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Is inequality underestimated in Mozambique?

Accounting for underreported consumption

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Abstract: Household budget surveys in sub-Saharan Africa are designed to facilitate poverty measurement and may fail to fully capture consumption in wealthy households. As a result, inequality is likely underestimated. We address upper tier consumption underreporting by aligning consumption derived from Mozambican household surveys with national accounts. Consumption in categories most consumed by wealthy households is more frequently underreported, and therefore scaling household level consumption by category upwardly adjusts upper tier consumption. Using scaled consumption, we find evidence that inequality in Mozambique is underestimated and that inequality began increasing in 2002 rather than 2008 as the official numbers suggest.

Keywords: consumption underreporting, household surveys, inequality, Mozambique, national accounts
JEL classification: D31, D63, E01, O55

Tables: at the end of the paper.

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1 Introduction

It is well known that household budget surveys in sub-Saharan Africa (SSA) are designed to facilitate poverty measurement; yet, in prioritizing the consumption patterns of the poor, they may fail to fully capture consumption[1] in wealthy households, particularly very wealthy households. While this shortcoming does not significantly impact estimated poverty rates, it creates a strong downward bias on inequality measures such as the Gini coefficient. This is particularly troublesome in the African context, where a small share of the population is expected to hold a large share of consumption, income, and wealth; and reliance on household income and budget surveys for measures of inequality is almost complete.[2]

The limitations of household surveys in measuring consumption/income among the very rich are generally attributed to two factors. First, upper-income households hold a large share of income while representing a small yet heterogeneous population in which income varies considerably. In order for household surveys to accurately reflect inequality, this small but crucial population needs to be over-sampled. In practice, this population seems more likely to be under-represented. Under-representation results from both a greater unwillingness of wealthy households to participate in household surveys as well as a difficulty accessing wealthy communities (see for example, Mistiaen and Ravallion 2003; Korinek et al. 2006). Under-representation is compounded by consumption/income underreporting by wealthy households when they are actually included in samples. Consumption undercounting results in part from efforts to simplify questionnaires to best achieve the primary goal of estimating poverty rates. Questionnaires geared more toward the expenditure patterns of the poor by design fail to include products, which may not be important in the budgets of poor household, but comprise an important share of expenditures in rich households (see for example, Deaton and Grosh 2000).

Numerous studies provide striking evidence of the extent to which upper-income households are misrepresented in developing country household surveys. In a comparison of 18 Latin American household surveys by Székely and Hilgert (1999), the ten richest households in each survey have incomes no greater than managerial wages. Similar outcomes are evident in Egypt where median senior executive salaries, known from outside the survey, far exceed median income in the top one per cent of households in a 2008 budget survey (van der Weide et al. 2016). Argentine tax records indicate that nearly 700 households have incomes exceeding one million US$, yet no such observations exist in the household survey (Alvaredo 2010). In Vietnam, the average executive salary is more than double the top salaries recorded in the household survey (World Bank 2014). Finally, Banerjee and Piketty (2005) find that a significant portion of the gap between consumption growth in national accounts and household surveys can be attributed to underreporting in wealthy households.

In this study we consider the impact of missing upper-tail consumption on inequality estimates in Mozambique. Most certainly Mozambican household surveys are not exempt from this well documented and widespread limitation of household surveys. Furthermore, the vast disparities in the consumption patterns of rural poor relative to the urban elite combined with pressures to

[1] Consumption, which is the preferred welfare measure in much of the developing world and particularly in SSA, is the welfare measure of choice in this study. Though the literature is primarily geared toward missing top incomes, much of the discussion is directly relevant to consumption, though consumption undercounting is generally thought to be a lesser concern (Deaton and Grosh 2000).

[2] South Africa is an exception.

shorten and simplify the consumption questionnaire, likely result in pronounced undercounting. The Fourth National Poverty Assessment indicates that inequality has been on the rise over the past two decades with a significant increase in recent years (MEF/DNEAP 2016). The Gini coefficient increased only mildly from 0.40 in 1996/97 to 0.42 in both 2002/03 and 2008/09. This period corresponded to substantial reductions in poverty followed by stagnation with the poverty rate falling from nearly 70 per cent in 1996 to 53 and 52 per cent in 2002/03 and 2008/09, respectively. Between 2008/09 and 2014/15, the Gini coefficient increased sharply to 0.47 while poverty declined 5.5 percentage points to 46 per cent.

Arndt et al. (2015) note that the differences in consumption patterns in richer and poorer households are likely to impact real consumption differentials during periods of steeply rising commodity prices. They derive a household specific price index to capture different price dynamics across expenditures during the food and fuel crisis of 2007–09 and show that accounting for such differential results in markedly higher inequality measures in 2008/09. In particular, they find that using a household specific price index results in a 2008/09 Gini coefficient that is .03 points higher.

In light of the sensitivity of the Gini coefficient to methodological choices and the potential bias due to missing upper tails in the consumption distribution, we explore the impact of supplementing household survey consumption with information from national accounts (NA). Section 2 discusses various approaches to accounting for missing upper incomes in household surveys and presents our approach for applying information from national accounts to the household survey data. Section 3 presents adjusted household consumption and the resulting inequality measures. Finally, Section 3 provides concluding remarks.

2 Methodology

2.1 Literature

Atkinson (2007) and Alvaredo (2011) present an approach for correcting for missing upper incomes and estimating an adjusted Gini coeffiient. By supplementing survey data with information from alternative databases that better capture upper-incomes, the top tail of the income distribution can be re-estimated and joined with survey estimates. Tax data is commonly applied to this approach (see for example Alvaredo and Londoño Vélez 2013, Diaz-Bazan 2014, Burdín et al. 2014).

At the national level, correcting for the missing upper tail has a significant upward effect on Gini coefficients. For example, Alvaredo and Londoño Vélez (2013) find, when accounting for upper incomes in Colombia, the 2009 Gini coefficient increases from 0.55 to 0.59. Diaz-Bazan (2014) generalizes the cut-off value for determining the upper tail and obtains an even greater coefficient of 0.6. Burdín et al. (2014) find that supplementing Uruguayan survey data in 2009, 2010, and 2011 results in a similar trend in the Gini coefficient, though the Gini is .03 to .04 points higher in each year. In other scenarios, a failure to account for upper incomes may change inequality dynamics. In the case of the United States, Atkinson et al. (2011) compare inequality measured using the Current Population Survey (CPS) to the CPS supplemented using tax data with and without capital gains. Not only does supplementing upper incomes increase the Gini coefficient in a given year, but increases the change in inequality between 1976 and 2006 from .053 points to .088 points (excluding capital gains) and .108 points (including capital gains). Considering Argentina, Alvaredo (2011) further illustrates that if upper incomes not captured in surveys increase at a sufficiently greater rate relative to the remaining income distribution, Gini coefficients using survey data could

indicate declining inequality, while Gini coefficients accounting for upper incomes indicate a rising trend. Unfortunately, tax data is not widely available in much of the developing world. Alternatively, van der Weide et al. (2016) use housing price data to supplement upper-incomes in Egypt and find that the 2009/10 urban Gini increases from .36 to .47.

A number of international inequality studies also supplement survey data using tax records. Anand and Segal (2015) append upper incomes to Milanovic's (2012) household survey based global distribution dataset. In other words, they assume that the data set represents the bottom 99 percentile of the income distribution and use tax records (or regression imputations when tax records are not available) to estimate the upper 1 per cent. These adjustments raise the Gini coefficient in every year by approximately 0.02 points.[3]

In making these adjustments, survey data are commonly scaled to fit the mean in NA data of either Gross Domestic Product (GDP) or household final consumption expenditure (HFCE), while maintaining the household survey distribution (for example, Chotikapanich et al. 1997; Dowrick and Akmal 2005; Sala-i-Martín 2006; and Schultz 1998). The implicit assumptions underlying this approach are that the NA mean is superior to the survey mean and survey underreporting is distribution neutral. However, as discussed in Section 1, survey underreporting is most likely not distribution neutral. Bourguignon (2015) notes that, because the likelihood that underreporting is greatest in wealthy households, proportional scaling introduces bias into the distribution. Furthermore, methods used to produce national accounts statistics have their own shortcomings and are not necessarily superior to household surveys (Ravallion 2003; Deaton 2005; Anand and Segal 2015). This leaves open the question of why the mean from one source should be prioritized over the other.

Ravallion (2003) describes a number of reasons why survey consumption and NA consumption might not agree. First, NA consumption aggregates are not without measurement errors such as difficulties capturing output in the informal sector and heavy extrapolation between benchmark years. Second, differences in accounting practices underlying estimated receipts in kind, imputed rents, and financial services may lead to incompatibilities between surveys and NA. Finally, differences exist in the coverage between the two systems. This is particularly the case with GDP but also relevant when HFCE is chosen as it includes consumption not collected in household surveys such as expenditures by nonprofits on households (Anand and Segal 2015).

Nevertheless, national accounts may provide useful information to supplement household surveys. Lakner and Milanovic (2013) assume the gap between survey and NA consumption is primarily attributable to underreporting in the upper tail of consumption. Rather than scale the entire distribution to fit the NA mean, they follow Atkinson (2007) to supplement top incomes based on the discrepancy between survey and HFCE. Lakner and Milanovic begin with the Milanovic (2015) dataset, which was also used by Anand and Segal (2015). Re-estimating top incomes results in a Gini coefficient 0.03–0.05 point higher in every year and declines only slightly over the 17-year period. This is a substantially greater level impact than Anand and Segal obtained using tax records.

Bourguignon (2015) presents an additional method for adjusting survey income to national accounts. In the construction of CEPALSTAT, a dataset of income distribution in Latin America, the Economic Commission for Latin America and the Caribbean scales survey income by the ratio

[3] Anand and Segal (2015) also estimate top incomes following Atkinson (2007) and Alvaredo and Londoño Vélez (2013) by replacing the top income based on tax records rather than appending the top 1 per cent. These calculations result in slightly lower Gini coefficients.

of survey income to national accounts by income source. Studies by Feres (2004) and Bravo and Valderrama Torres (2011) indicate that such NA adjustments lead to varying changes in income levels and trends by country and even within the same country overtime. Bourguignon warns that underreporting is not likely to be independent of income for all income sources. Consequently, differentiating by income source when scaling may reduce bias in some cases while introducing new noise to others.

2.2 Our approach

In data poor SSA, tax data and even housing price data is typically not available. In this exercise, we follow a method that is similar in spirit to that employed by the Economic Commission for Latin America and the Caribbean in the construction of the CEPALSTAT dataset but is more detailed. Specifically, we scale household survey consumption based on discrepancies with HFCE reported in national accounts. Importantly, unlike some efforts to reconcile household surveys with NAs, we do not scale based on total economy-wise consumption. Rather, we conduct the scaling based on differences in broad expenditure categories. To do this, we determine the ratios of total spending in specific survey categories to the same NA categories. At the household level, products in a given category are then scaled using the corresponding category ratio.

This approach has the advantage of identifying the source of potential survey shortfalls and only scaling survey consumption as appropriate. While the approach does not directly address expenditure shortfalls in upper-income households, it is expected that consumption on items comprising a greater portion of wealthier households' budgets are more frequently underreported. If this is indeed the case, scaling consumption by category will achieve our goal of upwardly adjusting consumption in wealthy households.

National accounts HFCE is a measure of the market value of all goods and services purchased by households, which includes the purchase value of durable goods and the imputed rent of owner-occupied housing. HFCE also includes expenditures not reported in household surveys such as expenditures of nonprofits on households. Additionally, not every product or service consumed in the household survey can be neatly matched with NA accounts expenditures. We deal with these issues by only scaling categories that can be consistently defined in both the survey and NA. Remaining survey consumption is included as reported.

The approach is not without shortcomings. First, this method assumes that household survey under- or over-reporting within each category is distribution neutral. This is almost certainly not the case. Second, as noted in Section 3.1, while the approach reconciles survey consumption with HFCE, NA reported consumption is not directly comparable to survey consumption, nor can it be presumed that HFCE is preferable. Nonetheless, HFCE provides guidance in identifying categories with a propensity for misreported consumption. NA adjusted survey consumption is not presumed to be a better estimate but provides a means for evaluating the possible extent to which inequality is underestimated.

2.3 Data

The primary data employed in this study are three household budget surveys, the 2002/03 *Inquérito aos Agregados Familiares* (IAF02) and the 2008/09 and 2014/15 *Inquérito sobre Orçamento Familiar* (IOF08 and IOF14). The surveys collect information on both household and individual characteristics and consumption. All three surveys are representative by quarter at the national, provincial, and urban/rural level. The IAF02 consumption aggregate is based on a sample of 8,700

households of which 4,005 are urban compared to a total of 10,832 households (5,223 urban) in the IOF08. The IOF1415 was conducted as a panel covering three quarters; however, we treat households in each quarter as distinct observations. The IOF1415 consumption aggregates are based on 33,192 household observations (18,043 urban). Details and supplementary information for the household surveys can be found in MPF (2004), INE (2010), MPD/DNEAP (2010), and MEF/DNEAP (2016). The HFCE data is obtained from national account datasets (INE 2016). HFCE is tabulated at the national level and is disaggregated by broad categories of goods and services. NA expenditure categories both guide and constrain our definition of categories used to adjust survey consumption.

A note is merited regarding the difference between household consumption aggregates used to compute official poverty figures and those constructed in this analysis. Official consumption aggregates incorporate daily and monthly expenditures as well as the use value of durable goods, imputed rents, and in kind receipts and transfers (MPD/DNEAP 2010 and MDF/DEEF 2016). Aiming for consistency with HFCE, we modify the official consumption aggregate in two ways. As noted above, HFCE includes the market value of all items purchased in the current period and therefore our consumption aggregate incorporates the value of durable goods purchased in the current survey period rather than the use value of all durable goods possessed by the household. Though the IAF/IOF surveys report self-imputed rent for owner occupied dwellings, the official consumption aggregate supplements these values with imputed rent obtained from hedonic regressions. For this analysis, we choose to preserve survey reported rental values. Finally, we use nominal consumption without spatial or temporal price adjustments. It should be emphasized that differences in the consumption aggregate and the use of nominal consumption render the inequality outcomes presented here non-comparable with those published in previous studies.

2.4 Household consumption discrepancies

Table 1 compares IAF/IOF and HFCE total daily nominal consumption in 25 expenditure categories. While basic food categories align quite well, drinks, tobacco, transportation, and financial services are severely undercounted in every year. Underreporting of tobacco and alcohol is expected in household budget surveys. Low values of financial services are consistent with the hypothesis of missing consumption in wealthy households.

The household survey did not substantially change between 2002/03 and 2008/09, but the IOF14 introduced modules to capture expenditures abroad and individual expenditures on food and drink services, tobacco, communication, fuel, and transportation. The expanded ability to capture these expenditures is reflected in the reduced discrepancy between survey consumption and HFCE in transportation. It appears that in other cases HFCE did not keep pace with the greater consumer data; survey consumption exceeds NA consumption by a factor of 3, 4, and 25 for communication, accommodations and tourism, and food services, respectively. For this reason, we do not adjust 2014 expenditures in these categories downward. Furthermore, HFCE in housing and education follows inconsistent trajectories, which lead us to question the usefulness in aligning survey consumption to HFCE. Housing and education consumption are not adjusted in any of the three surveys.

3 Results

3.1 Scaled household consumption

Tables 2 and 3 present daily per capita household nominal consumption values before and after NA adjustments. Table 2 reports consumption by quantiles and indicates that in all surveys the impact of scaling increases by quantile with a substantially greater impact on households in the upper tenth quantile. In 2002/03 and 2014/15, household consumption increases in all percentiles while, in 2008/09, scaling has a negative impact on consumption at the 50th percentile and below. The greater negative impact on consumption in 2008/09 is likely driven by higher survey than NA consumption in most food categories. The impact of scaling is far lower in 2014/15 than the pervious surveys. For instance, consumption in the top one-percentile increases by 41 and 49 per cent in 2002/03 and 2008/09 compared to 16 per cent in 2014/15.

Table 3 indicates that scaling increases mean national household consumption by 26, 14, and 10 per cent in the three surveys with the greatest impact on urban and southern consumption. In 2002/03, scaling also significantly increases consumption in rural areas and the north and central regions. Over all consumption adjustments supports the expectation that consumption by the wealthiest households was underreported to a greater degree than was the case for all other households.

3.2 Inequality

Tables 4 and 5 present consumption percentile ratios using nominal survey consumption and NA adjusted nominal consumption. Comparing consumption at the 99th, 90th, and 10th percentiles to the median provides one perspective on the degree to which scaling consumption impacts inequality. In 2002/03, national survey consumption in the upper most echelon (99 percentile) is nearly ten times the median. After NA adjustments this ratio increases by 24 per cent to 12.3. Not only are the ratios for at the 90th percentile far lower (2.7 and 3.0) but also increase to a lesser degree (12 percent). Nominal consumption at the 10th percentile is less than half the median and declines slightly with NA scaling. Adjusting consumption produces the greatest impact on 2008/09 upper tier ratios and only a relatively mild impact on 2014/15 ratios.

Table 6 reports Gini coefficients by region based on nominal survey consumption and nominal NA adjusted consumption.[4] Comparing inequality of adjusted consumption to unadjusted consumption we find that scaling household consumption to align with national accounts results in greater inequality in every year at the national and all subnational levels. Nationally, the adjusted Gini increases by .05, .07, and .02 points to .511, .531, and .559 in 2002/3, 2008/09, and 2014/15. Official inequality estimates and the unadjusted Gini reported in Table 6 suggest that inequality stagnated between 2002/03 and 2008/09 followed by a sharp increase. National accounts scaling materially alter this trend. The particularly large impact on inequality in 2008/09 results in rising inequality between each period. Furthermore, inequality does not spike in 2014/15 but increases by only a slightly greater margin than in the previous period. This trend holds for all subnational levels with the exception of the northern region where inequality is greatest in 2008/09. Rising

[4] The Gini coefficients reported in Table 6 differ from those reported in the Fourth National Poverty Assessment for two reasons. First, as noted in Section 4.2, the household consumption aggregates differ. Second, the Gini is calculated using nominal consumption.

inequality between 2002/03 and 2008/09 is consistent with the work of Arndt et al. (2015) who temporally adjust 2008/09 consumption using a household specific price index and find that inequality increases from .477 in 2002/03 to .501 in 2008/09[5].

4 Conclusion

In this paper we addressed the potential undercounting of upper level income by scaling consumption derived from 2002/03, 2008/09 and 2014/15 IAF/IOF survey data to align with national accounts household final consumption. These adjustments were made to household level consumption based on discrepancies between aggregate survey data and HFCE in 25 expenditure categories. As noted, HFCE is not necessarily a better measure of total household consumption. Not only do we not presume that HFCE is less subject to error, but there are reasons to believe that HFCE should not align with consumption reported in the IAF/IOF in every expenditure category. Consequently, the adjustments to survey consumption and the resulting inequality measures should be interpreted accordingly. Nonetheless, adjusted inequality figures provide an estimate of the extent to which measurement error of wealthy households introduces a downward bias to inequality measures and alters dynamics. Both this study and Arndt et al. (2015) provide evidence that inequality in Mozambique is underestimated and that a trend of increasing inequality began in 2002/03 rather than 2008/09 as the official numbers suggest. While official estimates indicate a steep acceleration between 2008/09 and 2014/15, this study suggests that inequality increased at only a slightly greater pace than in the previous period.

Undercounting of upper income is not unique to Mozambique. Challenges in collecting accurate measures of household welfare are of particular concern in SSA where, at the same time, careful analysis of poverty and inequality dynamics is crucial. However, data limitations have prevented detailed analyses of the impact of upper incomes on inequality as have been widely studied in other parts of the world. The approach presented in this paper provides a practical way forward using available data. Application to other SSA household surveys would further our understanding of the extent to which undercounted upper incomes introduce a downward bias on inequality estimates.

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[5] Consistent with this study, these Ginis are derived from spatially unadjusted consumption. Arndt et al. also compute a spatially adjusted Gini in 2002/03 (.415) and a Gini adjusted both spatially and temporally using their household price index in 2008/09 (.440).

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Tables

Table 1: Survey and national account daily consumption by source (thousands of Meticals)

	2002/03			2008/09			2014/15		
	IAF	NA	ratio	IOF	NA	ratio	IOF	NA	ratio
Staples	44,781	47,962	0.93	132,930	119,821	1.11	178,617	168,992	1.06
Meat, Fish, Dairy	18,111	18,453	0.98	47,342	45,620	1.04	94,117	113,784	0.83
Fruits & Vegetables	20,358	21,281	0.96	61,330	54,228	1.13	89,602	116,892	0.77
Other foods	9,958	13,639	0.73	24,788	27,838	0.89	42,852	36,325	1.18
Drinks	2,171	10,128	0.21	2,582	21,485	0.12	3,916	59,967	0.07
Tobacco	551	2,112	0.26	635	3,585	0.18	4,045	17,235	0.23
Textiles	14,259	14,472	0.99	35,871	22,295	1.61	77,344	42,544	1.82
Furniture	1,425	1,881	0.76	2,744	2,790	0.98	12,481	9,379	1.33
General Goods	9,061	5,255	1.72	18,437	9,073	2.03	28,684	26,768	1.07
Machines & Electronics	1,999	4,636	0.43	10,697	8,438	1.27	21,232	22,055	0.96
Health Goods & Services	2,321	2,384	0.97	1,845	3,751	0.49	16,577	8,918	1.86
Vehicles	592	4,514	0.13	11,992	14,233	0.84	33,262	36,182	0.92
Fuel	3,584	3,757	0.95	11,138	35,634	0.31	41,100	35,707	1.15
Solid Fuels	10,012	10,447	0.96	26,740	27,658	0.97	51,635	35,477	1.46
Chemicals	4,944	5,423	0.91	13,880	8,500	1.63	26,988	24,191	1.12
Housing	25,250	25,559	0.99	64,986	26,334	2.47	225,464	52,276	4.31
Utilities	4,206	4,221	1.00	9,428	10,909	0.86	3,267	15,688	0.21
Food & Drink Services	2,154	2,175	0.99	3,170	4,822	0.66	100,236	3,962	25.30
Accommodations & Tourism	231	233	0.99	332	526	0.63	3,136	790	3.97
Transportation Services	4,758	25,752	0.18	7,737	59,941	0.13	40,968	97,078	0.42
Air Transportation	432	412	1.05	318	799	0.40	245	1,244	0.20
Communication	2,426	2,742	0.88	8,144	9,685	0.84	42,921	14,688	2.92
Finance	23	369	0.06	480	9,212	0.05	1,875	18,213	0.10
Education	1,299	1,378	0.94	3,398	2,907	1.17	13,144	48,708	0.27
Other Services	3,615	7,626	0.47	6,219	4,763	1.31	15,434	8,074	1.91

Source: Authors' calculations based on IAF02, IOF08, IOF14, and national account datasets (INE 2016).

Table 2: Survey and national accounts adjusted household daily per capita consumption by quantile

	2002/03			2008/09			2014/15		
	IAF	NA adj.	% change	IOF	NA adj.	% change	IOF	NA adj.	% change
5%	2.3	2.5	7%	4.7	4.5	-5%	7.7	7.9	2%
10%	2.9	3.1	9%	6.3	6.0	-5%	10.2	10.4	2%
25%	4.4	4.9	12%	9.8	9.3	-5%	16.0	16.3	2%
50%	6.8	7.7	14%	15.9	15.4	-3%	26.4	27.3	3%
75%	10.8	12.9	19%	26.1	26.7	3%	46.0	48.9	6%
90%	18.2	23.2	27%	42.2	47.9	14%	83.9	92.7	11%
95%	27.8	36.3	31%	59.2	72.5	23%	130.2	146.2	12%
99%	67.3	95.2	41%	146.1	217.1	49%	360.0	418.1	16%

Source: Authors' calculations based on IAF02, IOF08, IOF14, and national account datasets (INE 2016).

Table 3: Survey and national accounts adjusted mean household daily per capita consumption by area

	2002/03			2008/09			2014/15		
	IAF	NA adj.	% change	IOF	NA adj.	% change	IOF	NA adj.	% change
Nation	10.3	13.0	26%	23.55	26.75	14%	46.69	51.18	10%
Urban	16.2	21.2	31%	36.06	45.92	27%	80.76	90.74	12%
Rural	7.6	9.1	20%	18.08	18.38	2%	30.89	32.83	6%
North	8.0	9.4	18%	21.93	23.28	6%	32.84	34.47	5%
Central	9.1	11.2	24%	18.28	18.45	1%	34.31	36.89	8%
South	15.4	20.3	32%	35.25	46.48	32%	90.66	102.97	14%

Source: Authors' calculations based on IAF02, IOF08, IOF14, and national account datasets (INE 2016).

Table 4: Nominal consumption percentile ratios before NA adjustments

	2002/03			2008/09			2014/15		
	p99p50	p90p50	p10p50	p99p50	p90p50	p10p50	p99p50	p90p50	p10p50
National	9.95	2.69	0.43	9.18	2.65	0.40	13.62	3.18	0.39
Urban	13.11	3.19	0.37	12.39	3.02	0.37	16.46	3.70	0.29
Rural	5.64	2.22	0.45	5.02	2.32	0.42	6.32	2.41	0.42
North	5.94	2.30	0.47	8.38	2.40	0.43	7.09	2.53	0.42
Central	7.03	2.28	0.41	6.12	2.46	0.41	8.46	2.57	0.39
South	13.77	3.46	0.36	11.81	2.88	0.39	16.97	3.53	0.32

Source: Authors' calculations based on IAF02, IOF08 and IOF14.

Table 5: Nominal consumption percentile ratios after NA adjustments

	2002/03			2008/09			2014/15		
	p99p50	p90p50	p10p50	p99p50	p90p50	p10p50	p99p50	p90p50	p10p50
National	12.36	3.01	0.41	14.10	3.11	0.39	15.33	3.40	0.38
Urban	15.64	3.70	0.34	19.33	3.87	0.36	17.53	3.82	0.28
Rural	7.15	2.34	0.43	6.57	2.44	0.41	7.21	2.52	0.42
North	8.38	2.43	0.46	11.35	2.75	0.43	8.29	2.59	0.42
Central	9.78	2.51	0.38	7.08	2.51	0.39	9.94	2.74	0.39
South	15.77	3.89	0.34	16.23	3.84	0.37	18.09	3.70	0.30

Source: Authors' calculations based on IAF02, IOF08, IOF14, and national account datasets (INE 2016).

Table 6: Gini coefficients based on nominal survey and NA adjusted consumption

	Survey Consumption			NA Adjusted Consumption		
	2002/03	2008/09	2014/15	2002/03	2008/09	2014/15
National	0.465	0.462	0.537	0.511	0.531	0.559
Urban	0.520	0.512	0.590	0.556	0.580	0.601
=Rural	0.364	0.384	0.406	0.405	0.419	0.427
North	0.400	0.433	0.442	0.435	0.485	0.448
Central	0.402	0.406	0.447	0.452	0.435	0.473
South	0.535	0.502	0.583	0.566	0.578	0.596

Source: Authors' calculations based on IAF02, IOF08, IOF14, and national account datasets (INE 2016).