

Urban income inequality in China revisited (1988-2002)*

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Abstract:

Using newly available spatial price deflators, this paper shows that inequality evaluations in the literature overstate the magnitude of inequality and inequality changes, as well as the role played by regional differences in the observed inequality rise during the 1990s.

Keywords: Inequality; China; Spatial price-deflators; Inequality decomposition.

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1. Introduction

The rise of inequality in China has been extensively documented by a growing literature that stresses the central role played by regional differences in explaining both the high levels of inequality reached at the end of the 1990s and the observed increasing trend (Griffin and Zhao 1993, Gustafsson and Li 2001, Khan and Riskin 2001, Riskin *et al.* 2001, World Bank 1997). However, up to recently, a key variable was missing in these evaluations since no information was available on consumer prices differences across regions and provinces. Yet, evidence of regional market segmentation in China (Young, 2000; Wederman, 2003) suggests that price differences may be quite strongly correlated with nominal income differences across provinces, and thus that inequality studies in China may be strongly and systematically biased if regional price differences are not taken into account. In this note, we evaluate the magnitude of these biases for urban household disposable income inequality over the 1988-2002 period, by using new data constructed by Brandt and Holz (2004). These data provide for the first time valuable and reliable estimations of consumer prices at the provincial level. Three issues are at stake here. First, we evaluate the impact of provincial price deflators on the measures of inequality and inequality changes over time. Second, we estimate the impact of the use of price deflators on the measure of the relative importance of regional inequalities in explaining total urban income inequality. Third, we evaluate the induced bias on the evaluation of the relative importance of the regional dimension in explaining urban income inequality changes over time.

2. Data

The data used in this paper come from three household income surveys conducted by the China Project of Income Inequality organized by the Institute of Economics, Chinese Academy of Social Sciences with assistances from the National Bureau of Statistics (NBS), for the reference periods of 1988, 1995 and 2002. The 1988 survey covered ten provinces, i.e., Anhui, Beijing, Gansu, Guangdong, Henan, Hubei, Jiangsu, Liaoning, Shanxi, and Yunnan. In the 1995 survey Sichuan was included with the ten provinces and in the 2002 survey Chongqing was treated as a separated provincial-level city from Sichuan. The sample in each survey was drawn from a large-scale sample selected by NBS for its annual household survey¹. The sample size is rather large, 9,009 households and 31,827 individuals in the first survey, 6,931 households and 21,694 individuals in the second survey, and 6,835 households and 20,632 individuals in the third survey. The data from the three surveys are usually called as the CHIP (China Income Project) data.

For space limitation reasons, we chose here to restrict the presentation to the income variable proposed by Khan and Riskin. The variable has a broader coverage of income components than the income variable adopted by NBS, as the former takes into account income in kind, housing subsidies and imputed rent of private housing². However, all our results on the sensitivity of inequality measures and decomposition to the use of provincial price deflators are robust to the use of narrowly defined household income variables of the NBS type.

To analyze the inter-regional dimension of urban inequality, we use the standard grouping for the eleven provinces included in the urban survey: the coastal region (Beijing,

¹ Regarding the sampling method of NBS's surveys, please find its brief introduction in China Statistical Yearbook 2002 (p. 318).

² For the detailed illustration of the income definition and its computation procedure, please refer to Griffin and Zhao 1993, and Khan and Riskin 2001.

Guangdong, Jiangsu and Liaoning), the central region (Henan, Anhui, Hubei and Shanxi), and the western region (Gansu, Sichuan and Yunnan).

As mentioned above, evidence of market segmentation in China suggests that price differences may be quite strongly positively correlated with nominal income differences across provinces, which may lead to strong and systematic biases in inequality evaluation. However, up to very recently, no spatial price deflators were available. In the analysis that follows, incomes are adjusted for provincial purchasing power differences by using Brandt and Holz (2004) urban provincial-level spatial price deflators³. This newly created dataset is based on the meticulous analysis of household expenditures and prices for a base year, 1990, which is then extended over the 1984-2002 period using provincial consumer price indexes. Although they may still be subject to some measurement errors⁴, these data provide without any doubt a reliable evaluation of provincial prices, and fill a major gap in the study of inequality in China.

In this note, we chose to present inequality in urban household disposable income using the square root of the total number of household members as the equivalence scale. All results are however robust to alternative hypotheses⁵.

3. Urban inequality in China: 1988-2002

Table 1 presents inequality changes over the 1988-2002 period for various inequality indexes both with and without deflating household disposable income by provincial price indexes. If the dramatic inequality rise over the 1988-1995 period has been largely

³ In the current study, the reference is nationwide prices in 2002.

⁴ In particular, they rely strongly on the official provincial CPI for years other than 1990, which may lead to systematic biases and the impact of differences in housing prices may still be under evaluated since only construction costs are taken into account.

⁵ Alternative equivalence scales used include the two extreme cases of no equivalence scale and household income per capita.

documented⁶, the inversed evolution for the 1995-2002 period may be less common knowledge. The finding of slightly decreasing inequality has been analyzed in details in Khan and Riskin (2004) who show that its major sources are the drop in inter-provincial inequality and changes in the distribution of subsidies while, at the same time, wage income became more unequalizing⁷.

Table 1 clearly shows that inequality levels are quite substantially over evaluated when price differences are not taken into account. Indeed, depending on the year and the index considered, inequality computed from non deflated income is between 7% and 20% higher than that observed for deflated income. This issue, which has already been documented by Benjamin, Brandt and Giles (2004)⁸ and Benjamin, Brandt, Giles and Wang (2004) on different periods⁹ is confirmed here for urban household disposable income using the CHIP data. It provides *per se* a major motivation to use regional price deflators in any analysis of income inequality in China. Moreover, Table 1 also stresses the magnitude of the variability in the degree of over-evaluation over time. This means that not only the levels of inequality usually presented in the literature can be misleading but also that evaluations of inequality changes may be substantially biased. Indeed, for all inequality indexes considered here, the magnitude of the bias substantially decreases over the 1988-1995 period, leading to an under-evaluation of the magnitude of the increase in inequality over the period. As for the 1995-2002 period, no clear trend can be observed.

⁶ See in particular Riskin *et al.* (2001), World Bank (1997).

⁷ Standard NBS income measures, which fail to incorporate an important part of household subsidies in kind, do not show this trend and still report a rise in inequality over the most recent period. Going further in the debate would go far beyond the scope of this note, which is to address the issue of the sensitivity of inequality study results to the use of province deflators.

⁸ For rural China, using data from the Research Centre for Rural Economy (RCRE).

⁹ For urban and rural China, using data from the China Health and Nutrition Study (CHNS).

4. Spatial urban income inequality decompositions

As mentioned above, most analyses of inequality changes in China stress the major role played by the geographic dimension. Differences between regions as well as between provinces have been shown to explain a sizeable share of observed household income inequality. Moreover, the observed rise in inequality at the end of the 1990s has been shown to be largely driven by the widening of income gaps between regions and provinces. The object of this section is to evaluate how sensitive these findings are to the use of provincial deflators.

Static biases

Tables 2 and 3 provide standard inequality decompositions by sub-groups for the two most commonly used decomposable inequality indexes, the Theil index (General Entropy Index with parameter 1) and the Mean Log Deviation Index (MLD, General Entropy Index with parameter 0). Decompositions are run over the two most common geographical variables used in China studies: regions (western, central and coastal China) and provinces. Although tables 2 and 3 clearly show that the regional dimension remains a key factor in explaining urban inequality in China, they also indicate that its contribution is usually much over-evaluated when household income is not deflated by provincial prices. The absolute contribution of inter-regional inequality to overall inequality is over-evaluated by between 68% and 200% depending on the inequality index and the year considered¹⁰. Similarly, the absolute contribution of inter-provincial inequality to overall inequality is over-evaluated by between 70% and 250%¹¹.

¹⁰ Respectively, the relative contribution of inter-regional inequality is over-evaluated by between 47% and 153%.

¹¹ Respectively, the relative contribution of inter-provincial inequality is over-evaluated by between 50% and 191%.

Dynamic biases

Lastly, as discussed above and illustrated in table 1, the bias induced by provincial price differences is varying over time and may in turn not influence the static evaluation of the geographical dimension of inequality but also the evaluation of the role of regional inequality in the observed evolution of household inequality in China. Tables 4 and 5 report evaluations of the contribution of inter-regional and inter-provincial inequality in the observed inequality changes, with and without using price deflators for the two sub-periods 1988-1995 and 1995-2002.

Again, they clearly show that the spatial dimension remains a clear and robust source of inequality changes. Indeed, in any case at least 10% of observed inequality changes can be attributed to inequality changes between regions and more than 20% can be attributed to inter-provincial inequality changes. However, using provincial price deflators substantially changes the magnitude of evaluated effects.

Indeed, over the 1988-1995 period, inequality decompositions based on non-deflated incomes greatly overstate the role of inter-provincial inequality in the observed inequality rise. At the same time, as mentioned above, the observed inequality rise is under-evaluated when price differences are not taken into account, which leads to an under-evaluation of the rise in the relative contribution of regional dimensions to overall inequality.

Findings for the 1995-2002 period confirm the central role played by the reduction of inter-provincial and inter-regional inequalities in the observed decrease in urban household income inequality already documented and analyzed by Khan and Riskin (2004). Moreover, using provincial price deflators over the period influences differently the evaluation of the role played by inter-provincial and inter-regional inequalities since the former is over-evaluated if income is not deflated while the latter is under-evaluated.

5. Conclusion

This note stresses the importance of taking into account price differences across provinces when evaluating inequality and analyzing the sources of inequality changes in China. We show that inequality evaluations proposed in the literature tend to overstate the magnitude of inequality as well as the role played by regional differences in the observed inequality rise of the 1990s.

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Table 1
Household total disposable income inequality: 1988-2002

		<i>1988</i>	<i>1995</i>	<i>2002</i>
Gini	<i>Not deflated</i>	0.208	0.321	0.304
	<i>Deflated</i>	0.191	0.298	0.284
	<i>Bias</i>	9%	8%	7%
Theil index	<i>Not deflated</i>	0.079	0.234	0.157
	<i>Deflated</i>	0.065	0.211	0.134
	<i>Bias</i>	20%	11%	17%
Mean Log Deviation index (MLD)	<i>Not deflated</i>	0.074	0.179	0.155
	<i>Deflated</i>	0.063	0.157	0.136
	<i>Bias</i>	17%	14%	14%
General Entropy Index ($\epsilon = -1$)	<i>Not deflated</i>	0.081	0.240	0.184
	<i>Deflated</i>	0.071	0.214	0.163
	<i>Bias</i>	14%	12%	13%

Note: The equivalence scale used is the square root of the total number of household members.

Table 2
Group decomposition of household income inequality by region

		Observed			Absolute contribution			Relative contribution		
		<i>1988</i>	<i>1995</i>	<i>2002</i>	<i>1988</i>	<i>1995</i>	<i>2002</i>	<i>1988</i>	<i>1995</i>	<i>2002</i>
MLD	<i>Not deflated</i>	0.074	0.179	0.155	0.009	0.034	0.026	12%	19%	17%
	<i>Deflated</i>	0.063	0.157	0.136	0.003	0.020	0.012	5%	13%	9%
Theil	<i>Not deflated</i>	0.079	0.234	0.157	0.009	0.034	0.026	11%	15%	17%
	<i>Deflated</i>	0.065	0.211	0.135	0.003	0.020	0.012	4%	10%	9%

Note: The equivalence scale used is the square root of the total number of household members.

Table 3
Group decomposition of household income inequality by province

		Observed			Absolute contribution			Relative contribution		
		<i>1988</i>	<i>1995</i>	<i>2002</i>	<i>1988</i>	<i>1995</i>	<i>2002</i>	<i>1988</i>	<i>1995</i>	<i>2002</i>
MLD	<i>Not deflated</i>	0.074	0.179	0.155	0.016	0.053	0.034	21%	29%	22%
	<i>Deflated</i>	0.063	0.157	0.136	0.005	0.031	0.016	8%	20%	11%
Theil	<i>Not deflated</i>	0.079	0.234	0.157	0.017	0.058	0.037	21%	25%	24%
	<i>Deflated</i>	0.065	0.211	0.135	0.005	0.033	0.016	7%	16%	12%

Note: The equivalence scale used is the square root of the total number of household members.

Table 4

Contribution of inter-regional inequality to urban inequality changes

		<i>1988 - 1995</i>					<i>1995 - 2002</i>				
		Observed evolution		Change in			Observed evolution		Change in		
				Absolute contribution		Relative contribution			Absolute contribution		Relative contribution
MLD	<i>Not deflated</i>	0.105	142%	0.025	24%	7%	-0.024	-13%	-0.008	34%	-2%
	<i>Deflated</i>	0.094	149%	0.017	18%	8%	-0.021	-13%	-0.009	41%	-4%
Theil	<i>Not deflated</i>	0.155	197%	0.026	17%	4%	-0.077	-33%	-0.008	10%	2%
	<i>Deflated</i>	0.146	222%	0.017	12%	5%	-0.076	-36%	-0.008	11%	-1%

Note: The equivalence scale used is the square root of the total number of household members.

Table 5

Contribution of inter-provincial inequality to urban inequality changes

		<i>1988 - 1995</i>					<i>1995 - 2002</i>				
		Observed evolution		Change in			Observed evolution		Change in		
				Absolute contribution		Relative contribution			Absolute contribution		Relative contribution
MLD	<i>Not deflated</i>	0.105	142%	0.037	35%	8%	-0.024	-13%	-0.018	76%	-7%
	<i>Deflated</i>	0.094	149%	0.026	28%	12%	-0.021	-13%	-0.015	74%	-8%
Theil	<i>Not deflated</i>	0.154	169%	0.043	28%	6%	-0.086	-35%	-0.021	25%	0%
	<i>Deflated</i>	0.144	188%	0.030	21%	10%	-0.085	-38%	-0.017	20%	-3%

Note: The equivalence scale used is the square root of the total number of household members.