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 in China, as well as the role played by regional differences in the observed inequality rise during the 1990s.

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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 (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: consumer prices differences across regions and provinces. Yet, evidence of regional market segmentation in China (Young, 2000; Wederman, 2003) suggests that price differences are quite strongly correlated with nominal income differences across provinces, and therefore that inequality studies may be strongly and systematically biased. 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 (2005), which provide for the first time valuable and reliable estimations of consumer prices at the provincial level.

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 sample in each survey was drawn from a large-scale sample selected by NBS for its annual household survey[1]. The sample size is

[1] The sampling method of NBS's surveys is briefly described in NBS (2002, p. 318).

rather large, 9,009 households for 1988, 6,931 for 1995, and 6,835 for 2002. The data from the three surveys are usually refered to as the CHIP (China Income Project) data[2].

For space limitation reasons, we restrict our analysis here 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, since it also takes into account income in kind, housing subsidies and imputed rent of private housing[3]. However, all our results on the sensitivity of inequality measures and decompositions to the use of provincial price deflators are robust to the use of narrowly defined household income variables of the NBS type. Moreover, we only present inequality in urban household disposable income using the square root of the total number of household members as the equivalence scale, though all results are robust to alternative hypotheses[4].

To analyze the inter-regional dimension of urban inequality, we use the standard grouping for the eleven provinces included in the urban survey for the three years: the coastal region (Beijing, Guangdong, Jiangsu and Liaoning), the central region (Henan, Anhui, Hubei and Shanxi), and the western region (Gansu, Sichuan and Yunnan).

In the analysis that follows, incomes are adjusted for provincial purchasing power differences by using Brandt and Holz (2005) urban provincial-level spatial price deflators[5]. 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

[2] See Griffin and Zhao (1993), Riskin, Zhao and Li (2001) and Khan and Riskin (2005) for further details on the data.
[3] For a detailed discussion of the income definition and computation procedure, see Griffin and Zhao (1993), and Khan and Riskin (2001).
[4] Including the two extreme cases of no equivalence scale and household income per capita.
[5] The reference is nationwide prices in 2002.

errors[6], these data provide without any doubt a reliable evaluation of provincial prices, and fill a major gap in the study of inequality in China.

3. Urban inequality in China: 1988-2002

Table 1 presents inequality changes over the 1988-2002 period for various inequality indexes with and without deflating household disposable income by provincial price indexes. If the dramatic inequality rise over the 1988-1995 period has been largely documented[7], the reversed evolution for the 1995-2002 period may be less common knowledge. The finding of slightly but significantly decreasing inequality has been analyzed in details by Khan and Riskin (2005) 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 unequalizing[8].

Table 1 clearly shows that inequality levels are quite substantially over-evaluated when price differences are not taken into account. Indeed, inequality computed from non-deflated income is between 7% and 20% higher than that observed for deflated income[9]. This issue, which has already been documented by Benjamin, Brandt and Giles (2005) [10] and Benjamin, Brandt, Giles and Wang (2005)[11] on different periods and databases 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 stresses the dynamics of the over-evaluation phenomenon. Indeed, not only can the levels of inequality usually presented in the literature be misleading but

[6] 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.
[7] See in particular Riskin *et al.* (2001) and World Bank (1997).
[8] Standard NBS income measures, which fail to incorporate an important part of household subsidies in kind, do not show this trend. Going further in the debate would go far beyond the scope of this note.
[9] All biases are statistically significant at the 5% level.
[10] For rural China, using data from the Research Centre for Rural Economy (RCRE).
[11] For urban and rural China, using data from the China Health and Nutrition Study (CHNS).

evaluations of inequality changes may also be substantially biased. For all inequality indexes considered here, the magnitude of the bias substantially decreases between 1988 and 1995, leading to a potential under-evaluation of the magnitude of the increase in inequality over this period[12].

4. Spatial urban income inequality decompositions: 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 and the Mean Log Deviation Index (MLD). Our results clearly confirm that the regional dimension, stressed by most analyses of inequality changes in China, is a key factor in explaining urban inequality. However, they also indicate that its contribution is much over-evaluated if household income is not deflated by provincial prices. Indeed, the absolute contribution of inter-regional inequality to overall inequality is over-evaluated by between 64% and 200% depending on the inequality index and the year considered[13], and the absolute contribution of inter-provincial inequality is over-evaluated by between 90% and 300%[14,15].

5. Spatial urban income inequality decompositions: dynamic biases

Concerning the dynamics of inequality, Tables 4 and 5 clearly show that the spatial dimension stressed in the literature remains a clear and robust source of inequality changes. Indeed, observed inequality changes can be attributed in a sizeable part to the evolution of inequality between regions and even in a larger part to inter-provincial inequality changes.

[12] Observed decreases in the bias are however weakly statistically significant (at the 15% level for Gini, Theil and MLD and not significant for GE(-1)).
[13] Respectively, the relative contribution of inter-regional inequality is over-evaluated by between 45% and 200%.
[14] Respectively, the relative contribution of inter-provincial inequality is over-evaluated by between 65% and 250%.
[15] Biases are statistically significant at the 5% level in all cases.

Here again, using provincial price deflators may also substantially modify 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[16]. Since, as mentioned above, the observed inequality rise is under-evaluated, this in turn leads to an under-evaluation of the rise in the relative contribution of the provincial dimension 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 by Khan and Riskin (2005). However, using provincial price deflators does not significantly influence differently the evaluation of the role played by inter-provincial and inter-regional inequalities.

6. Conclusion

This note stresses the importance of taking into account prices 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

		1988		*1995*		*2002*	
Gini	*Not deflated*	**0.208**	*0.002*	**0.321**	*0.009*	**0.304**	*0.003*
	Deflated	**0.191**	*0.002*	**0.298**	*0.010*	**0.284**	*0.003*
	Bias (%)	**8.9**	*0.5*	**7.7**	*0.6*	**7.1**	*0.3*
Theil index	*Not deflated*	**0.079**	*0.003*	**0.234**	*0.033*	**0.157**	*0.004*
	Deflated	**0.065**	*0.002*	**0.211**	*0.035*	**0.134**	*0.003*
	Bias (%)	**20.3**	*1.6*	**11.5**	*3.4*	**16.6**	*0.8*
Mean Log Deviation index (MLD)	*Not deflated*	**0.074**	*0.002*	**0.179**	*0.012*	**0.155**	*0.003*
	Deflated	**0.063**	*0.002*	**0.157**	*0.013*	**0.136**	*0.002*
	Bias (%)	**17.0**	*1.1*	**13.9**	*1.6*	**13.7**	*0.6*
General Entropy Index (*e* = -1)	*Not deflated*	**0.081**	*0.003*	**0.240**	*0.026*	**0.184**	*0.004*
	Deflated	**0.071**	*0.003*	**0.214**	*0.026*	**0.163**	*0.003*
	Bias (%)	**14.2**	*1.1*	**12.1**	*1.5*	**12.6**	*0.6*

Notes: 1. The equivalence scale used is the square root of the total number of household members.

2. Standard errors in italics are computed from a 300 replications bootstrap procedure.

Table 2

Group decomposition of household income inequality by region

		Absolute "between" contribution						Relative "between" contribution (%)					
		1988		*1995*		*2002*		*1988*		*1995*		*2002*	
Theil index	*Not deflated*	**0.0085**	*0.0008*	**0.0334**	*0.0042*	**0.0266**	*0.0022*	**10.84**	*1.03*	**14.25**	*3.25*	**16.95**	*1.19*
	Deflated	**0.0025**	*0.0005*	**0.0203**	*0.0033*	**0.0137**	*0.0014*	**3.76**	*0.74*	**9.62**	*2.63*	**10.17**	*0.97*
	Bias	**0.0061**	*0.0007*	**0.0131**	*0.0042*	**0.0129**	*0.0020*	**7.09**	*1.13*	**4.63**	*2.01*	**6.78**	*1.47*
Mean Log Deviation index (MLD)	*Not deflated*	**0.0085**	*0.0008*	**0.0328**	*0.0040*	**0.0259**	*0.0022*	**11.43**	*1.04*	**18.35**	*2.54*	**16.71**	*1.19*
	Deflated	**0.0025**	*0.0005*	**0.0201**	*0.0033*	**0.0134**	*0.0014*	**3.88**	*0.74*	**12.76**	*2.05*	**9.80**	*0.95*
	Bias	**0.0060**	*0.0007*	**0.0128**	*0.0041*	**0.0125**	*0.0019*	**7.56**	*1.13*	**5.59**	*2.01*	**6.90**	*1.42*

Notes: See table 1.

Table 3

Group decomposition of household income inequality by province

		Absolute "between" contribution						Relative "between" contribution (%)					
		1988		*1995*		*2002*		*1988*		*1995*		*2002*	
Theil index	*Not deflated*	**0.0175**	*0.0015*	**0.0611**	*0.0047*	**0.0410**	*0.0030*	**22.21**	*1.68*	**26.10**	*5.48*	**26.13**	*1.45*
	Deflated	**0.0042**	*0.0006*	**0.0312**	*0.0045*	**0.0143**	*0.0018*	**6.44**	*0.88*	**14.78**	*3.47*	**10.65**	*1.22*
	Bias	**0.0133**	*0.0014*	**0.0299**	*0.0056*	**0.0266**	*0.0025*	**15.77**	*1.13*	**11.32**	*2.01*	**15.48**	*1.89*
Mean Log Deviation index (MLD)	*Not deflated*	**0.0160**	*0.0014*	**0.0551**	*0.0040*	**0.0377**	*0.0026*	**21.65**	*1.55*	**30.80**	*3.04*	**24.30**	*1.37*
	Deflated	**0.0043**	*0.0006*	**0.0294**	*0.0041*	**0.0140**	*0.0017*	**6.79**	*0.91*	**18.71**	*1.93*	**10.23**	*1.16*
	Bias	**0.0117**	*0.0012*	**0.0257**	*0.0048*	**0.0237**	*0.0023*	**14.86**	*1.13*	**12.09**	*2.01*	**14.07**	*1.67*

Notes: See table 1.

Table 4

Share of inequality changes due to inter-regional inequality changes

(%)		*1988-1995*		*1995-2002*	
Theil index	*Not deflated*	**15.98**	*2.76*	**8.77**	*6.12*
	Deflated	**12.26**	*2.32*	**8.65**	*4.72*
	Bias	**3.72**	*2.82*	**0.13**	*6.21*
Mean Log Deviation index (MLD)	*Not deflated*	**23.23**	*3.91*	**29.04**	*19.03*
	Deflated	**18.74**	*3.49*	**32.14**	*16.83*
	Bias	**4.49**	*4.12*	**-3.10**	*20.38*

Notes: See table 1.

Table 5

Share of inequality changes due to inter-provincial inequality changes

(%)		*1988-1995*		*1995-2002*	
Theil index	*Not deflated*	**28.07**	*3.22*	**26.04**	*7.52*
	Deflated	**18.53**	*3.13*	**22.04**	*6.37*
	Bias	**9.54**	*3.83*	**4.00**	*8.03*
Mean Log Deviation index (MLD)	*Not deflated*	**37.25**	*4.09*	**73.03**	*21.19*
	Deflated	**26.73**	*4.46*	**74.29**	*21.52*
	Bias	**10.52**	*5.02*	**-1.26**	*23.89*

Notes: See table 1.