Wealth Polarization All Over the World

A Distributional Analysis of BRICS and SSA's Experiences

May 11st, 2018

Polarization in BRICS Countries - the case of Brazil and China

[1] and F. Schettino*[1]

[1] *University of Campania L. Vanvitelli, Naples, Italy*

ONDH - World Bank

*Based on: Clementi F. and F. Schettino (2015), Declining Inequality in Brazil in the 2000s: What is Hidden Behind?, *Journal of International Development*, 27(7);
Khan AH, Schettino F and A Gabriele (2018), Polarization and the Middle Class in China: a Non-Parametric Evaluation Using CHNS and CHIP Data, *submitted*

Overview

Introduction

Why Brazil?

- Brazil has long been known as one of the countries with the most unequal income distribution in the world.
- The concentration of incomes in 1960 was already high by international standards, and continued to increase in the following decades (López-Calva, 2012).
- Income inequality only declined starting in the mid-1990s; from 2001 on, inequality levels have fallen steadily (Barros et al., 2010).
- Poverty in the country also declined significantly during the last decade (e.g., Higgins, 2012); meanwhile, Brazil's GDP growth managed to overtake the UK as the world's sixth-largest economy in 2011 (CEBR, 2011).
- Several factors contributed to the recent progress in terms of poverty and inequality reduction: economic growth (Barros et al., 2010); expanded access to education (Gasparini and Lustig, 2011); increased demand for unskilled labour (Robinson, 2010); an increase in the minimum wage (Barros, 2007).
- Social assistance programs have also played a crucial role (Hall, 2006): "Bolsa Família", now the largest such program in the world, accounted for something between 21% and 16% of the total fall in Brazilian inequality since 2001 (Soares, 2012).

Aim of the Work

- The mentioned evidence heavily relies on summary measures of inequality, but relatively little work has been done in terms of analyzing changes in the shape of Brazil's income distribution over the recent decade.
- As pointed out by Morris et al. (1994; but see also Voitchovsky, 2005, and Pittau and Zelli, 2006), standard measures of inequality may suggest a particular outcome in terms of inequality change – e.g., a fall in the Gini coefficient – while implying a radically different pattern of distributional change; in particular, they may not capture aspects such as multi-modality and polarization.
- In investigating the recent inequality experience of Brazil, we seek to understand "how" inequality fell by looking *behind* the usual summary measures and closely examining the patterns of changes that have occurred along the entire Brazilian household income distribution.
- More specifically, it is our aim to investigate whether the favourable combination of economic growth and inequality reduction from which the country has benefited during the last 15 years or so has produced significant movements across the income scale, and whether these movements have taken the form of a convergence of the top and bottom percentiles toward the middle income class or of a shrinking of the latter – thereby leading to greater polarization.
- For this purpose, we use a non-parametric tool, the *relative distribution*, which is applied to survey income data (PNAD) spanning 2001–2015 and covering a large number of households across all federal units of Brazil.

The Data

The National Household Sample Survey

- We use data from Brazil's annual national household survey (Pesquisa Nacional por Amostra de Domicílios, PNAD) for 2001 to 2015.
- The PNAD is collected every year in September – except in 2010 – by the National Census Bureau (Instituto Brasileiro de Geografia e Estatística, IBGE) and is nationally representative at the level of each state.
- However, until 2003 the PNAD was not representative for the rural areas of the North region (minus the state of Tocantins). Therefore, in order to maintain time series comparable these areas were excluded from PNAD data for 2004 onward. In this way, our samples have on average about 107,000 observations a year.
- All calculations are based on total household income expressed in Brazilian Reais (R$). Current values have been deflated using the consumer price index (yearly series based on 2005) reported by the OECD (`http://stats.oecd.org/`).
- Furthermore, incomes have been equivalized for differences in household size and weighted by using appropriate sampling weights provided by the IBGE staff.

Table 1 Summary measures of Brazilian household income, 2001–2015

	2001	2002	2004	2005	2006	2007	2008	2009	2011	2012	2014	2015
Mean	874.7	879.8	851.1	883.5	940.3	969.4	1,017.3	1,034.4	1,083.9	1,165.5	1,101.1	1,120.9
Median	462.7	467.2	480.9	500.0	543.0	570.6	613.4	627.1	672.7	724.0	689.6	693.9
Income shares												
Bottom 5%	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4
Bottom 10%	1.2	1.2	1.3	1.4	1.3	1.5	1.4	1.5	1.5	1.5	1.6	1.5
Bottom 20%	3.2	3.3	3.6	3.8	3.8	3.9	4.0	4.0	4.3	4.4	4.5	4.4
Top 20%	61.1	60.8	59.0	58.8	58.3	57.4	56.9	56.3	55.4	55.3	54.6	4.2
Top 10%	44.8	44.5	42.7	42.8	42.4	41.4	41.0	40.5	39.8	40.0	48.9	38.5
Top 5%	31.5	31.1	29.9	29.8	29.6	28.8	28.5	28.2	27.7	27.9	26.8	26.4
Inequality metrics												
Gini	0.562	0.557	0.538	0.535	0.529	0.520	0.514	0.509	0.498	0.498	0.489	0.487
Theil	0.630	0.626	0.577	0.572	0.560	0.537	0.525	0.519	0.495	0.530	0.479	0.469

Source: authors' calculation on weighted household income data from PNAD

Besides the growth of real mean and median incomes, the most notable feature is that income shares of the poorest percentiles of the population increased on average between approximately 2% and 3% per year in the period examined, on the contrary of what observed for the richest percentiles whose shares decreased by around 1% or more. As for inequality, the improvements were also noticeable: the Gini and Theil indices exhibited nearly the same temporal profile, showing an average yearly decrease that amounts respectively to 1% and 2%.

The Relative Distribution

Background

- The *relative distribution* (Morris et al., 1994; Handcock and Morris, 1998, 1999) is a non-parametric statistical approach that compares the income (or other) distributions of two populations – either cross-sectionally or over time – in a way to consider differences throughout the entire income range.
- It combines the strengths of summary measures with the details of distributional change offered by the analysis of the income distribution shape.
- Specifically:
  - it readily lends itself to simple and informative graphical displays that reveal precisely where and by how much two income distributions differ;
  - by providing the potential for decomposition into location and shape components, it allows one to examine several hypotheses regarding the origins of distributional change – such as whether the change was due to a proportional variation in all incomes that moved the overall distribution either back or forth (while leaving the shape unaltered) or to shape modifications which, by definition, are independent of location shifts;
  - it allows to quantify the degree of polarization due to changes in distributional shape only (i.e. net of location shifts), thus enabling one to isolate aspects of inter-distributional inequality that are often hidden when also changes in location are examined.
- Some studies based on the relative distribution are: Alderson et al. (2005); Massari (2009); Massari et al. (2009a,b); Borraz et al. (2011); Alderson and Doran (2011, 2013).

Definition

- Let Y_0 be the income variable for the *reference* population (e.g., households in 2001) and Y the income variable for the *comparison* population (e.g., households in 2015).
- The *relative distribution* is defined as the ratio of the density of the comparison population to the density of the reference population evaluated at the relative data r:

$$g(r) = \frac{f\left(F_0^{-1}(r)\right)}{f_0\left(F_0^{-1}(r)\right)} = \frac{f(y_r)}{f_0(y_r)}, \quad 0 \leq r \leq 1, \quad y_r \geq 0,$$

  where $f(\cdot)$ and $f_0(\cdot)$ denote the density functions of Y and Y_0, respectively, and $y_r = F_0^{-1}(r)$ is the quantile function of Y_0.
- When no changes occur between the two distributions, $g(r)$ has a uniform distribution; a value of $g(r)$ higher (lower) than 1 means that the share of households in the comparison population is higher (lower) than the corresponding share in the reference population at the r^{th} quantile of the latter.

Location and Shape Decomposition

- One of the major advantages of this method is the possibility to decompose the relative distribution into changes in *location* and changes in *shape*.
- The decomposition can be written as:

$$\underbrace{\frac{f(y_r)}{f_0(y_r)}}_{\text{Overall}} = \underbrace{\frac{f_{0L}(y_r)}{f_0(y_r)}}_{\text{Location}} \times \underbrace{\frac{f(y_r)}{f_{0L}(y_r)}}_{\text{Shape}}.$$

- $f_{0L}(y_r)$ is the *median-adjusted* density function:

$$f_{0L}(y_r) = f_0(y_r + \rho),$$

where the value ρ is the difference between the medians of the comparison and reference distributions – alternative indices like the mean and/or multiplicative location shift can also be considered.

Distributional Polarization

- The relative distribution approach also includes a *median relative polarization* index, which is a measurement of the degree to which the comparison distribution is more polarized than the reference one:

$$MRP = \frac{4}{n}\left(\sum_{i=1}^{n}\left|r_i - \frac{1}{2}\right|\right) - 1.$$

- The values of the MRP index ranges between -1 and 1: positive values represent more income polarization and negative values represent less polarization; a value of 0 indicates no differences in distributional shape.
- The MRP index can be additively decomposed into the *lower relative polarization* index and the *upper relative polarization* index, which behave similarly as the MRP:

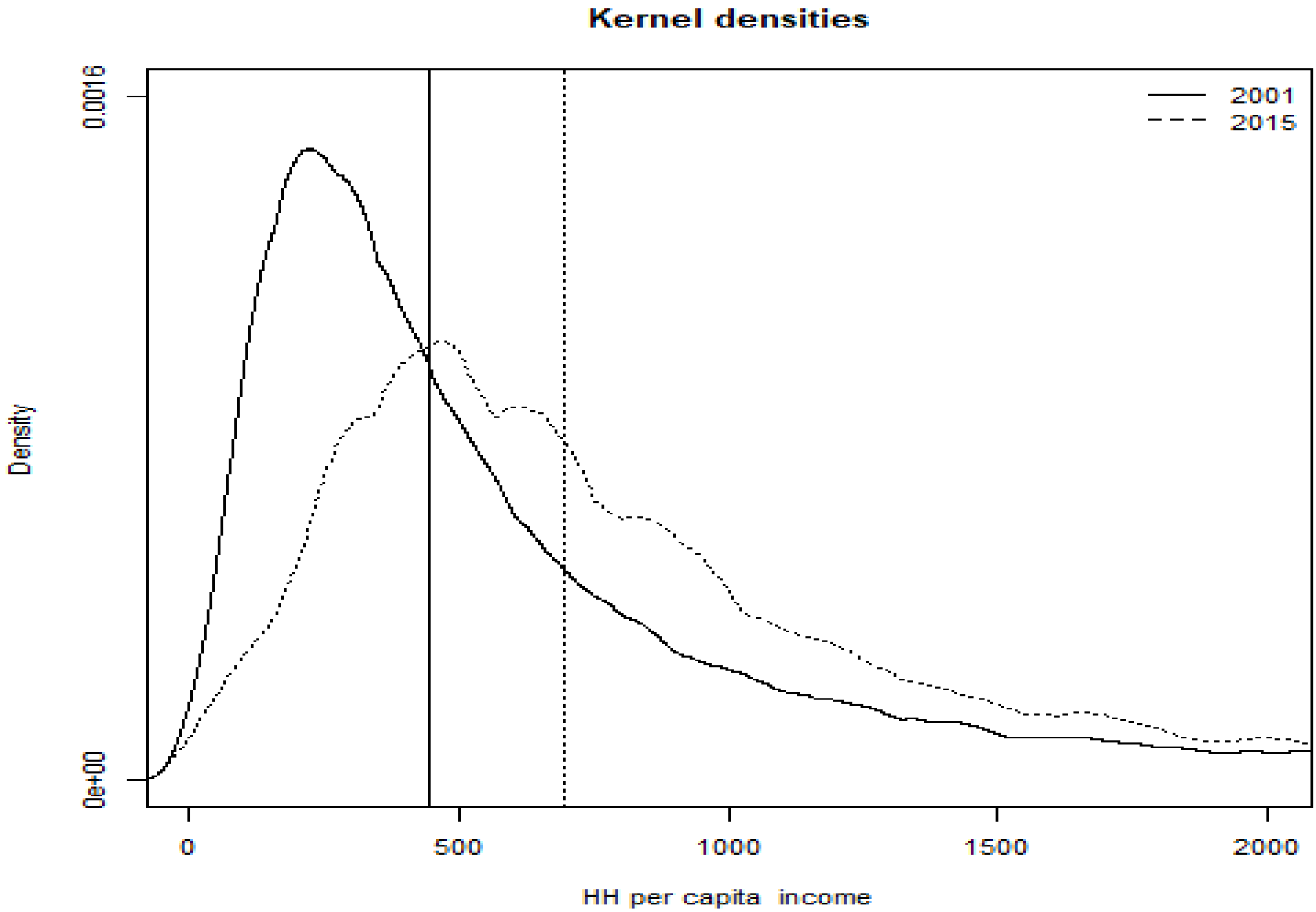
$$MRP = \frac{1}{2}\left(LRP + URP\right).$$

Empirical Results

Changes in Household Income Distribution

- There is a rightward shift of the whole distribution and a change of the shape, especially in the middle income range, from 2001 to 2015.
- The relative distribution is nearly monotonic in its increase, hence implying a decrease of the mass at the lower and middle income ranges and a concomitant spreading out of incomes in the top half of the distribution.
- Since the median shift is positive, the location effect reduces the share of households in bottom deciles and increases that in the higher ones.
- The shape effect indicates a marked change for incomes below the median, with a prominent increase of the fraction of households at the poorest decile of the distribution, and a moderate income growth in the upper part.
- The fraction of households in the bottom income levels increased consistently by the mid-2000s, whereas a moderate growth in upper income levels is only apparent toward the end of the decade.
- The relative polarization indices document a downgrading trend around the mid-2000s and, by 2007, the emergence of a more marked pattern of polarization.
- The polarization indices proposed by Foster and Wolfson (1992) and Duclos, Esteban, and Ray (2004) portray similar tendencies as that depicted by polarization evaluated using measures based on the relative distribution.

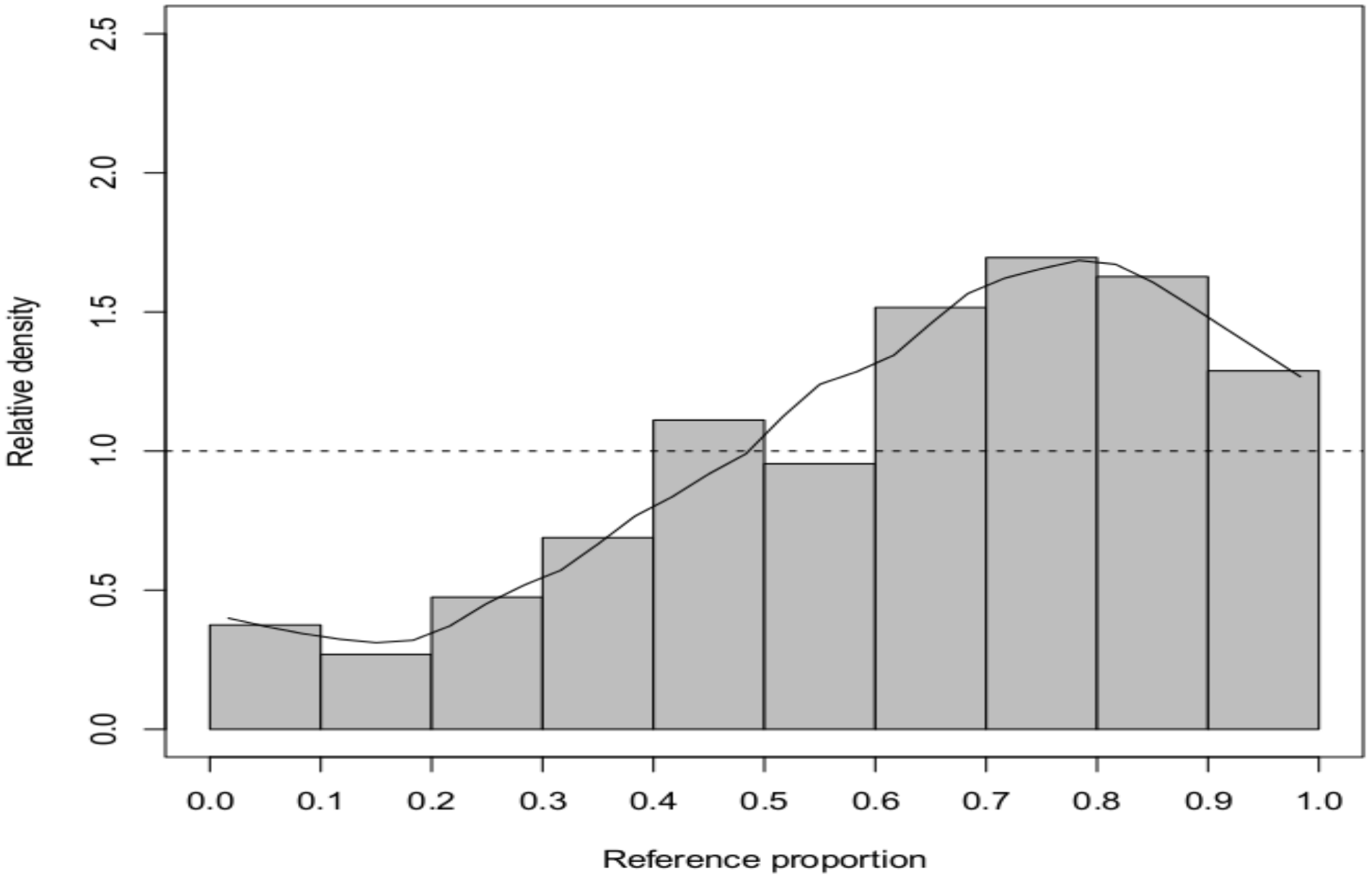
Figure 1 Kernel density estimates of 2001 and 2015 income distributions



Changes in Household Income Distribution

- There is a rightward shift of the whole distribution and a change of the shape, especially in the middle income range, from 2001 to 2015.
- The relative distribution is nearly monotonic in its increase, hence implying a decrease of the mass at the lower and middle income ranges and a concomitant spreading out of incomes in the top half of the distribution.
- Since the median shift is positive, the location effect reduces the share of households in bottom deciles and increases that in the higher ones.
- The shape effect indicates a marked change for incomes below the median, with a prominent increase of the fraction of households at the poorest decile of the distribution, and a moderate income growth in the upper part.
- The fraction of households in the bottom income levels increased consistently by the mid-2000s, whereas a moderate growth in upper income levels is only apparent toward the end of the decade.
- The relative polarization indices document a downgrading trend around the mid-2000s and, by 2007, the emergence of a more marked pattern of polarization.
- The polarization indices proposed by Foster and Wolfson (1992) and Duclos, Esteban, and Ray (2004) portray similar tendencies as that depicted by polarization evaluated using measures based on the relative distribution.

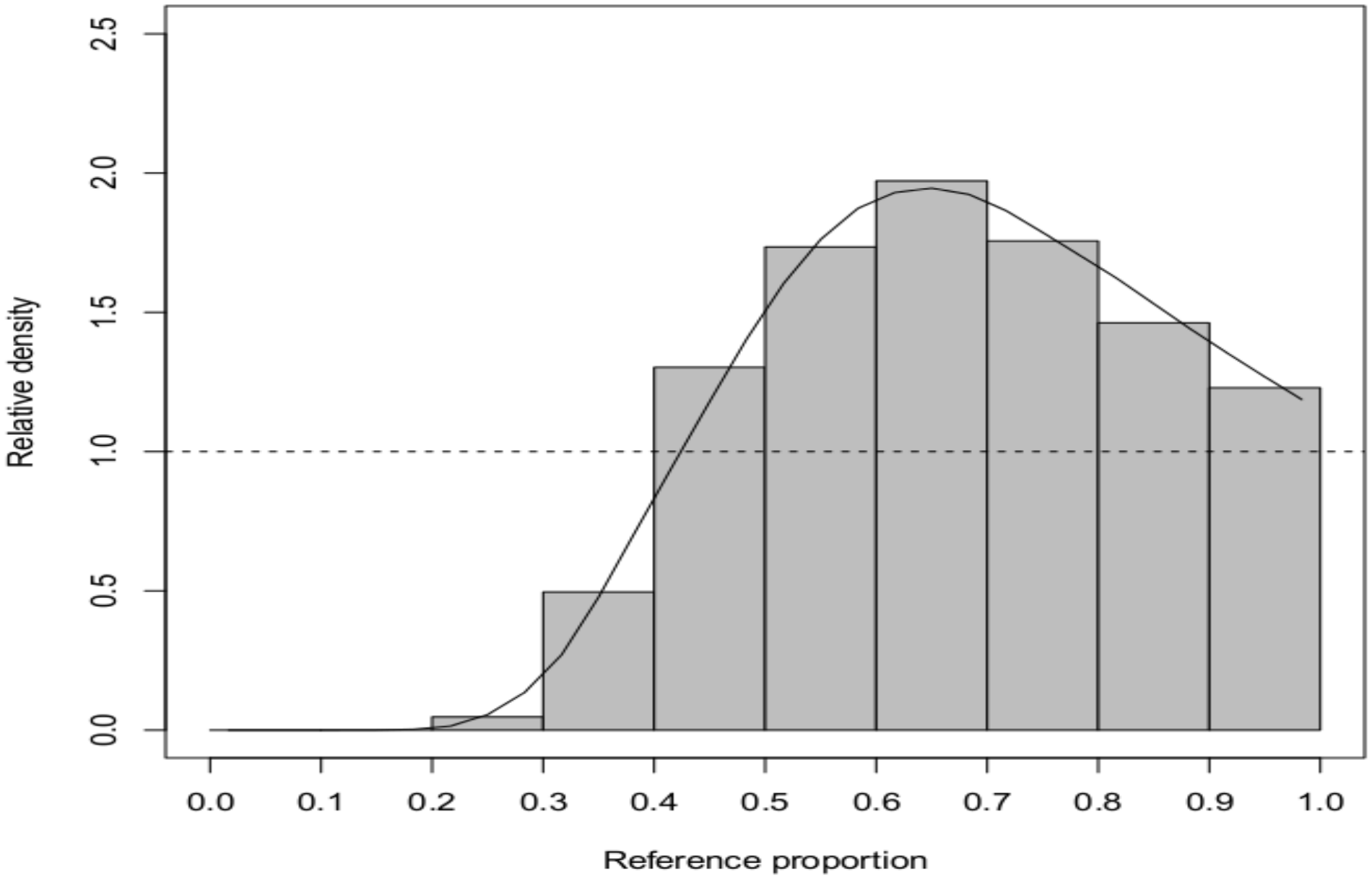
Figure 2 Relative distribution, 2015 to 2001



Changes in Household Income Distribution

- There is a rightward shift of the whole distribution and a change of the shape, especially in the middle income range, from 2001 to 2015.
- The relative distribution is nearly monotonic in its increase, hence implying a decrease of the mass at the lower and middle income ranges and a concomitant spreading out of incomes in the top half of the distribution.
- Since the median shift is positive, the location effect reduces the share of households in bottom deciles and increases that in the higher ones.
- The shape effect indicates a marked change for incomes below the median, with a prominent increase of the fraction of households at the poorest decile of the distribution, and a moderate income growth in the upper part.
- The fraction of households in the bottom income levels increased consistently by the mid-2000s, whereas a moderate growth in upper income levels is only apparent toward the end of the decade.
- The relative polarization indices document a downgrading trend around the mid-2000s and, by 2007, the emergence of a more marked pattern of polarization.
- The polarization indices proposed by Foster and Wolfson (1992) and Duclos, Esteban, and Ray (2004) portray similar tendencies as that depicted by polarization evaluated using measures based on the relative distribution.

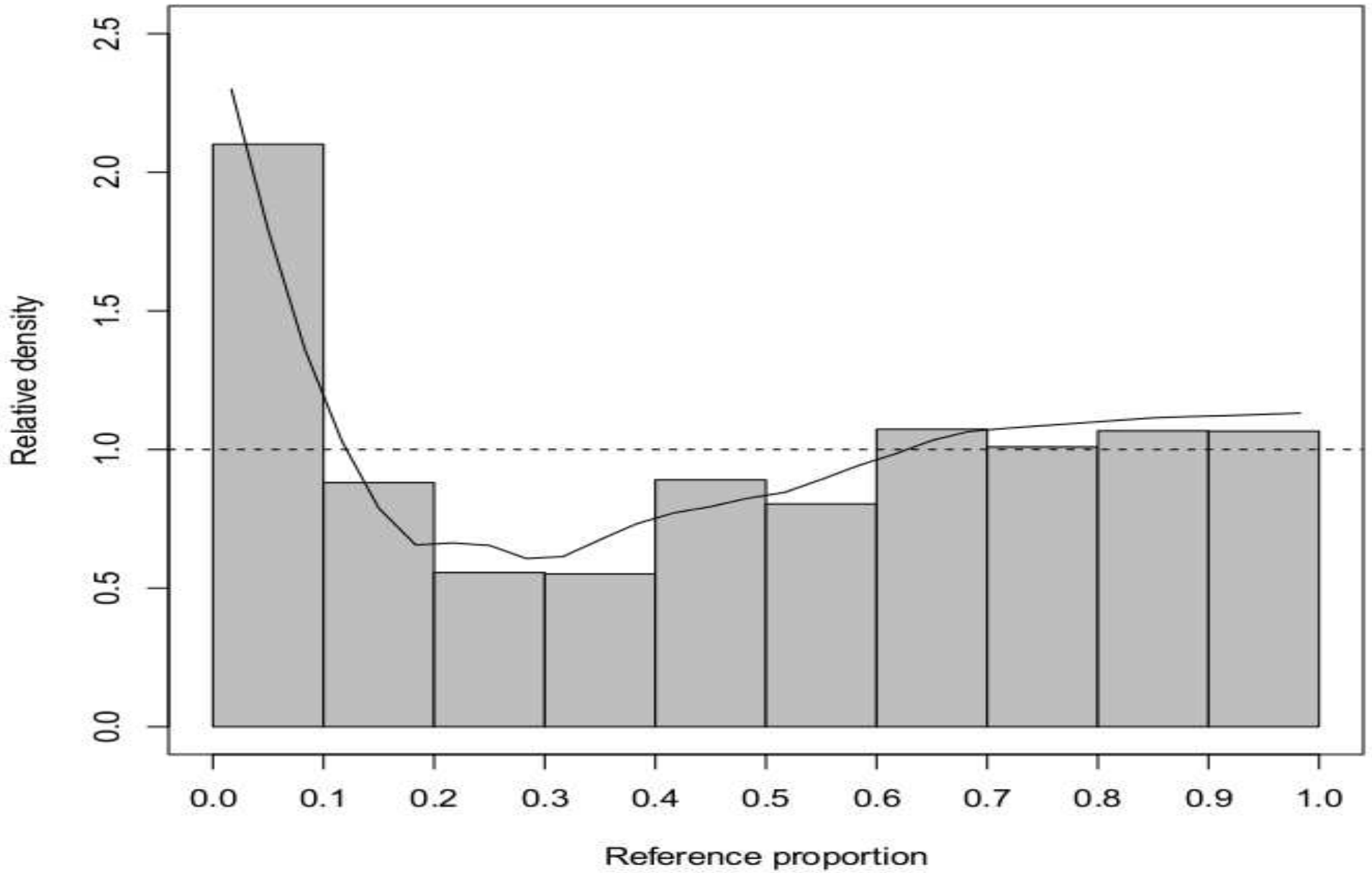
Figure 3 Relative distribution, 2015 to 2001: location effect



Changes in Household Income Distribution

- There is a rightward shift of the whole distribution and a change of the shape, especially in the middle income range, from 2001 to 2015.
- The relative distribution is nearly monotonic in its increase, hence implying a decrease of the mass at the lower and middle income ranges and a concomitant spreading out of incomes in the top half of the distribution.
- Since the median shift is positive, the location effect reduces the share of households in bottom deciles and increases that in the higher ones.
- The shape effect indicates a marked change for incomes below the median, with a prominent increase of the fraction of households at the poorest decile of the distribution, and a moderate income growth in the upper part.
- The fraction of households in the bottom income levels increased consistently by the mid-2000s, whereas a moderate growth in upper income levels is only apparent toward the end of the decade.
- The relative polarization indices document a downgrading trend around the mid-2000s and, by 2007, the emergence of a more marked pattern of polarization.
- The polarization indices proposed by Foster and Wolfson (1992) and Duclos, Esteban, and Ray (2004) portray similar tendencies as that depicted by polarization evaluated using measures based on the relative distribution.

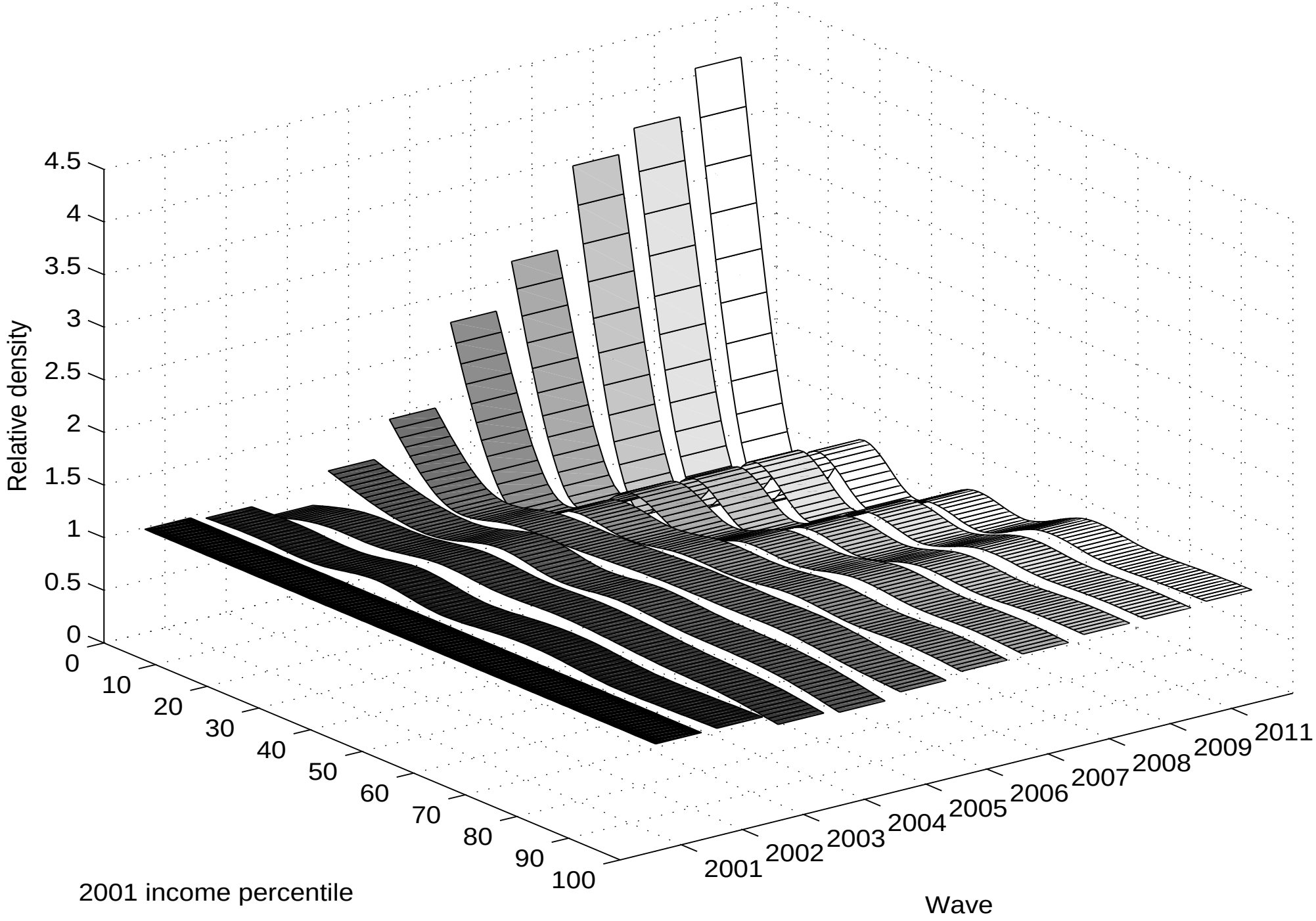
Figure 4 Relative distribution, 2001 to 2015: shape effect



Changes in Household Income Distribution

- There is a rightward shift of the whole distribution and a change of the shape, especially in the middle income range, from 2001 to 2015.
- The relative distribution is nearly monotonic in its increase, hence implying a decrease of the mass at the lower and middle income ranges and a concomitant spreading out of incomes in the top half of the distribution.
- Since the median shift is positive, the location effect reduces the share of households in bottom deciles and increases that in the higher ones.
- The shape effect indicates a marked change for incomes below the median, with a prominent increase of the fraction of households at the poorest decile of the distribution, and a moderate income growth in the upper part.
- The fraction of households in the bottom income levels increased consistently by the mid-2000s, whereas a moderate growth in upper income levels is only apparent toward the end of the decade.
- The relative polarization indices document a downgrading trend around the mid-2000s and, by 2007, the emergence of a more marked pattern of polarization.
- The polarization indices proposed by Foster and Wolfson (1992) and Duclos, Esteban, and Ray (2004) portray similar tendencies as that depicted by polarization evaluated using measures based on the relative distribution.

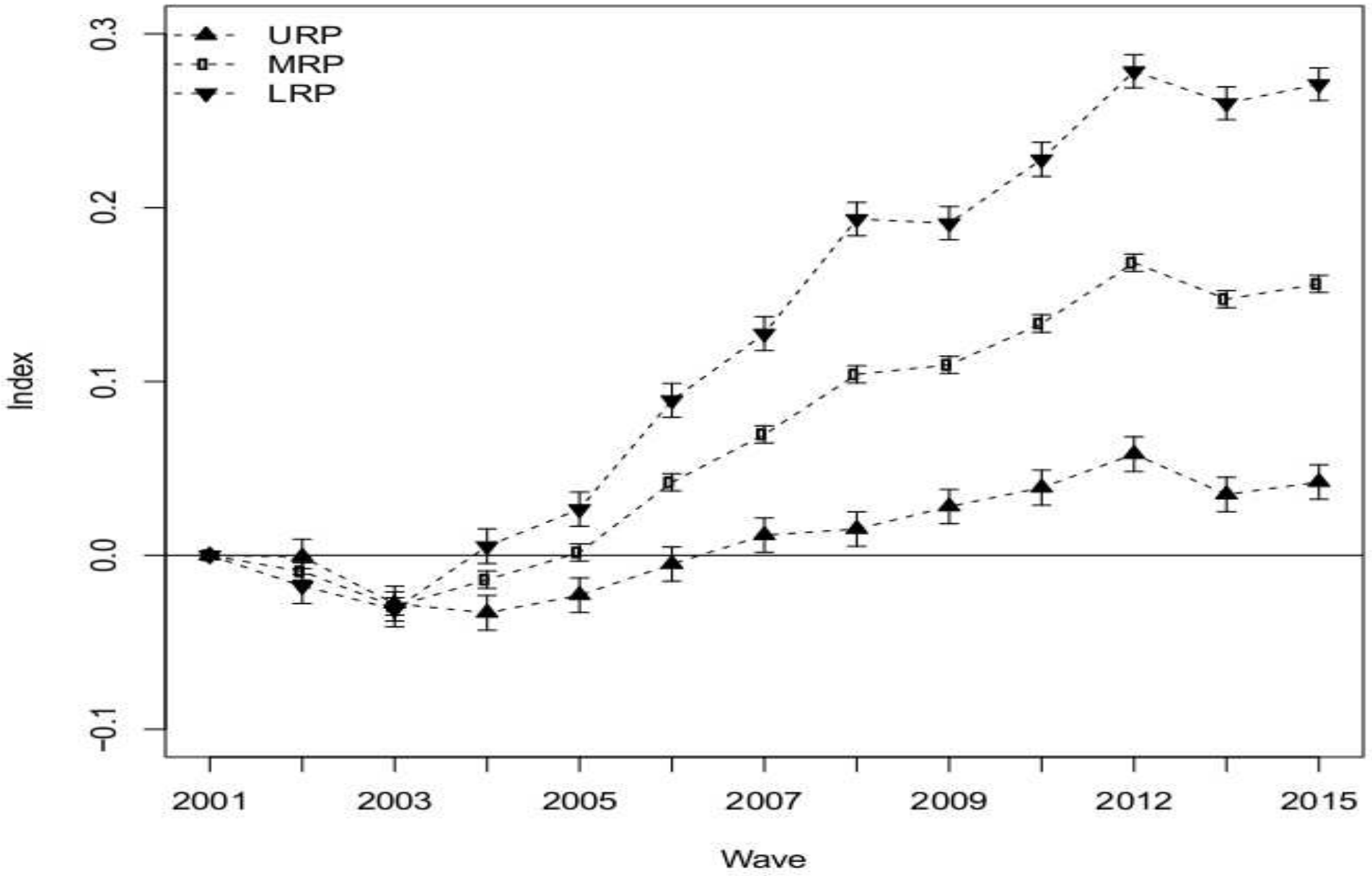
Figure 5 Median-adjusted household income distribution, 2001–2015



Changes in Household Income Distribution

- There is a rightward shift of the whole distribution and a change of the shape, especially in the middle income range, from 2001 to 2015.
- The relative distribution is nearly monotonic in its increase, hence implying a decrease of the mass at the lower and middle income ranges and a concomitant spreading out of incomes in the top half of the distribution.
- Since the median shift is positive, the location effect reduces the share of households in bottom deciles and increases that in the higher ones.
- The shape effect indicates a marked change for incomes below the median, with a prominent increase of the fraction of households at the poorest decile of the distribution, and a moderate income growth in the upper part.
- The fraction of households in the bottom income levels increased consistently by the mid-2000s, whereas a moderate growth in upper income levels is only apparent toward the end of the decade.
- The relative polarization indices document a downgrading trend around the mid-2000s and, by 2007, the emergence of a more marked pattern of polarization.
- The polarization indices proposed by Foster and Wolfson (1992) and Duclos, Esteban, and Ray (2004) portray similar tendencies as that depicted by polarization evaluated using measures based on the relative distribution.

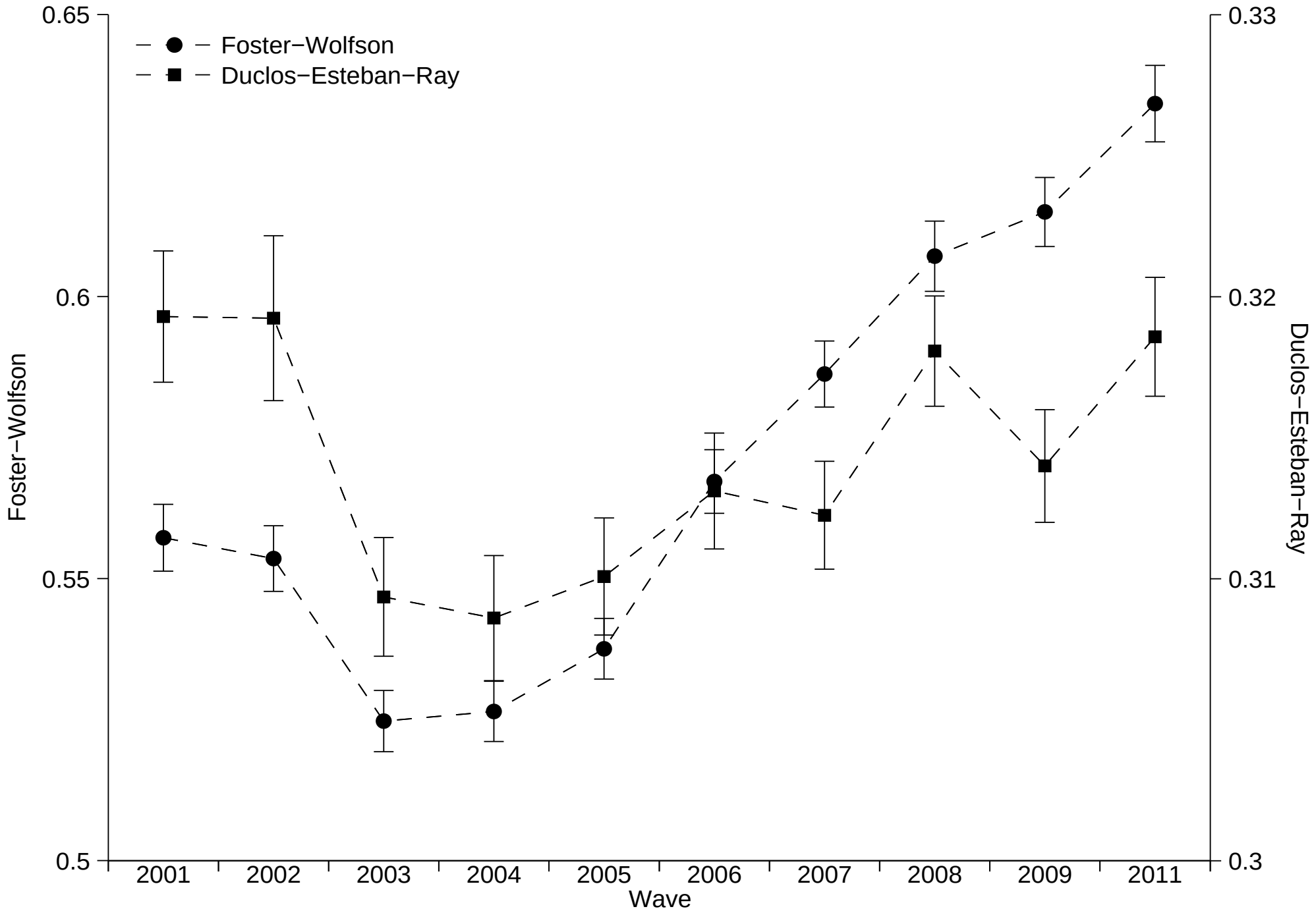
Figure 6 Median relative polarization, 2001–2015



Changes in Household Income Distribution

- There is a rightward shift of the whole distribution and a change of the shape, especially in the middle income range, from 2001 to 2015.
- The relative distribution is nearly monotonic in its increase, hence implying a decrease of the mass at the lower and middle income ranges and a concomitant spreading out of incomes in the top half of the distribution.
- Since the median shift is positive, the location effect reduces the share of households in bottom deciles and increases that in the higher ones.
- The shape effect indicates a marked change for incomes below the median, with a prominent increase of the fraction of households at the poorest decile of the distribution, and a moderate income growth in the upper part.
- The fraction of households in the bottom income levels increased consistently by the mid-2000s, whereas a moderate growth in upper income levels is only apparent toward the end of the decade.
- The relative polarization indices document a downgrading trend around the mid-2000s and, by 2007, the emergence of a more marked pattern of polarization.
- The polarization indices proposed by Foster and Wolfson (1992) and Duclos, Esteban, and Ray (2004) portray similar tendencies as that depicted by polarization evaluated using measures based on the relative distribution.

Figure 7 Polarization in the distribution of household income in Brazil, 2001–2015



Conclusions

Summary

- We have used the relative distribution approach to analyze changes in the Brazilian household income distribution between 2001 and 2011.
- This method provides a non-parametric framework for taking into account all of the distributional differences that could arise in the comparison of distributions over time; we are thus able to examine distributional changes that would not be detected easily from a comparison of standard measures of inequality.
- We document relevant changes in the Brazilian income distribution, despite the substantial falling off in income inequality: the analysis reveals indeed an overall upshift of the distribution, especially from 2005 onward, which masks a tendency to income polarization.
- In fact, having controlled for the median increase, a more clear rise in polarization is detected, mainly due to a downgrading of lower incomes that overcompensated the convergence of higher incomes toward the median; by contrast, starting from 2007 the process of polarization of household incomes is more pronounced, with both the lower and upper tails shifting away from the median of the distribution.

Future Research

- The most obvious extension of the analysis is to examine how different sources of household income might have impacted the observed increase of income polarization.
- Also, the decomposition of the relative distribution according to covariates measured on households would allow one to detect the contribution to the observed changes of different household characteristics, such as geographic location, gender, age, education, and so forth.
- Due to the richness of data available from the PNAD and the many opportunities offered by the relative distribution approach, we are in a good position to readily expand our analysis in the near future.

References

1. A. S. Alderson, J. Beckfield, and F. Nielsen. Exactly How Has Income Inequality Changed? Patterns of Distributional Change in Core Societies. *International Journal of Comparative Sociology*, 46:405–423, 2005.
2. A. S. Alderson and K. Doran. Global Inequality, Within-Nation Inequality, and the Changing Distribution of Income in Seven Transitional and Middle-Income Societies. In C. Suter, editor, *Inequality Beyond Globalization: Economic Changes, Social Transformations, and the Dynamics of Inequality*, pages 183–200. Transaction Publishers, New Brunswick, NJ, 2011.
3. A. S. Alderson and K. Doran. How Has Income Inequality Grown? The Reshaping of the Income Distribution in LIS Countries. In J. C. Gornick and M. Jäntti, editors, *Income Inequality: Economic Disparities and the Middle Class in Affluent Countries*, pages 51–74. Stanford University Press, Stanford, CA, 2013.
4. R. P. Barros. A Efetividade do Salário Mínimo em Comparação à do Programa Bolsa Família como Instrumento de redução da Pobreza e da Desigualdade. In R. P. Barros, M. N. Foguel, and G. Ulyssea, editors, *Desigualdade de Renda no Brasil: Uma Análise da Queda Recente*, volume 2, pages 507–549. Instituto de Pesquisa Econômica Aplicada (IPEA), Brasília, DF, 2007.
5. R. Barros, M. De Carvalho, S. Franco, and R. Mendonça. Markets, the State, and the Dynamics of Inequality in Brazil. In L. F. López-Calva and N. Lustig, editors, *Declining Inequality in Latin America: A Decade of Progress?*, pages 134–174. Brookings Institution Press and UNDP, Washington, DC, 2010.

6. N. Birdsall, A. De La Torre, and A. Menezes. *Fair Growth: Economic Policies for Latin America's Poor and Middle-Income Majority*. Center for Global Development, Washington D.C., 2008.
7. F. Borraz, N. G. Pampillón, and M. Rossi. Polarization and the Middle Class. dECON Working Paper 20, Universidad de la República, Montevideo, 2011.
8. CEBR. *World Economic League Table*. Technical Report, Centre for Economics and Business Research, London, 2011.
9. J.-Y. Duclos, J.-M. Esteban, and D. Ray. Polarization: Concepts, Measurement, Estimation. *Econometrica*, 72:1737–1772, 2004.
10. J. E. Foster and M. C. Wolfson. Polarization and the Decline of the Middle Class: Canada and the U.S. OPHI Working Paper 31, University of Oxford, Oxford, 1992. Now in *Journal of Economic Inequality*, 8:247–273, 2010.
11. L. Gasparini and N. Lustig. The Rise and Fall of Income Inequality in Latin America. In J. A. Ocampo and J. Ros, editors, *The Oxford Handbook of Latin American Economics*, pages 691–714. Oxford University Press, New York, NY, 2011.
12. A. Hall. From Fome Zero to Bolsa Família: Social Policies and Poverty Alleviation under Lula. *Journal of Latin American Studies*, 38:689–709, 2006.
13. M. S. Handcock and M. Morris. Relative Distribution Methods. *Sociological Methodology*, 28: 53–97, 1998.
14. M. S. Handcock and M. Morris. *Relative Distribution Methods in the Social Sciences*. Springer-Verlag Inc., New York, 1999.

15. S. Higgins. The Impact of Bolsa Família on Poverty: Does Brazil's Conditional Cash Cransfer Program Have a Rural Bias? *Journal of Politics & Society*, 23:88–125, 2012.
16. L. F. López-Calva. Declining Income Inequality in Brazil: The Proud Outlier. *World Bank – Inequality in Focus*, 1:5–8, 2012.
17. R. Massari. *Is Income Becoming More Polarized in Italy? A Closer Look With a Distributional Approach*. Working Papers 1, Sapienza University of Rome, Doctoral School of Economics, 2009.
18. R. Massari, M. G. Pittau, and R. Zelli. A Dwindling Middle Class? Italian Evidence in the 2000s. *Journal of Economic Inequality*, 7:333–350, 2009a.
19. R. Massari, M. G. Pittau, and R. Zelli. Caos calmo: l'evoluzione dei redditi familiari in Italia. In L. Cappellari, P. Naticchioni, and S. Staffolani, editors, *L'Italia delle disuguaglianze*, pages 19–28. Carocci editore, Rome, 2009b.
20. M. Morris, A. D. Bernhardt, and M. S. Handcock. Economic Inequality: New Methods for New Trends. *American Sociological Review*, 59:205–219, 1994.
21. M. G. Pittau and R. Zelli. Trends in Income Distribution in Italy: A Non-Parametric and a Semi-Parametric Analysis. *Journal of Income Distribution*, 15:90–118, 2006.
22. J. A. Robinson. The Political Economy of Redistributive Policies. In L. F. López-Calva and N. Lustig, editors, *Declining Inequality in Latin America: A Decade of Progress?*, pages 39–71. Brookings Institution Press and UNDP, Washington, DC, 2010.

23. S. S. D. Soares. *Bolsa Família, its Design, its Impacts and Possibilities for the Furture*. Working Papers 89, UNDP – International Policy Centre for Inclusive Growth (IPC-IG), Brasilia, 2012.
24. S. Voitchovsky. Does the Profile of Income Inequality Matter for Economic Growth?: Distinguishing Between the Effects of Inequality in Different Parts of the Income Distribution. *Journal of Economic Growth*, 10:273–296, 2005.

Why China?

1. RPC is still considered as a Socialist country
2. Since the inception of the market-socialist reforms in the late 1970s, China's growth skyrocketed. Per capita GDP increased eightfold over the period
3. During the first half of the 2010s, China's economic growth progressively "slowed down", recording a rate of about 7% per year
4. Population: 1,403,500,365 persons (2016)
5. Impressive reduction of poverty in the last few decades was accompanied by a clear increase in economic disparities.
6. China's innovation strategy embodied world-class best practices from technological world leaders and successful late industrializers

Household Surveys

Projects/surveys	China Household Income Project	Rural-Urban Migration in Indonesia and China	China Health and Nutrition Survey	Chinese General Social Survey	Chinese Family Panel Studies	China Health and Retirement Longitudinal Study	China Household Finance Survey
Abbreviations	CHIP	RUMiC	CHNS	CGSS	CFPS	CHARLS	CHFS
Reference years	1988, 1995, 2002, 2007 + 2012	2007 +	1989, 1991, 1993, 1997, 2000, 2004, 2006, 2009 +	2003, 2004, 2005, 2006, 2008， 2010 +	2010+	2011-2012, 2013+ (pilot survey and resurvey 2008, 2012)	2011
Sample size	2007: circa 10,000 urban households; 13,000 rural; 5,000 rural-urban migrant	2007: approximately 5 000 urban households and 8 000 rural households, and 5 000 migrant households.	Approximately 4 400 households, 19 000 individuals	2003:5894 (urban only); 2004+ approximately 10 000 individuals 2010+ approximately 10 000 individuals	Approximately 16 000 households	Approximately 17 500 individuals of 10 000 households,	Approximately 8 400 households, 29 500 individuals
Main host Institution	China Institute for Income Distribution (CID), Beijing Normal University (BNU) http://www.ciidbnu.org/	RUMiCI project, the Australian National University http://rse.anu.edu.au/rumici/ and CID, BNU	The Carolina Population Center, the University of North Carolina at Chapel Hill http://www.cpc.unc.edu/projects/china	National Survey Research Center, Renmin University of China (RUC) http://www.chinagss.org/	Institute of Social Science Survey, Peking University http://www.isss.edu.cn/cfps/	Institute of Social Science Survey, Peking University http://charls.ccer.edu.cn/zh-CN	The Survey and Research Center for China Household Finance (CHFS), Southwestern University of Finance and Economics (SWUFE). http://www.chfsdat

CHIP Household Survey

Main features

- Started at the end of 1980s (last round - 2013);
- Work with the NBS in many stages of the data generating process;
- Households selected for the rural and urban surveys of CHIP are subsamples from the NBS's larger surveys and cover many province level units;
- Microdata from CHIP 2002 has recently been made available from LIS Cross National Data Centre in Luxembourg.
- CHIP is a repeated cross-section survey, although some retrospective data on household income has been collected

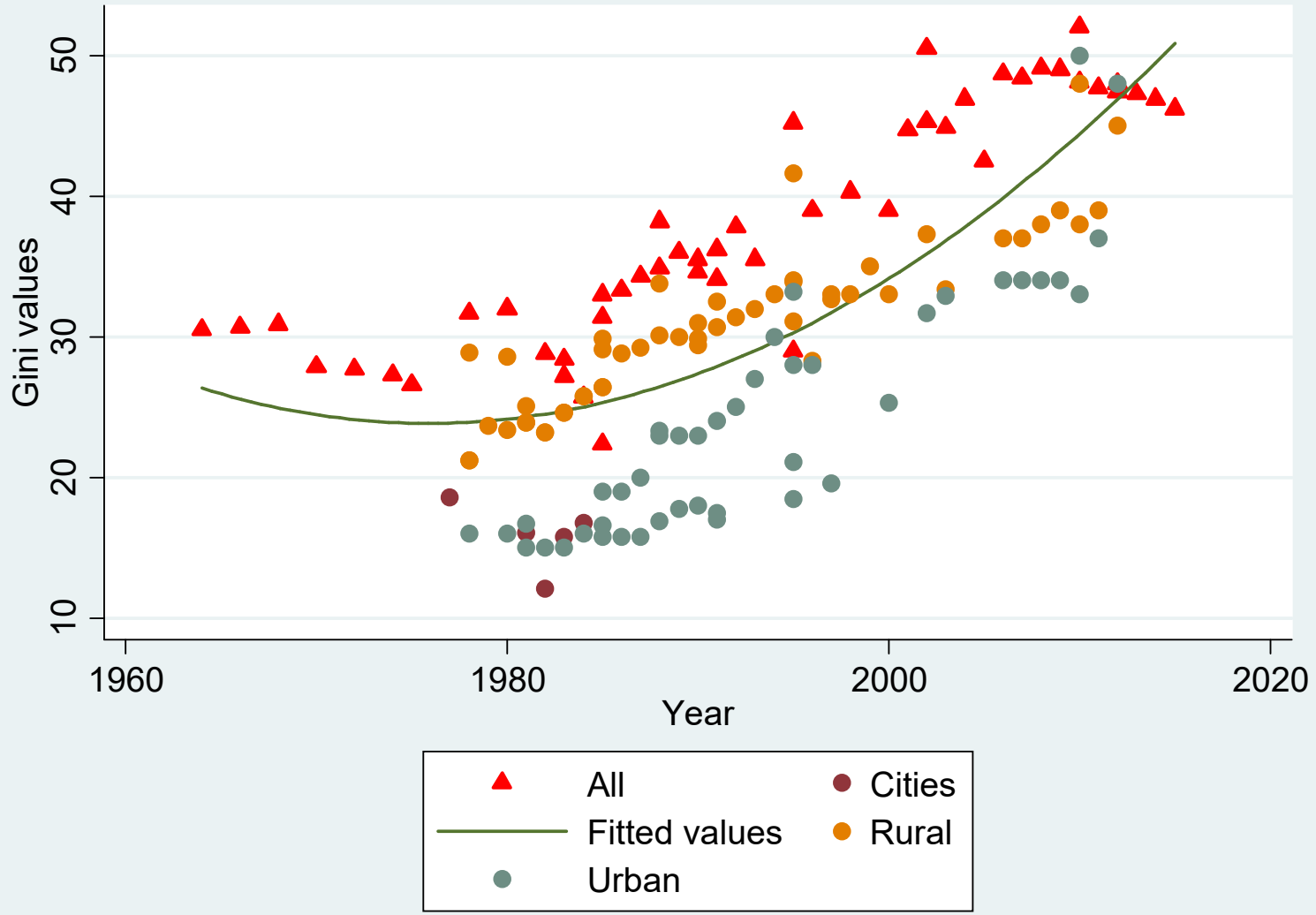
CHNS Household Survey

Main Features

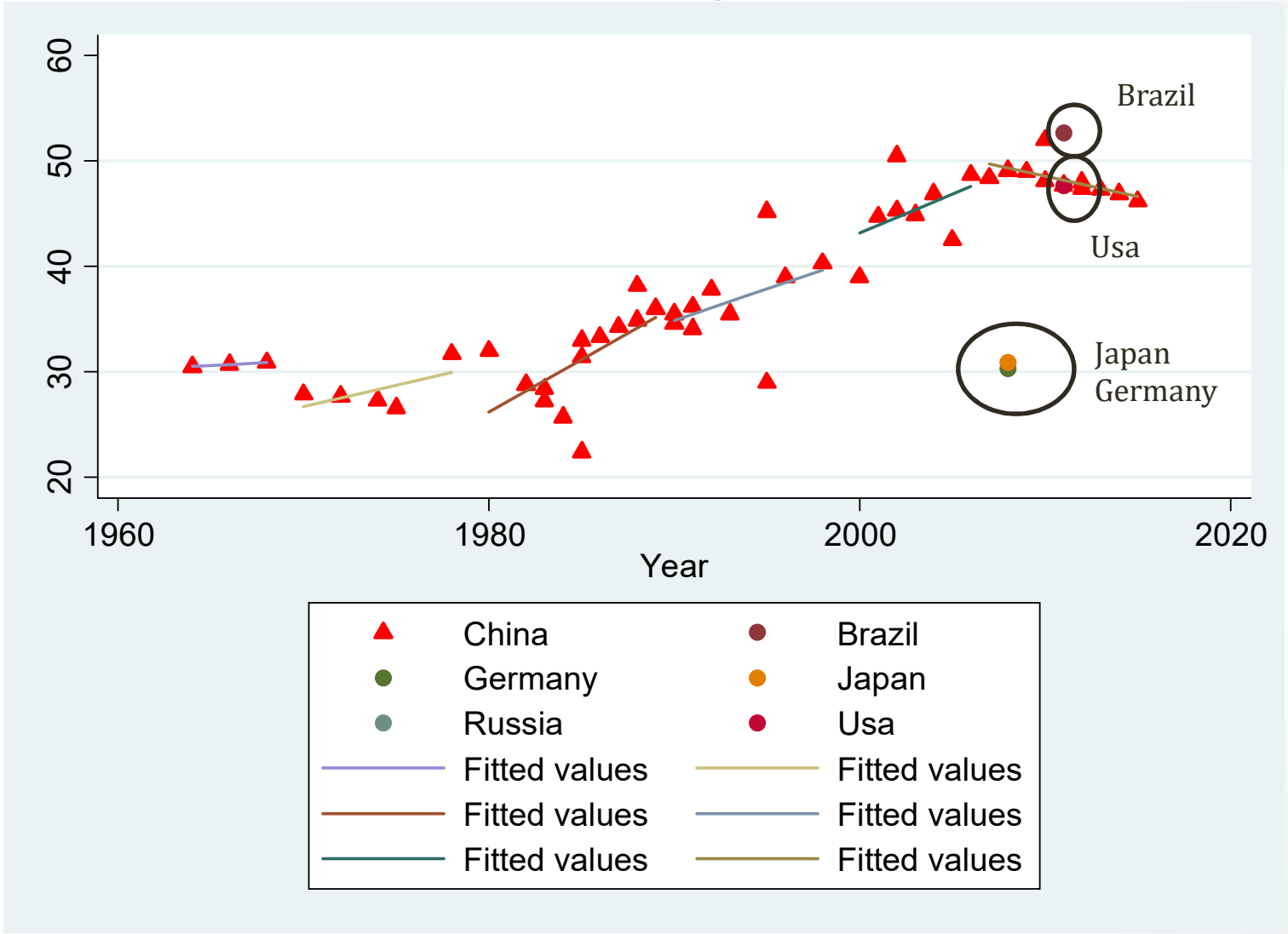
- Started at the end of 1980s (10+ rounds until 2011);
- Rich data on health and nutrition variables, with less detailed income information;
- The coverage of province level units is smaller than CHIP and does not include for example, any of the four municipalities
- CHNS has panel data characteristics

Gustafson B, Shi L and H Sato, *Data for Studying Earnings, the Distribution of Household Income and Poverty in China*, IZA DP 8244, 2014

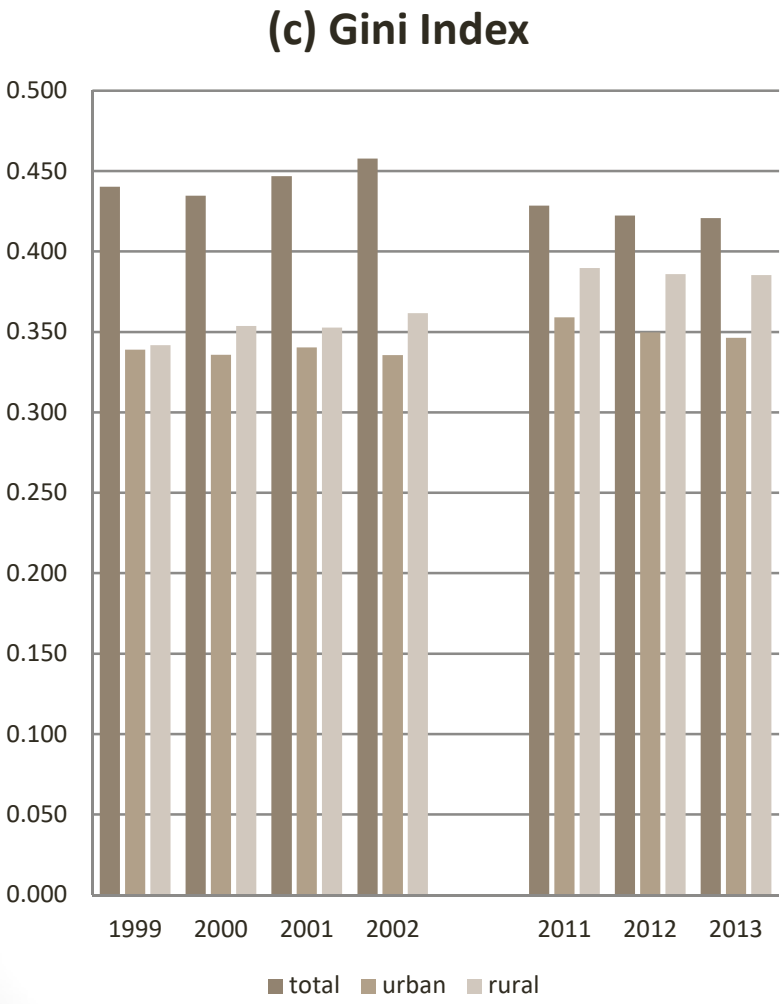
GINIs of China (Source Unu-Wider)

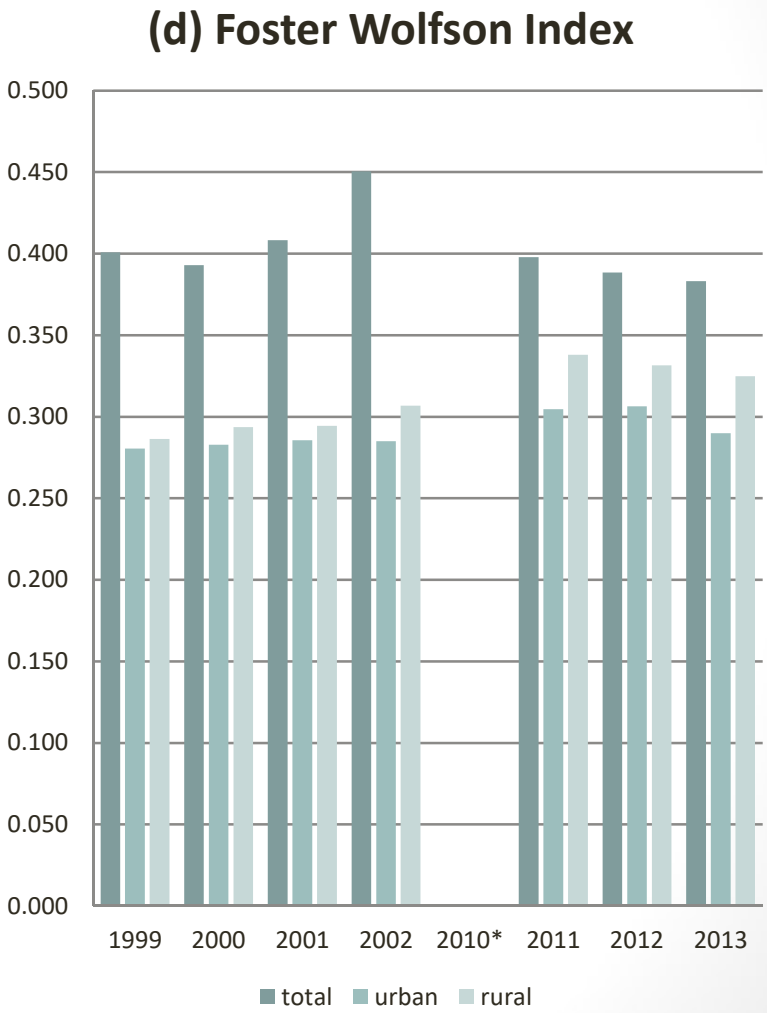


Ginis' trends by decade



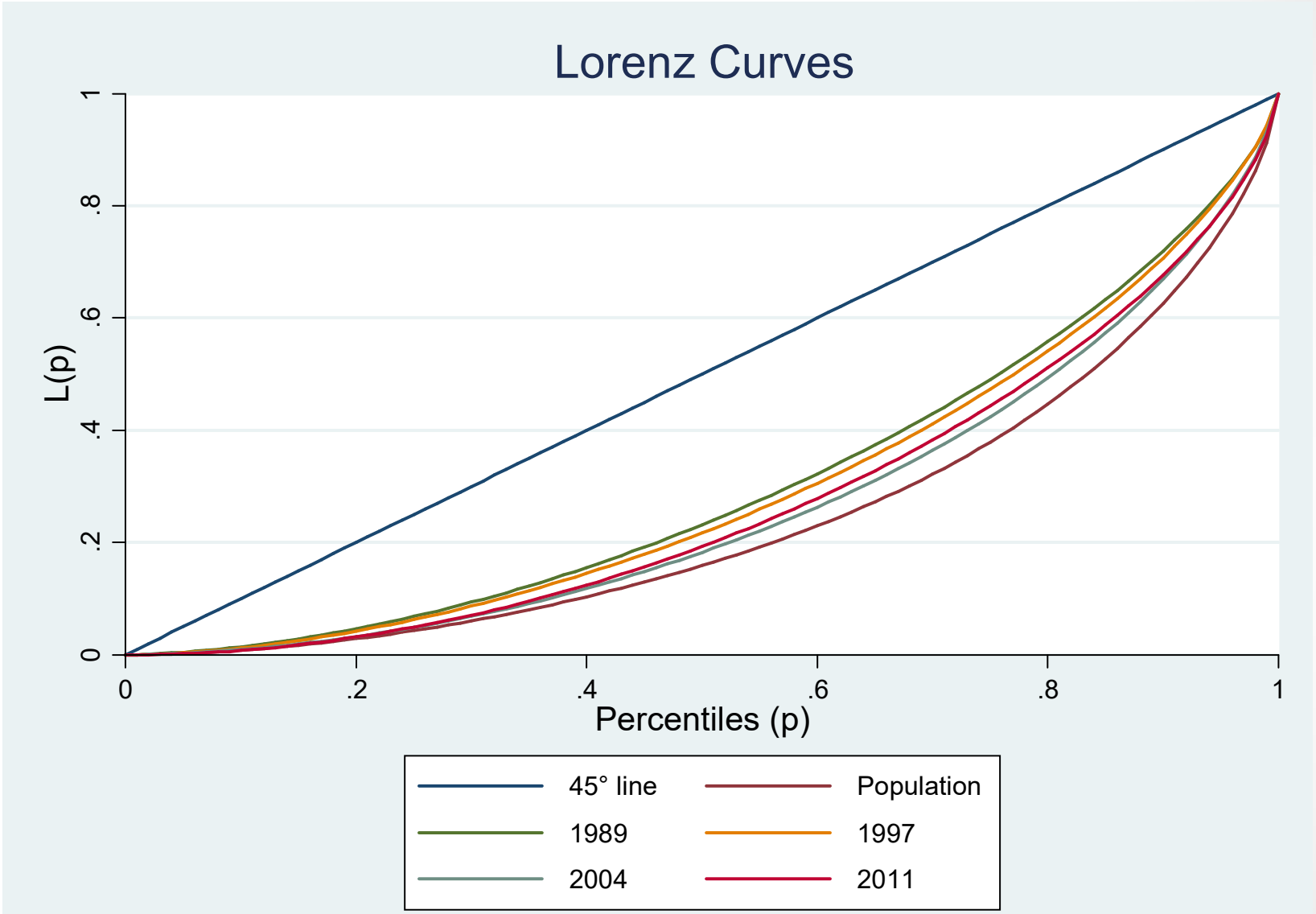
First outcomes (CHIP)

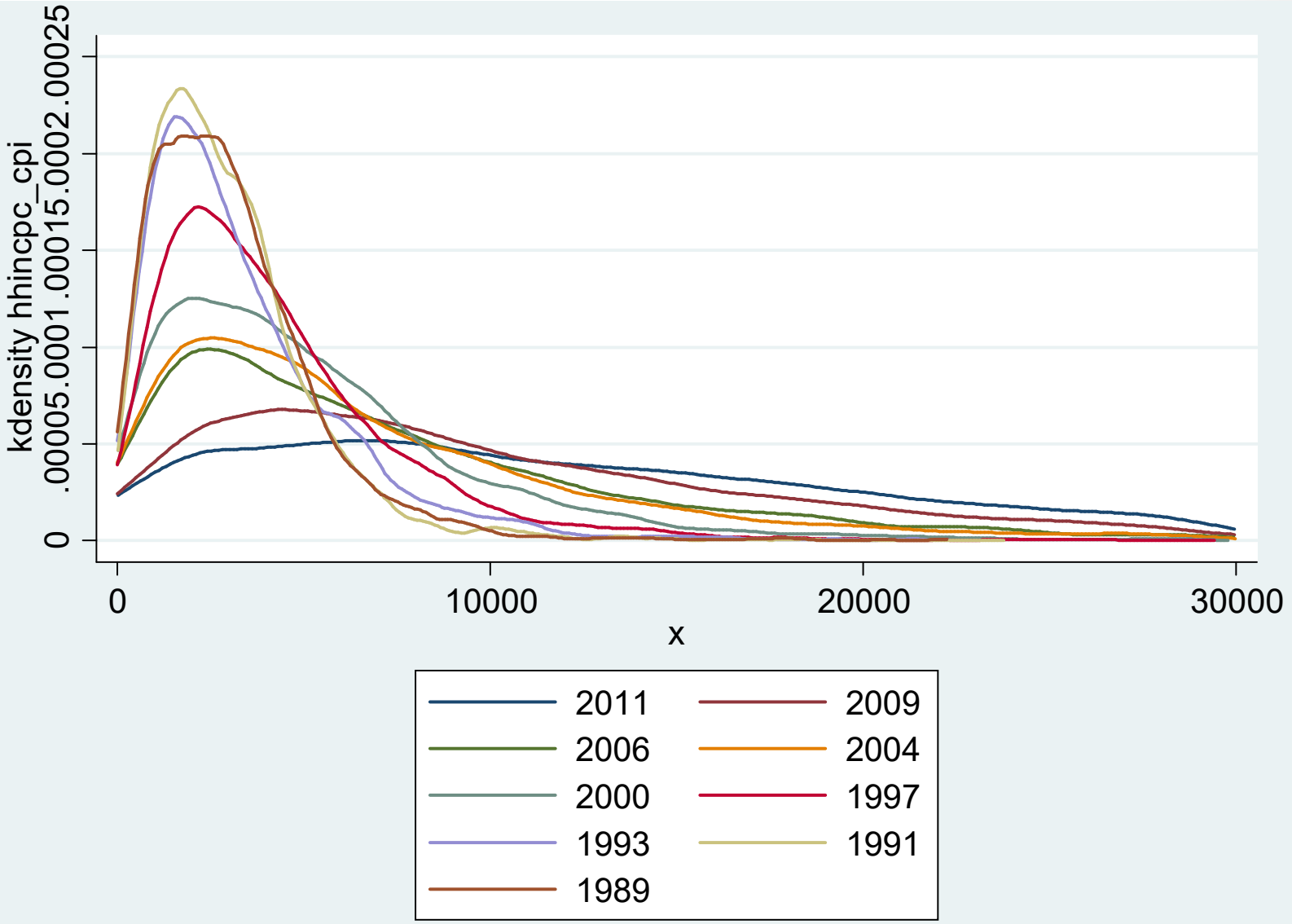




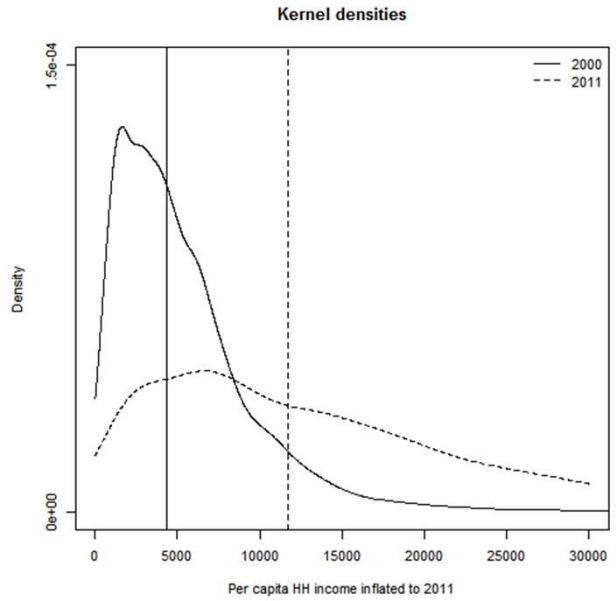
CHNS results (hh_income_pc)

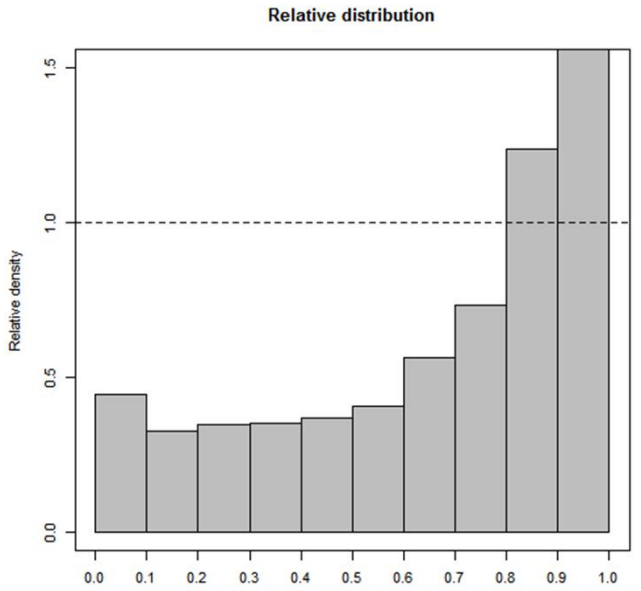
	total			*urban*			*rural*		
	Gini	FW	mean	Gini	FW	mean	Gini	FW	mean
1989	0.380	0.337	3,128	0.300	0.229	3,796	0.428	0.406	2,724
1991	0.370	0.335	3,043	0.300	0.237	3,579	0.403	0.373	2,754
1993	0.412	0.393	3,488	0.373	0.322	4,132	0.433	0.419	3,154
1997	0.398	0.367	4,340	0.371	0.300	4,926	0.421	0.404	3,963
2000	0.443	0.403	5,656	0.412	0.335	6,901	0.457	0.431	4,991
2004	0.475	0.470	7,575	0.456	0.429	9,574	0.487	0.472	6,423
2006	0.508	0.500	8,889	0.478	0.423	11,319	0.523	0.513	7,522
2009	0.483	0.463	12,754	0.473	0.398	15,727	0.509	0.464	10,827
2011	0.458	0.432	15,385	0.417	0.351	18,655	0.497	0.469	12,523

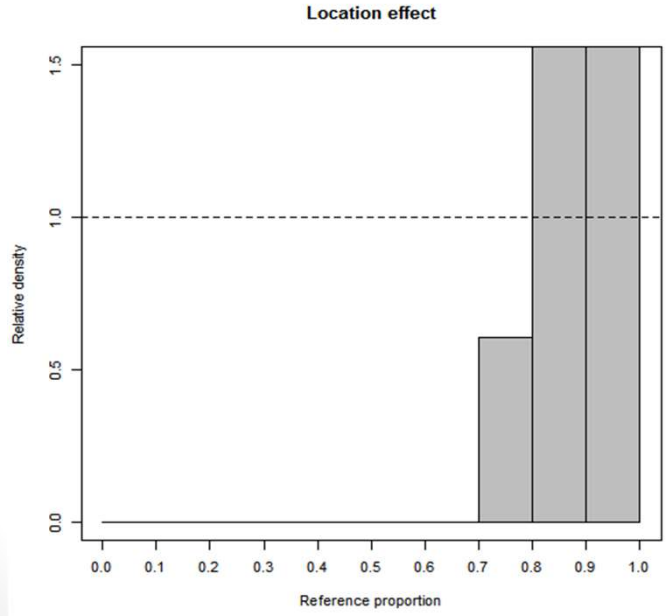

Lorenz Curves
L(p)
0
.2
.4
.6
.8
1
Percentiles (p)
0
.2
.4
.6
.8
1
45° line
Population
1989
1997
2004
2011

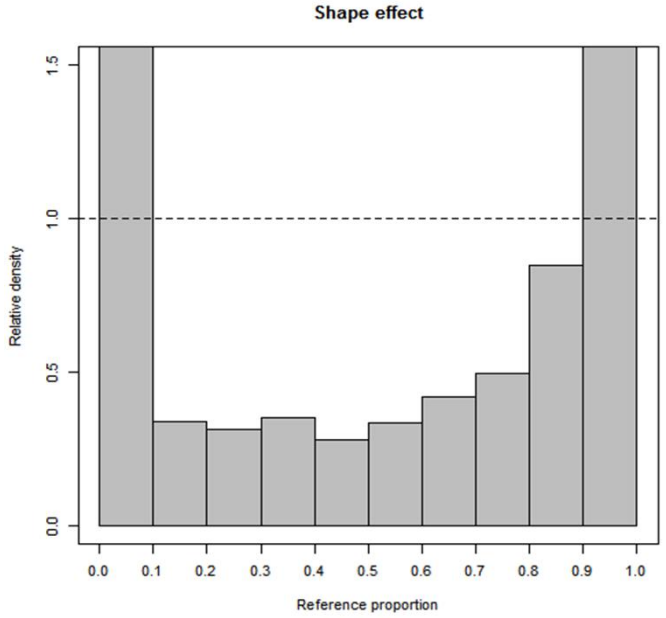

kdensity hhincpc_cpi
0
.00005.0001.00015.0002.00025
0
10000
20000
30000
x
2011
2009
2006
2004
2000
1997
1993
1991
1989

Relative distribution 2000-2011









Relative polarization index

- MRP – Medium relative polarization index

$$\mathrm{MRP}(F;\ F_0) \ = \ 4\mathrm{E}\left[\ \left|\ R_{0L} - \frac{1}{2}\ \right|\right] \ - \ 1$$

- LRP – Lower relative polarization index

$$\mathrm{LRP}(F;\ F_0) \ = \ 4\mathrm{E}\left[\ \left|\ R_{0L} - \frac{1}{2}\ \right|\ \middle|\ R_{0L} \leq \frac{1}{2}\right] \ - \ 1$$

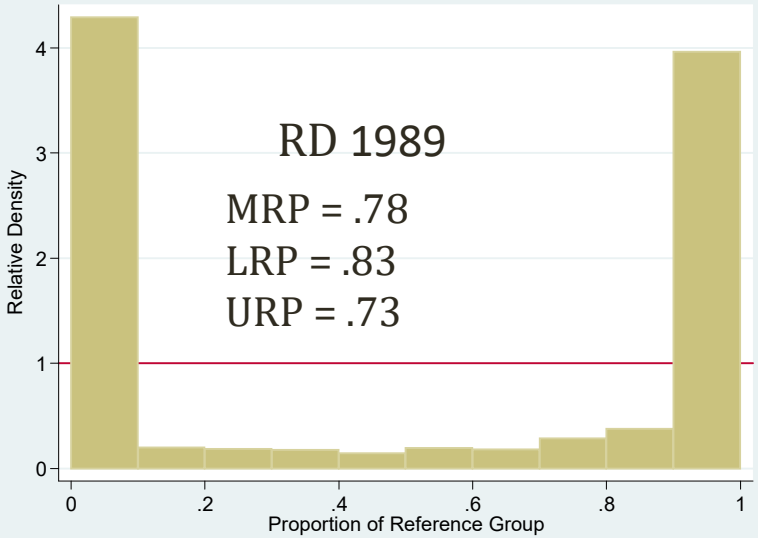
- URP – Upper relative polarization index

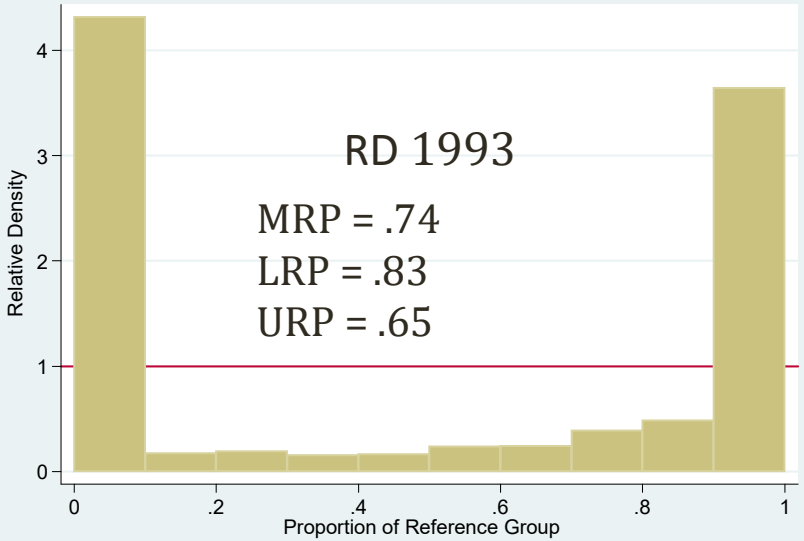
$$\mathrm{URP}(F;\ F_0) \ = \ 4\mathrm{E}\left[\ \left|\ R_{0L} - \frac{1}{2}\ \right|\ \middle|\ R_{0L} > \frac{1}{2}\right] \ - \ 1$$

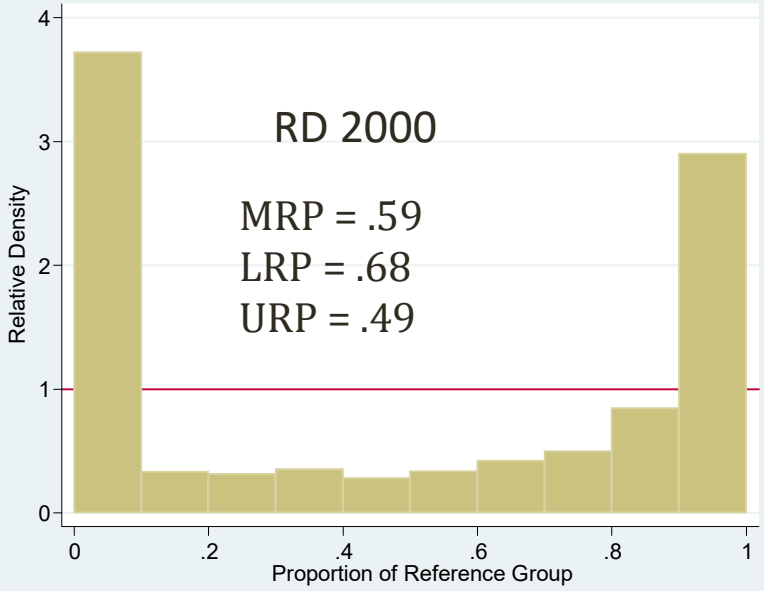
Indeed:

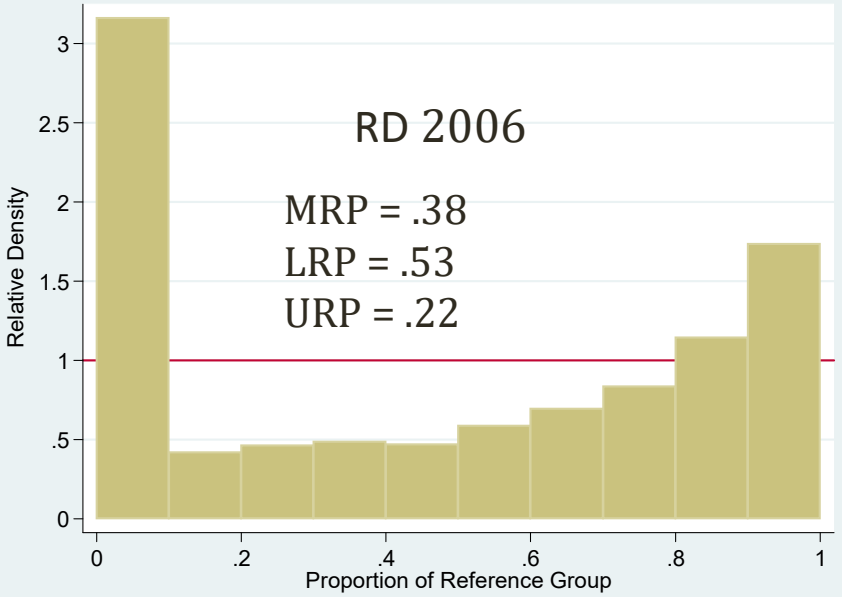
$$\mathrm{MRP}(F;\ F_0) \ = \ \frac{1}{2}\mathrm{LRP}(F;\ F_0) \ + \ \frac{1}{2}\mathrm{URP}(F;\ F_0).$$

Relative Distribution (CD=2011)

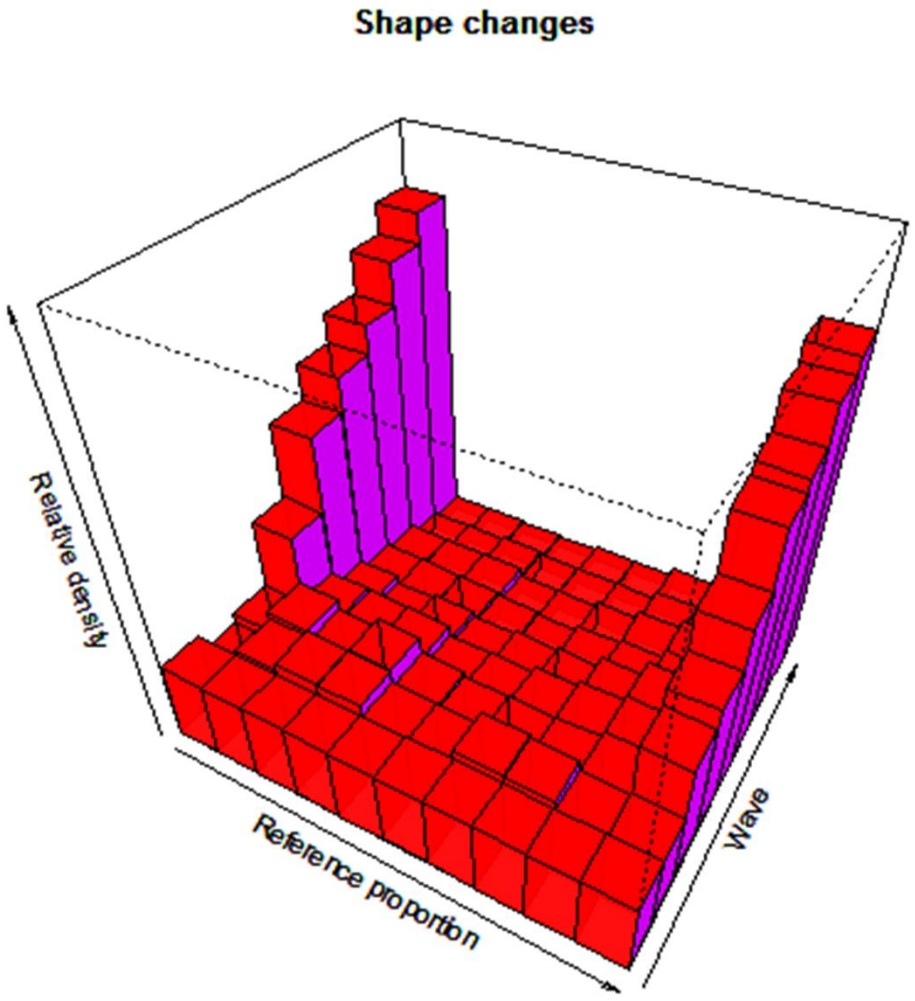








Relative Distribution 1989-2011



Results

- Our results show clearly that the impressive GDP growth of last decade hides the significant "pure" distributive change (shape effect) that in the 1990s and in the 21st century has proceeded in the direction of an increasing polarization, driven principally from the bottom deciles of the distribution
- As growth slows, unless countervailing policies are undertaken, polarization will reveal itself more sharply, and might eventually lead to increasing distributional and related conflicts in PRC.

Thank you

- Main reference:

Khan, Haider Ali and Schettino, Francesco and Gabriele, Alberto (2017): *Polarization and the Middle Class in China: a Non-Parametric Evaluation Using CHNS and CHIP Data* -- submitted

Available as Working paper at:

https://mpra.ub.uni-muenchen.de/86133/