

# THE CENTER CANNOT HOLD: PATTERNS OF POLARIZATION IN NIGERIA

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# INTRODUCTION

# Nigeria: The GIP Trilogy and Beyond

- Recent analysis on consumption patterns in Nigeria (e.g. [World Bank, 2013](#)) seems to suggest an increase in “I”-nequality that could have offset the benefits from sustained “G”-rowth in terms of “P”-overty reduction.
- Inequality increase is, however, just one aspect of the whole problem; our hypothesis is that Nigeria is also going through a process of economic *polarization*.
- Broadly speaking, the notion of polarization is concerned with the disappearance of the middle class (e.g. [Foster and Wolfson, 1992](#), and [Wolfson, 1994, 1997](#)); it can also be regarded as the “clustering” of a population around two or more poles of the income/consumption distribution, which might give rise to social conflicts and tensions ([Esteban and Ray, 1999, 2008, 2011](#)).
- Nigeria represents an interesting case for undertaking a polarization analysis: GDP per capita has steadily grown in the last decade and Nigeria is likely to become the biggest African economy, but yet clear signs of consolidation of a national middle class are limited; moreover, the country is increasingly affected by sub-regional conflicts.

# Aim of the Work

- Studies on polarization in Nigeria are still few (e.g. [Araar, 2008](#), [Awoyemi and Araar, 2009](#), and [Awoyemi et al., 2010](#)) and the limited availability of comparable data series not too close in time has hindered an investigation of the long-run patterns – the process of polarization is indeed generally slow and significant changes can be detected only over long periods.
- The present study is innovative under at least three aspects:
  - 1) unlike previous studies, rather than just computing and comparing polarization indices, we apply a non-parametric tool (the “relative distribution”) to explore polarization along the entire distribution;
  - 2) since the relative distribution analysis requires at least two comparable survey rounds, we use “survey-to-survey” imputation techniques to produce fully comparable distributions; in this way we overcome the lack of comparable surveys that limited the scope of previous work.
  - 3) since Nigeria is highly heterogeneous across macro regions, we also aim at documenting sub-national patterns of polarization; the flexibility of the relative distribution approach allows indeed an accurate analysis at the macro-regional level too.

# DATA AND METHODOLOGY

# The Need for Comparable Data

- Excluding cases of sudden shocks, measures such as inequality, poverty or polarization tend to move slowly in time; comparison of such measures, computed on surveys relatively distant in time, captures therefore more accurately the effects of structural modifications in the distribution of a welfare variable.
- Comparisons over a long time span, however, can be made difficult – if not impossible – by changes in data collection methodology ([Tarozzi, 2007](#)).
- In particular, there is increasing evidence that questionnaire revisions can affect respondents' answer in relevant ways (e.g. [Deaton and Grosh, 2000](#)).
- Other changes such as the switch from a diary-based collection to a recall-based collection can dramatically alter aggregate food consumption expenditures, a relevant component of total expenditures in many developing countries (e.g. [Beegle et al., 2010](#), and [Ahmed et al., 2014](#)).
- For our specific case, since we adopt a methodology based on comparison of two distributions, it becomes crucial using distributions sufficiently distant in time in order to see significant differences; the need for comparable data requires thus to be directly addressed.

# The Nigerian Household Consumption Data

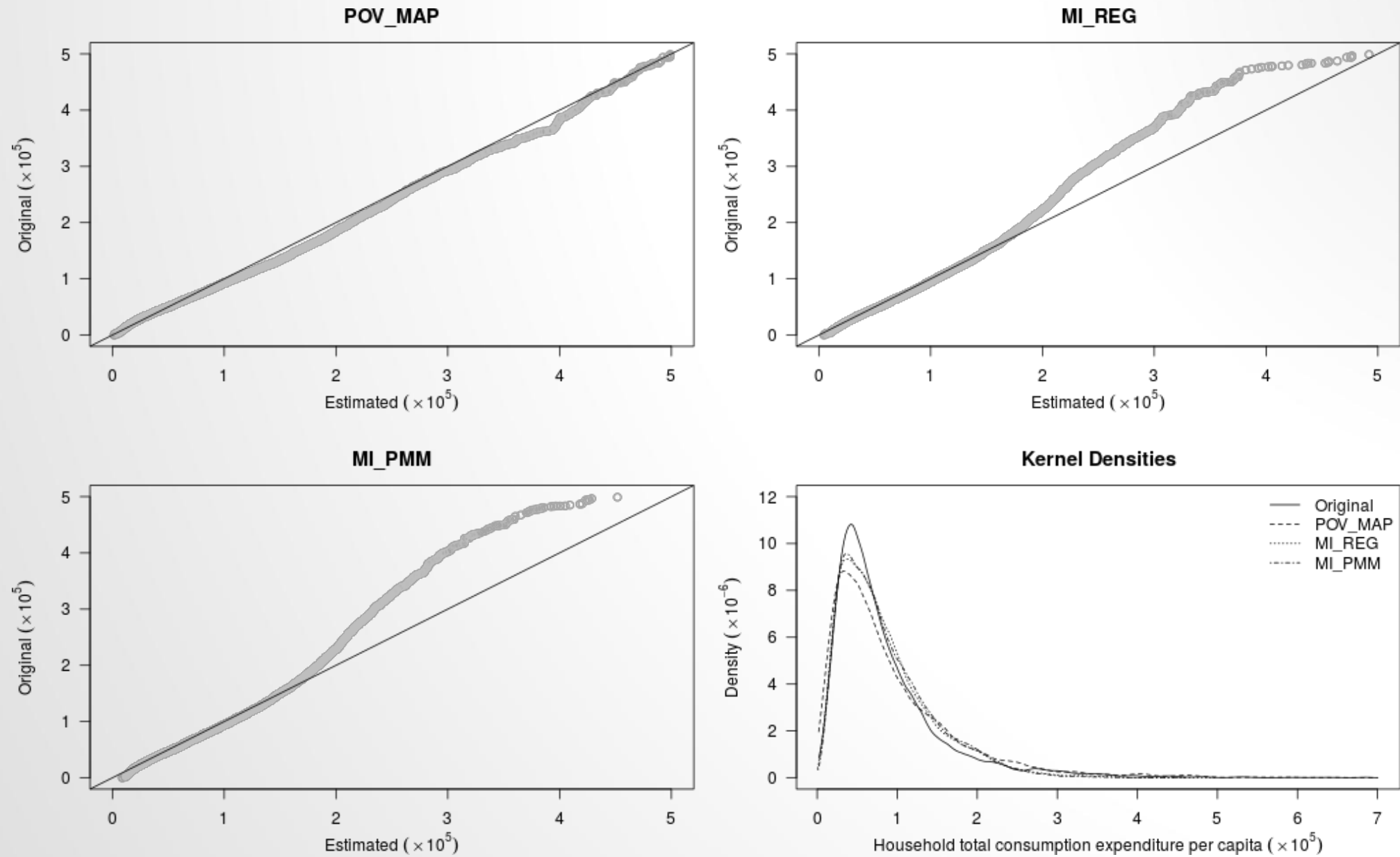
- The Nigeria's National Bureau of Statistics (NBS) has generally used the National Living Standard Survey (NLSS) 2003/2004 and the Harmonized National Living Standard Survey (HNLSS) 2009/2010 to monitor progress in poverty reduction over the last decade.
- The NBS also conducts other household surveys, most notably the General Household Survey (GHS) cross section and panel.
- The GHS cross section is a survey of 22,000 households carried out periodically throughout the country; data on consumption are collected by asking the household about broad categories of consumed items in the last month: food, healthcare, school, and so forth; available datasets include 6 rounds, from 2004/2005 to 2010/2011.
- The GHS panel is a randomly selected sub-sample from GHS cross section consisting of 5,000 households and covering the periods 2010/2011 (Wave 1) and 2012/2013 (Wave 2); it is representative at national and zonal (geo-political) levels; in every panel wave, households are interviewed two times: once in the "post-planting" period (from August to November) and once in the "post-harvesting" period (from February to April).



# Enabling Data Comparison for Nigeria

- Nigerian consumption data from the three previously mentioned household surveys are not directly comparable; preliminary checks for poverty and inequality levels computed on the GHS panel and the HNLSS, for example, indicate that the figures derived using the former look substantially different from those computed on the latter.
- To enable data comparison over a long time span (a decade), we employ “survey-to-survey” imputation techniques ([Elbers et al., 2003](#)).
- Specifically, we first estimate a model of log per capita consumption expenditures on the Wave 1 of GHS panel data by including several household variables on demographic characteristics, durables and location as explanatories; we use then the estimated coefficients to predict consumption on the 2003/2004 NLSS survey.
- The validity of the model has been tested by means of both in-sample criteria (i.e. by evaluating the  $R^2$  size = 0.63) and out-of-sample criteria (i.e. by testing its ability to simulate the consumption distribution of GHS panel Wave 2, where household consumption and non-consumption data are available reliably) against two alternative imputation methods ([Figure 1](#)).

**Figure 1** Post-Imputation Diagnostic Plots



# The Relative Distribution for Inequality Questions

- The “relative distribution” ([Handcock and Morris, 1998, 1999](#)) can be taken advantage of whenever the distribution of some quantity across two populations (or points in time) is to be compared.
- The basic idea underlying the relative distribution is to take the values of one distribution (the “comparison” distribution) and express them as positions in another (the “reference” distribution).
- As a matter of example, consider two distributions of household consumption expenditure, one measured at  $t - 1$  and one at  $t$ ; treat  $t$  as the comparison distribution and  $t - 1$  as the reference distribution, and divide this latter into deciles; the relative distribution then measures what fraction of households in the comparison population fall into each decile of the reference population.
- If the fraction of households in a decile rises or falls over time, the relative distribution will rise or fall; if there is no change in the distribution, the relative distribution will be flat.
- In this way, one can distinguish between growth, decline or stability at all points on the distribution.

# The Relative Distribution: Some Advantages

- Decomposition into “location” and “shape” changes: cancel out differences in location to isolate changes in distributional shape between the comparison and reference populations.
  - Location differences are presented as the density ratio of the “location-adjusted” reference population relative to the unadjusted one.
  - Shape changes are presented as the density ratio of the comparison population relative to the location-adjusted reference population.
- Polarization summary measures: the relative distribution supports the “median relative polarization” (MRP) index to summarize distributional inequalities not due to location shifts (it is location-adjusted).
  - The MRP index takes values between  $-1$  and  $1$ , where zero represents no differences in distributional shape while positive values represent more polarization (increases in the tails of the distribution) and negative values represent less polarization (convergence to the center of the distribution).
  - It is also decomposable into the “upper” and “lower” relative polarization indices, representing the contributions from the upper and lower halves of the distribution; these indices have similar interpretations to the MRP.

# RESULTS

# Changes in Nigerian Consumption Distribution

- An insight on the key changes occurring in the distribution of total per capita consumption expenditure of Nigerian households is provided by [Table 1](#).

**Table 1** Summary Measures for Nigerian Household Consumption Expenditure Per Capita

	2003/2004	2012/2013
Mean	64,424	93,597
Median	49,563	64,846
Standard deviation	60,565	201,536
Skewness	7.11	53.15
Kurtosis	142.57	4,853.21
Consumption shares		
Bottom 5%	0.80	0.77
Bottom 10%	2.09	2.00
Bottom 20%	5.61	5.33
Top 20%	45.82	50.52
Top 10%	29.65	35.44
Top 5%	18.76	24.77
Inequality measures		
Gini	0.40	0.45
Theil	0.29	0.46
Polarization measures <sup>a</sup>		
Foster-Wolfson	0.36	0.37
Duclos-Esteban-Ray	0.24	0.26

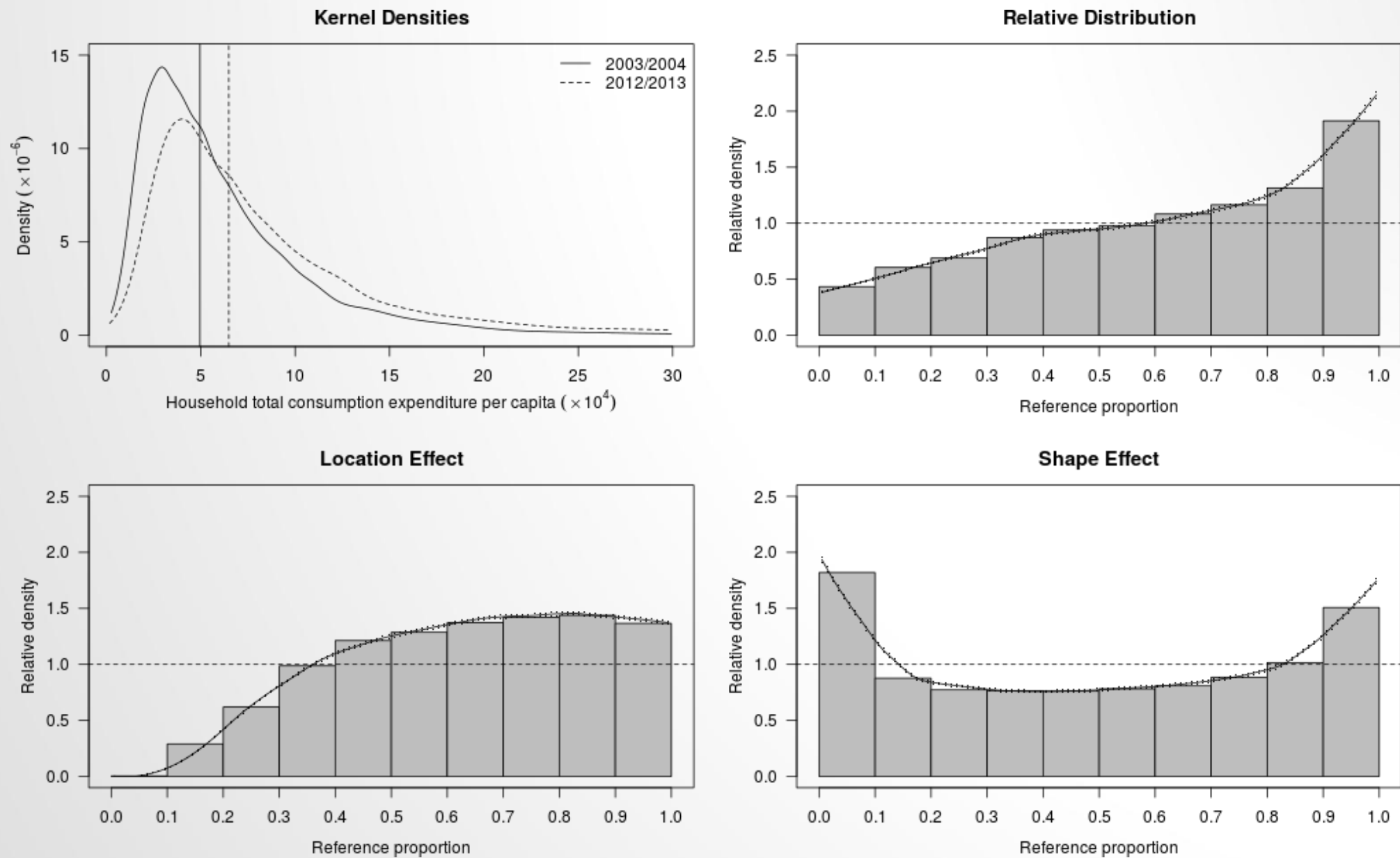
<sup>a</sup> The Duclos-Esteban-Ray index has been computed with the polarization sensitivity parameter  $\alpha$  set at 0.5

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**Figure 2** Changes in the Nigerian Consumption Distribution over 2003-2013



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- The size and sign of the estimated relative polarization indices confirm the impression left by the graphical display ([Table 2](#)).

**Table 2** Relative Polarization Indices, 2012/2013 to 2003/2004

Index <sup>a</sup>	Value	LB <sup>b</sup>	UB <sup>c</sup>	p-value <sup>d</sup>
MRP	0.18	0.16	0.19	0.00
LRP	0.21	0.18	0.24	0.00
URP	0.15	0.12	0.18	0.00

<sup>a</sup> MRP = median relative polarization index; LRP = lower relative polarization index; URP = upper relative polarization index

<sup>b</sup> Lower bound of the 95 percent confidence interval

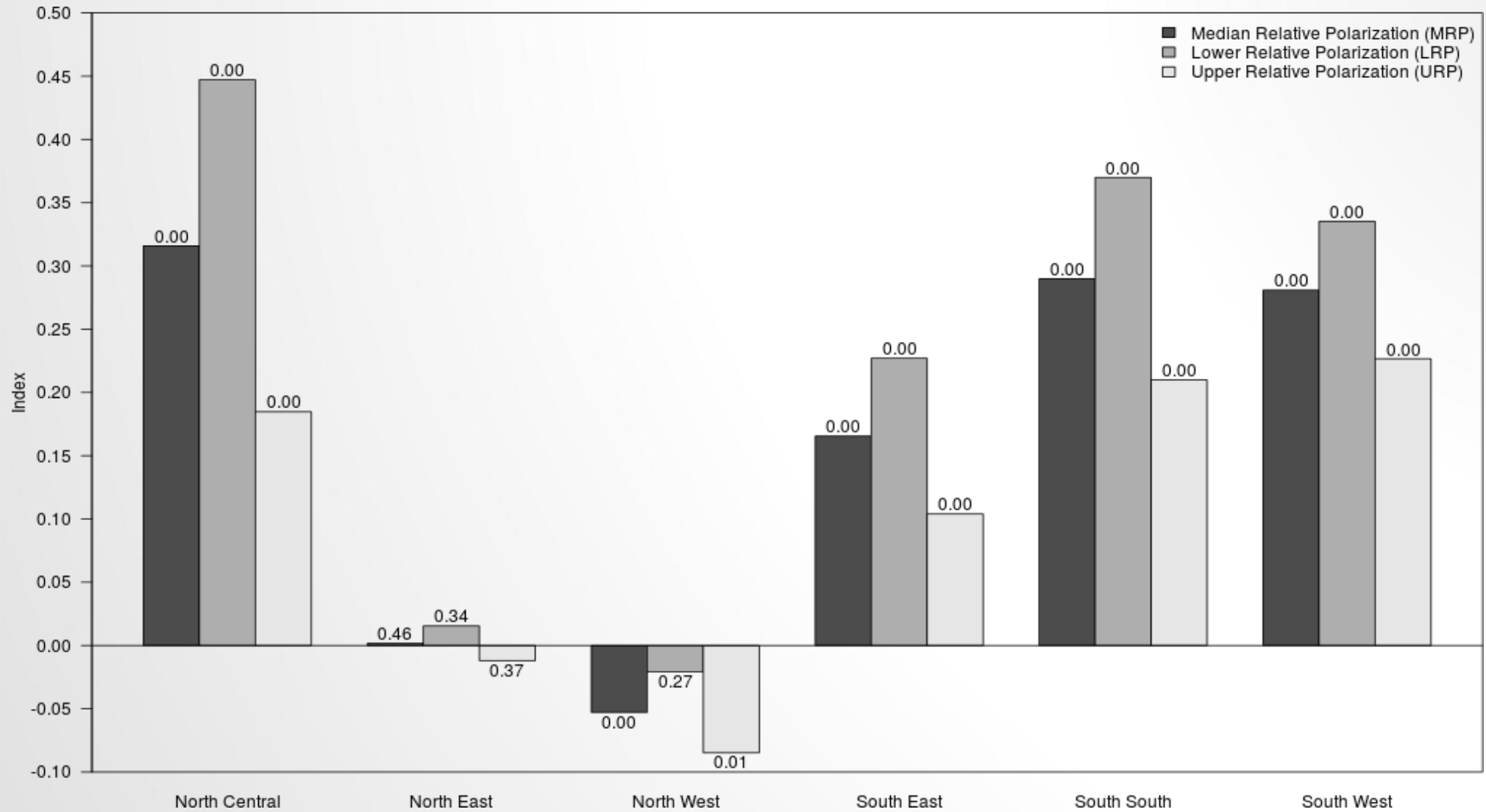
<sup>c</sup> Upper bound of the 95 percent confidence interval

<sup>d</sup> Refers to the null hypothesis of no change with respect to the reference distribution, i.e. that the index equals 0

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- This pattern of distributional polarization, however, is not entirely homogeneous within the country, but varies from zone to zone ([Figure 3](#)).

**Figure 3** Relative Polarization Indices by Zone, 2012/2013 to 2003/2004

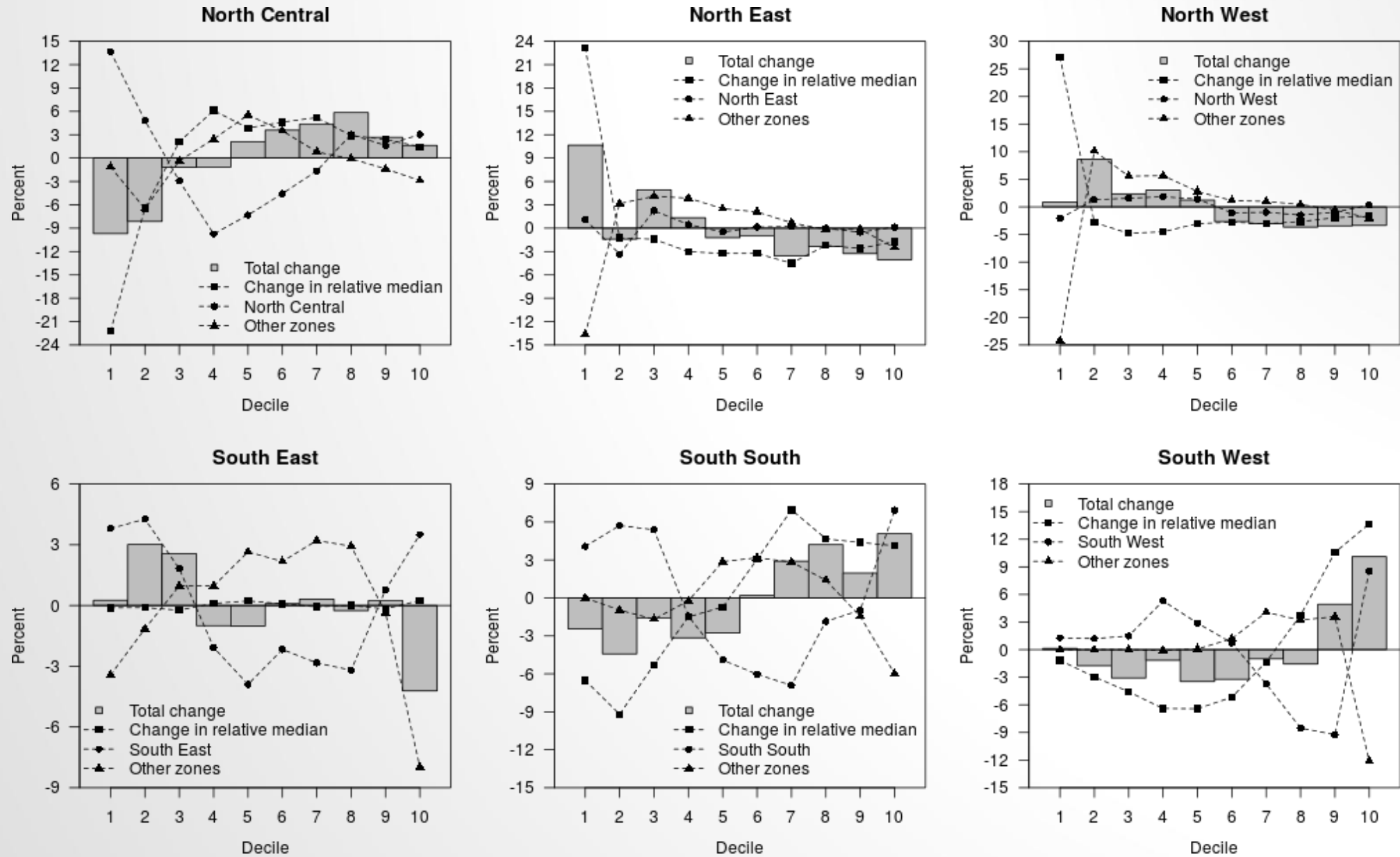


**Note** The number above or below each bar indicates the *p*-value for the null hypothesis that the index equals 0

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- This pattern of distributional polarization, however, is not entirely homogeneous within the country, but varies from zone to zone ([Figure 3](#)).
- When controlling for spatial characteristics of household head, a clear macro-regional gap seems to emerge: in fact, while the South South and South West regions contribute mainly to polarization in the upper tail of the national consumption distribution, households in the North East and North West zones – the conflict-stricken areas – are more likely to fall in the lower national deciles compared to the rest of the country ([Figure 4](#)).

**Figure 4** Sources of Distributional Change by Zone, 2003-2013



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- Results for the other covariates (demographic characteristics and durables ownership) look instead as expected.



# CONCLUDING REMARKS

- Nigeria experienced a stable and sustained growth over the last decade, but despite this the outcomes in terms of poverty reduction have not been satisfactory, probably due to fast increases of inequality.
- Inequality, however, represents just one aspect of the whole problem: the country, we argue, is also undergoing through a process of polarization.
- By undertaking an analysis that is innovative from different points of view, we were indeed able to detect a clear rise in polarization, meaning that the distributional changes observed between 2003/2004 and 2012/2013 hollowed out the middle of the Nigerian household consumption distribution and increased concentration of the mass toward the tails.
- These modifications describe in particular a situation where Northern households increasingly moved from the center toward the bottom of the distribution, while Southern households increasingly moved upward; the overall impact was a generalized hollowing out of the middle and a further accentuation of the North-South divide characterizing the country.
- An obvious side effect of our analysis is the tendency of the Nigerian society to be more conflict-prone; our future research will be therefore directed in understanding how existing conflicts in Nigeria can be interpreted and linked to the patterns of polarization.

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«Things fall apart; the centre cannot hold»  
[C. Achebe. *Things Fall Apart*. William Heinemann Ltd., London, 1958]

**THANK YOU ALL!**