\left(\frac{CE}{GDP - D}\right), \quad (9)$$

CE: Compensation of employees
GDP: GDP in the income approach
D: Depreciation of fixed assets

Depreciation is subtracted in the denominator because in Marxian economics, depreciation is a transfer of value rather than newly created value. In the numerator, compensation of employees comprises the wages and benefits of workers, managers, and government employees, the agricultural income of rural households, and self-employment income. We do not further deduct indirect taxes from the denominator, which means we focus on the power of labour relative to both the state and capital and analyze how this power affects labour's share relative to the state's and capital's shares

as a whole. The Chinese state played a crucial role in the power relations of society throughout the reform era. Capitals in China, no matter state-owned or private ones, are not separated from the state. The nature of the relation between the state and private capitalists in China has been a heated topic in the literature, and many studies suggest the Chinese state has successfully controlled and co-opted private capitalists (So, 2003; Dickson, 2008; van der Pijl, 2012). The Chinese state resembles a class which, in various ways, takes a part of surplus value produced by the working class for particular purposes such as economic growth. Besides, this measure can be applied to both the first stage when firms were mostly state-owned and the second stage when private capital expanded substantially.

To be consistent with our analysis, we should focus on the wages and benefits of workers in the enterprise sector; however, the regional data for that sector are limited. To overcome this problem, first of all, we employ control variables, such as the shares of agriculture and self-employment, in the regressions. Secondly, although the baseline regressions take labour share in the overall economy as the dependent variable, some regressions in the robustness check take labour share in the non-agricultural economy as the dependent variable. For 1978–91, the data allow us to exclude agricultural income of rural households from the compensation of employees. For 1999–2010, we estimate regional agricultural income with the data of GDP in the production approach to obtain labour share in the non-agricultural economy. Lastly, although it is impossible to distinguish managers' payment from workers' wages, the empirical models, to a large extent, have captured the effect of managers' payment, given that the management–worker inequality in the first stage can be seen as a constant (which can be captured by fixed effects), and the empirical model of the second stage explicitly considers this inequality.

4.2 Management–worker inequality

We use data of listed state-owned companies from the China Stock Market and Accounting Research (CSMAR) dataset to construct management–worker inequality. We focus on state-owned companies because the inequality within those companies reveals a transition process of the management–worker division; moreover, managers of private companies usually receive little payment if they are at the same time shareholders. We also use the inequality measure from the data of all state-owned and private listed companies and obtain similar results in regressions.

This measure of inequality equals the average compensation of the top executives in all the listed state-owned companies of a region in a year, divided by the average wage of all the employees in those companies.

$$INEQ = \frac{\frac{1}{N}\sum_{i=1}^{N} CEO_i}{\frac{1}{M}\sum_{j=1}^{M} W_j} \tag{10}$$

CEO: Payment of a top executive in a listed company
N: Number of top executives in all the listed companies in the region
W: Wage of an employee in a listed company
M: Number of employees in all the listed companies in the region

We drop the bottom 10% of companies according to the average wage because these wages are abnormally low compared to the urban wage level; we then winsorize (at 5%) the observations according to the inequality within a company. We apply equation (10) to the cleaned data to calculate regional inequality. The inequality ranges from 1.2 to 11.0; this appears to be smaller than the ACFTU figure mentioned in Section 2. However, the ACFTU figure derives from 208 state-owned firms that tend to be larger-than-average in scale, while our data derive from all listed state-owned companies; additionally, the ACFTU figure compares the payment of top executives to the wages of frontline workers, while our data compare that payment to the wages of all employees. From 1999 to 2010, the mean of *INEQ* more than doubled, from 2.6 to 5.6. Higher inequality implies that power relations are more unfavourable to workers; thus, *INEQ*'s sign is expected to be negative.

4.3 Reserve army of labour effect

Marx suggests that the reserve army of labour comprises three parts—namely, a floating, latent and stagnant reserve army of labour (Marx, 1976, pp. 794–802). China's unemployment data cover only urban registered unemployment and do not include unemployed migrant workers or unregistered urban unemployment. Meanwhile, the reserve army should also include rural labour forces. Considering data availability, we measure a reserve army of labour *effect* instead of the scale of the reserve army. This effect is:

$$RAL = \frac{ARWP + URU + NPE}{UE}, \tag{11}$$

ARWP: Adjusted rural working-age population
URU: Urban registered unemployment
NPE: Not-on-post workers
UE: Urban employment

The numerator includes not-on-post workers and rural working-age population, in addition to registered urban unemployment. Not-on-post workers are laid-off workers not counted in unemployment. We adjust rural working-age population because the reserve army of a region includes not only local rural labour forces but also those from neighbouring regions. Rural labour forces in a region may work out of their home regions. The question is how to define 'neighbouring regions'. Due to cross-regional migration, geographically neighbouring regions might differ from the regional sources of migrant workers. We define the neighbouring regions of a particular region as the top three destination regions for travellers from the region in question during the Chinese New Year period. Baidu Migration data provide the destination regions for travellers in the ten days previous to the Chinese New Year of 2015 when the vast majority of travellers were travelling from their work regions to home regions; these data were captured through a popular smartphone application that can locate millions of users. Although data quality remains questionable, we need only the top three destination regions, rather than fine-grained data.

In summary, the adjusted rural working-age population is the sum of the rural working-age population from the local region and that from the three selected neighbouring regions. RAL represses workers' bargaining power; thus, it is expected to have a negative effect.

4.4 Replacement income

The replacement income differs between the two major components of workers (i.e. migrant workers and formal urban workers, where the latter refers to workers in the urban unit sector). Some workers outside the urban unit sector are not migrant workers but similar to migrant workers in terms of working conditions and job security. Thus, we assume the overall replacement income is a weighted average of the replacement income for migrant workers and formal urban workers.

$$RI = RI_1 . \frac{FE}{UE} + RI_2 . (1 - \frac{FE}{UE}), \quad (12)$$

RI_1 Replacement income of formal urban workers
FE: Formal employment
UE: Urban employment
RI_2: Replacement income of migrant workers

For migrant workers, one might consider 'agricultural income' their replacement income. However, in the labour extraction model, the replacement income comprises the social subsidies that workers can receive upon being dismissed; this means that workers should not receive this income if they keep their job. We argue that agricultural income is not migrant workers' replacement income, because they can receive it even when they work in urban areas, in line with how rural households carry out agricultural production. A 2009 investigation showed that 80% of migrant workers live in urban areas without their family members, and less than 5% of migrant workers have access to unemployment insurance.[14] A typical rural household is semi-proletarianised because the younger generation within the household tends to work in cities as migrant workers and the older generation tends to work as cultivators in the countryside. The inter-generational division of labour within the household implies that the household receives farming income *no matter* the migrant workers of the household have jobs or not in cities. Thus, we assume that the replacement income of migrant workers is zero.[15] For formal urban workers, we use the subsidy for lowest living conditions as the replacement income; this subsidy is distributed to urban residents (migrant workers are not included) whose per-capita family income is lower than the standard for the lowest living conditions. The subsidy is deflated by urban CPI. A higher *RI* strengthens workers' bargaining power; thus, it is expected to have a positive effect.

4.5 Control variables

We control the share of agriculture in GDP (*AGR*). The contemporary literature suggests that sectoral structure relating to agriculture is a major determinant of labour share. Economic growth (*GROWTH*) is controlled, as economic fluctuations may affect distribution. Capacity utilisation could be a better measure of economic fluctuations

[14] Source: National Statistical Bureau, *Investigation Report on Migrant Workers 2009* (in Chinese), http://www.stats.gov.cn/tjfx/fxbg/t20100319_402628281.htm.

[15] Besides, there are economic and social forces that make the unemployed migrant workers look for another job in cities rather than returning to villages and doing agricultural work. Farming has been less attractive than working in cities as migrant workers. The new generation of migrant workers born after 1980 has a stronger preference for living permanently in cities; moreover, they lack farming skills, meaning they could not return to farming even if they were fired in cities.

and effective demand, but there is no official data for it. Given that the self-employment sector was negligible in the first stage but became large in the second, the share of self-employment (*SELF*) is controlled for the second stage. In different specifications, we also control variables that commonly appear in the literature, including trade openness (*TRADE*), foreign direct investment (*FDI*, only for the second stage), the share of state ownership (*SOE*) and the share of governments (*GOV*). Finally, to capture the effect of institutional factors on distribution, we control the marketisation index of government-market relations (*MARKET*) developed by Fan et al. (2010) and Wang et al. (2017), which reflects the intervention of governments: the larger the index, the less intervention of governments. This index is available only for the second stage.

Tables 1 and 2 provide variables' definitions, data sources and descriptive statistics.

5. Results and robustness

Many recent studies apply to regional panel data the system GMM method. Given the small panel size, such applications are likely to suffer from 'too many instruments' (Roodman, 2009; Bazzi and Clemens, 2013), which jeopardises the effectiveness of the Hansen test. We estimate equations (7) and (8) with the fixed-effect method; as Stockhammer (2017) suggests in a relevant study, GMM is not superior to our method in this case. Every specification controls for year dummies and all standard errors are heteroskedasticity-robust. Table 3 gives the regression results for the first stage (based on equation (7)).

In general, the results confirm that there was a social contract that linked labour productivity with wages. In Table 3, Column (1) contains the results of the baseline model. Capital per worker has a statistically significant and positive effect. There is a U-shaped relationship between bonuses and labour share. When bonuses reached 171 yuan (close to the level of 1988), labour share began to be raised; this means the abuse of bonuses eventually lowered the profit share, which might constrain accumulation. Economic fluctuations have a negative but statistically insignificant effect; it is insignificant, probably because the economic system was a combination of planning and markets. The share of agriculture has a statistically significant and positive effect, which is consistent with the orthodox argument that the agricultural sector had a higher labour share relative to the rest of the economy.

In each of Columns (2)–(4), we add one explanatory variable. The results of the variables in the baseline model change only slightly. In Column (2), trade openness has a positive but statistically insignificant effect. Using the export–GDP ratio instead does not change the result. In Column (3), state ownership has a negative but statistically insignificant effect, and in Column (4), the share of governments has a positive but statistically insignificant effect.

Table 4 reports the results for the second stage (based on equation (8)), showing that the social contract vanished, and wages and labour productivity was delinked. Column (5) provides the baseline results. Capital per worker has a statistically significant and negative effect. Both management–worker inequality and the reserve army have statistically significant and negative effects; the replacement income has a statistically significant and positive effect. The signs of these variables are as expected. This implies that managers used wages and unemployment to discipline workers. Economic fluctuations have a statistically significant and negative effect, implying that labour

Table 1. *Variable definitions and data sources*

Variable	Definition	Notes	Data sources
ln*(LS)*	Logarithm of labour share		Hsueh and Li (1999), NBS (2007), CSY
ln*(LSNA)*	Logarithm of labour share in the non-agriculture economy		Hsueh and Li (1999), NBS (2007), *CSY*, and the author's estimation
BONUS	Bonus in real terms		*CSY*
BONUSQ	Square of BONUS		*CSY*
INEQ	Manager–worker inequality		*CSMAR*
RAL	Reserve army of labour effect		*CSY*, *CLSY*, Baidu Migration
ln*(KL)*	Logarithm of fixed capital per worker		*CSY*
GROWTH	GDP growth	Real growth rate of per-capita GDP	*CSY*
AGR	Share of agriculture	Value-added of agriculture / GDP	*CSY*
SELF	Share of self-employment	Urban self-employment / urban employment	*CSY*
TRADE	Trade openness	(Export + import) / GDP	*CSY*
FDI	Foreign direct investment	Foreign direct investment / GDP	
SOE	Share of state ownership	Industrial output of state-owned and state-holding enterprises / total industrial output	*CSY*
GOV	Share of governments	Fiscal expenditure / GDP	*CSY*
MARKET	Marketisation index		Fan et al. (2010), Wang et al. (2017)

Note: *CSY*: *China Statistical Yearbook*; *CLSY*: *China Labour Statistical Yearbook*. The statistical criterion for the compensation of employees was modified by the NBS in 2004–07, and data for 2008 are unavailable. We estimate and adjust the data following reasonable procedures. The data are available upon request.

Table 2. *Descriptive statistics*

Variable	Obs	Mean	SD	Min	Max
Period: 1978–91					
ln*(LS)*	394	−0.53	0.23	−1.44	−0.28
ln*(LSNA)*	394	−0.79	0.21	−1.54	−0.46
ln*(KL)*	345	−0.41	0.52	−1.60	0.94
BONUS	308	136.62	66.59	7.08	383.92
BONUSQ/1000	308	23.09	23.30	0.05	147.40
AGR	406	0.31	0.12	0.03	0.60
GROWTH	405	0.10	0.05	−0.09	0.25
TRADE	363	0.18	0.49	0.00	3.82
SOE	403	0.71	0.13	0.29	0.94
GOV	399	0.16	0.07	0.06	0.45
Period: 1999–2010					
ln*(LS)*	348	−0.57	0.14	−0.96	−0.23
ln*(LSNA)*	348	−0.68	0.15	−1.09	−0.26
ln*(KL)*	348	1.33	0.55	0.01	2.90
INEQ	346	4.60	1.73	1.20	10.99
RAL	348	19.90	17.91	3.51	105.14
RI	348	0.12	0.08	0.01	0.46
AGR	348	0.14	0.07	0.01	0.36
GROWTH	348	0.12	0.03	0.05	0.24
SELF	348	0.13	0.05	0.02	0.28
TRADE	348	0.33	0.42	0.00	1.80
FDI	348	0.03	0.03	0.00	0.15
SOE	348	0.50	0.20	0.11	0.90
GOV	348	0.17	0.07	0.06	0.55
MARKET	348	7.29	1.67	2.75	10.53

share is counter-cyclical and wage growth cannot catch up with GDP growth during economic booms. The share of self-employment has a statistically significant and positive effect; given that most of the self-employment value-added accrues to labour income under the statistical system, this result is reasonable.

The share of agriculture has a positive effect, but this effect is statistically insignificant. Bai and Qian (2010b) shows that the fall in the share of agriculture explains a significant part of the decline in labour share, by Solow's decomposition method; however, sectoral change has not exhausted all causalities between agriculture and labour share in the context where the rural economy has been integrated into the whole market economy. For instance, a region with a larger agricultural sector tends to have a poorer rural economy, and so a higher proportion of rural labour forces need to participate in wage labour to increase their income. This may impose extra downward pressure on labour share, offsetting the positive sectoral effect of agriculture. It is not surprising to see that the share of agriculture has a statistically significant effect only in the first stage when the rural economy was not integrated into a market economy.

To each of Columns (6)–(10), we add one explanatory variable. Trade openness and FDI have no statistically significant effect. Even if globalisation is supposed to be favourable for Chinese workers (as the Stolper–Samuelson theorem predicts), it has not been favourable to labour share. State ownership and the share of governments both

Table 3. *Regression results for the first stage*

	(1)	(2)	(3)	(4)
Period: 1978–91				
Dependent variable: ln*(LS)*				
ln*(KL)*	0.088***	0.106***	0.079**	0.072**
	(3.492)	(5.616)	(2.507)	(2.701)
BONUS	−0.002***	−0.002***	−0.002***	−0.002***
	(−3.323)	(−2.924)	(−3.226)	(−3.250)
BONUSQ	0.005***	0.005***	0.005***	0.005***
	(4.088)	(3.899)	(3.982)	(3.877)
GROWTH	−0.062	−0.057	−0.073	−0.051
	(−0.732)	(−0.615)	(−0.818)	(−0.621)
AGR	0.798**	0.927**	0.872**	0.829**
	(2.358)	(2.674)	(2.226)	(2.452)
TRADE		0.022		
		(0.405)		
SOE			−0.188	
			(−0.789)	
GOV				0.282
				(1.215)
CONS	−0.732***	−0.763***	−0.616***	−0.816***
	(−7.776)	(−7.656)	(−5.197)	(−8.858)
Adj. R^2	0.519	0.521	0.523	0.521
N	287	276	287	287

Notes: *t*-statistics are reported in parentheses. All SEs are heteroskedasticity-robust. All specifications include year dummies. The coefficients of *BONUSQ* are multiplied by 1,000.

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

have no statistically significant effect.[16] *MARKET* has a statistically significant and negative effect on labour share, meaning less government intervention is bad for labour share. Less government intervention may imply that governments cannot maintain the growth of employment during economic downturns with fiscal policies; neither can they influence the investments of firms with micro subsidies.

To illustrate the relative size of effects of each variable, we compare the contributions of the variables relevant to power relations, based on the baseline results in Column (5). From 1999 to 2010, the regional labour share on average declined by 7.2 percentage points. Given that the social contract vanished, labour productivity has contributed 7.5 percentage points; management–worker division has contributed to 2.1 percentage points. During this period, although the reserve army was massive and the replacement income was low, the reserve army was gradually shrinking after it emerged in the 1990s and that the replacement income was rising; as a result, they have negative contributions to the decline in labour share, and each of them has contributed −2.2 percentage points, respectively. The shrinking reserve army and the increasing replacement income suggest a recovery of the bargaining power of labour in some aspects, which echoes significant

[16] GOV might underestimate the size of governments, compared to MARKET, which takes into account not only fiscal expenditure but also non-tax interventions in enterprises.

Table 4. *Regression results for the second stage*

	(5)	(6)	(7)	(8)	(9)	(10)
	Period: 1999–2010					
	Dependent variable: ln*(LS)*					
ln*(KL)*	−0.116**	−0.117**	−0.124**	−0.113*	−0.114**	−0.106*
	(−2.071)	(−2.102)	(−2.110)	(−2.017)	(−2.120)	(−1.936)
INEQ	−0.012***	−0.012***	−0.012**	−0.012***	−0.013***	−0.011***
	(−3.075)	(−3.094)	(−2.661)	(−3.209)	(−3.148)	(−3.228)
RAL	−0.003**	−0.003**	−0.003**	−0.003**	−0.004***	−0.003**
	(−2.399)	(−2.372)	(−2.405)	(−2.467)	(−2.778)	(−2.377)
RI	0.353**	0.358**	0.372**	0.352**	0.335**	0.351**
	(2.443)	(2.494)	(2.502)	(2.413)	(2.520)	(2.422)
GROWTH	−1.101**	−1.105**	−1.141***	−1.045**	−1.007**	−1.045**
	(−2.762)	(−2.762)	(−2.770)	(−2.603)	(−2.427)	(−2.710)
AGR	0.297	0.305	0.364	0.216	0.334	0.415
	(0.462)	(0.475)	(0.601)	(0.330)	(0.511)	(0.633)
SELF	0.759***	0.759***	0.736***	0.772***	0.777***	0.746***
	(3.357)	(3.359)	(3.249)	(3.638)	(3.378)	(3.271)
TRADE		−0.012				
		(−0.350)				
FDI			0.639			
			(0.981)			
SOE				0.051		
				(0.363)		
GOV					−0.415	
					(−1.491)	
MARKET						−0.019*
						(−1.739)
CONS	−0.404**	−0.401**	−0.428***	−0.432**	−0.343**	−0.349**
	(−2.474)	(−2.453)	(−2.842)	(−2.471)	(−2.098)	(−2.296)
Adj. R^2	0.363	0.362	0.368	0.362	0.369	0.373
N	346	346	346	346	346	346

Notes: *t*-statistics are reported in parentheses. All SEs are heteroskedasticity-robust. All specifications include year dummies.
*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

regulatory changes (for instance, China formally carried out the minimum wage system in 2004) and the wage increases for migrant workers in the 2000s. However, our results suggest that the recovery was not sufficient for reversing the overall declining trend between 1999 and 2009; the wage increases still fell behind the increases in national income. The mass layoff that mainly happened in the mid-1990s created such a massive reserve army that a moderate recovery in the 2000s had played a limited role in recovering labour share. To sum up, all the variables reflecting power relations contributed 5.2 percentage points, in other words, 73% of the decline in labour share.

It is worthwhile to note that there was an increase in labour's share between 2008 and 2014 (see Figure 1) and our empirical model can predict that increase. This period witnessed a slowdown of economic growth and a further reduction in the reserve army of labour.[17] The economy grew at a speed of 10.1% in 1999–2010, compared to 8.2% in 2011–14 (NBS, 2019). However, effects of the economic slowdown were not sufficiently strong to reverse the shrinking tendency of the reserve army. The econometric results in Table 4 show that labour's share is counter-cyclical, indicating that slower economic growth is associated with a higher labour's share. The results also indicate that a smaller reserve army of labour is associated with a higher labour's share.[18]

Table 5 provides four robustness checks for the baseline models.[19] In Columns (11) and (12), we replace the independent variable with the labour share in the non-agricultural economy, and drop the share of agriculture as an explanatory variable; the key results persist. In Columns (13) and (14), we use three-year averages from the data, and the effects of key variables still have the expected signs and are statistically significant.

We also use micro-level data to confirm the effect of management–worker inequality.[20] Firstly, we use data from the Nanjing Enterprise Survey to examine whether management–worker inequality has expected effects on firm-level distribution. These data cover 168 firms located in the city of Nanjing, over the 1997–2001 period. Given that the Nanjing survey was conducted in a single place, the effects of the reserve army and replacement income can be purged with the fixed-effect model. This micro-level evidence confirms that management–worker inequality has a significantly negative effect. Secondly, we use the micro-level data of listed companies from the CSMAR dataset to examine the causality between management–worker inequality and firm-level wage share with instrumental variables. The 2SLS result has confirmed that management–worker inequality has a significantly negative effect on labour share.

Finally, it is noteworthy that our empirical results are generally consistent with Piovani's (2014) findings. Piovani provides empirical evidence to show that privatisation, labour market informalisation and retreat of the state from social provisioning are key factors explaining the decline in the wage share of China's industrial sector. Despite that Piovani uses a different set of explanatory variables, she explains that those variables affect the wage share either through affecting workers' fallback position

[17] There has been a heated debate in the literature on whether China passed the Lewis turning point (Cai 2010; Cai and Du, 2011; Knight et al., 2011; Zhang et al., 2011). Several indicators evidence such a turning point. For instance, China's working-age population has continuously declined since 2012 (Li, 2019). The growth in the number of migrant workers has slowed down since 2010 (NBS, 2017).

[18] China's macro distribution in the post-2010 era may deserve a more nuanced analysis that takes into account both institutional and economic changes under Xi Jinping as well as changes in the global environment.

[19] More robustness checks are available upon request.

[20] The estimation results with firm-level data are available upon request.

Table 5. *Robustness checks*

	(11)	(12)	(13)	(14)
Period	1978–91	1999–2010	1978–92	1999–2010
Dependent variable	ln*(LSNA)*	ln*(LSNA)*	ln*(LS)* 3-year average	ln*(LS)* 3-year average
ln*(KL)*	0.216***	−0.144*	0.089***	−0.162**
	(5.114)	(−1.901)	(3.113)	(−2.668)
BONUS	−0.001*		−0.001**	
	(−1.786)		(−2.182)	
BONUSQ	0.004**		0.004***	
	(2.461)		(2.888)	
INEQ		−0.017**		−0.021**
		(−2.686)		(−2.497)
RAL		−0.005**		−0.003**
		(−2.293)		(−2.507)
RI		0.485**		0.738***
		(2.251)		(3.531)
GROWTH	−0.179*	−1.268**	−0.169	−1.301**
	(−1.709)	(−2.469)	(−0.674)	(−2.254)
AGR			1.405***	−0.248
			(2.943)	(−0.298)
SELF		0.997***		1.078***
		(3.010)		(3.944)
CONS	−0.644***	−0.423***	−0.875***	−0.283
	(−13.345)	(−3.271)	(−5.973)	(−1.266)
Adj. R^2	0.466	0.231	0.625	0.504
N	287	346	116	116

Notes: *t*-statistics are reported in parentheses. All SEs are heteroskedasticity-robust. All specifications include year dummies. The coefficients of *BONUSQ* are multiplied by 1,000.

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

or through affecting the reserve army of labour, which is generally consistent with our approach. The difference between the two studies is that Piovani investigates the wage share in the industrial sector for the whole reform era with the cointegration method, while here we investigate the labour share in the entire economy with the panel data method, particularly emphasising periodisation of the reform era. Besides, our results reveal that the social contract and the management–worker inequality have effects on the labour share.

6. Conclusion

China's rapid economic growth over the last three decades has been one of the major events in the era of neoliberalism, which was unlikely to happen without low labour share. It is generally recognised in the Marxian tradition that W/Y has an impact on the demand structure. A lower labour's share induces a higher investment share in GDP because it means stronger incentives for investments.[21] Orthodox economics

[21] Is it possible that the investment share in GDP (I/Y) has an impact on labour's share? While heterodox macro models mostly do not assume such an impact, I/Y might have an indirect impact on labour's share in the long run. A higher I/Y is generally helpful to increase capital per worker in the long run, which has a negative effect on labour's share.

suggests that labour share is mainly determined by sectoral structure, and since sectoral changes are inevitable for economic 'modernisation', policies should promote sectoral changes and await a Kuznets turning point. In contrast, we provide empirical evidence of the impact of power relations and argue that the disappearance of the social contract and the repressed workers' power are the major factors that affect the decline in labour share in the second stage.

Changes in the power relation prepared the conditions for rapid accumulation in the 2000s and the formation of the 'world factory'. However, China's economy has witnessed a slowdown since 2012. The secular stagnation of the global economy required China to expand the domestic market; however, the low labour share has been a constraint for that expansion. Thus, reforms that promote the bargaining power of workers may help to resolve the problems with accumulation faced by China's economy.

Our econometric analysis focuses on various aspects of power relations and consistencies between historical and empirical analyses, but it does not seriously discuss endogeneity problems. Given our panel dataset size and the complex relations among macro-level variables, it is difficult to instrument potentially endogenous variables; thus, we leave the task of applying the instrumental variable method to future research. Whenever possible, one should further deal with the endogeneity of our results by using city-level data—a step that extends beyond the scope of this study.

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