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**STRUCTURE CHANGE AND URBAN
INEQUALITY IN THE PEOPLE'S
REPUBLIC OF CHINA**

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Abstract

The People's Republic of China (PRC) is thought to be one of the most unequal economies in the world, but very few studies ever touched on the determinants and the evolution of its urban inequality. This paper firstly applies the inequality decomposition method to an urban household sample covering the period from 2003–2012, and finds that wage inequality of urban households is dominated by inequality component within service industry, and also its decline after 2008 is mainly attributable to the declining inequality component within the service industry. Secondly, we provide evidence indicating that the change in employment structure and wage determination in the urban labor market can help reduce wage income inequality in urban PRC. These results can help explain the fact that inequality in urban PRC no longer shows deterioration after 2008. Policy implications are also proposed at the end of this paper.

JEL Classification: D63, P25

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1. INTRODUCTION

Much of the world is watching the People's Republic of China (PRC) with concern. Not only has it created fast economic growth, but it is also thought of as an economy with surprisingly high inequality. During the economic transition over the past 4 decades, inequality in the PRC kept a very clear increasing trend and the World Bank (2007) warned that high inequality could push it into middle-income trap.

The worsening income inequality in the PRC during its economic transition has attracted worldwide attention, resulting in a sizable literature. There is a rich literature that focuses on determinants of rural–urban gaps, and inequality in the rural sector (Adelman and Sunding 1987; Griffin and Saith 1982; Knight and Song 1993; Knight and Song 1999; Khan et al. 1992; Wan 2004, 2007; Kanbur and Zhang 1999; Bhalla et al. 2003; Yang 1999; Tian 2001; Zhu 1991; Zhao 1999; Lu 2002; Zhang and Zou 2012; Sicular 2013; Ito 2008). Also, there have been very good studies on inequality in the PRC (Wan and Zhou 2005; Chen et al. 2010; Gustafsson et al. 2010; Wang et al. 2014). Unfortunately, the National Bureau of Statistics (NBS) of the PRC has only recently started to report time series measuring inequality in urban PRC, although they had reported a national level Gini Index and one for rural areas. Very few studies focus on the determinants and evolution of inequality in urban PRC. Based on China Household Income Project (CHIP) survey data, Khan et al. (1992) decompose the urban Gini index by income sources, and find that the two most important contributors are wages (34%) and housing subsidies (24%). Employing the same data, Meng (2004) finds that during the marketization of urban sectors, unemployment and under-employment led to a fall in urban workers' incomes, and reduced inequality in the urban labor market. Li et al. (2016) investigate the evolution of urban inequality from the angle of wage structure between 1995 and 2013, and find that regional gap and inequality of human capital are major contributors to overall wage inequality in urban PRC. Ma and Li (2016) evaluate the effect of minimum wage on urban inequality from 1993 to 2013 and find that the increase of minimum wages had a positive effect on the wage levels of the low-wage group only from 2007–2013; there was no such effect from 1993–1995 and from 1998–2002.

In the PRC, inequality in the urban sector has been low relative to its rural counterpart (Wang et al., 2014). But this cannot be an excuse for economists and policymakers to ignore it. We believe that the determination and evolution of inequality in urban PRC, especially the structural change in the urban labor market, deserves intensive study for the following reasons.

First, employment in the urban sector increased sharply from 23.69% in 1978 to 50.88% in 2014 (NBS 2015), and this urbanization process is likely to continue for a long time into the future. So, the urban sector will play a more and more important role in the evolution of urban and overall inequality in the PRC.

Second, for most urban households in the PRC, wages are the most important income source. For example, the share of wage income in total income decreased slightly from 71.16% in 2000 to 64.30% in 2012 (NBS, 2015). That is to say, wage income still dominates total income of urban households. So, the changes in employment structure and wage determination should have an important effect on inequality within the urban sector and even on overall inequality. There have been some studies on the PRC's structural change, e.g., Fan et al. (2003). But there have been few if any attempts to bring structure change and the evolution of inequality together. Dollar (2007) provides a detailed discussion of government policy and social disparities in the PRC, and predicts that the policy shift toward encouraging migration, funding

education, and improving the health of people in poor areas and of poor households, and rebalancing the economy away from investment and exports toward domestic consumption and public services, will help reduce social disparities. However, he does not provide any evidence.

Third, most existing studies focus on explaining the driving forces behind the reduction in urban inequality during the economic transition, but no attention has been paid to new trends of urban inequality in recent years. For example, employing CHIP data, Table 1 presents the inequality measures of wage income for both residents with urban household registration identity (thereafter urban locals) and rural migrants, showing that they peaked in 2007 and subsequently decreased.

Table 1: Inequality of Wage Income in Urban PRC (Urban Locals+Migrants)

	2002	2007	2008	2013
Gini Index	0.4169	0.4293	0.4063	0.3609
Theil Index	0.3094	0.3636	0.2856	0.2386

Data source: Author's computation based on CHIP survey data.

Using Urban Household Survey samples collected by NBS of the PRC, we measure the Gini Index and Theil Index of wage incomes for urban locals, and present them in Table 2. It shows that after 2008 the increase in inequality of wage income for urban locals slowed, which is a positive development for the PRC. Although it is difficult to know whether this is a long-term or a short-term trend, it is an important development that deserves analysis and has important implications. Yet, there have not been any studies so far to explain this new trend. Using a rich data set covering a long time period, this paper attempts to fill the gap and contribute to the inequality literature.

Table 2: Inequality of Wage Income in Urban PRC (Urban Locals)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Gini Index	0.3726	0.3778	0.3836	0.3807	0.3802	0.3922	0.3721	0.3984	0.4016	0.3914
Theil Index	0.2412	0.2512	0.2562	0.2519	0.2486	0.2653	0.2364	0.2772	0.2849	0.2722

PRC = People's Republic of China.

Note: Those observations having no information on wages are dropped when measuring inequality.

Data source: Urban Samples from NBS of the PRC.

And last but not least, compared with the existing literature, which has very limited data resources, we have very good urban household data from the NBS of the PRC, which makes both the inequality decomposition and regressions possible. This paper is one of the first trying to explain the effect of employment structure change on inequality in urban PRC. The inequality decomposition and empirical evidence provided in this paper can help understand the determinants of inequality in the PRC.

The rest of this paper is structured as follows. Section 2 provides an introduction of the data source. Section 3 firstly introduces our inequality decomposition method, and then applies it to the data source from the PRC, which reveals the main driving force behind overall inequality in urban PRC. Section 4 links the development of the service industry with the evolution of urban inequality, predicting that the growth of the low-skilled service sector and changes in wage determination in the urban labor market play a positive role in reducing inequality in urban PRC. The last section concludes the paper and provides some policy implications.

2. DATA SOURCE

The data source being used in this paper is the Urban Household Survey (UHS) data collected by NBS of the PRC. It includes a large number of urban household samples in 2003–2012. The sampling framework of the NBS of the PRC and the journal of household activities ensure that the quality of this data among the best collected in the PRC. Table 3 presents the number of provinces and individuals covered in the household data set employed in this paper.

Table 3: Sample Size of Survey Data Used in This Paper

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Province	16	16	16	16	18	18	18	4	4	4
Individual	90,861	95,326	99,093	98,249	142,778	161,109	151,706	37,414	33,243	32,800

3. INEQUALITY DECOMPOSITION

3.1 Decomposition Method of Inequality Index

To gauge the determinants of inequality in urban PRC, we follow Shorrocks (1980; 1984), and decompose the inequality index as shown below:

The generalized entropy (GE) class of inequality measures can be expressed as follows:

$$GE(y) = \begin{cases} \sum_{i=1}^n f(y_i) \left\{ \left(\frac{y_i}{\mu} \right)^c - 1 \right\} & \text{for } c \neq 0, 1, \\ \sum_{i=1}^n f(y_i) \left(\frac{y_i}{\mu} \right) \log \left(\frac{y_i}{\mu} \right) & \text{for } c = 1, \\ \sum_{i=1}^n f(y_i) \log \left(\frac{y_i}{\mu} \right) & \text{for } c = 0. \end{cases} \quad (1)$$

where y_i is the i th income, μ represents the total sample mean, $f(y_i)$ is the population share of y_i in the total population, and n denotes the total population. When c is less than 2, the measure is transfer-sensitive, that is to say, the bottom income group is more sensitive to transfers than the upper income group. $GE(1)$ and $GE(0)$ represent the Theil index and Mean Log Deviation, respectively. GE can be further decomposed by income groups:

$$GE(y) = \sum_g^K w_g I_g + I(\mu_1 e_1, \dots, \mu_k e_k), \quad (2)$$

where

$$w_g = \begin{cases} f_g \left(\frac{\mu_g}{\mu} \right)^c & \text{for } c \neq 0, 1, \\ f_g \left(\frac{\mu_g}{\mu} \right) & \text{for } c = 1, \\ f_g & \text{for } c = 0. \end{cases}$$

In equation (2), I_g denotes inequality within the g th group, μ_g is the mean of the g th group, e_g is a vector of 1s of length n_g , and n_g is the g th group's population. f_g denotes the population share of the g th group in the total population. $\sum_g^K w_g I_g$ represents the within-group inequality while $I(\mu_1 e_1, \dots, \mu_k e_k)$ is the between-group inequality. For simplicity, our paper use $GE(0)$, the Mean Log Deviation.

Applying this decomposition method to the survey data gives us stylized facts about the determinants and evolution of inequality in urban PRC.

3.2 Inequality Decomposition: Components of Wage Inequality within Urban Locals

Employing the samples of urban locals from NBS of the PRC, Table 4 presents the Gini Index of all urban locals in three industries¹. It is revealed that, firstly, the Gini Index in the primary industry is always much lower than that in other industries, suggesting that it contributes very little to overall inequality in urban PRC; secondly, the Gini Index in the third industry is always higher than that in the second industry.

Table 4: Gini Index of Wage Income for Urban Locals

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total	0.3726	0.3778	0.3836	0.3807	0.3802	0.3922	0.3721	0.3984	0.4016	0.3914
Primary Industry	0.3106	0.3242	0.3268	0.3069	0.2947	0.3546	0.3309	0.3204	0.3675	0.3252
Second Industry	0.3636	0.3685	0.3741	0.3710	0.3646	0.3734	0.3539	0.3706	0.3770	0.3750
Third Industry	0.3758	0.3808	0.3872	0.3851	0.3871	0.3994	0.3790	0.4083	0.4097	0.3968

Data source: computed from the samples from NBS of the PRC.

Because most agricultural production is concentrated in rural areas, the share of the primary industry workers in urban PRC is very low, and their contribution to overall inequality in the urban labor market can be ignored.² So, we drop those samples from the primary industry to simplify the decomposition and analysis. Table 5 presents the Theil Mean Log Deviations of wage incomes for urban locals in the second and the third industry, and it can be seen that they have similar patterns as in Table 4.

Table 5: Theil Mean Log Deviation of Wage Incomes for Urban Locals

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Second and third Industry	0.2745	0.2693	0.2789	0.2696	0.2650	0.2946	0.2522	0.2980	0.3122	0.2901
Second Industry	0.2487	0.2444	0.2518	0.2435	0.2326	0.2561	0.2198	0.2390	0.2479	0.2453
Third Industry	0.2865	0.2800	0.2906	0.2809	0.2785	0.3097	0.2646	0.3177	0.3324	0.3033

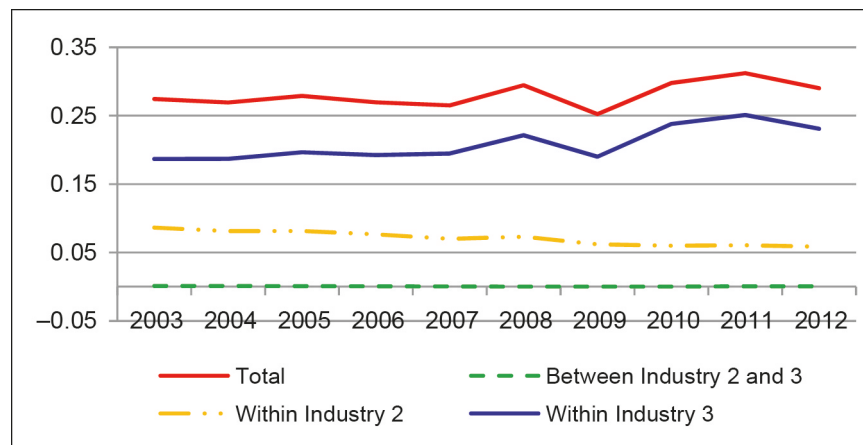
Data source: Computed from the samples from NBS of the PRC.

¹ In this paper, we do not distinguish between the term third industry and the term service industry.

² For example, according to NBS of the PRC, its share was basically less than 1% in recent decades, and the share of primary industry workers in the urban sample being used in this paper is also lower than 1%.

The results of applying the decomposition method to the sample of urban locals in the second and third industry, are presented in Figure 1.

Figure 1: Inequality Decomposition of the Second and Services Industry



Data source: Computed from the urban household samples from NBS of the PRC.

It can be seen that the inequality component in the service industry is much higher than any other components. And also, it has a pattern very similar to that of the total inequality index. This suggests that the increase and decrease of overall inequality in the second and third industries in urban PRC was dominated by the inequality component within services.

The decomposition result is actually not surprising because of two facts: first, in urban PRC, a larger share of labor is employed in the service industry from the 1990s³; second, the service industry includes a very wide array of jobs from modern services like insurance and banking, and traditional services like lodging and catering. The former generally needs high levels of human capital or skills and pays very high wages, while the latter does not need too much knowledge or high skills and pays low wages. It can be assumed then that the change in inequality inside the service industry may be related to the change in the employment structure and the change in the wage structure.

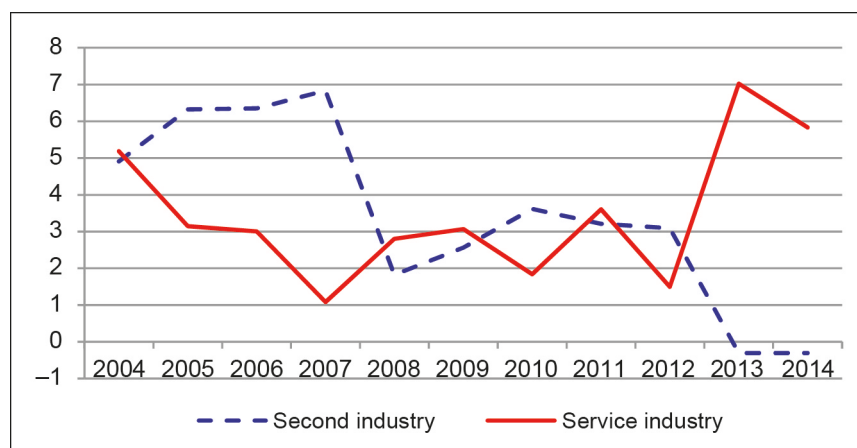
4. EXPLANATION AND EVIDENCE: STRUCTURE CHANGE AND DECREASING INEQUALITY

Given the potential relationship between inequality and economic growth (Lewis, 1955; Kuznets, 1955) and the intrinsic link between economic growth and structural change, we propose the following theoretical hypothesis to explain the new trend of urban inequality in the PRC after 2008: the development of the service industry and the structural transformation of the PRC economy changed the employment structure and wages of low-skilled workers in the service industry, and consequently reduced inequality in the service industries, and subsequently inequality in urban PRC. Next, we provide some evidence to explain this mechanism.

³ According to the NBS of the PRC, before 1995, the employment share of the service industry in total employment was lower than that of the second industry. This situation began to change in 1995, in which year the former was 24.8%, while the latter was 23%. After 1995, the former was always higher than the latter.

Theoretically speaking, urbanization, agglomeration of economic activities, and international trade are all important drivers of economic structure transformation, but in this paper we believe that the development of the service industry played an important role in the evolution of urban inequality in the PRC after 2008. For example, Figure 2 presents the growth rate of employment in the second industry and the service industry in the PRC from 2004 to 2014. We see that, before 2008 employment in the second industry had a higher growth rate than that of the service industry. But the situation began to change in 2008, and after 2012 employment in the service industry grew at a much higher rate than in the second industry. These changes suggest that the development of the service industries meant more and more workers were absorbed by the urban labor market.

Figure 2: Growth Rate of Employment in the Second and Services Industry (%)



Data source: computed from statistics on the website of NBS of The PRC, www.stats.gov.cn.

Then how about the employment structure in the service industry? Based on the fact that certain services do not require high levels of human capital or skills, whereas the others do, we can crudely classify the service industry into low-end and high-end services⁴ and then investigate their respective employment and wage structures. In the existing literature, there is no generally accepted definition or classification of low-end and high-end services. In this paper, we use the average wage levels of two-digit code services and the characteristics of different services to define high-end services, as shown in Table 6. Other services not listed in Table 6 are classified as low-end services. In fact, after computing the average wage levels of these high-end services, we find that the high-end services presented in Table 9 are always in the top-10 of having the highest wages from 2003 to 2012.

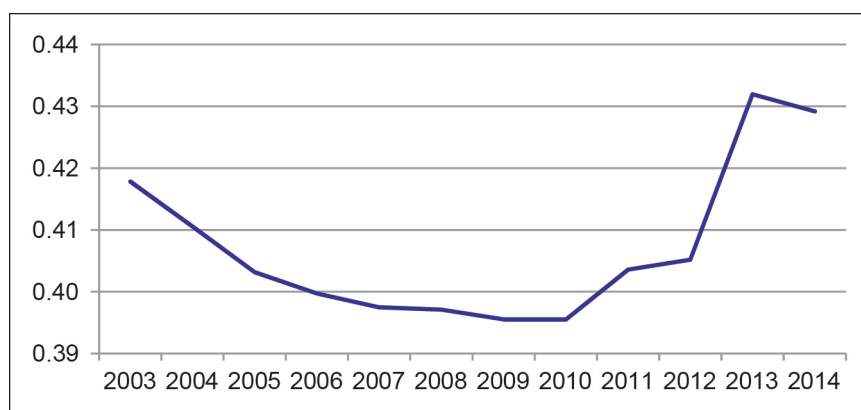
After defining low-end and high-end services, we can explore the employment structure inside services. Figure 3 reports the employment share of low-end services in the service industry. It shows that the share of employment in low-end services kept a very clear U-shape trend, decreasing until 2009–2010 when it started to increase. This U-shape suggests that, after 2008, the service industries absorbed more and more low-end workers rather than high-end workers in urban PRC.

⁴ We do not adopt the classification of consumer services vs. producer services for that; some industries provide services for both consumers and producers, such as transportation and information transmission.

Table 6: Definition of High-end Services

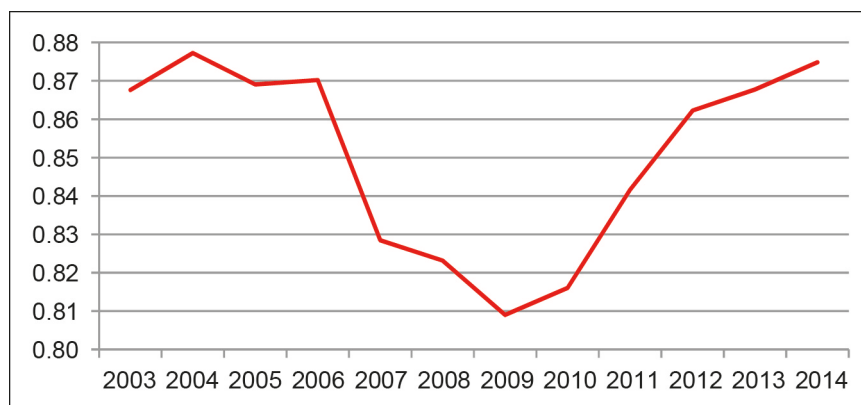
Two-digit Code	Industry
07	Information Transmission, Computer Services and Software
10	Banking
11	Real Estate
13	Scientific Research, Technical Services, Geological prospecting
16	Education
19	Public Management and Social Organization
20	International Organization

Note: two-digit codes of industries come from the NBS of the PRC.

Figure 3: Employment Share of Low-end Services in the Services Industry

Data source: Computed from the statistics on the website of NBS of the PRC.

Actually, not only has the employment structure changed after 2008, wage determination inside the service industry also saw a dramatic change. For example, Figure 4 presents the mean wage gap between low-end services and high-end services in recent years. It can be seen that, before 2009, the wage gap kept a clear U-shape with a turning point in 2009. This indicates that mean wage in low-end services kept a slower growth rate than that in high-end services before 2009, but this trend was completely reversed after 2009.

Figure 4: Mean Wage Gap between Low-end and High-end Services

Data source: computed from statistics on the website of NBS of the PRC, www.stats.gov.cn.

Summing up, from 2008, the employment structure in the urban labor market saw a dramatic change. Given that the decline in overall inequality is mainly driven by the decline in inequality within services, these changes can help reduce overall inequality in the service industry and subsequently reduce inequality in urban PRC.

Employing individual data, we next provide empirical evidence showing there were also changes to the wage determination in low-end service industries. In order to test whether wage determinations also changed after 2008, we run the Mincer wage equation in the low-end service industry. Dependent and independent variables are defined in Table 7.

Table 7: Variable Definition of Regression Models

Variable	Variable Definition
Mwage	Monthly wage of workers (in log)
Lowskill	Workers with less than 10 years of schooling
Age	Age of workers
Age_sq	Squared age of workers
Female	Dummy variable for female workers (female=1)
Married	Dummy variable for married workers(married=1)
Education	Schooling years of workers
Experience	Years of working experience of workers

Table 8: Wage Equation for Urban Locals (2003–2012)

	2003	2004	2005	2006	2007
Lowskill	−0.8080*** (0.0779)	−0.2540*** (0.0813)	−0.0222 (0.0822)	−0.0645 (0.0826)	0.0365 (0.0674)
Age	−0.1270*** (0.0223)	−0.1390*** (0.0251)	−0.1760*** (0.0247)	−0.2260*** (0.0252)	−0.1840*** (0.0201)
Age_sq	0.0008*** (0.0003)	0.0012*** (0.0003)	0.0016*** (0.0003)	0.0022*** (0.0003)	0.0017*** (0.0005)
Female	0.0069 (0.0405)	−0.2130*** (0.0448)	−0.2620*** (0.0455)	−0.2770*** (0.0455)	−0.2160*** (0.0372)
Married	−0.3530*** (0.0945)	−0.7030*** (0.1050)	−0.6650*** (0.1040)	−0.4870*** (0.1060)	−0.5640*** (0.0864)
Education	0.3230*** (0.0119)	0.3260*** (0.0145)	0.3610*** (0.0143)	0.3490*** (0.0143)	0.3220*** (0.0116)
Experience	0.112*** (0.0046)	0.0946*** (0.0043)	0.0933*** (0.0044)	0.0899*** (0.0044)	0.0838*** (0.0039)
Constant	6.3750*** (0.4280)	6.6790*** (0.4900)	6.8900*** (0.4870)	8.0170*** (0.5020)	7.8830*** (0.4040)
Observation	16,317	18,895	20,047	20,545	30,600
R ²	0.213	0.127	0.2514	0.111	0.087

continued on next page

Table 8 *continued*

	2008	2009	2010	2011	2012
Lowskill	0.2340*** (0.0647)	0.2690*** (0.0695)	0.1150 (0.1370)	0.0184 (0.1450)	0.0340 (0.1530)
Age	-0.1480*** (0.0180)	-0.1610*** (0.0198)	-0.1710*** (0.0388)	-0.1340*** (0.0396)	-0.1220*** (0.0419)
Age_sq	0.0014*** (0.0002)	0.0015*** (0.0002)	0.0017*** (0.0005)	0.0012*** (0.0005)	0.0012** (0.0005)
Female	-0.3160*** (0.0360)	-0.3890*** (0.0386)	-0.2970*** (0.0756)	-0.3790*** (0.0803)	-0.4410*** (0.0856)
Married	-0.6080*** (0.0787)	-0.4770*** (0.0871)	-0.6500*** (0.1680)	-0.9090*** (0.1690)	-0.9860*** (0.1760)
Education	0.3320*** (0.0111)	0.3580*** (0.0120)	0.2980*** (0.0236)	0.2650*** (0.0250)	0.2840*** (0.0257)
Experience	0.0675*** (0.0035)	0.0654*** (0.0037)	0.0414*** (0.0077)	0.0481*** (0.0083)	0.0456*** (0.0089)
Constant	7.2140*** (0.3600)	7.2420*** (0.3990)	8.7210*** (0.8050)	8.7240*** (0.8220)	8.1440*** (0.8700)
Observation	35,889	33,799	9,012	8,120	7,786
R ²	0.076	0.077	0.060	0.056	0.056

Note: The numbers in brackets are standard errors; *, **, ***, respectively, indicate significant level at the 10%, 5%, and 1%.

In the Mincer wage equation, we add a dummy variable “lowskill,” that measures whether labor is low-skilled. From the regression results in Table 8 we conclude that, after controlling for individual characteristics that determine a worker’s productivity, the dummy variable “lowskill” turned from negative (even significant in the first 2 years) to positive after 2007, and even significantly positive in 2008 and 2009. This suggests that the determinations of low-skilled urban locals’ wage in low-end services also dramatically changed after 2007/2008. These results provide further evidence that the development of service industries during structural transformation in urban PRC fundamentally changed the wage determination in the urban labor market, which can help reduce inequality in urban PRC.

So, this section provides statistical and empirical evidence indicating that, since 2008, there have been significant changes to the employment structure and wage determination in urban PRC and in the low-service industry. These changes have helped to reduce inequality in urban PRC after 2008.

5. CONCLUSION AND POLICY IMPLICATIONS

Even though income inequality in the PRC widened quickly during the economic transition in what was already considered to be one of the most unequal economies in the world, its urban inequality surprisingly declined from 2008. The existing literature fails to note and explain this important issue. Employing a large urban household sample from NBS of the PRC, this paper fills this gap. Firstly, inequality decomposition suggests that, decreasing of wage inequality in urban PRC is mainly attributable to the decreasing of inequality components within service industry, but inequality components within the second industry and that between the second and service industry only have

a minor effect. Secondly, we explain that the structure change in urban PRC plays an important role in this process. We show that during the structure transformation, development of service industry in urban PRC was faster than the second industry after 2008, and inside the service industry, more workers are employed in low-end services rather than high-end services. Also, wage determinations in low-end services changed after 2007/2008, i.e., gaps between low-skilled workers and skilled labor decreased. All of these changes definitely can help reduce inequality in urban PRC.

The policy implications of this paper are straightforward. Since the PRC started its economic reform and open-door policies, structural transformation has developed quickly in the urban sector. After 2008, the structural transformation changed the employment structure and wage determination in the urban labor market, which played an active role in reducing wage income inequality. So, one important way to reduce inequality in developing economies is to create more job opportunities for low-skilled or unskilled workers, or to encourage the development of labor-intensive industries. This can provide more opportunities for the majority of those in the urban labor market.

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