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Spatial consumption inequality in Mozambique

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Abstract: In this paper, I show that the trend in spatial inequality in Mozambique almost entirely explains the outstanding surge in inequality in the country over the past decade, as well as its decline immediately after the pandemic, in contrast to its secondary role in the earliest years. For this analysis, I use an innovative regression-based decomposition framework based on the Recentred Influence Function to estimate each area's contribution to inequality and a Blinder–Oaxaca approach to disentangle the nature of their contribution to spatial and non-spatial inequality trends. This rise in inequality was mainly due to a generalized drop in consumption experienced by households in the afflicted rural areas in the north and centre of the country, affected by natural disasters and growing conflict. This was aggravated by disproportionally larger economic growth in two urban areas: the Maputo area, which encompassed the capital, during the expansive phase, and the urban area of coal-rich Tete province during the recession that followed. In more recent years, the crisis disproportionally affected the capital and other urban areas, producing a strong mitigating effect on inequality that might be only temporary. The findings of this research have the potential to significantly inform policy decisions to address inequality in Mozambique, thereby contributing to the country's economic development substantially.

Key words: spatial inequality, Mozambique, sub-Saharan Africa, rural, urban, RIF, regression-based decomposition

JEL classification: D31, D63, N37, O15, R12

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1 Introduction

Mozambique is a low-income country in eastern Africa that witnessed substantial and sustained economic growth after the post-independence war ended in 1992 when the country was the poorest in the world. The country's per capita income nearly tripled in constant international dollars between 1992 and its peak in 2018. The growth rates outpaced others in the region, even if the country remains among the world's poorest. As measured in household surveys, real household consumption per capita showed a less impressive trend than gross domestic product (GDP), yet it almost doubled between the first and fourth household surveys (1996/97 and 2014/15). This trend, however, was followed by a significant setback after the 2014/15 survey, undoing much of the previous progress in increasing real consumption or reducing poverty. If the national poverty rate had plummeted from 70 per cent in 1996/97 to 46 per cent in 2014/15, it bounced back to 68 per cent in 2019/20, reaching levels unseen in the last two decades, with only a moderate decline in 2022/23 (65 per cent).[1]

This recent economic downturn was the result of a complex macroeconomic situation triggered by a debt crisis, combined with a surge in natural disasters and violent conflict in resource-rich areas that have not only disrupted the livelihood of many in rural communities but also produced a large number of internally displaced people. The recent COVID-19 crisis affected mostly better-off urban areas in Mozambique and reduced the already meagre incomes in the countryside (Barletta et al. 2022a; Salvucci and Tarp 2024; World Bank 2023a).

I show that inequality has been rising in Mozambique in the last three decades but has particularly accelerated during the 2010s using nationally representative household surveys and the usual methodology to estimate daily real per capita consumption. This implies a persistent upward trend that extends during solid consumption growth and the following economic recession. This trend was driven by a higher consumption concentration at the upper end of the distribution at the expense of the rest. Inequality only went down right after the recent pandemic crisis, which provided what might be only temporary relief.

In this context, the main contribution of this paper is to investigate the role of spatial inequalities in fuelling this trend. As pointed out by Shifa and Leibbrandt (2024), despite the potential role of spatial inequality in reducing overall inequality and improving social cohesion and political stability in sub-Saharan Africa, there is limited work on the spatial dimension of inequality in countries in this region.[2] Although Mozambique has seen a few administrative and political decentralization reforms since its independence, their effectiveness has been questioned, so the country remains highly centralized. Some resource-rich areas of the country may feel they are being left behind regarding the distribution of the benefits their natural resources create while paying the costs associated with their exploitation. In that case, it may have substantial implications for the country's governance, especially with the increasing risks of violent conflict and climate shocks.[3]

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[1] See Section 3 for the corresponding data sources.

[2] This contrasts with more abundant research on inequality in other areas (e.g., see the analysis by Mukhopadhyay and Garcés Urzainqui (2018), and references included therein, for the case of India).

[3] According to Forquilha (2023: 184), 'the reforms develop according to group interests, particularly political party interests, which capture the state and use the reforms as a mechanism for maintaining and bolstering political power. In this regard, rather than being a means of improving the provision of public services and strengthening democracy, decentralisation works more as an instrument for reinforcing state control and pandering to the elite.'

Spatial consumption inequality is defined here as inequality between areas that combine the province and zone of residence (rural or urban), the two main dimensions of potential geographical disparities.[4] The contribution of spatial to overall inequality is obtained by applying the Shapley decomposition of overall inequality into inequality between and within areas (Chantreuil and Trannoy 2013; Shorrocks 2013). The Shapley approach guarantees that spatial and non-spatial contributions to inequality add to overall inequality for all indices regardless of their decomposability properties, not only the mean log deviation (MLD). It also guarantees consistency in comparisons across inequality measures, facilitating the analysis of the extent to which the trend depends on sensitivity at different parts of the distribution, for example, using the entropy measures. To identify what areas are driving this process, as well as whether their influence comes through changes in their population share (compositional effect) or in their consumption distribution (distributive effect), I use an innovative regression-based decomposition framework based on the Recentred Influence Function (RIF) to estimate each area contribution to overall and spatial and non-spatial inequality (Gradín 2020).

The results show that spatial inequality has primarily driven the increasing inequality in the last decade, even if the nature of this process has changed over time. There is a large concentration of human capital and off-farm remunerated activity around urban areas, especially Maputo, but also Tete, a coal-rich province in the country's central region. The better performance of Maputo explains most of the inequality increase during the economic boom. The deep decline in consumption levels in the afflicted rural north alongside the excellent performance of a minority of households in urban Tete were the main factors explaining that inequality kept growing during the generalized recession before the pandemic. The recession and the pandemic have particularly hit the capital, Maputo, and urban Tete, with a mitigating effect on inequality, substantially driving down inequality in the first post-pandemic survey. This strong dependency of inequality on the performance of consumption in specific areas such as Maputo, urban Tete, and the rural north raises severe concerns about the future trend. A fast recovery of Maputo and other urban areas, along with a possible intensification of the country into a resource-based economy, points to the persistence of high inequality levels in the future, especially if the chronic problems in the poorest rural areas in the north and centre of the country persist.

2 A framework to study spatial inequality and its contribution to overall inequality

This paper's framework for analysing spatial inequality consists of two parts. First, the Shapley decomposition is used to estimate the aggregate contribution of spatial and non-spatial inequality to overall inequality consistently across various measures. Second, RIF regressions are used to obtain the detailed area contributions to spatial and non-spatial inequality, as well as an extended Blinder–Oaxaca decomposition of the change in overall inequality and its components over time into the detailed composition (changes in areas' population shares) and pure distributive effects.

2.1 Decomposition of overall inequality into spatial and non-spatial inequality

Let $y = (y^1, \dots, y^n)$ denote the *overall consumption distribution* made up of n different areas, where y^i is the vector with the consumption distribution of area i with population N^i. The total population is $N = \sum_{i=1}^{n} N^i$; $\bar{y}^i$ is the corresponding consumption mean for the area i, while $\bar{y} =$

[4] Spatial inequalities, more broadly, also involve other socioeconomic aspects. The IMF (2022) highlighted the large disparities between leading and lagging regions in basic services such as education and infrastructure in sub-Saharan countries. Countries with high regional inequality also tend to have high consumption inequality among households.

$\frac{1}{\mathrm{N}}\sum_{i=1}^{n} N^i \bar{y}^i$ denotes the overall mean. Furthermore, $I(y)$ denotes overall inequality computed on y.

Let us also consider the *between-area consumption distribution* $y_b = (y_b^1, \dots, y_b^n)$, with y_b^i being the counterfactual distribution of area i where there is no inequality within the area, while the average consumption of areas remains unchanged. This y_b distribution is obtained by replacing the consumption of every person in y with the mean in their area: for all individual j in area i, $y_j^i = \bar{y}_b^i In\, I(y_b^i) = 0$. Inequality in this smoothed distribution, $I(y_b)$, is just inequality of consumption among mean area consumption levels (with areas weighted by their population).

Let us further consider the *within-area consumption distribution* $y_w = (y_w^1, \dots, y_w^n)$, with y_w^i being the counterfactual distribution of area i after between-area inequality has been removed; that is, every area has the same mean consumption while keeping within-area inequality unchanged. This y_w is obtained by rescaling the consumption of every person in y^i by the same factor, the inverse of the relative mean of the area, $y_w^{\mathrm{i}} = y\left(\frac{\bar{y}}{\bar{y}^i}\right)$, such that for all i, $\bar{y}_w^i = \bar{y}$, which does not affect inequality in the area, $I(y_w^i) = I(y^i)$.

In the case of additive decomposable measures (the entropy family), inequality in the within-area distribution is given by the population-weighted sum of area inequality.[5]

$$GE_\alpha(y_w) = \sum_{i=1}^{n} \frac{N^i}{N} GE_\alpha(y^i) \qquad (1)$$

In the case of the Gini index, something similar occurs. Still, the weights are also affected by an index O of overlapping (i.e. as opposed to stratification), as defined in Gradín (2000), between the area i and the country, measured in the rescaled distribution:[6]

$$G(y_w) = \sum_{i=1}^{n} \frac{N^i}{N} O(y_w^i, y_w) G(y^i) \approx \sum_{i=1}^{n} \frac{N^i}{N} G(y^i) \qquad (2)$$

These overlapping indices O are equal to 1 whenever there is perfect overlapping between the area and the rest. Therefore, in the rescaled within-area distribution y_w where all areas are recentred at the country's mean, overlapping will tend to be around 1. Then, the Gini index is of a similar magnitude to the population-weighted average of inequality across areas.

Thus, there are three main inequality concepts involved here: *overall* country inequality $I(y)$, *spatial* or between-area inequality $I(y_b)$, and *non-spatial* or within-area inequality $I(y_w)$.

Most popular inequality measures are not decomposable as just the sum of spatial and non-spatial inequality as defined here because of the presence of another term that is an interaction between

[5] This expression is straightforward to obtain from the formula of additive decomposable indices after equalizing group mean incomes in Shorrocks (1984).

[6] This overlapping index is a population-weighted sum of the overlap of each area with all areas in the country, including itself. Like Yitzhaki's (1994) overlapping measure, it is obtained from the decomposition of the Gini index into inequality between and within areas. However, instead of an alternative definition, the index is based on the conventional between-group inequality term $I(y_b)$. The formula is easily obtained after equalizing group mean incomes in the decomposition in Gradín (2000).

the between-area and within-area distributions (I_{bw}) and that only vanishes for the MLD.[7] This term can be positive or negative in other indices. It can be large, particularly for the Gini coefficient due to its sensitivity to overlapping among areas, but also for the GE_2:

$$I(y) = I(y_b) + I(y_w) + I_{bw} \tag{3}$$

In the case of entropy measures, we have:

$$GE_{\alpha\,bw} = \sum_{i=1}^{n} \frac{N^i}{N} \left[\left(\frac{\bar{y}^i}{\bar{y}} \right)^{\alpha} - 1 \right] GE_{\alpha}(y^i),$$

which reflects the extent to which inequality tends to be higher in more affluent areas. For example, in the case of the Theil index ($\alpha = 1$), the impact of an area above the country's mean increases with its level of inequality, while the opposite is true for areas below the mean. This interaction is always zero only in the case of MLD ($\alpha = 0$).

Similarly, in the case of the Gini index, the interaction is:

$$G_{bw} = \sum_{i=1}^{n} \frac{N^i}{N} \left[\frac{\bar{y}^i}{\bar{y}} O(y^i, y) - O(y_w^i, y_w) \right] G(y^i) \tag{4}$$

This is similar to the case of the Theil index ($\alpha = 1$). Still, it also depends on the change in overlapping between each area and the country distribution after equalizing between-area consumption differences. This interaction can be large and negative if there is a high level of consumption stratification among areas in y that vanishes after areas are recentred at the country's mean in y_w.

The presence of this interaction creates an inconsistency in these indices since the level of inequality between areas, $I(y_b)$, is not the same as the change in inequality after equalizing average consumption across areas, $I(y) - I(y_w)$, although both seem reasonable representations of spatial inequality. In both cases, they reflect inequality that goes away after smoothing area averages; for example, after implementing successful spatial redistributive policies. Still, the former is computed after non-spatial inequality has been removed, whereas the latter while non-spatial inequality remains. The interaction term is entirely assigned to the source of inequality being smoothed first (within areas in the first case and between areas in the second case), ignoring that it fuels inequality through both channels.

For that reason, to estimate the exact contribution of the spatial and non-spatial components accounting for both direct and interaction effects and so that the sum adds up to overall inequality for all indices, I apply the Shapley decomposition (Chantreuil and Trannoy 2013; Shorrocks 2013).[8] In this way, there is no need to constrain the analysis to the MLD or to sacrifice the consistency of the decomposition using other measures (i.e. misestimating the actual contribution of spatial inequality). The Shapley contribution splits the interaction term equally between both components.

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[7] See a more detailed discussion in Gradín and Zapata-Román (2024) regarding inequality of opportunity. The mean log deviation is the only path-independent measure in which inequality in the between-group distribution is the same as inequality gone after smoothing incomes between groups: $I(y_b) = I(y) - I(y_w)$ (Foster and Shneyerov 2000). A complete discussion of decomposability of inequality measures can be found in Chakravarty (2009).

[8] Davies and Shorrocks (2021) and Gradín (2024) for global inequality, Gradín and Zapata-Román (2024) for equality of opportunities, and the country studies in Gradín et al. (2022) for between-occupation earnings inequality provide other applications of the Shapley decomposition.

In other words, the Shapley contribution is the average between the two alternative approaches to measuring spatial inequality:

$$I(y) = I^s(y_b) + I^s(y_w)$$

$$I^s(y_b) = \frac{1}{2}[I(y_b) + I(y) - I(y_w)] = I(y_b) + \frac{1}{2}I_{bw}$$

$$I^s(y_w) = \frac{1}{2}[I(y_w) + I(y) - I(y_b)] = I(y_w) + \frac{1}{2}I_{bw} \quad (5)$$

Among the most common indices, both definitions are identical only in the MLD case because the index is path independent.

2.2 A regression-based approach to explain spatial inequality

a. Inequality as the sum of area contributions

Following the method proposed in Gradín (2020), the contribution of an area to overall inequality is obtained using an RIF regression; that is, a simple ordinary least squares (OLS) regression of the RIF of the inequality measure $I(y)$ over the set of area dummies, with no intercept, where $A_j^i = 1$ if person j resides in area i, 0 otherwise (with $j = 1, \dots N;\ i = 1, \dots, n$):

$$RIF(y_j) = \sum_{i=1}^{n} \beta_i A_j^i + u_j \quad (6)$$

The $RIF(y_j)$ is the expected change in the selected outcome (inequality) after marginally increasing the population with consumption y_j (Firpo et al. 2007, 2009; Hampel 1974), recentred so that the average is the observed level of inequality. Under the usual OLS assumptions, the observed inequality can then be written as the expected change across the population or as inequality predicted by this linear model:

$$I(y) = \frac{1}{N}\sum_{j=1}^{N} RIF(y_j) = \sum_{i=1}^{n} \beta_i p_i \quad (7)$$

where $p_i = \frac{1}{N}\sum_{j=1}^{N} A_j^i = N^i/N$ is the population share of area i.

The $RIF(y_j)$ can be interpreted as the per capita contribution to overall inequality of people with consumption y_j, with the average per capita contribution across the population being $I(y)$. Thus, the average RIF value of people in area i, which is equal to the coefficient β_i, can also be interpreted as the per capita area contribution to overall inequality:[9]

$$\beta_i = \frac{1}{N_i}\sum_{j=1}^{N} RIF(y_j) A_j^i \quad (8)$$

Due to the known properties of the RIF of inequality measures, the per capita contribution of an area to inequality tends to be U-shaped, being larger whenever people residing in the area tend to

[9] Note that the RIF regressions are often estimated without an intercept and omitting one area (the first without loss of generality). In this case, $RIF(y_j) = \alpha_1 + \sum_{i=2}^{n} \alpha_i A_j^i + u_j$, with per capita contributions given by $\beta_1 = \alpha_1$, and $\beta_i = \alpha_1 + \alpha_i$ for all $i \geq 2$.

concentrate at the tails of the country's distribution (i.e. being among the poorest, the most affluent, or both), and smaller as they move from the tails towards the country's average consumption level (or some other central reference value, depending on the index).

Given the per capita contribution, the total contribution of an area, S_i, is proportional to its population size: $S_i = \beta_i p_i$, with all area contributions adding up to overall inequality:

$$I(y) = \sum_{i=1}^{n} S_i = \sum_{i=1}^{n} \beta_i p_i \quad (9)$$

Therefore, we can estimate the area relative contribution as $s_i = 100 \cdot S_i / I(y)$, with $\sum_{i=1}^{n} s_i = 100$. Note that this linear method guarantees that the contribution of an area does not depend on the level of aggregation of areas. This attractive property makes its interpretation easier. For example, a region's contribution will be the sum of the contribution of all its provinces. It will be the same regardless of the level of aggregation of the rest of the areas (e.g., whether they are considered separately, together, or aggregated by region).

As discussed in Gradín (2020), a clear alternative to this method would be computing the contribution of an area as the marginal change in inequality that occurs after sequentially making zero the contribution to inequality in each area.[10] As this method is path-dependent, this calls for using the Shapley approach again, but now to the detailed area contributions and averaging these changes for each area over all possible sequences. Apart from the computation being cumbersome when there are many areas, this has at least three important limitations. First, the Shapley contribution of an area would depend on the level of aggregation of areas. There are ad-hoc solutions to this problem, like using the nested Shapley or the Owen decompositions. Still, they would significantly increase the complexity of the estimation (see the discussion in Chantreuil and Trannoy 2013; Charpentier and Mussard 2011). Second, although it is straightforward to make zero the contribution of an area to inequality in the case of entropy measures (giving the country mean to everybody in the area), as well as in the Atkinson measures (giving them the equally distributed equivalent consumption instead), it is not apparent how to do that in the case of the Gini index, since even if everybody in the area is given the country average consumption, the area would still contribute to inequality by overlapping with other areas. Finally, the Shapley approach does not easily allow incorporating the estimation of contributions conditional on different characteristics as the regression-based approach used here. Note, however, that the RIF approach can be seen as a linear approximation of the more general marginal area contribution approach. The RIF area contribution is approximately equal to the Shapley marginal area contribution in the case of the MLD.

b. Area contributions to spatial and non-spatial inequality

Interestingly, the same regression-based decomposition analysis used for $I(y)$ can be used for spatial and non-spatial inequality separately to obtain the corresponding per capita contributions as β_{bi} and β_{wi}:

[10] This corresponds to the 'equalizing income' decomposition (e.g., see Sastre and Trannoy 2002). Alternatively, the equivalent to the 'zero income' decomposition in this context would imply estimating the contribution of an area as the change in inequality after entirely removing the area from the country in line with some usual practice in how the contribution of China to global inequality is estimated (e.g., see Sala-i-Martin 2006). These contributions, however, are even more problematic. For example, if all areas have the same consumption distribution, the method will indicate that no area contributes to existing inequality (see the discussion in Gradín 2024).

$$I(y_b) = \sum_{i=1}^{n} RIF(\bar{y}^i)\, p_i = \sum_{i=1}^{n} \beta_{b_i} p_i$$

$$I(y_w) = \frac{1}{N}\sum_{i=1}^{n}\sum_{j=1}^{N^i} RIF\left(y_j^i \left(\frac{\bar{y}}{\bar{y}^i}\right)\right) A_j^i \; = \sum_{i=1}^{n} \beta_{w_i} p_i \qquad (10)$$

The β_{b_i} indicates the per capita contribution of area i to overall inequality through inequality between areas or spatial inequality. This captures whether or not the average consumption in the area is close to the country's mean (or other reference central value). Both the poorest and the most affluent areas contribute disproportionally to spatial inequality. The β_{w_i} indicates the area contribution through inequality within areas or non-spatial inequality. Areas with more internal inequality tend to disproportionally contribute to this component (compared with their population share), regardless of their average consumption.

We can obtain the corresponding Shapley contributions $S_{b_i} = \lambda_{b_i} p_i$ and $S_{w_i} = \lambda_{w_i} p_i$, where:

$$\lambda_{b_i} = \frac{1}{2}\left[\beta_{b_i} + \beta_i - \beta_{w_i}\right]$$

$$\lambda_{w_i} = \frac{1}{2}\left[\beta_{w_i} + \beta_i - \beta_{b_i}\right] \qquad (11)$$

This allows us to decompose overall inequality into the detailed area contributions distinguishing those coming through spatial and non-spatial inequality as:

$$I(y) = I_b^s(y) + I_w^s(y) = \sum_{i=1}^{n}\left(S_{b_i} + S_{w_i}\right) = p_i\left(\sum_{i=1}^{n}\lambda_{b_i} + \sum_{i=1}^{n}\lambda_{w_i}\right) \qquad (12)$$

The S_{b_i} and S_{w_i} terms incorporate the corresponding direct effects above and how they vary with the interaction of the between- and within-area distributions. For example, if two affluent areas have the same mean consumption and population, the most unequal will contribute more to spatial inequality to the Theil index. If they also have the same level of inequality, the area that is more segregated from the rest of the distribution will contribute less to the Gini index.

c. The change in inequality over time by area contributions: composition and pure distributive effects

Of particular interest is to determine the area contributions to changes in inequality between two different years s and t: $\Delta I(y) = I(y^t) - I(y^s)$.

To disentangle the nature of the change in these contributions, following the extended Blinder–Oaxaca regression-based decomposition approach for the RIF regressions, we can consider a counterfactual distribution such as y^{st} that combines the per capita contributions in one year (s) and the population shares in another year (t). In this case, inequality in this counterfactual distribution is given by:

$$I(y^{st}) = \sum_{i=1}^{n} \lambda_i^s p_i^t \qquad (13)$$

Then, by adding and subtracting this term, we get:

$$\Delta I(y) = \sum_{i=1}^{n}(\lambda_i^t p_i^t - \lambda_i^s p_i^s) = \sum_{i=1}^{n}(\lambda_i^t - \lambda_i^s)p_i^t + \sum_{i=1}^{n}\lambda_i^s(p_i^t - p_i^s) \qquad (14)$$

The distributive change, the first term on the right-hand side of Equation 14, reflects the impact on overall inequality of changes in the distribution of people in the area over time, evaluated with

constant population. The compositional effect, the second term, indicates instead the change in overall inequality that comes from differential population growth by areas, with constant per capita contributions.

d. Full decomposition to changes in inequality

By combining Equations 12 and 14, we get the complete decomposition of the inequality change into the distributive spatial and non-spatial area effects and their corresponding composition effects:

$$\Delta I(y) = \sum_{i=1}^{n}(\lambda_{b_i}^{t} - \lambda_{b_i}^{s})p_i^t + \sum_{i=1}^{n}(\lambda_{w_i}^{t} - \lambda_{w_i}^{s})p_i^t + \sum_{i=1}^{n}(\lambda_{b_i}^{s} + \lambda_{w_i}^{s})(p_i^t - p_i^s) \quad (15)$$

To better understand the driving factors, another decomposition of the change in the Shapley spatial and non-spatial inequality components is done by replacing the area dummies in the RIF regressions with a set of household head characteristics. These include demographics such as sex, age interval, and marital status; education (literacy and attained education); and their labour status, including whether they worked, were self-employed, in the public or the private sector, were unpaid workers, in what the industry they worked (agriculture, mining, construction, trade), and whether they were part or not of the non-subsistence economy.

The standard errors for area contributions and their decomposition are obtained following Jann (2008).[11]

3 Data

In this study, I use the six household budget surveys collected by the Mozambican national statistical authority (Instituto Nacional de Estatística, INE) in 1996/97 and 2002/03 (Inquéritos aos Agregados Familiares), as well as in 2008/09, 2014/15, 2019/20, and 2022/23 (Inquéritos aos Agregados Familiares sobre Orçamento Familiar).[12] Regarding the two most recent surveys, the interviews for the 2019/20 survey were conducted between November 2019 and November 2020, thus overlapping with the COVID-19 pandemic. They will capture the effects of lockdowns to some extent. At the same time, the interviews for the 2022/23 survey were conducted between January 2022 and January 2023, thus capturing the immediate recovery that followed the pandemic. All these surveys are highly comparable, with the main difference being the specific design in 2014/15, in which households were interviewed three times. In this case, I follow the usual practice in related research, including national poverty assessments, of pooling all the observations to prevent seasonal bias and guarantee comparability across surveys.[13]

The primary welfare measure used in this study is daily real per capita consumption, typical in the sub-Saharan region and previous research about Mozambique. This variable was constructed to capture constant household purchasing power for the national poverty assessments, which report

[11] Using the variance–covariance matrix for coefficients and *X*-values computed by the Oaxaca Stata module (Jann 2008), adjusted using the corresponding formulae for the standard errors of the composition and coefficients effects.

[12] See INE (2004, 2010, 2015, 2021).

[13] When considering the three quarters separately, inequality, as measured by the Gini index, ranges between 0.448 and 0.480 due to a higher consumption concentration in the top decile in the second quarter than in the fourth quarter (39.9 versus 36.8 per cent). Pooling household effect is an intermediate point in that range (a Gini index of 0.468, with 38.7 per cent of consumption attributed to the top decile).

the main results of each household budget survey using the PLEASe methodology developed by Arndt et al. (2017).[14]

In sum, nominal consumption is first obtained by aggregating various expenditures, own production, in-kind receipts, imputed and actual house rents, use value of durable goods, and others over various reference periods. Spatial comparability of current consumption in each survey in a country with large price contrasts and limited market integration is obtained after adjusting for spatial and seasonal variability in the cost of living. Spatial price indices are computed separately for 13 relatively homogeneous spatial domains. In contrast, temporal food price indices are calculated for the three geographical regions (north, south, and central region) and urban and rural areas to account for intra-survey price variability over time.

Intertemporal comparability of monetary amounts across surveys is finally obtained after calculating real consumption as the ratio between current consumption in each survey and the contemporary national poverty line. The latter represents the monetary amount that the poorest population needs to purchase a flexible basket of basic food and non-food items and is usually preferred as a deflator in Mozambique because of the limited representativity of the consumption price index (CPI). The main discrepancy between the poverty line and the CPI reported by the World Bank (2023b) arises between the 2014/15 and 2019/20 surveys, with much higher inflation, according to the former.[15] Note that this price adjustment between surveys affects the magnitude of changes in living standards over time but not the trend in inequality measures used in the analysis because they all are scale-invariant, reflecting relative rather than absolute inequality. I will convert the real consumption computed above into 2017 constant international dollars in this study.[16] Using the national poverty lines as a deflator, the national official poverty line amounts to 2.13 USD, similar to the World Bank's international poverty line (2.15 USD).[17]

4 The context: growth, poverty, and inequality in Mozambique after the end of the post-independence war

4.1 Growth and poverty

Following the end of its post-independence war and alongside several major economic reforms, Mozambique experienced a sustained period of economic growth, especially by taking advantage of its abundant natural resources, with GDP per capita tripling between 1992 and its peak in 2018, from 437 to 1,289 constant international dollars (2017 USD purchasing power parity; Figure 1).

[14] Barletta et al. (2022b) and the fourth national poverty assessment (MEF-DEEF 2016) provide an extensive summary of this methodology.

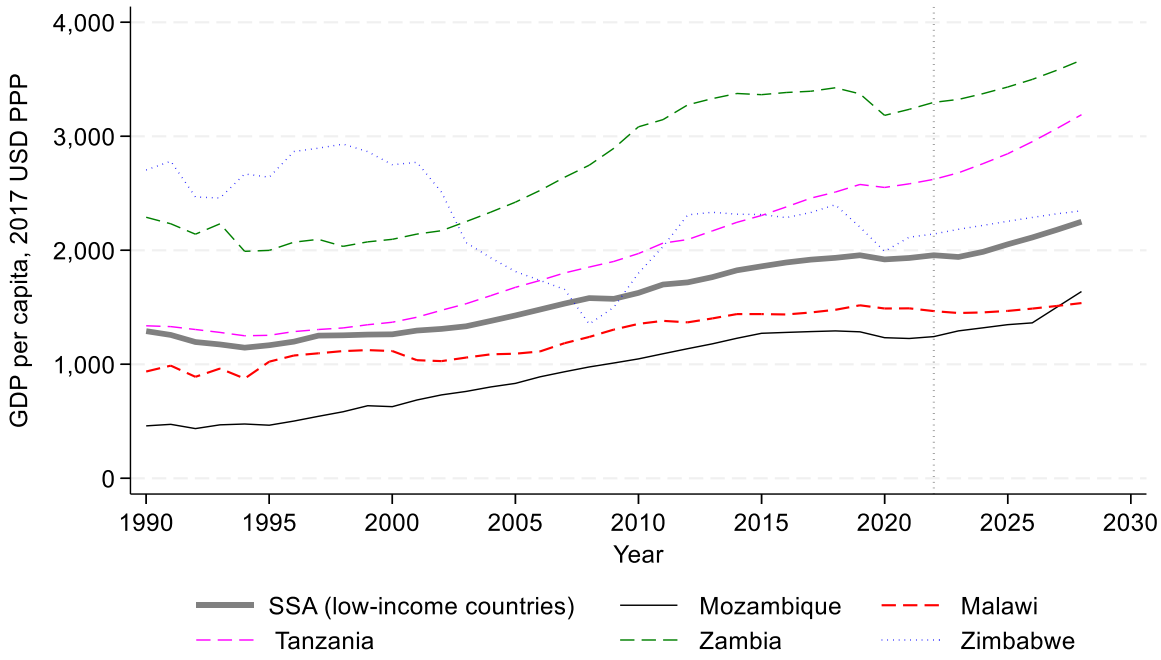
[15] The World Bank's (2023b) CPI series for Mozambique is based on International Monetary Fund data; that is, the World Economic Outlooks in the first two surveys and the International Finance Statistics in the rest. The CPI and poverty lines in 2019/20 are 560 and 960 per cent higher than in 1996/97. The most significant discrepancy occurred between 2014/15 and 2019/20 (the last survey reported by the Poverty and Inequality Platform in March 2024). The CPI in 2019/20 (1.1) is 50 per cent higher than in 2014/15 (0.73), while the value of the national poverty line doubled over the same period (from 29.2 to 58.4 meticais). The implicit spatial price indices using the PLEASe methodology are in Appendix Table B2.

[16] After multiplying poverty-line adjusted real consumption in each year by the estimated poverty line for 2017, 46.7 meticais (obtained by prorating the poverty lines in 2014/15 and 2019/20) and dividing by the purchasing power parity for Mozambique reported by World Bank (2023b), almost 22 meticais/USD.

[17] The national poverty line deflated by the CPI ranges between USD1.35 in 2002/03 and USD2.41 in 2019/20.

Growth in Mozambique thus outpaced other low-income countries in the region, including its neighbours, but, despite that, remains among the poorest, and it has substantially slowed down since around 2015. A robust economic growth path is expected to resume in the following years based on current projections by the International Monetary Fund, likely linked to the exploitation of abundant natural resources following the discovery of a vast quantity of natural gas off the northern coast.

Figure 1: GDP per capita trend in sub-Saharan Africa (SSA): Mozambique, selected neighbours, and population-weighted average in SSA low-income countries



Source: author's construction using World Development Indicators for 1990–2022 (World Bank 2023d) and the 2022–28 GDP growth rate projections from the World Economic Outlook (IMF 2023).

The recent economic downturn was the fatal result of a combination of adverse factors, as discussed in the World Bank's (2023a) country report. These included a complex macroeconomic situation, with a drastic currency depreciation (metical), a surge in inflation, a fall in foreign direct investment and official aid, and limited credit access. This happened in the context of a debt crisis resulting from the discovery in 2016 of state-backed 'hidden loans', aggravated by the country's high exposure to commodity price fluctuations, mainly coal and aluminium.

The country also witnessed an intensification of natural disasters in recent years, which it has been historically prone to, such as cyclones, tropical storms, floods, and droughts (Manuel et al. 2020). These included the 2015 cyclone Chedza (particularly affecting agricultural output in the provinces of Tete, Manica, Sofala, and Maputo), the 2019 Kenneth and Idai cyclones (mainly affecting production in the provinces of Sofala, Zambezia, Manica, and Tete), a storm and a flood in 2020 that affected Cabo Delgado, Nampula, Sofala, Zambezia, and Tete provinces, or the 2021 tropical cyclone Eloise that affected Sofala, Inhambane, and Manica provinces, but also affecting Nampula (World Bank 2023c). These weather shocks disrupted agriculture production, the most important source of livelihood in rural areas (with maize being the main food crop), increasing food insecurity. This was aggravated by the impact of inflation and the contraction of the secondary and tertiary sectors on the off-farm incomes in the affected rural areas that followed the debt crisis and devaluation (World Bank 2023c).

Furthermore, an Islamist insurgency has emerged since the end of 2017 in the north of the country, especially Cabo Delgado, after large gas reserves and ruby deposits were discovered in the area (Louw-Vaudran 2022). Although it has complex roots, it is clear that deep spatial inequalities fuel this conflict.[18] There have been large numbers of internally displaced people from the areas affected by these shocks (UNHCR 2022) as well as forced resettlements of numerous rural households in Tete province (central region) where a transnational would exploit coal mines, which also raised significant protests (Friends of the Earth Mozambique 2022).[19]

The growth trend is less impressive regarding real household consumption per capita, which better measures people's living standards. Yet, after two periods of solid growth (between household surveys conducted in 1996/97 and 2002/03, and between 2008/09 and 2014/15), the mean increased by two-thirds and the median increased by almost a half. This trend, however, was followed by a significant setback in the next period between 2014/15 and 2019/20, as the result of the recession, with median real consumption falling from 1.1 times the poverty line to only 70 per cent of the poverty line (USD1.50), even below the level in 1996/97 (73 per cent, USD1.54). Thus, the impact of the recession on real consumption seems to have been much more profound than as measured by real GDP. As a result, if the country had successfully managed to reduce poverty rates from 69.7 per cent in 1996/97 to 46.1 per cent in 2014/15, poverty would have risen again to 68.2 per cent in the 2019/20 survey, undoing most of the progress in the previous two decades (Figure 2 and Appendix Table A2).[20]

The World Bank's (2023c) poverty assessment pointed out that part of the substantial fall in consumption observed in 2019/20 may be transient due to the uncertainty and limited mobility during the lockdowns. This would align with the modest recovery of the median and mean consumption in the post-COVID survey in rural areas. At the same time, they continued to fall in urban areas (the median for the country rose to 0.77 times the poverty line, or USD1.65, while the mean still declined). Barletta et al. (2022a), using projections from the 2014/15 survey, and Salvucci and Tarp (2024), using the 2019/20 survey (taken during the pandemic), pointed out that the recent COVID-19 crisis may have affected urban areas the most but with rural areas experiencing a higher increase in poverty rates due to their already low consumption levels. The most recent data show poverty in the country resumed its decline between 2019/20 and 2022/23 (from 68.2 to 65.0 per cent). Still, it is noticeable that the decline was concentrated in rural areas (from 76.5 to 68.4 per cent), while poverty kept rising in urban areas (from 52.8 to 58.4 per cent). On the other hand,

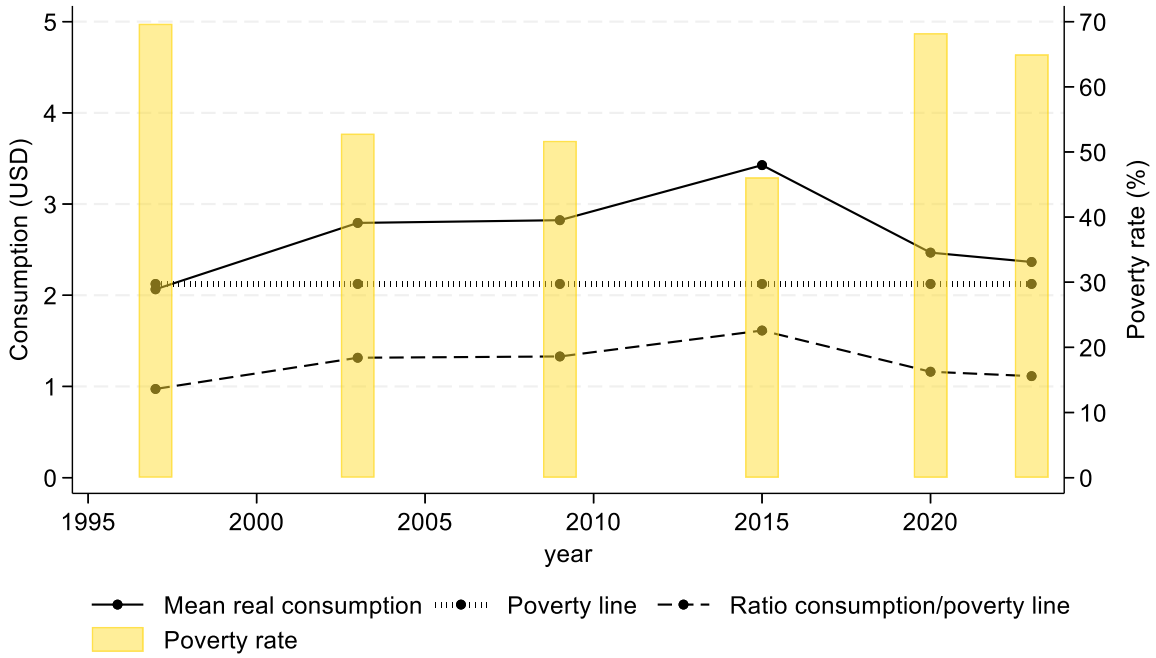
[18] 'The causes of the conflict are predominantly national and have been attributed to a complex mix of governance, security, political and economic challenges, which together create an opportunity structure for violent extremism, increasingly linked to transnational forces, to take root [. . .] The discovery of rubies in Montepuez and liquified natural gas (LNG) off the coast of the Rovuma Basin, and the lack of opportunities for the local population to benefit from these discoveries, further exacerbated feelings of marginalisation and exclusion' (Hendricks et al. 2023: 2–3). 'The group has links to the Islamic State (IS), although the extent of this is unknown. However, what is clear is that the growth of the rebellion has succeeded due to the recruitment of ordinary Mozambicans, disenfranchised with the government and their opportunities for the future' (Lucey and Patel 2022: 4). 'The speeches reveal feelings of discrimination and disadvantage towards foreign citizens or those from the South of the country (known as Maputecos), considered to be privileged in the access to the best jobs to the detriment of the people of the province' (Feijó 2020: 22). 'Many respondents spoke of marginalisation, social and political exclusion and the perpetual absence of the state as reasons for the insurgency' (Ewi et al. 2022: 14).

[19] The Brazilian mining company VALE started operating the Moatize Coal Mine in rural Tete province in 2011. It was sold to the Indian Vulcan Minerals company in 2022 (Club of Mozambique 2022).

[20] The poverty and Gini index estimates presented in this section are consistent with those in the national poverty assessments for the 1996/97–2014/15 period (see the fourth national poverty report, MEF-DEEF 2016). There is no report for 2019/20 or 2022/23, but the estimates here use the same methodology. I discuss in Appendix B how these estimates compare with those reported by the World Bank, as there are essential discrepancies.

Barletta et al. (2022b) showed a generally positive trend in multidimensional poverty, with improvement in most indicators even during the recession, except for deprivation in access to a safe water source and ownership of durable goods.

Figure 2: Average consumption and consumption poverty rate in Mozambique



Note: the average real consumption per day in 2017 in international dollars (PPP) was deflated by the contemporary national poverty line. Poverty rates using the national poverty line (USD2.13).

Source: author's construction using household budget surveys.

4.2 Inequality

Consumption inequality was already relatively high when the first household survey was conducted in 1996/97 (with a Gini index of 0.397), in line with other sub-Saharan countries. However, it increased until the pandemic, especially after 2008/09, showing a persistent trend both during the period of growth and during the economic downturn that followed (reaching a Gini index of 0.511 in 2019/20).[21]

Gradín and Tarp (2019) had already highlighted that the same growth pattern that led to a reduction in poverty over time went alongside a substantial increase in inequality, especially between 2008/09 and 2014/15, the last survey included in that study. This rise in inequality was mainly driven by consumption disproportionally increasing among households in the upper tail of the distribution. This narrative seemed consistent with the classical predictions for the initial stages in the development of dualistic economies, with employment growth taking place in the least labour-intensive sectors. At the same time, the majority of the population continued to engage in subsistence agriculture. This raised severe concerns about the future trends if the distributional growth pattern kept accentuating the duality of the economy. The results presented here show that the upward trend continued with the 2019/20 survey as the likely result of the recession, the

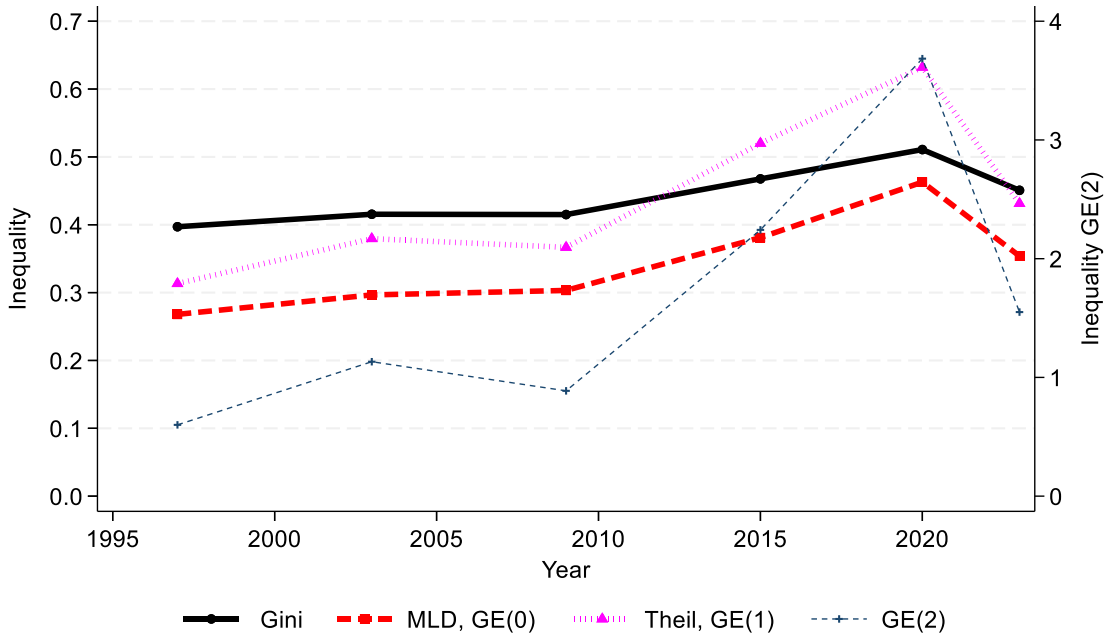
[21] The trend in the Gini index is similar using nominal consumption (i.e. with no time or spatial price adjustment). In particular, the trend still reflects the large increase after 2008/09, although there is a decline between 2002/03 and 2008/09 (from 0.471 to 0.460) (see Table 1).

pandemic, and the other shocks witnessed by the country. The first post-pandemic survey shows a substantial decline in Gini index (0.451), undoing much of the most recent increase. However, it is unclear how much of this decline is affected by conjunctural factors that have especially hit urban areas.

Figure 3a displays the inequality trend using four measures: (i) the Gini index, which is less sensitive to both ends of the distribution than other measures; (ii) MLD (M-Theil index or GE_0), which is particularly sensitive to the bottom of the distribution; (iii) Theil (L-Theil index or GE_1), more sensitive to the top than MLD or the Gini index; and (iv) GE_2 (half the square of the coefficient of variation) which is even more sensitive to the top than MLD or the Gini index (Gradín 2020). All four indices point to a substantial increase in inequality between 2008/09 and 2019/20. Compared with MLD, the steeper increase with Theil or GE_2 points to this inequality being driven by the upper tail of the consumption distribution. In fact, after revolving around 32 to 34 per cent of total consumption, the consumption share of the top 10 per cent of the population, according to household survey estimates, increased from 33 in 2008/09 to 39 per cent in 2014/15 and more than 42 per cent in 2019/20 (Figure 3b).[22] This larger consumption share of the better-off during the growth and the first phase of the recession periods came at the expense of the rest of the distribution, with the share of the bottom 40 per cent falling from 16 to 15 and 13 per cent and the share of the middle 50 per cent (those between percentiles 41 and 90) from 51 to 47 and 45 per cent, respectively, over the same period. In the post-pandemic period, the country witnessed a substantial decline in inequality driven by the lower concentration of consumption at the top (36 per cent) and higher at the bottom (15 per cent), undoing the previous period's inequality-enhancing trend.

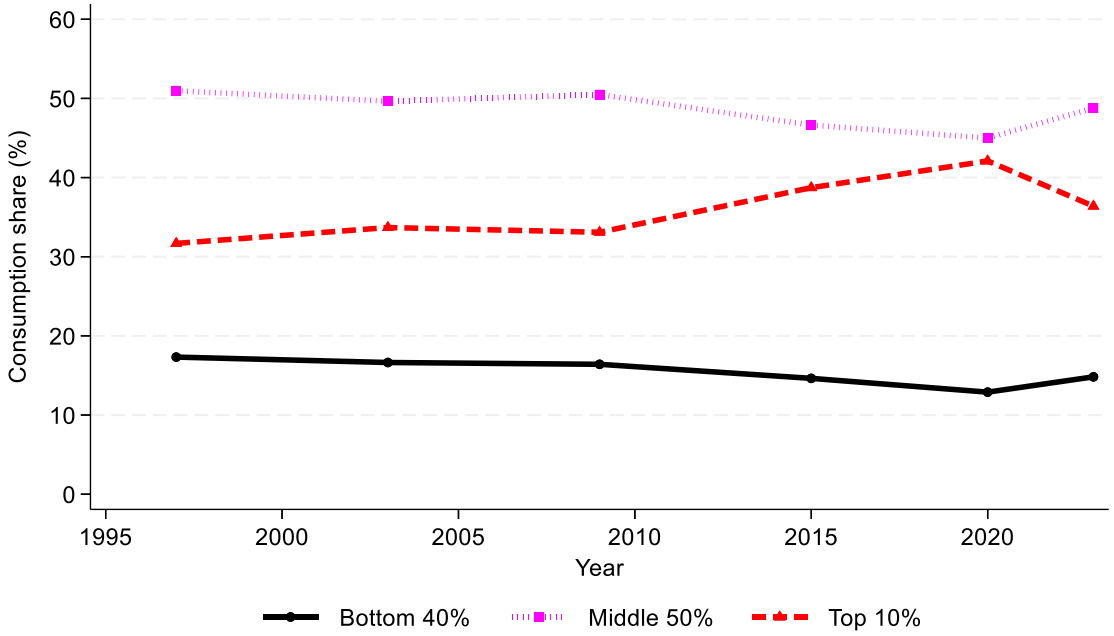
Figure 3: Consumption inequality in Mozambique: (a) inequality measures; (b) consumption share

(a)



[22] The income share of the top 10 per cent was higher and increased slightly more between 2008/09 and 2014/15, from 56 to 64 per cent, according to the World Inequality Database (WID.World 2024). Their estimates were obtained after 'upgrading' World Bank's (2023b) consumption distributions to pre-tax national income per adult, typically more unequally distributed. They also used a statistical correction due to the usual underestimation of the income share of the rich in household surveys.

(b)



Source: author's construction using household budget surveys.

The high level of consumption inequality in Mozambique is in line with other neighbours in eastern Africa (Table 1), but its trend is outstanding. Around 1997, the level of inequality in Mozambique was similar to the level in Tanzania but clearly below the levels shown by Malawi, Zambia, or Zimbabwe. Around 2020, inequality in Mozambique was the highest among these countries, only after Zambia, regardless of what source was used for Mozambique (our study, with real and nominal consumption, or the World Bank's publications).

Table 1: Consumption inequality (Gini index) in Mozambique (various consumption measures and sources) and in other SSA countries

Source	Circa											
	1997		2003		2009		2015		2020		2023	
This study												
Mozambique												
Real C. (1)	(1997)	0.397	(2003)	0.415	(2009)	0.415	(2015)	0.468	(2020)	0.511	(2023)	0.451
Nominal C. (2)	(1997)	0.448	(2003)	0.474	(2009)	0.462	(2015)	0.534	(2020)	0.558	(2023)	0.519
Nominal C. (3)	(1997)	0.448	(2003)	0.471	(2009)	0.460	(2015)	0.537	(2020)	0.556	(2023)	0.514
WB PA												
Mozambique			(2003)	0.466	(2009)	0.472	(2015)	0.561	(2020)	0.504	—	—
WB PIP												
Mozambique	(1997)	0.536	(2003)	0.470	(2009)	0.456	(2015)	0.540	(2020)	0.505	—	—
Malawi	(1993)	0.620	(2005)	0.399	(2011)	0.455	(2017)	0.447	(2020)	0.385	—	—
Tanzania	(1993)	0.395	(2001)	0.373	(2007)	0.403	(2012)	0.378	(2018)	0.405	—	—
Zambia	(1996)	0.483	(2003)	0.421	(2010)	0.520	(2015)	0.559			—	—
Zimbabwe	(1995)	0.703			(2011)	0.431	(2017)	0.443	(2019)	0.503	—	—

Note: the table indicates the corresponding last year of the survey in parentheses. (1) Real consumption, adjusted for intra-survey price variability over time and spatially, used in this study. (2) Nominal consumption, only adjusted for intertemporally price variability. (3) Nominal consumption with no price adjustment. WB PA is the World Bank's (2023c) Poverty Assessment; WB PIP is the World Bank's (2023b) 'Platform on Poverty and Inequality'.

Source: author's construction using household surveys and other sources detailed in the notes.

5 Spatial inequality in Mozambique

5.1 Spatial heterogeneity in human capital and the non-subsistence economy

The geographical distribution of the population in Mozambique (Appendix Table A1) did not change substantially over time, with only a moderate urbanization process (from 32 to 35 per cent of the country's population between 2014/15 and 2022/23). Faster population growth was noted in the northern region, increasing from 31.5 to nearly 36 per cent of the country's total population between 1996/97 and 2022/23, and lower in the southern region, which includes Maputo. The share of the urban population around Maputo was relatively stable, around 9 per cent since 2002/03, with the 2-percentage point loss in the capital (from 5.7 to 3.6 per cent) compensated by the increase in the urban areas in Maputo province (from 3.1 to 5.4 per cent). In contrast, the urban area of Tete province increased its population share by 70 per cent between 2015/16 and 2019/20 from 1.3 to 2.2 per cent (2.3 in 2022/23).

There is no doubt that inequality has a substantial spatial dimension in Mozambique due to pre-existing and recent geographical asymmetries during the development process, with a high concentration of the growing activity outside the subsistence sector around the capital, Maputo, as well as the unequal distribution of natural resources or the higher prevalence of natural disasters and conflicts in specific areas of the country. As a result, Mozambique exhibits an outstanding spatial socioeconomic inequality in terms of average consumption and poverty rates across the country, mainly between the urban area around the capital (and more recently in resource-rich Tete province) and the rest of the country, as well as more generally between urban and rural areas and, more recently, between the southern and the central and northern regions.

Based on annual national accounts disaggregated at the province level (INE 2023), Maputo city and province, with less than a tenth of the country's population, concentrate around two-thirds of the manufacturing sector in the GDP, 43 per cent of the financial activity, or 40 per cent of the construction sector. Three provinces (Tete, Cabo Delgado, and Inhambane) make up almost 60 per cent of the extractive industry, and Tete province alone holds 44 per cent of the production and distribution of electricity and gas. On the other hand, agriculture represents around 45 per cent of the GDP in two provinces (Niassa and Manica), well above the level for the country (27 per cent).

Based on household surveys, Maputo city, despite its decline in previous years, still exhibited in the 2022/23 survey an average real consumption that was more than three times that of the rural area of Cabo Delgado in the northern region, with about half of its poverty rate. The unequal distribution of economic activity over the territory also becomes apparent based on these surveys (Table 2), with workers outside the subsistence agriculture disproportionally overrepresented in urban Maputo city and urban areas in the Maputo province (94 and 90 per cent of the household heads in 2022/23) as well as in urban Tete (which witnessed the largest increase since 1996/97 from 45 to its peak of 81 per cent in 2014/15–2019/20, to fall again to 74 per cent in the last survey). This contrasts with figures around 45–60 per cent in the urban areas in a few northern or central provinces (Cabo Delgado, Nampula, Niassa, and Zambezia) or an even lower 8–15 per cent in their rural areas. There is also an asymmetric distribution of human capital, with 45 per cent of household heads in Maputo and 53 per cent in urban Tete that have completed at least secondary school in the last survey, compared with around 29 per cent in the northern urban areas or only 6–8 per cent in northern rural areas.

Table 2: Occupation (non-subsistence economy) and human capital among employed household heads in Mozambique

Region		Share of non-subsistence sector (%)						Secondary or higher education (%)						
		1996/97	2002/03*		2008/09	2014/15	2019/20	2022/23	1996/97	2002/03*		2008/09	2014/15	2019/20	2022/23
	Mozambique	19.9	24.9	24.9	24.5	29.9	34.5	32.0	2.8	4.9	4.9	7.0	10.4	15.5	17.1
	All rural areas	9.7	14.9	11.0	8.4	14.1	17.7	15.4	0.7	2.5	1.4	2.8	4.4	6.9	8.6
North	Niassa	10.1	14.6	10.0	9.9	11.0	8.2	8.3	1.5	3.5	1.0	6.4	4.6	6.5	7.9
	Cabo Delgado	7.4	8.5	5.8	5.0	8.3	14.6	11.8	0.4	4.0	1.1	3.3	4.1	7.0	6.7
	Nampula	8.8	13.0	8.0	6.2	11.6	12.7	8.9	0.7	2.2	2.1	2.1	4.8	5.2	5.8
Centre	Zambezia	5.4	11.8	9.9	6.7	13.8	13.5	10.0	0.4	2.0	1.1	1.2	3.2	5.6	7.4
	Tete	4.9	9.5	7.1	4.3	6.3	24.5	14.8	0.6	2.5	1.7	3.0	3.2	8.8	10.9
	Manica	14.1	22.1	17.5	8.9	21.3	18.8	26.0	1.6	3.2	1.4	3.6	7.7	10.5	14.9
	Sofala	15.5	24.5	18.2	15.2	15.4	18.0	18.6	0.2	1.9	0.6	2.1	3.9	5.7	8.6
South	Inhambane	11.1	22.2	14.6	9.7	19.6	25.2	23.3	0.4	1.8	0.5	1.4	3.5	6.1	4.2
	Gaza	17.4	17.2	12.6	9.2	24.1	22.4	22.0	1.6	2.5	2.3	2.2	5.3	5.0	7.3
	Maputo Province	22.9	36.1	33.0	34.5	40.0	67.1	74.0	0.7	2.8	2.6	10.5	7.9	21.2	31.1
	All urban areas	69.3	78.0	59.5	62.5	69.1	68.7	69.5	13.0	17.9	13.8	16.9	25.4	32.9	36.5
North	Niassa	34.0	62.0	56.3	50.9	51.3	48.7	49.3	13.2	24.1	24.0	16.7	27.2	32.7	28.9
	Cabo Delgado	68.1	59.9	40.4	32.0	52.1	54.2	46.3	18.8	22.2	23.3	14.0	23.3	31.7	29.4
	Nampula	38.5	76.1	42.9	46.4	64.4	56.9	59.6	6.6	16.2	7.3	13.4	23.2	24.1	29.4
Centre	Zambezia	89.3	76.6	42.7	46.3	47.1	48.5	45.4	29.2	19.4	14.7	17.5	21.7	31.5	32.6
	Tete	45.0	76.8	64.3	54.2	81.4	81.5	74.3	7.5	16.6	15.9	16.7	35.7	47.1	53.2
	Manica	52.8	64.4	59.1	52.5	66.3	65.4	70.4	8.0	19.2	17.2	15.3	29.1	40.4	39.0
	Sofala	70.5	77.9	73.3	70.2	69.1	72.6	70.3	5.8	10.5	10.1	18.1	26.7	33.3	36.7
South	Inhambane	79.7	67.1	61.8	39.5	68.5	73.9	79.6	21.2	21.2	10.7	7.4	24.5	33.7	41.9
	Gaza	39.9	54.9	48.1	46.0	61.6	52.4	54.1	5.0	10.3	6.6	9.5	15.0	19.3	19.2
	Maputo Province	91.6	81.8	78.8	84.1	84.1	88.4	89.7	6.6	13.7	12.5	15.5	24.9	33.7	40.3
	Maputo City	96.8	92.8	92.8	92.9	92.0	93.9	94.3	20.0	25.9	25.9	27.0	31.2	44.1	45.1

Note: *the estimates use the 1996/97 urban/rural classification for 1996/97 and 2002/03 (first column of this survey). From 2002/03 (second column of the 2002/03 survey) onwards, the 2002/03 classification is used.

Source: author's construction using household budget surveys.

5.2 Trend in spatial and non-spatial inequality

The country is divided into areas defined by a combination of each of the 11 provinces and their zone type (i.e. rural or urban), the two main vectors of spatial heterogeneity. Since Maputo city is only urban, this produces 21 areas, with the smallest generally being the urban areas (other than Maputo and Nampula), each representing between 1.5 and 3.5 per cent of the country's population in the latest survey and the largest being the rural areas of Zambezia (15 per cent) in the centre and Nampula (14 per cent) in the north.

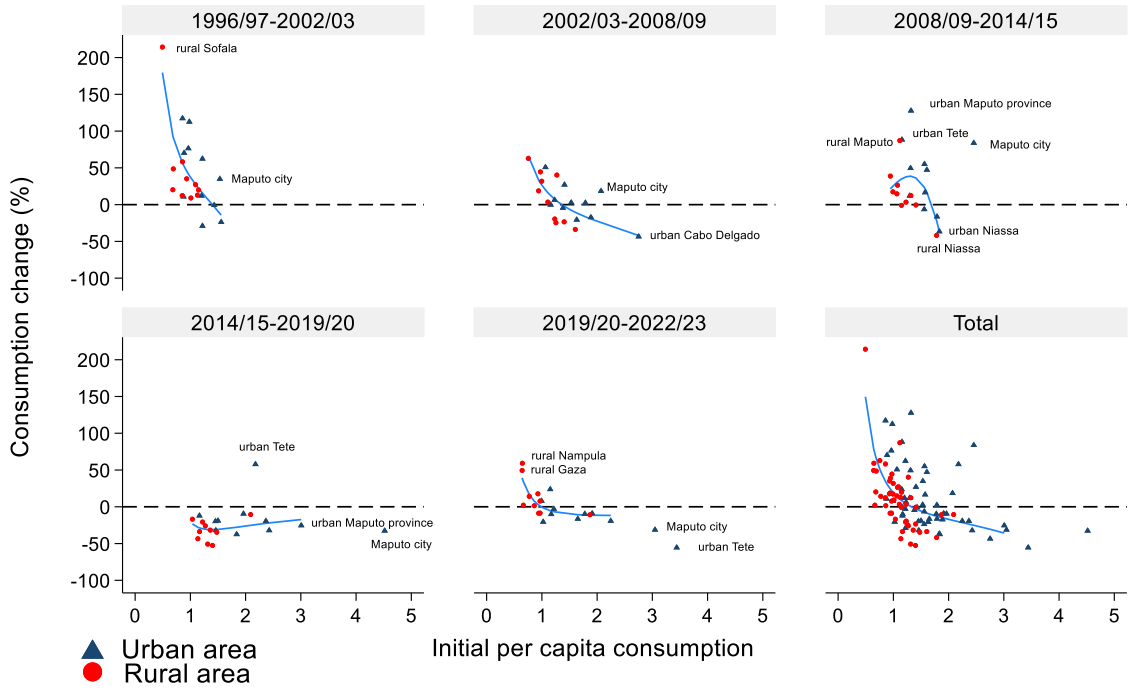
Spatial inequality is seen here as inequality in average per capita consumption between these areas after smoothing consumption within areas. In contrast, non-spatial inequality is inequality within areas once consumption has been rescaled such that all areas have the same average consumption while keeping their original intra-area distribution. Overall inequality is decomposed into spatial and non-spatial inequality using the Shapley decomposition (i.e. with the interaction term split between both inequality sources).

Areas are classified as rural or urban using the official survey classifications. The changes in spatial and non-spatial inequality between the first two surveys can only be produced using the 1996/97 classification, while the subsequent changes are based on the new 2002/03 classification (the 2002/03 survey has information with both). This change in classification is not trivial since the proportion of the urban population increased from 20 to 32 per cent after reclassifying from rural to urban 15 per cent of the weighted rural observations, with the largest share in Nampula (28 per cent) and the smallest in Tete (6.5 per cent). Those reclassified had a consumption average 45 per cent larger than the other rural households, with the largest impact in Cabo Delgado (increasing the average consumption from 1.35 to 2.75 times the poverty line). The Gini spatial inequality increased with the new classification from 0.128 to 0.144. For that reason, for the consistency of the time series, the level of spatial inequality in 1996/97 is rescaled by adding the impact of the classification change in 2002/03 (e.g., in the case of Gini, 0.159 after adding 0.016, to the observed 0.143).

Consumption and inequality by area

To contextualize the spatial inequality analysis, Figure 4 maps initial consumption and its change by area in each period, with a non-linear prediction (obtained excluding the main outliers, i.e. Maputo city and urban Tete). The graph distinguishes between urban (triangles) and rural (circles) areas. Appendix Table A2 reports the corresponding consumption values deflated by the national poverty line. There is a tendency towards spatial convergence in average consumption by area in most periods, as the generally downward-slopping prediction shows, but with essential reservations between 2008/09 and 2019/20 (Figure 4). Convergence is evident during the first two periods, indicating declining spatial inequality. In the third period (2008/09–2014/15), there are key outstanding areas, with relatively affluent areas such as Maputo and urban Tete showing more robust growth than the others and weak growth experienced by the poorest areas. Still, some convergence is observed among the rest. There is no sign of convergence in the next period (2014/15–2019/20), with a deeper recession in the poorest areas, while convergence seems to resume after the pandemic, accentuated by the deep recession in Maputo and Tete urban areas.

Figure 4: Consumption growth by area (with non-linear prediction)



Note: each graph maps initial per capita real consumption per day (deflated by the corresponding poverty line; 1 indicates consumption equal to the poverty line) and its accumulated change as a percentage of the initial value. The curves represent the fractional polynomial prediction (excluding Maputo city and urban Tete, which are the usual outliers). Estimates for 1996/97–2002/03 are based on the 1996/97 classification of urban and rural areas; the rest are based on the 2002/03 classification.

Source: author's construction using household budget surveys.

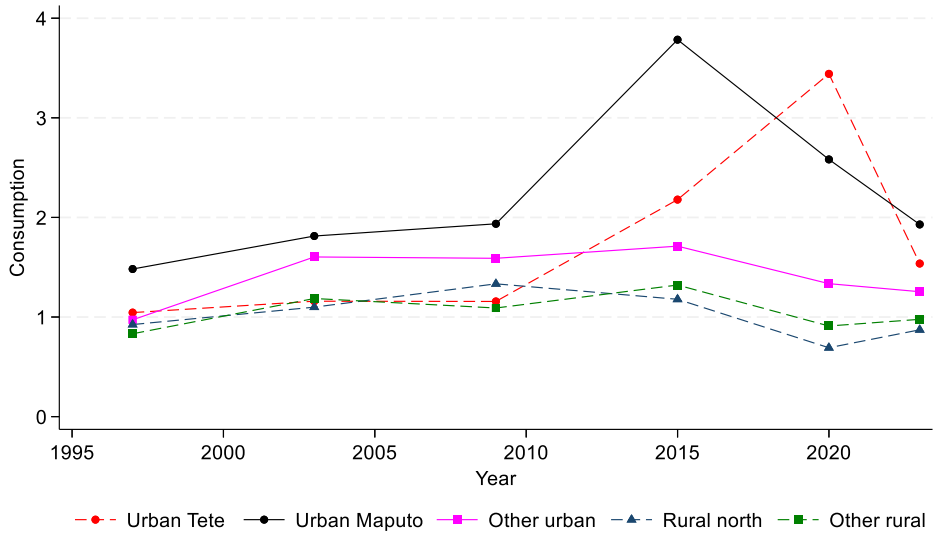
Figure 5 shows the average growth in some aggregated areas, where the differential trend followed by urban Tete and Maputo can be seen in perspective, as opposed to the rest of the country's impoverished rural areas in the north.[23] However, it is worth noting that while the mean consumption in urban Tete grew from 1.2 in 2008/09 to 2.2 times the poverty line in 2014/15 and 3.4 in 2019/20, its median consumption only grew from 0.8 to 1.2, falling to 1.0 in 2019/20, indicating that the mining boom primarily benefited a small number of well-off households. The rural north showed a generalized decline in real consumption levels between 2014/15 and 2019/20, with the average and median falling to about half of their value in 2008/09, from 1.3 and 1.1 to 0.7 and 0.5. The setback faced by people living in urban Maputo areas (2014/15–2022/23) and in urban Tete (2019/20–2022/23) also undid the gains seen during the previous two surveys. For example, average consumption in Maputo city fell from 4.5 in 2014/15 to 2.1 in 2022/23, whereas Tete changed from 3.4 in 2019/20 to 1.5 in 2022/23.

Regarding non-spatial inequality, Figure 6 maps the initial and final inequality in each period using the Gini index in each area, with the 45º line indicating no change (values reported in Appendix Table A3 and other measures in Appendix Figure A4). There is a tendency towards higher inequality in each

[23] The density functions for urban Maputo and urban Tete, as well as for the rural north, are also displayed in Appendix Figure A3. Appendix Figures A1 and A2 display the percentage and average consumption of the population whose head has secondary or higher education by aggregated areas.

period, except for urban areas in the earliest period, and a tendency towards declining inequality after the pandemic in the last period.

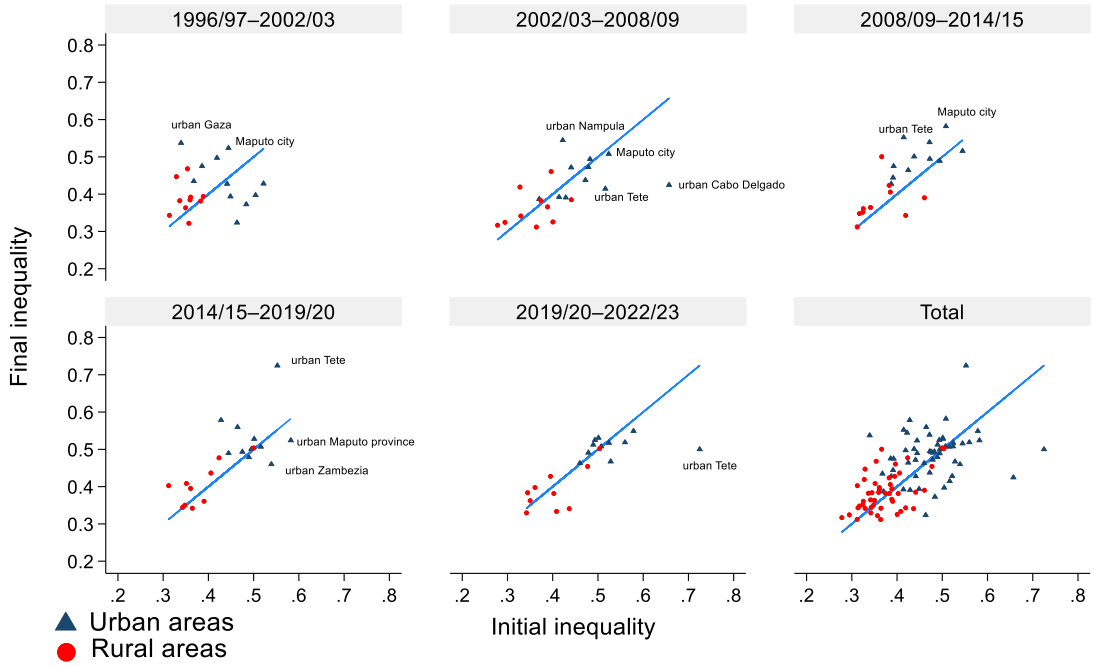
Figure 5: Average real consumption per day by area



Note: per capita real daily consumption (deflated by the corresponding poverty line; 1 indicates consumption equal to the poverty line). Urban Maputo here refers to Maputo city and urban Maputo province.

Source: author's construction using household budget surveys.

Figure 6: Inequality by area and period (Gini index)



Note: each graph maps each period's initial and final daily real consumption Gini coefficient. Straight lines represent constant inequality. Markers above (below) the line indicate an increase (decline) in inequality. Estimates for 1996/97–2002/03 are based on the 1996/97 classification of urban and rural areas; the rest are based on the 2002/03 classification.

Source: author's construction using household budget surveys.

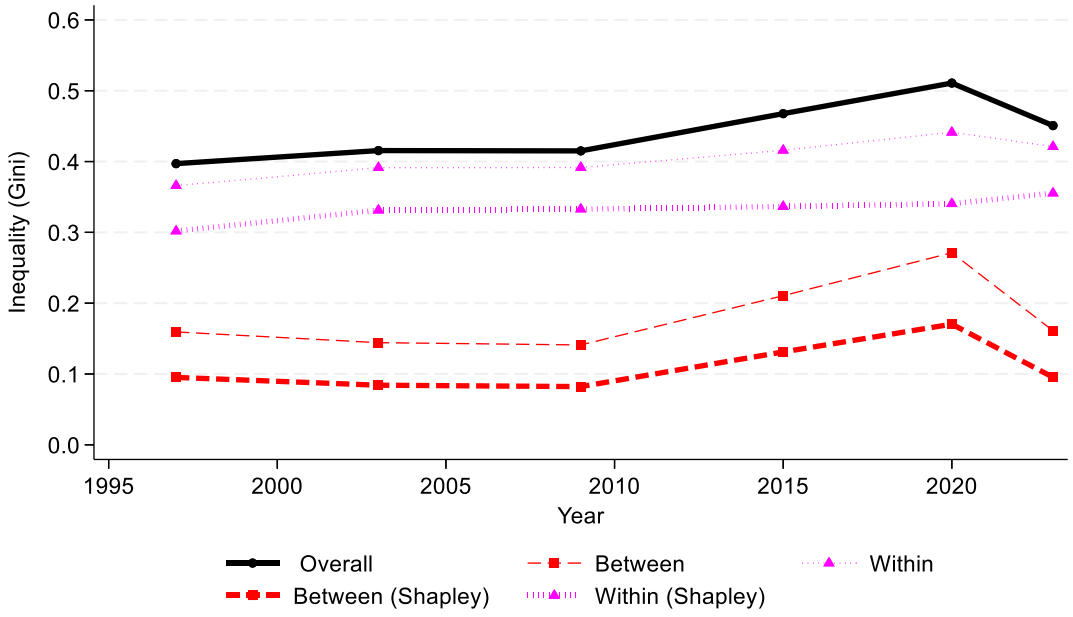
Aggregate spatial inequality

How did these patterns affect spatial and non-spatial inequality? Combining the trends in inequality within and between areas using the Gini index (shown in Figure 7a) suggests two well-distinguished phases. In the first phase between 1996/97 and 2008/09, spatial inequality only partially mitigated the increase in within-area inequality, which dominates the trend in the period. Later, spatial inequality became the main driver explaining the rise in inequality between 2008/09–2019/20 and its fall in 2022/23. Similar results can be appreciated with the entropy measures (MLD, Theil, and GE_2; Figure 7b–7d).

The empirical trends in spatial and non-spatial inequality in Figure 7 only add up to overall inequality with the MLD; for that reason, the Shapley decomposition (where both components add up to overall inequality with all measures) is also displayed. The Shapley decomposition affects spatial and non-spatial inequality (lower with Gini, higher with entropy measures) but much less their trends.[24] Figure 7e summarizes the share of spatial inequality for each measure. The (Shapley) contribution of spatial inequality (right-hand side graph) reveals the expected decline in its relevance to explaining overall inequality between 1996/97 and 2008/09, its increase between 2008/09 and 2019/20 and decline later. At its peak in 2019/20, spatial inequality explained about 33 per cent of overall inequality with the Gini index; it also explained between 25 and 38 per cent of overall inequality with the entropy measures (showing a higher share, the more sensitive the index is to the top of the distribution).

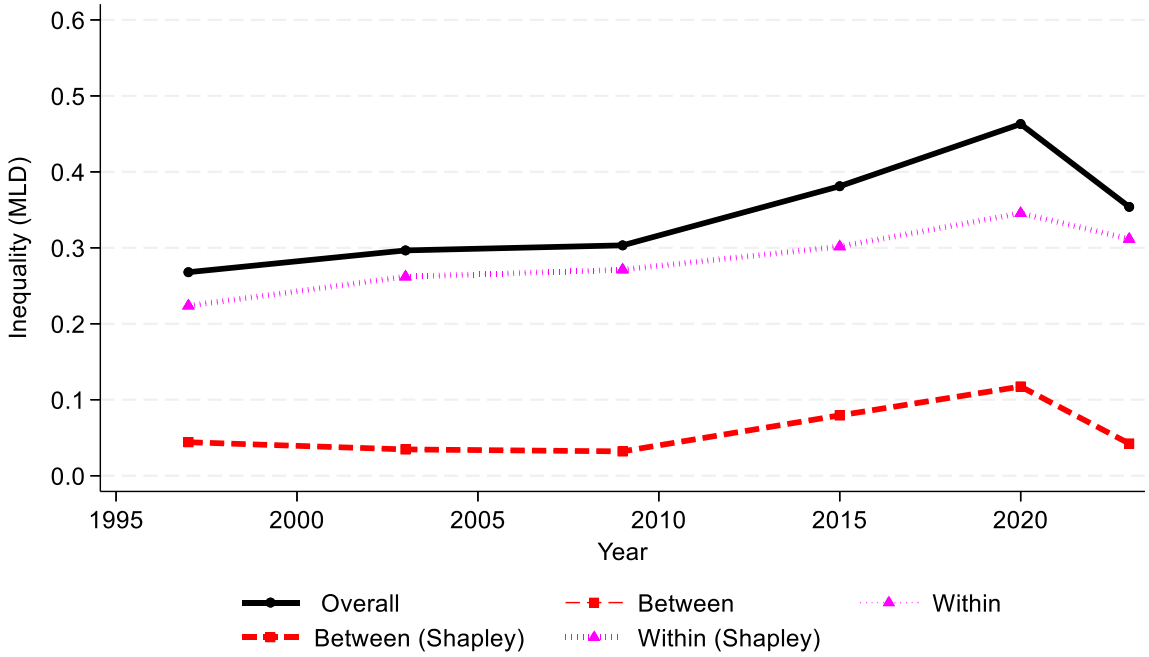
Figure 7: The trend in consumption inequality in Mozambique for overall, spatial (between-area), and non-spatial (within-area) distributions: (a) Gini, (b) MLD, (c) Theil, (d) GE_2 and (e) share of overall inequality explained by spatial inequality (empirical and Shapley decomposition)

(a)

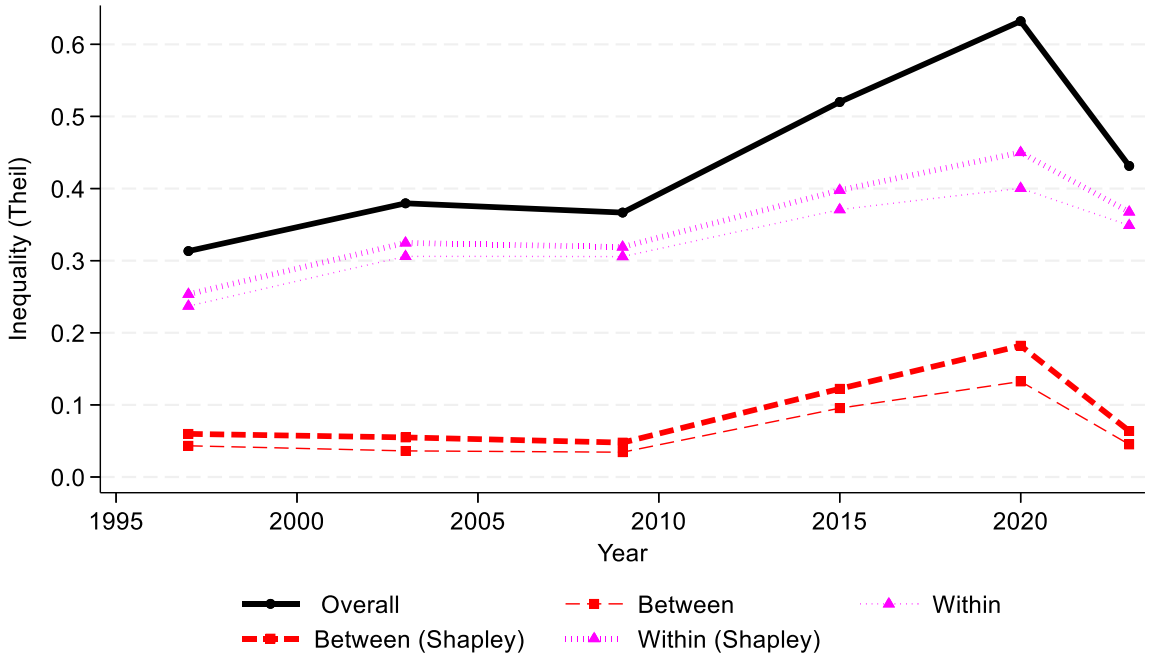


[24] Except for GE_2 between 2014/15 and 2019/20, when the empirical spatial and non-spatial inequality, which add up to only a small fraction of overall inequality, do not reflect the large increase observed in both components with the Shapley decomposition.

(b)


Inequality (MLD)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
1995
2000
2005
2010
2015
2020
Year
Overall
Between
Within
Between (Shapley)
Within (Shapley)

(c)


Inequality (Theil)
0.0
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1995
2000
2005
2010
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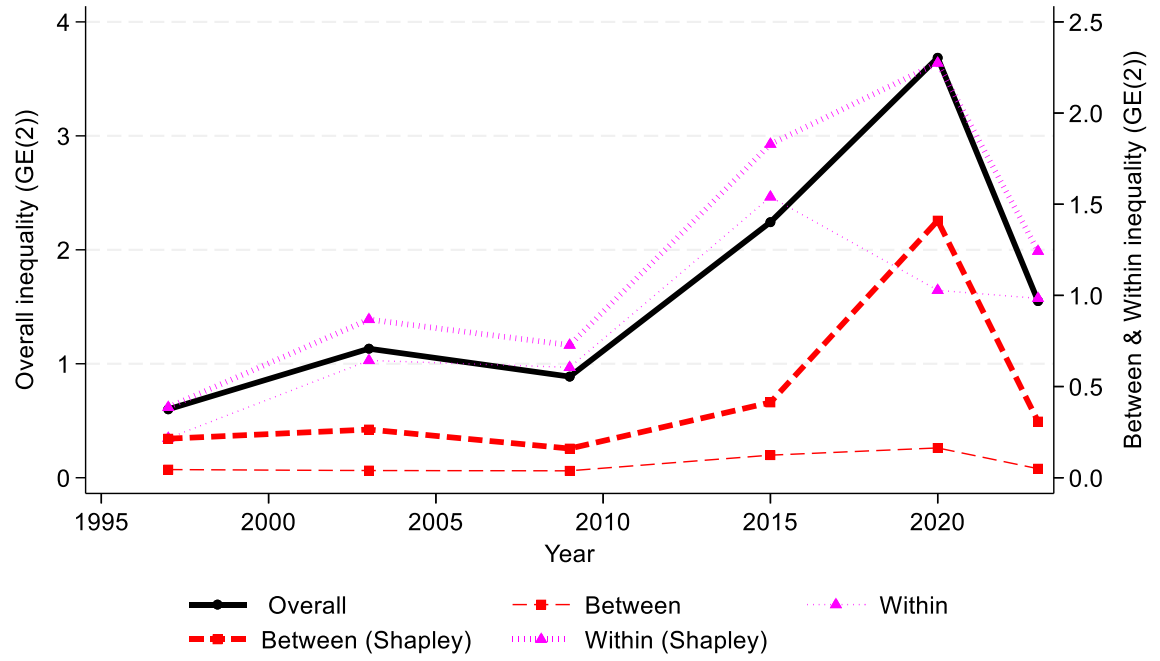
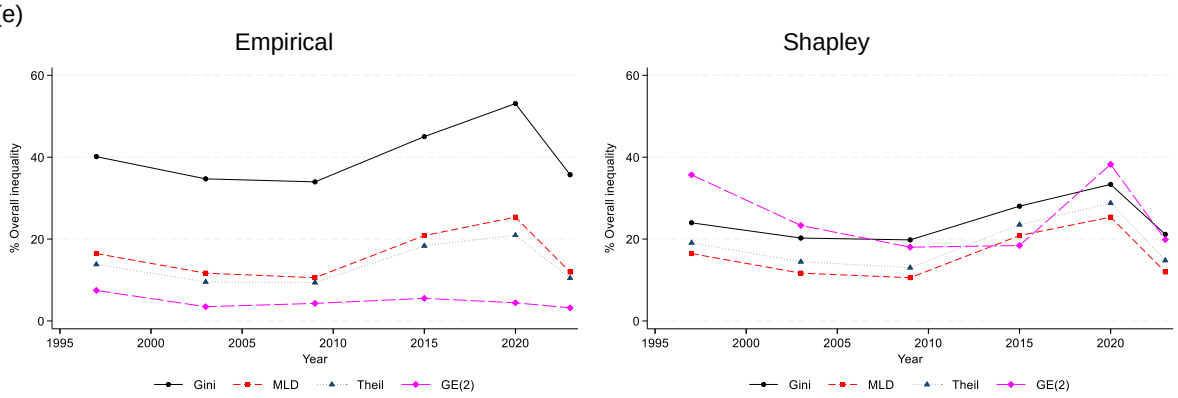
2020
Year
Overall
Between
Within
Between (Shapley)
Within (Shapley)

(d)



(e)



Note: the chained series between 1996/97 and 2002/03 was due to the change in the definition of urban area. The empirical spatial and non-spatial inequality only add to overall inequality with the MLD. The Shapley spatial and non-spatial inequality adds to overall inequality for all measures.

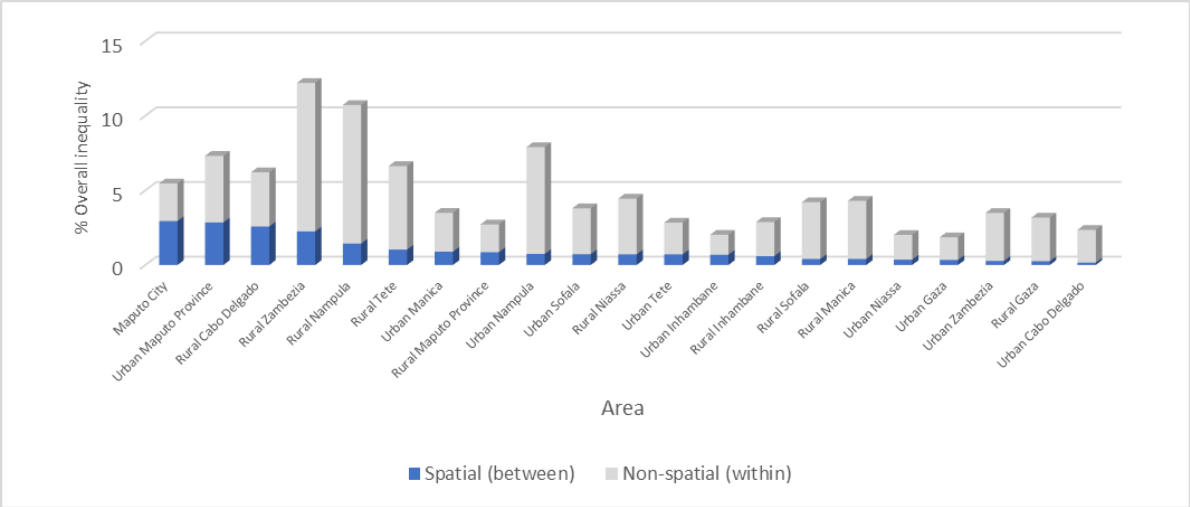
Source: author's construction using household budget surveys.

The empirical share for the Gini index is higher, 53 per cent in 2019/20 (36 per cent in 2022/23), but this is an overestimation, as non-spatial inequality explained an even much higher share of 86 per cent (93 per cent in 2022/23), the awkward result of the path-dependency of this index (i.e. the sum of the contributions of the within and between components being larger than overall inequality). In the case of entropy measures, other than MLD, the empirical values largely underestimate the role of spatial inequality (e.g., 10 and 3 per cent in 2019/20) because, in these cases, the between and within components total less than the overall inequality. This highlights the importance of using the Shapley decomposition to obtain meaningful estimates.

Detailed contributions to inequality by area

Figure 8 shows area contributions to spatial and non-spatial inequality as a percentage of overall inequality in the most recent survey, 2022/23. The sum of all area contributions through both channels adds up to 100 per cent of overall inequality.

Figure 8: Contributions to spatial (between-area) and non-spatial (within-area) inequality (Gini index) by area in 2022/23 (% overall inequality), Shapley decomposition



Note: areas sorted by their contribution to spatial inequality.

Source: author's construction using household budget surveys.

The largest contributions to spatial inequality take place at both ends of the consumption distribution: in the Maputo urban areas (around 14 per cent of between-area inequality, or nearly 3 per cent of overall inequality), as well as in the poorest rural areas of Cabo Delgado and Zambezia (around 12 and 11 per cent of between-area inequality, or 2.6 and 2.2 of overall inequality).

As could be expected, the largest total contributions to overall inequality originate from the most populated areas, like rural Zambezia and Nampula, which explained around 12 and 11 per cent of overall Gini inequality, with the largest part (10 and 9 per cent) being their contribution to within-area inequality. Their contributions to total within-area inequality (around 12 per cent each), however, are smaller than their population shares (15 and 13 per cent, respectively) due to their low level of inequality. On the other hand, the most unequal area, urban Manica, with only 2.6 per cent of the population, contributes to 3.3 per cent of all within-area inequality.

Figure 9 shows the decomposition of area contributions to changes in inequality over time into spatial and non-spatial inequality distributive effects (with constant population) and composition effects (due to changes in population shares with constant distribution). The results are presented for the two main phases identified according to the changing role of spatial inequality in Mozambique.

Figure 9: Contributions to the change in inequality by area through spatial (between-area) and non-spatial (within-area) inequality (Gini index, Shapley decomposition)

Note: see the decomposition with standard errors in Appendix Table A4.

Source: author's construction using household budget surveys.

1996/97–2008/09

The period between the first three surveys, 1996/97–2008/09, is characterized by a limited increase in overall inequality. This was entirely driven by higher inequality in rural areas and Maputo, only partially compensated by declining spatial disparities. Thus, spatial inequality is secondary during this period, mitigating higher inequality within areas.

More precisely, overall inequality initially increased in Mozambique between 1996/97 and 2002/03, mainly due to increasing inequality within rural areas (especially Cabo Delgado in the north, Tete and Zambezia in the south, and Inhambane and Sofala in the centre), as well as in Maputo city. Spatial inequality declined, helping to mitigate the increase in overall inequality, mainly due to the substantial consumption growth in rural Sofala. The latter was partially compensated by the weak consumption growth in rural Nampula and the significant increase in the urban areas of Sofala and Nampula.

Overall inequality barely changed between 2002/03 and 2008/09, resulting from a slight increase in inequality within rural areas, compensated by an equalizing composition effect. With consumption increasing by 18 per cent, Maputo city started contributing to higher spatial inequality, but this effect is still small and was compensated by equalizing effects elsewhere.

2008/09–2022/23

Contrary to previous years, spatial inequality entirely explains the sharp upward trend in inequality in Mozambique between 2008/09 and 2019/20 and its post-pandemic decline. Spatial inequality is driven by the evolution of the gap between urban areas in Maputo and Tete and rural areas, particularly in the north.

Between 2008/09 and 2014/15, the period of solid consumption growth and rising spatial inequality was driven by the increasing advantage of the Maputo urban areas, which had already started in the previous years and almost doubled their real consumption in this period. Together, they explain around 72 per cent of the overall increase in consumption inequality in the country. This quantifies the role of Maputo highlighted in previous research for this period (Gradín 2020; Gradín and Tarp 2019) and contrasts with the decline in consumption observed in some northern areas during this booming period of non-inclusive growth. The decrease in consumption in rural Nampula alone explains an additional 15 per cent of the inequality rise in this period.

The steep rise in inequality that followed between 2014/15 and 2019/20, during the generalized recession, is explained by the more considerable fall in average consumption in poor rural areas (68 per cent of the overall increase in inequality), mostly Nampula and Cabo Delgado in the north or Zambezia in the centre. It was aggravated by the outstanding consumption growth in urban Tete, the only area that increased its average consumption, which explains an additional 31 per cent of the overall increase. Its population gain explains an additional 11 per cent. While the contribution of the other urban areas is small, the fact that Maputo urban areas were particularly hit by the recession and the pandemic helped to mitigate the rise in inequality, reducing it by 16 per cent.

In the last two surveys, inequality primarily declined after the pandemic, and spatial disparities also drove this decline. Within-area inequality declined less, resulting in the decline mentioned above in the share of overall inequality explained by spatial inequality. While half of the decrease in inequality can be attributed to a fall in consumption in the affluent urban areas in Maputo and Tete, the rest is explained by the generalized improvement in consumption levels in the poorest rural areas, especially in Nampula in the north and Zambezia in the centre.

Household-level driving factors of spatial inequality

Finally, the detailed decomposition of changes in spatial inequality (Figure 10) highlights the predominant role of changes in education to explain the increases in spatial inequality in every period, but especially between 2014/15 and 2019/20, explaining 46 per cent of the overall increase in the period in which we observed the largest inequality increase.[25] This contribution was smaller between 2008/09 and 2014/15, 8 per cent of the overall increase, on top of another 4 per cent, explained by changes in labour characteristics.

Figure 10: Decomposition of changes in spatial inequality by household-level characteristics: (a) composition (explained) effect; (b) distributive (unexplained) effect

Note: see the decomposition with standard errors in Appendix Table A5.

Source: author's construction using household budget surveys.

In the last period, 2019/20–2022/23, changes in education continued to contribute to higher inequality (3 per cent), with an even larger contribution of labour characteristics (12 per cent). Still, these effects were more than compensated by the unexplained effects.

The intercept dominates the unexplained (distributive effects), meaning they remain unidentified. However, it shows that consumption returns to education are not a key driving force since they tended to reduce inequality, except in the 2008/09–2014/15 period. Similarly, the effect of returns to labour characteristics tends to be minor, and while it increased inequality in the 2015–20 period, it decreased it in the previous one.

For non-spatial inequality, Figure 11 shows that changes in the distribution of education had a substantial impact on raising inequality within areas between 2002/03 and 2015/20, while the change in the consumption returns to education operated in the opposite direction, helping to mitigate that increase. During the most recent period, when inequality declined, labour characteristics instead played a similar role.

[25] Appendix Figure A1 shows the evolution of attained secondary or higher education by aggregated areas.

Figure 11: Decomposition of changes in non-spatial inequality by household-level characteristics: (a) composition (explained) effect; (b) distributive (unexplained) effect

Note: see the decomposition with standard errors in Appendix Table A6.

Source: author's construction using household budget surveys.

6 Concluding remarks

Mozambique has shown a strong path of economic growth in the last three decades, driven mainly by its rich natural resources. Structural transformation has been limited, and the country remains among the poorest in the world. A diversity of crises in recent years has put the country in a complex scenario. This paper analysed the implications of this process to the trend in inequality between the end of the post-independence war in the early 1990s and the first post-pandemic years, focusing on its spatial dimension. Inequality has been on the rise for most of the period, but especially in the 2010s, and it is worth investigating the extent to which this trend is reflecting changes in the pre-existing spatial disparities inherited from the colonization process, like other low-income countries in the region, aggravated by the war that followed its independence.

For that, I used an innovative regression-based decomposition framework with great potential to analyse the spatial dynamics of well-being, identifying the main contributors. On the one hand, I used the Shapley approach to consistently decompose any inequality measure, without imposing a specific sensitivity to certain parts of the distribution, into the contribution of spatial and non-spatial inequality. On the other hand, this is combined with the use of RIF regressions to estimate the contribution of each area (or set of areas) to each component of inequality. Finally, a Blinder–Oaxaca approach lets us disentangle whether area contributions to a change in inequality operate through pure changes in the distribution between areas or within areas, measured with constant population, or a pure compositional effect exclusively due to changes in their population shares.

The results show that spatial inequality initially had a mitigating effect on overall inequality, which increased driven by higher inequality within rural areas and in Maputo. Later, the aggravation of spatial inequality in Mozambique entirely explains the outstanding surge in inequality in the country in the decade of the 2010s and the higher concentration of consumption at the top of the distribution. Rather than this being a general widening gap between urban and rural areas, the trend was mainly driven by the poor performance of the rural north and centre of the country, primarily affected by natural disasters, the emergence of conflict, and the side effects of the economic shocks even if they hit urban areas the most. This was combined with economic growth being disproportionally large in specific

urban areas (the capital Maputo during the booming first half and a minority of households in the resource-rich Tete later during the recession).

The pandemic has recently drastically corrected this trajectory of inequality. The reduction in spatial inequality associated with the continuation of the recession around Maputo and the decline in urban Tete substantially reduced the post-pandemic level of inequality in the country. This correction still raises some questions about the future trend in a country with a compelling need to reduce its high level of inequality (even when compared with other low-income countries in the region).

The country is expected to resume its strong economic growth path in the following years, thanks to exploiting its rich natural gas reserves and other natural resources. However, there is a risk that this recovery might reactivate the spatial factors that so dangerously fuelled inequality in the previous decade if the benefits of this economic growth are highly concentrated geographically and socioeconomically, aggravating local grievances. In this context, the unresolved conflict in the north, with deep socioeconomic roots, shows how dangerously it can interplay with these growing spatial disparities, compromising governance and the economic and social stability needed for a successful development path. The expected aggravation of climate-related disasters disproportionally affecting specific areas that might feel they do not receive the necessary response might also be a matter of concern and aggravate local grievances, especially in a country that has already paid a high price and where the livelihood of most of the population still depends on underdeveloped agriculture, largely part of the subsistence economy.[26]

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[26] See the discussion about the historically 'relative neglect of agriculture in Mozambique' in Carrilho et al. (2023).

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Appendix[27]

Appendix A: Additional tables and figures

Table A1: Population shares by area in Mozambique

		% Population share						
		1996/97	2002/03*		2008/09	2014/15	2019/20	2022/23
	Mozambique	100	100	100	100	100	100	100
Region	All rural areas	78.9	80.3	67.7	69.6	68.4	65.1	65.5
North	Niassa	3.8	4.6	4.1	4.6	4.9	4.8	5.0
	Cabo Delgado	7.1	7.6	6.5	6.2	5.6	6.3	6.4
	Nampula	15.0	15.7	11.2	13.5	13.3	13.6	13.6
Center	Zambezia	18.3	18.8	17.1	16.1	14.9	15.0	15.1
	Tete	5.9	7	6.5	7.7	8.4	7.3	7.4
	Manica	4.7	5.1	4.3	5.2	5.7	4.5	4.5
	Sofala	8.0	5.8	5.0	5.0	5.1	4.7	4.7
South	Inhambane	6.1	7	5.7	4.8	4.4	3.6	3.5
	Gaza	6.5	6.2	5.2	4.6	4.1	3.2	3.1
	Maputo Province	3.5	2.5	2.1	1.9	2.0	2.1	2.2
Region	All urban areas	21.2	19.9	32.0	30.3	31.7	34.9	34.5
North	Niassa	1.2	0.5	1.0	1.3	1.5	1.7	1.8
	Cabo Delgado	0.6	0.8	1.9	1.7	1.8	2.0	2.0
	Nampula	3.8	3.2	7.6	5.7	6.2	7.9	6.9
Center	Zambezia	1.0	0.4	2.1	2.9	3.9	3.3	3.4
	Tete	0.9	0.7	1.2	1.3	1.3	2.2	2.3
	Manica	1.0	1.6	2.4	1.7	1.8	2.4	2.6
	Sofala	2.1	2.6	3.3	3.1	2.9	3.4	3.5
South	Inhambane	1.2	0.4	1.6	1.3	1.4	1.5	1.5
	Gaza	0.5	0.9	1.8	1.7	1.4	1.6	1.5
	Maputo Province	2.2	3.1	3.4	4.4	4.6	5.2	5.4
	Maputo City	6.7	5.7	5.7	5.2	4.9	3.7	3.6

Note: The estimates for 1996/97 and 2002/03 (first column for this survey) use the 1996/97 urban/rural classification. From 2002/03 (second column of this survey) onwards the 2002/03 classification is used.

Source: Own construction using household budget surveys.

[27] The appendix was not copy-edited at publishing stage, with the exception of some formatting.

Table A2: Mean real consumption per day and poverty rates in Mozambique by area

		Mean daily real consumption (poverty line in each year = 1)						% Poverty rate					
		1996/97	2002/03*	2008/09	2014/15	2019/20	2022/23	1996/97	2002/03*	2008/09	2014/15	2019/20	2022/23
	Mozambique	1.0	1.3	1.3	1.3	1.6	1.2	1.1	69.7	52.8	52.8	51.7	46.1	68.2	65.0
Region	All rural areas	0.9	1.2	1.2	1.2	1.3	0.8	0.9	71.8	54.7	55.0	53.8	50.1	76.5	68.4
North	Niassa	0.9	1.4	1.3	1.8	1.0	0.9	0.9	72.5	48.6	49.4	30.8	59.9	73.9	69.4
	Cabo Delgado	1.1	1.4	1.0	1.4	1.4	0.7	0.7	58.2	60.3	63.6	38.4	42.0	84.1	82.8
	Nampula	1.0	1.1	1.1	1.1	1.1	0.6	1.0	66.2	53.0	51.9	51.8	57.7	85.2	65.1
Center	Zambezia	0.9	1.3	1.2	1.0	1.2	0.8	0.9	68.0	50.2	50.2	68.2	55.7	79.2	71.1
	Tete	0.7	1.0	1.0	1.3	1.5	1.0	0.9	83.2	59.5	59.6	37.8	30.2	65.5	69.4
	Manica	1.1	1.4	1.4	1.1	1.4	0.9	1.1	63.5	40.2	39.3	53.4	44.2	72.7	60.7
	Sofala	0.5	1.6	1.6	1.1	1.2	1.0	1.0	92.1	42.6	42.2	58.8	52.1	65.7	62.6
South	Inhambane	0.7	0.8	0.8	1.2	1.3	0.9	0.9	86.6	78.5	81.4	58.8	54.8	75.3	70.7
	Gaza	1.1	1.3	1.3	0.9	1.3	0.6	1.0	64.0	55.6	56.4	66.7	53.8	83.9	68.1
	Maputo Province	0.9	1.0	0.9	1.1	2.1	1.9	1.7	76.8	67.5	67.2	60.9	35.0	45.1	48.1
Region	All urban areas	1.2	1.7	1.6	1.7	2.4	1.8	1.4	61.8	45.3	48.2	46.8	37.4	52.8	58.4
North	Niassa	0.9	1.5	1.8	1.8	1.2	1.0	0.8	70.1	44.8	43.7	40.3	62.6	72.0	77.3
	Cabo Delgado	1.2	1.3	2.8	1.6	1.5	1.0	1.1	70.7	60.2	49.0	41.0	53.5	75.8	70.4
	Nampula	0.9	1.9	1.4	1.8	1.5	1.2	1.2	82.6	29.7	44.9	50.4	56.0	65.6	66.5
Center	Zambezia	1.2	2.0	1.6	1.3	1.5	1.2	1.1	60.5	27.9	46.0	61.3	59.8	64.4	70.7
	Tete	0.9	1.0	1.2	1.2	2.2	3.4	1.5	73.3	70.5	65.5	59.8	42.2	46.2	52.0
	Manica	1.6	1.2	1.2	1.3	2.0	1.8	1.6	57.0	58.3	54.2	50.8	30.8	56.0	59.0
	Sofala	1.0	2.1	1.9	1.6	2.4	1.7	1.4	71.6	38.3	39.9	47.2	30.1	52.8	53.7
South	Inhambane	1.2	0.9	1.1	1.6	2.4	1.9	1.7	64.1	70.6	66.5	39.0	28.9	45.2	50.8
	Gaza	1.0	1.7	1.5	1.6	1.8	1.2	1.4	75.6	54.1	52.6	45.8	43.8	63.1	61.3
	Maputo Province	1.4	1.4	1.4	1.3	3.0	2.2	1.8	48.2	51.9	53.8	53.7	12.0	32.9	47.6
	Maputo City	1.5	2.1	2.1	2.5	4.5	3.0	2.1	47.1	42.9	42.9	29.9	11.6	22.4	41.6

Note: The estimates use the 1996/97 urban/rural classification for 1996/97 and 2002/03 (first column of this survey). From 2002/03 (second column of this survey) onwards the 2002/03 classification is used.

Source: Own construction using household budget surveys.

Table A3: Gini index by area

		1996/97	2002/03*		2008/09	2014/15	2019/20	2022/23
Region	Rural areas							
North	Niassa	0.350	0.363	0.328	0.419	0.343	0.345	0.384
	Cabo Delgado	0.354	0.468	0.278	0.317	0.348	0.350	0.362
	Nampula	0.357	0.322	0.295	0.324	0.352	0.408	0.334
Center	Zambezia	0.314	0.343	0.330	0.341	0.364	0.342	0.330
	Tete	0.337	0.382	0.364	0.312	0.312	0.403	0.382
	Manica	0.389	0.394	0.400	0.326	0.361	0.395	0.428
	Sofala	0.359	0.385	0.397	0.461	0.390	0.361	0.398
South	Inhambane	0.329	0.447	0.441	0.385	0.406	0.437	0.341
	Gaza	0.383	0.381	0.374	0.383	0.424	0.477	0.454
	Maputo Province	0.361	0.392	0.389	0.366	0.500	0.504	0.502
Region	Urban areas							
North	Niassa	0.368	0.435	0.483	0.494	0.489	0.479	0.491
	Cabo Delgado	0.522	0.428	0.657	0.425	0.464	0.560	0.519
	Nampula	0.504	0.397	0.422	0.545	0.516	0.507	0.508
Center	Zambezia	0.449	0.394	0.441	0.472	0.539	0.460	0.463
	Tete	0.386	0.476	0.516	0.415	0.552	0.725	0.500
	Manica	0.484	0.373	0.370	0.387	0.428	0.579	0.549
	Sofala	0.419	0.498	0.472	0.438	0.501	0.528	0.467
South	Inhambane	0.463	0.324	0.414	0.392	0.475	0.493	0.525
	Gaza	0.340	0.538	0.479	0.472	0.495	0.501	0.531
	Maputo Province	0.441	0.428	0.429	0.391	0.445	0.490	0.513
	Maputo City	0.444	0.524	0.524	0.508	0.582	0.524	0.518

Note: the estimates use the 1996/97 urban/rural classification for 1996/97 and 2002/03 (first column of this survey). From 2002/03 (second column of this survey) onwards the 2002/03 classification is used.

Source: own construction using household budget surveys

Table A4: Blinder-Oaxaca RIF decomposition of the change in inequality (Gini index) by period. Area contributions

	Overall				Spatial (between)				Non-Spatial (within)			
	CE		DE		CE		DE		CE		DE	
1996/97-2002/03	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E
Mozambique	0.0114	0.0012	0.0069	0.0045	-0.00254	0.00056	0.00231	0.00104	0.01397	0.00105	0.00464	0.00391
Urban Niassa	-0.0007	0.0003	0.0015	0.0004	-0.00008	0.00003	0.00088	0.00010	-0.00066	0.00024	0.00066	0.00036
Rural Niassa	0.0009	0.0005	-0.0009	0.0009	0.00013	0.00007	-0.00090	0.00019	0.00076	0.00041	-0.00002	0.00077
Urban Cabo Delgado	0.0075	0.0006	0.0076	0.0008	0.00091	0.00010	0.00832	0.00033	0.00659	0.00054	-0.00076	0.00070
Rural Cabo Delgado	-0.0023	0.0006	-0.0023	0.0011	-0.00031	0.00009	0.00372	0.00024	-0.00197	0.00054	-0.00598	0.00096
Urban Nampula	0.0200	0.0009	-0.0069	0.0014	0.00176	0.00012	-0.00075	0.00029	0.01822	0.00086	-0.00618	0.00122
Rural Nampula	-0.0136	0.0009	-0.0044	0.0014	-0.00093	0.00007	0.00362	0.00030	-0.01267	0.00080	-0.00806	0.00121
Urban Zambezia	0.0052	0.0005	-0.0003	0.0007	0.00084	0.00008	0.00008	0.00015	0.00436	0.00041	-0.00038	0.00064
Rural Zambezia	-0.0038	0.0008	0.0029	0.0018	-0.00035	0.00008	-0.00008	0.00038	-0.00346	0.00076	0.00299	0.00155
Urban Tete	0.0012	0.0003	0.0016	0.0005	0.00012	0.00003	-0.00002	0.00010	0.00112	0.00025	0.00158	0.00044
Rural Tete	0.0024	0.0006	0.0006	0.0011	0.00084	0.00021	-0.00275	0.00024	0.00159	0.00041	0.00331	0.00099
Urban Manica	0.0084	0.0006	-0.0052	0.0008	0.00328	0.00021	-0.00489	0.00022	0.00510	0.00045	-0.00034	0.00072
Rural Manica	-0.0016	0.0006	0.0006	0.0009	-0.00015	0.00005	0.00005	0.00019	-0.00150	0.00051	0.00059	0.00077
Urban Sofala	0.0051	0.0005	0.0036	0.0009	0.00029	0.00005	0.00451	0.00021	0.00483	0.00048	-0.00090	0.00076
Rural Sofala	-0.0141	0.0008	-0.0031	0.0009	-0.00790	0.00045	-0.00960	0.00028	-0.00618	0.00042	0.00645	0.00080
Urban Inhambane	0.0023	0.0004	-0.0010	0.0006	0.00035	0.00006	-0.00016	0.00012	0.00192	0.00034	-0.00084	0.00051
Rural Inhambane	-0.0014	0.0006	0.0074	0.0010	-0.00051	0.00022	0.00376	0.00023	-0.00089	0.00039	0.00365	0.00090
Urban Gaza	0.0045	0.0005	0.0027	0.0008	0.00035	0.00009	0.00055	0.00016	0.00416	0.00048	0.00211	0.00071
Rural Gaza	-0.0050	0.0006	-0.0007	0.0010	-0.00056	0.00007	-0.00085	0.00021	-0.00447	0.00057	0.00019	0.00083
Urban Maputo Province	0.0062	0.0006	-0.0029	0.0009	0.00208	0.00020	-0.00484	0.00022	0.00415	0.00043	0.00191	0.00077
Rural Maputo Province	-0.0049	0.0005	0.0011	0.0006	-0.00070	0.00007	0.00133	0.00014	-0.00417	0.00039	-0.00019	0.00052
Urban Maputo City	-0.0048	0.0009	0.0052	0.0010	-0.00198	0.00036	0.00032	0.00022	-0.00286	0.00052	0.00484	0.00089

	Overall				Spatial (between)				Non-Spatial (within)			
	CE		DE		CE		DE		CE		DE	
2002/03-08/09	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E
Mozambique	-0.0041	0.0009	0.0036	0.0047	-0.00252	0.00055	0.00057	0.00106	-0.00154	0.00064	0.00304	0.00401
Urban Niassa	0.0019	0.0004	0.0001	0.0006	0.00048	0.00009	0.00006	0.00013	0.00146	0.00030	0.00008	0.00051
Rural Niassa	0.0016	0.0005	0.0055	0.0010	0.00014	0.00004	0.00424	0.00023	0.00147	0.00041	0.00128	0.00088
Urban Cabo Delgado	-0.0021	0.0008	-0.0089	0.0006	-0.00110	0.00044	-0.00746	0.00028	-0.00100	0.00040	-0.00147	0.00050
Rural Cabo Delgado	-0.0012	0.0005	-0.0004	0.0011	-0.00040	0.00017	-0.00407	0.00025	-0.00082	0.00036	0.00370	0.00097
Urban Nampula	-0.0083	0.0007	0.0098	0.0010	-0.00069	0.00008	0.00483	0.00023	-0.00758	0.00067	0.00493	0.00088
Rural Nampula	0.0073	0.0007	0.0029	0.0018	0.00130	0.00013	-0.00147	0.00038	0.00597	0.00060	0.00442	0.00155
Urban Zambezia	0.0039	0.0005	0.0004	0.0009	0.00068	0.00009	-0.00148	0.00019	0.00323	0.00042	0.00193	0.00076
Rural Zambezia	-0.0035	0.0008	0.0068	0.0018	-0.00030	0.00007	0.01034	0.00039	-0.00319	0.00075	-0.00349	0.00157
Urban Tete	0.0008	0.0004	-0.0014	0.0005	0.00005	0.00003	0.00006	0.00012	0.00072	0.00035	-0.00143	0.00047
Rural Tete	0.0045	0.0007	-0.0047	0.0013	0.00102	0.00015	-0.00421	0.00029	0.00345	0.00052	-0.00051	0.00116
Urban Manica	-0.0026	0.0004	0.0002	0.0005	-0.00020	0.00004	0.00005	0.00011	-0.00239	0.00035	0.00019	0.00048
Rural Manica	0.0039	0.0006	-0.0031	0.0011	0.00035	0.00006	0.00131	0.00024	0.00358	0.00053	-0.00446	0.00097
Urban Sofala	-0.0013	0.0006	-0.0024	0.0008	-0.00040	0.00018	-0.00287	0.00018	-0.00092	0.00043	0.00050	0.00068
Rural Sofala	0.0000	0.0006	0.0028	0.0010	0.00000	0.00011	-0.00104	0.00022	0.00001	0.00048	0.00381	0.00089
Urban Inhambane	-0.0014	0.0003	-0.0003	0.0005	-0.00022	0.00006	0.00013	0.00010	-0.00118	0.00029	-0.00045	0.00043
Rural Inhambane	-0.0046	0.0008	-0.0059	0.0010	-0.00186	0.00030	-0.00822	0.00026	-0.00277	0.00046	0.00231	0.00083
Urban Gaza	-0.0004	0.0004	0.0001	0.0006	-0.00005	0.00005	0.00025	0.00013	-0.00038	0.00037	-0.00018	0.00051
Rural Gaza	-0.0024	0.0005	0.0016	0.0009	-0.00017	0.00004	0.00372	0.00021	-0.00223	0.00050	-0.00211	0.00082
Urban Maputo Province	0.0042	0.0006	-0.0017	0.0010	0.00031	0.00006	-0.00003	0.00022	0.00390	0.00053	-0.00169	0.00090
Rural Maputo Province	-0.0011	0.0004	-0.0007	0.0006	-0.00029	0.00011	-0.00118	0.00013	-0.00079	0.00029	0.00046	0.00053
Urban Maputo City	-0.0033	0.0009	0.0028	0.0010	-0.00118	0.00033	0.00760	0.00026	-0.00210	0.00060	-0.00479	0.00089

	Overall				Spatial (between)				Non-Spatial (within)			
	CE		DE		CE		DE		CE		DE	
2008/09-14/15	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E
Mozambique	0.0010	0.0005	0.0491	0.0038	-0.00141	0.00038	0.04848	0.00086	0.00244	0.00038	0.00062	0.00346
Urban Niassa	0.0009	0.0003	-0.0005	0.0005	0.00021	0.00008	-0.00086	0.00010	0.00064	0.00024	0.00034	0.00044
Rural Niassa	0.0016	0.0005	-0.0023	0.0009	0.00043	0.00013	0.00102	0.00018	0.00118	0.00036	-0.00332	0.00078
Urban Cabo Delgado	0.0004	0.0003	0.0006	0.0005	0.00006	0.00004	-0.00035	0.00011	0.00034	0.00024	0.00092	0.00047
Rural Cabo Delgado	-0.0018	0.0004	0.0024	0.0009	-0.00023	0.00005	0.00056	0.00019	-0.00161	0.00035	0.00180	0.00080
Urban Nampula	0.0036	0.0007	-0.0052	0.0010	0.00072	0.00014	-0.00495	0.00021	0.00284	0.00057	-0.00021	0.00089
Rural Nampula	-0.0009	0.0006	0.0078	0.0014	-0.00012	0.00008	0.00706	0.00030	-0.00076	0.00051	0.00077	0.00125
Urban Zambezia	0.0045	0.0004	0.0027	0.0008	0.00028	0.00004	0.00032	0.00017	0.00421	0.00042	0.00241	0.00074
Rural Zambezia	-0.0050	0.0007	0.0031	0.0014	-0.00123	0.00017	-0.00115	0.00031	-0.00378	0.00054	0.00424	0.00130
Urban Tete	0.0000	0.0002	0.0024	0.0004	0.00000	0.00002	0.00142	0.00010	0.00003	0.00022	0.00100	0.00040
Rural Tete	0.0024	0.0005	0.0007	0.0011	0.00025	0.00005	0.00150	0.00024	0.00216	0.00040	-0.00078	0.00103
Urban Manica	0.0002	0.0003	0.0010	0.0005	0.00002	0.00002	0.00139	0.00011	0.00022	0.00024	-0.00040	0.00047
Rural Manica	0.0017	0.0004	0.0018	0.0009	0.00030	0.00007	-0.00046	0.00020	0.00137	0.00033	0.00222	0.00085
Urban Sofala	-0.0010	0.0004	0.0033	0.0006	-0.00015	0.00006	0.00387	0.00015	-0.00086	0.00034	-0.00061	0.00057
Rural Sofala	0.0002	0.0005	-0.0025	0.0009	0.00003	0.00006	0.00093	0.00018	0.00021	0.00046	-0.00341	0.00078
Urban Inhambane	0.0004	0.0002	0.0018	0.0005	0.00008	0.00004	0.00157	0.00010	0.00032	0.00019	0.00019	0.00042
Rural Inhambane	-0.0015	0.0004	0.0016	0.0008	-0.00013	0.00004	0.00123	0.00017	-0.00136	0.00038	0.00039	0.00071
Urban Gaza	-0.0014	0.0003	0.0001	0.0004	-0.00020	0.00005	0.00022	0.00009	-0.00119	0.00028	-0.00008	0.00039
Rural Gaza	-0.0020	0.0004	0.0010	0.0007	-0.00051	0.00011	-0.00219	0.00016	-0.00144	0.00032	0.00316	0.00068
Urban Maputo Province	0.0008	0.0004	0.0094	0.0008	0.00006	0.00003	0.01499	0.00024	0.00072	0.00038	-0.00558	0.00075
Rural Maputo Province	0.0003	0.0003	0.0027	0.0005	0.00004	0.00004	0.00148	0.00012	0.00027	0.00023	0.00125	0.00049
Urban Maputo City	-0.0024	0.0008	0.0172	0.0008	-0.00130	0.00041	0.02087	0.00029	-0.00109	0.00035	-0.00366	0.00075

	Overall				Spatial (between)				Non-Spatial (within)			
	CE		DE		CE		DE		CE		DE	
2014/15-19/20	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E
Mozambique	-0.0011	0.0008	0.0468	0.0055	-0.00458	0.00073	0.04570	0.00164	0.00348	0.00050	0.00109	0.00432
Urban Niassa	0.0011	0.0003	-0.0004	0.0007	0.00017	0.00005	-0.00018	0.00021	0.00096	0.00026	-0.00020	0.00058
Rural Niassa	-0.0003	0.0004	-0.0006	0.0012	-0.00011	0.00014	-0.00181	0.00035	-0.00021	0.00027	0.00119	0.00094
Urban Cabo Delgado	0.0008	0.0003	0.0020	0.0008	0.00008	0.00003	0.00034	0.00022	0.00077	0.00027	0.00167	0.00061
Rural Cabo Delgado	0.0027	0.0004	0.0055	0.0014	0.00037	0.00006	0.00864	0.00042	0.00232	0.00036	-0.00311	0.00110
Urban Nampula	0.0084	0.0007	-0.0009	0.0016	0.00068	0.00006	0.00220	0.00045	0.00769	0.00060	-0.00305	0.00125
Rural Nampula	0.0014	0.0006	0.0127	0.0020	0.00034	0.00016	0.01224	0.00060	0.00104	0.00048	0.00041	0.00159
Urban Zambezia	-0.0031	0.0005	-0.0027	0.0010	-0.00022	0.00004	0.00109	0.00028	-0.00293	0.00044	-0.00381	0.00077
Rural Zambezia	0.0006	0.0007	0.0019	0.0021	0.00012	0.00014	0.00720	0.00061	0.00045	0.00052	-0.00527	0.00166
Urban Tete	0.0053	0.0004	0.0141	0.0009	0.00129	0.00011	0.01422	0.00045	0.00396	0.00034	-0.00008	0.00069
Rural Tete	-0.0036	0.0004	0.0066	0.0015	-0.00055	0.00007	0.00177	0.00042	-0.00305	0.00036	0.00484	0.00114
Urban Manica	0.0027	0.0003	0.0048	0.0009	0.00067	0.00008	0.00163	0.00025	0.00205	0.00025	0.00322	0.00070
Rural Manica	-0.0047	0.0004	0.0020	0.0011	-0.00066	0.00006	0.00133	0.00033	-0.00401	0.00035	0.00064	0.00088
Urban Sofala	0.0030	0.0005	0.0001	0.0010	0.00105	0.00017	-0.00181	0.00030	0.00191	0.00031	0.00187	0.00081
Rural Sofala	-0.0017	0.0004	-0.0011	0.0012	-0.00030	0.00007	0.00029	0.00034	-0.00142	0.00035	-0.00143	0.00092
Urban Inhambane	0.0003	0.0003	0.0006	0.0007	0.00012	0.00011	0.00040	0.00019	0.00021	0.00019	0.00023	0.00052
Rural Inhambane	-0.0037	0.0004	0.0011	0.0010	-0.00054	0.00006	0.00053	0.00029	-0.00312	0.00034	0.00054	0.00079
Urban Gaza	0.0010	0.0003	0.0000	0.0007	0.00018	0.00005	-0.00031	0.00020	0.00085	0.00025	0.00030	0.00056
Rural Gaza	-0.0037	0.0004	0.0032	0.0010	-0.00047	0.00005	0.00389	0.00029	-0.00323	0.00034	-0.00066	0.00075
Urban Maputo Province	0.0035	0.0006	0.0024	0.0013	0.00209	0.00036	-0.00149	0.00036	0.00141	0.00025	0.00390	0.00100
Rural Maputo Province	0.0006	0.0003	0.0011	0.0008	0.00016	0.00008	0.00159	0.00023	0.00048	0.00026	-0.00053	0.00063
Urban Maputo City	-0.0117	0.0010	-0.0056	0.0010	-0.00906	0.00073	-0.00605	0.00032	-0.00265	0.00025	0.00043	0.00080

	Overall				Spatial (between)				Non-Spatial (within)			
	CE		DE		CE		DE		CE		DE	
2019/20-22/23	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E
Mozambique	0.0007	0.0009	-0.0607	0.0058	0.00129	0.00081	-0.07630	0.00161	-0.00060	0.00039	0.01557	0.00461
Urban Niassa	0.0003	0.0003	0.0004	0.0008	0.00005	0.00005	0.00038	0.00021	0.00028	0.00030	0.00004	0.00062
Rural Niassa	0.0004	0.0005	0.0004	0.0013	0.00011	0.00012	-0.00197	0.00035	0.00030	0.00034	0.00235	0.00103
Urban Cabo Delgado	0.0004	0.0004	-0.0009	0.0008	0.00004	0.00005	-0.00051	0.00023	0.00038	0.00039	-0.00041	0.00066
Rural Cabo Delgado	0.0004	0.0006	-0.0011	0.0015	0.00018	0.00025	-0.00044	0.00040	0.00025	0.00035	-0.00067	0.00117
Urban Nampula	-0.0049	0.0007	0.0005	0.0015	-0.00068	0.00011	-0.00148	0.00039	-0.00425	0.00064	0.00199	0.00116
Rural Nampula	0.0001	0.0009	-0.0188	0.0022	0.00003	0.00035	-0.01930	0.00060	0.00005	0.00057	0.00048	0.00170
Urban Zambezia	0.0003	0.0005	0.0001	0.0011	0.00005	0.00007	-0.00119	0.00029	0.00029	0.00038	0.00127	0.00085
Rural Zambezia	0.0009	0.0008	-0.0077	0.0023	0.00029	0.00026	-0.01016	0.00062	0.00060	0.00055	0.00245	0.00180
Urban Tete	0.0019	0.0010	-0.0165	0.0010	0.00125	0.00065	-0.01553	0.00045	0.00070	0.00037	-0.00100	0.00072
Rural Tete	0.0003	0.0006	-0.0015	0.0016	0.00005	0.00011	-0.00094	0.00043	0.00023	0.00050	-0.00058	0.00126
Urban Manica	0.0010	0.0005	-0.0008	0.0010	0.00028	0.00015	-0.00053	0.00026	0.00075	0.00040	-0.00023	0.00075
Rural Manica	0.0001	0.0005	0.0003	0.0012	0.00002	0.00009	-0.00196	0.00033	0.00008	0.00038	0.00225	0.00098
Urban Sofala	0.0006	0.0006	-0.0028	0.0011	0.00017	0.00015	-0.00193	0.00030	0.00048	0.00042	-0.00087	0.00087
Rural Sofala	0.0002	0.0005	0.0004	0.0013	0.00003	0.00009	-0.00191	0.00034	0.00014	0.00036	0.00235	0.00100
Urban Inhambane	0.0002	0.0004	0.0006	0.0007	0.00006	0.00014	-0.00012	0.00019	0.00010	0.00024	0.00069	0.00057
Rural Inhambane	-0.0005	0.0005	-0.0028	0.0011	-0.00009	0.00008	-0.00001	0.00029	-0.00044	0.00038	-0.00278	0.00085
Urban Gaza	-0.0007	0.0003	0.0008	0.0007	-0.00009	0.00005	0.00048	0.00018	-0.00060	0.00030	0.00031	0.00055
Rural Gaza	-0.0006	0.0005	-0.0025	0.0010	-0.00020	0.00017	-0.00433	0.00029	-0.00042	0.00035	0.00180	0.00081
Urban Maputo Province	0.0012	0.0008	-0.0017	0.0014	0.00063	0.00040	-0.00481	0.00038	0.00060	0.00039	0.00314	0.00108
Rural Maputo Province	0.0004	0.0005	-0.0002	0.0009	0.00015	0.00016	-0.00056	0.00023	0.00027	0.00029	0.00036	0.00069
Urban Maputo City	-0.0014	0.0009	-0.0069	0.0011	-0.00103	0.00065	-0.00950	0.00034	-0.00040	0.00025	0.00262	0.00086

Note: Shapley decomposition of inequality between and within areas (overall effects are the sum of the effects between and within areas). CE= Composition (explained) effect; DE=distributive (unexplained) effect. Coeff. = estimated coefficient (change in inequality); St. E. = Standard error.

Source: own construction using household budget surveys.

Table A5: Blinder-Oaxaca RIF decomposition of the change in Spatial inequality (Gini index) by period. Household head characteristics contributions

	19972003		**2003-09**		**2009-15**		**2015-20**		**2020-23**	
	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E
Final	0.084	0.001	0.082	0.001	0.129	0.001	0.170	0.002	0.095	0.001
Initial	0.084	0.001	0.084	0.001	0.082	0.001	0.129	0.001	0.170	0.002
Change	*0.000*	*0.001*	*-0.002*	*0.001*	*0.047*	*0.001*	*0.041*	*0.002*	*-0.075*	*0.002*
Composition E.	*0.002*	*0.001*	*0.005*	*0.001*	*0.006*	*0.000*	*0.017*	*0.001*	*0.011*	*0.004*
demographics	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	0.000	0.000	0.000
education	0.002	0.000	0.005	0.001	0.004	0.000	0.019	0.001	0.002	0.000
labor	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.009	0.004
Distributive E.	*-0.002*	*0.001*	*-0.007*	*0.001*	*0.041*	*0.001*	*0.024*	*0.002*	*-0.086*	*0.004*
demographics	0.004	0.002	-0.004	0.002	0.010	0.001	-0.011	0.003	0.003	0.003
education	0.003	0.001	-0.008	0.001	0.017	0.001	-0.027	0.002	-0.010	0.002
labor	-0.002	0.002	0.000	0.002	-0.014	0.001	0.008	0.002	-0.004	0.004
Intercept	-0.007	0.002	0.005	0.002	0.028	0.002	0.054	0.003	-0.074	0.003

Note: Shapley decomposition of inequality between areas. Coeff. = estimated coefficient (change in inequality); St. E. = Standard error.

Source: own construction using household budget surveys.

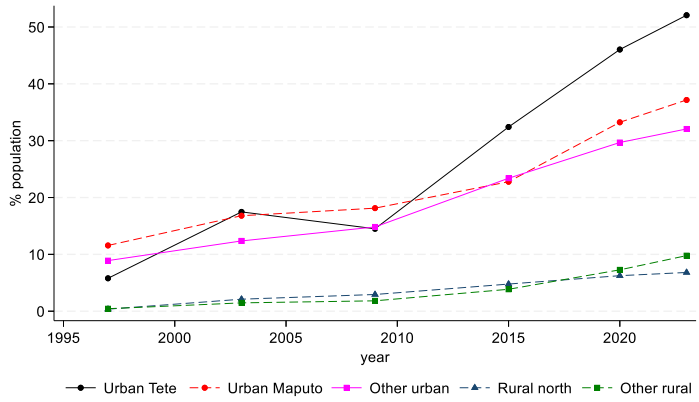
Table A6: Blinder-Oaxaca RIF decomposition of the change in non-spatial inequality (Gini index) by period. Household head characteristics contributions

	1997-2003		**2003-09**		**2009-15**		**2015-20**		**2020-23**	
	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E	Coeff.	St. E
Final	0.331	0.003	0.333	0.003	0.336	0.002	0.340	0.004	0.355	0.003
Initial	0.313	0.002	0.331	0.003	0.333	0.003	0.336	0.002	0.340	0.004
Change	*0.019*	*0.004*	*0.002*	*0.004*	*0.003*	*0.003*	*0.005*	*0.004*	*0.015*	*0.005*
Composition E. (explained)	*0.011*	*0.002*	*0.017*	*0.002*	*0.012*	*0.001*	*0.030*	*0.002*	*0.055*	*0.009*
demographics	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
education	0.006	0.001	0.014	0.002	0.011	0.001	0.035	0.002	0.003	0.001
labor	0.005	0.002	0.003	0.001	0.001	0.001	-0.005	0.001	0.051	0.009
Distributive E. (unexplained)	*0.008*	*0.004*	*-0.016*	*0.004*	*-0.009*	*0.004*	*-0.026*	*0.004*	*-0.040*	*0.010*
demographics	-0.005	0.007	0.011	0.007	0.009	0.006	-0.027	0.007	0.009	0.008
education	0.006	0.003	-0.016	0.003	-0.017	0.003	-0.023	0.004	-0.002	0.004
labor	-0.003	0.006	-0.013	0.006	-0.001	0.004	0.002	0.006	-0.053	0.011
Intercept	0.009	0.007	0.003	0.007	0.000	0.007	0.022	0.008	0.005	0.009

Note: Shapley decomposition of inequality between areas. Coeff. = estimated coefficient (change in inequality); St. E. = Standard error.

Source: own construction using household budget surveys.

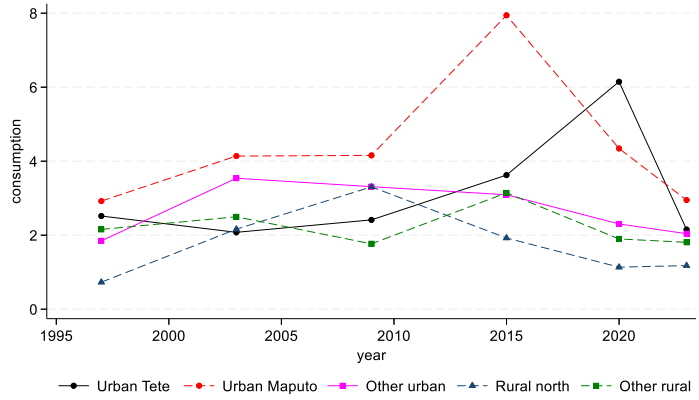
Figure A1: Percentage of the population whose head has secondary or higher education, by aggregated areas



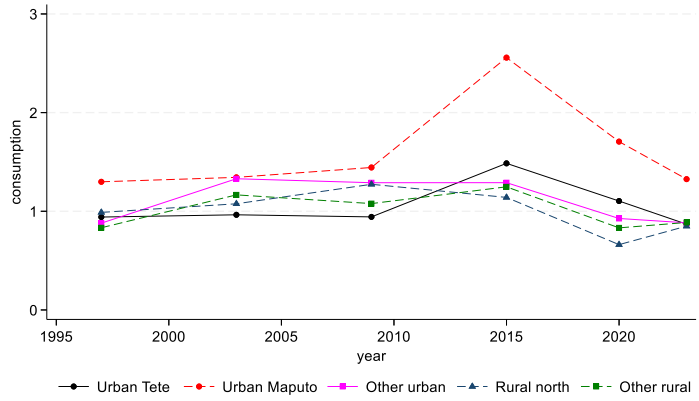
Source: own construction using household budget surveys.

Figure A2: Average consumption by area and household head's education

a. Head with secondary or higher education



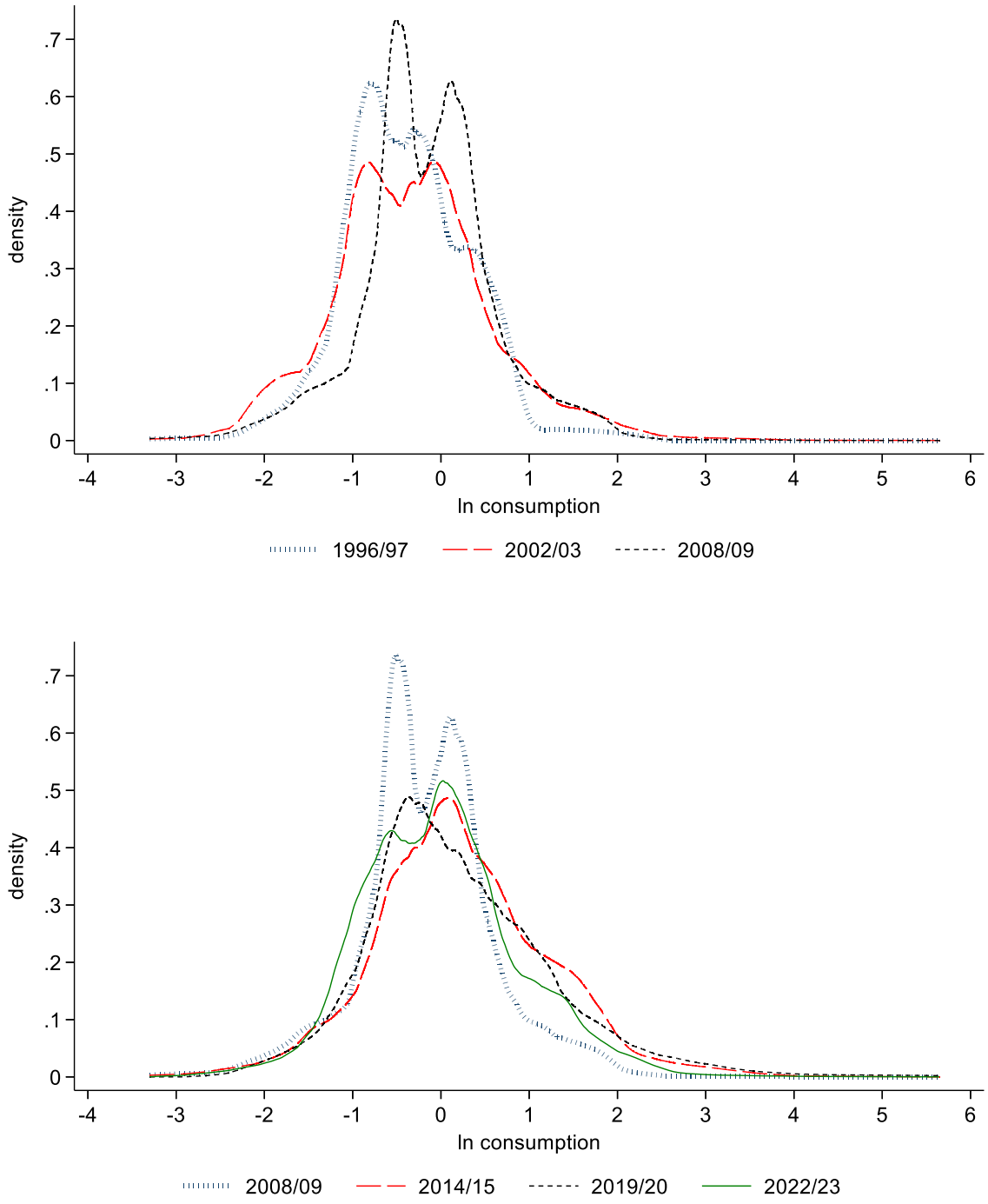
b. Head with less than secondary education



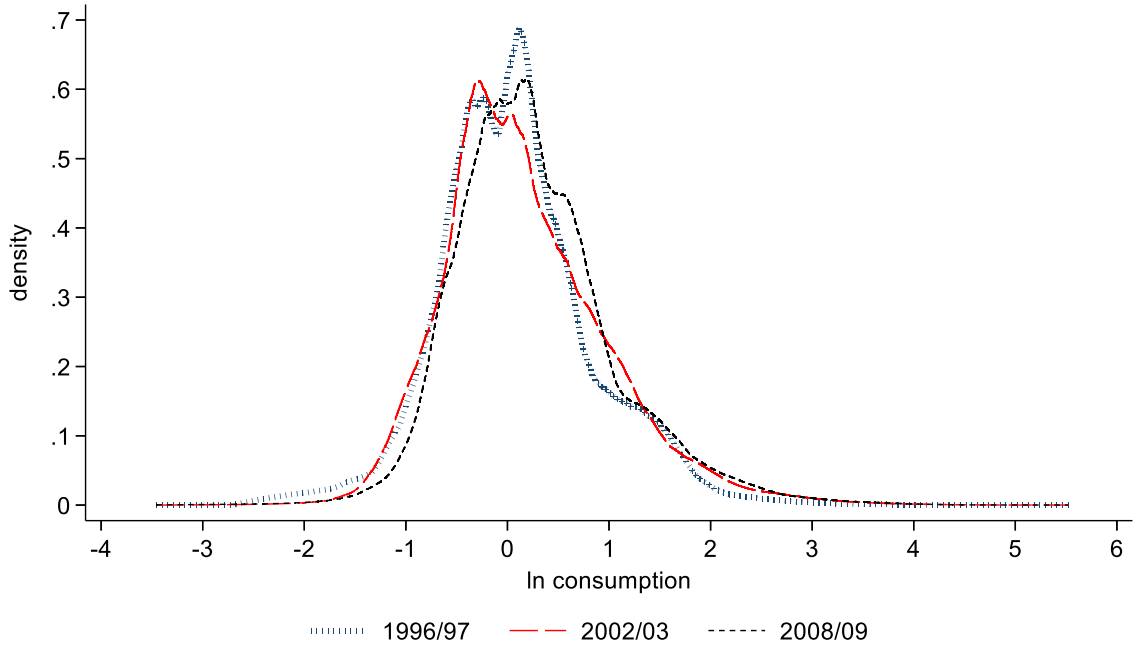
Source: own construction using household budget surveys.

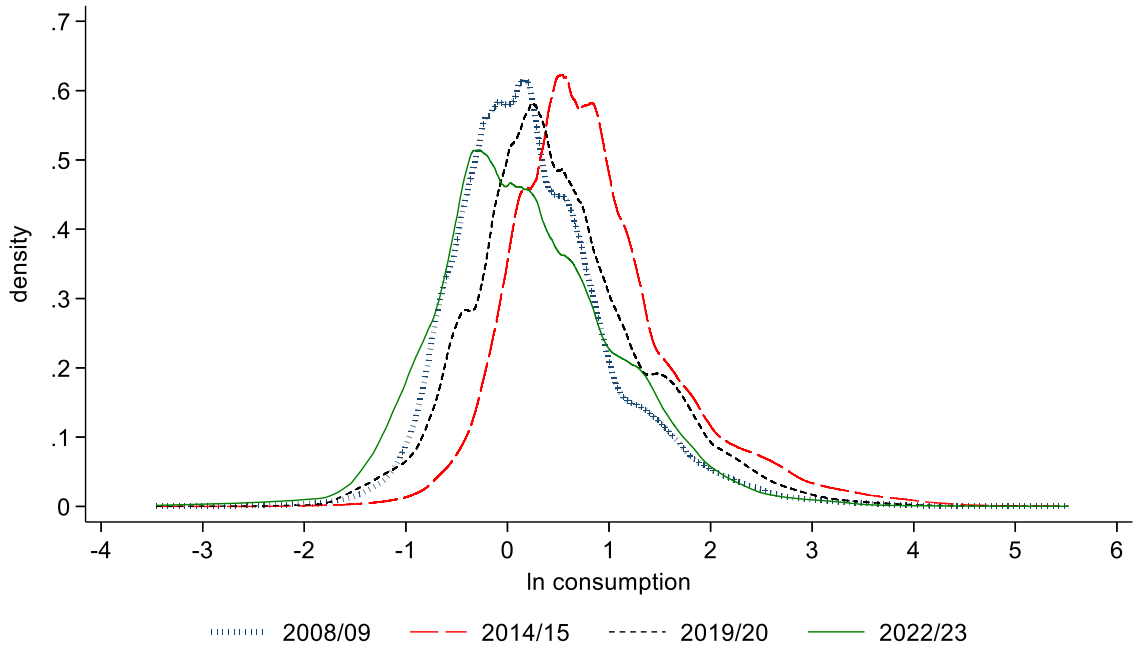
Figure A3: Density functions, log real daily consumption

Urban Tete

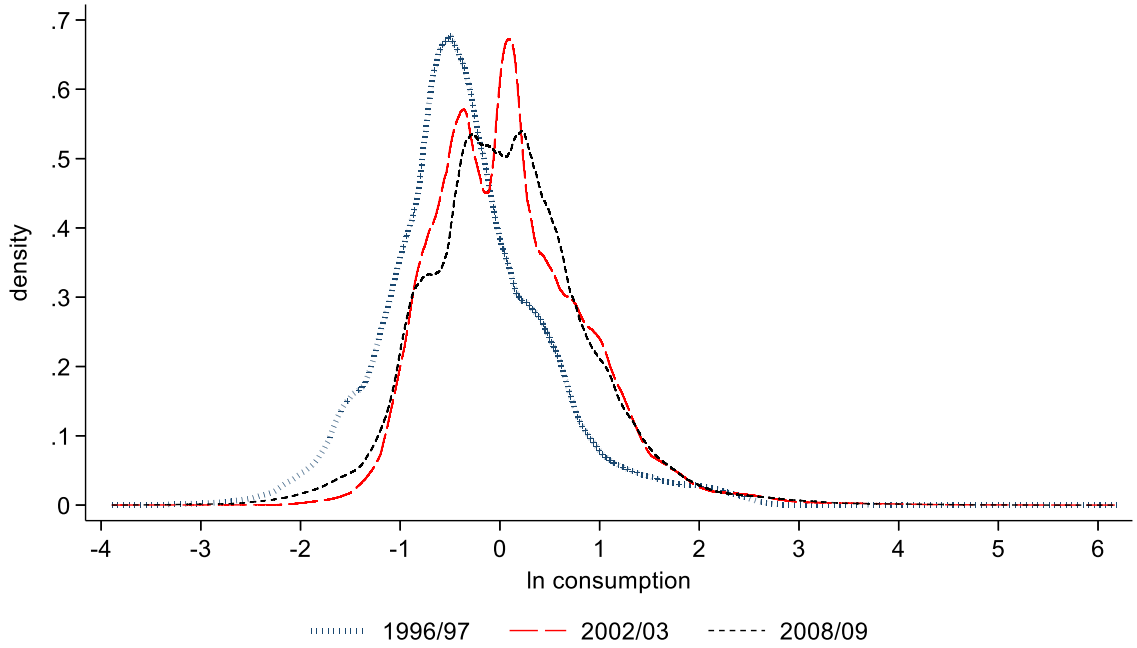


Urban Maputo (city and province)





Other urban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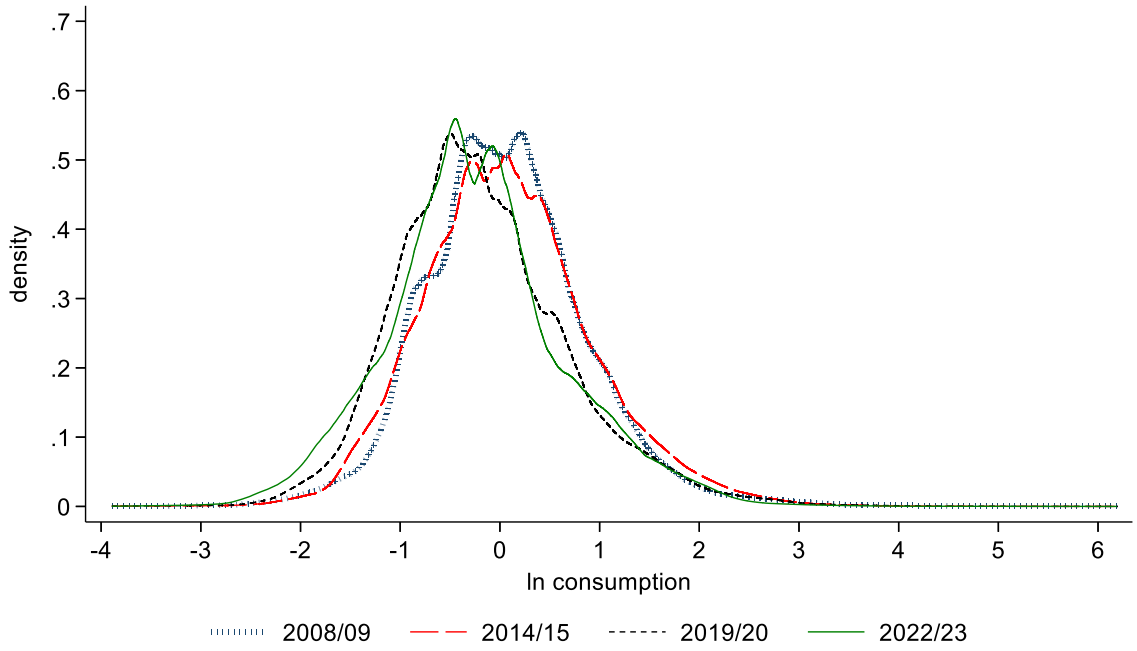
2008/09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ln consumption
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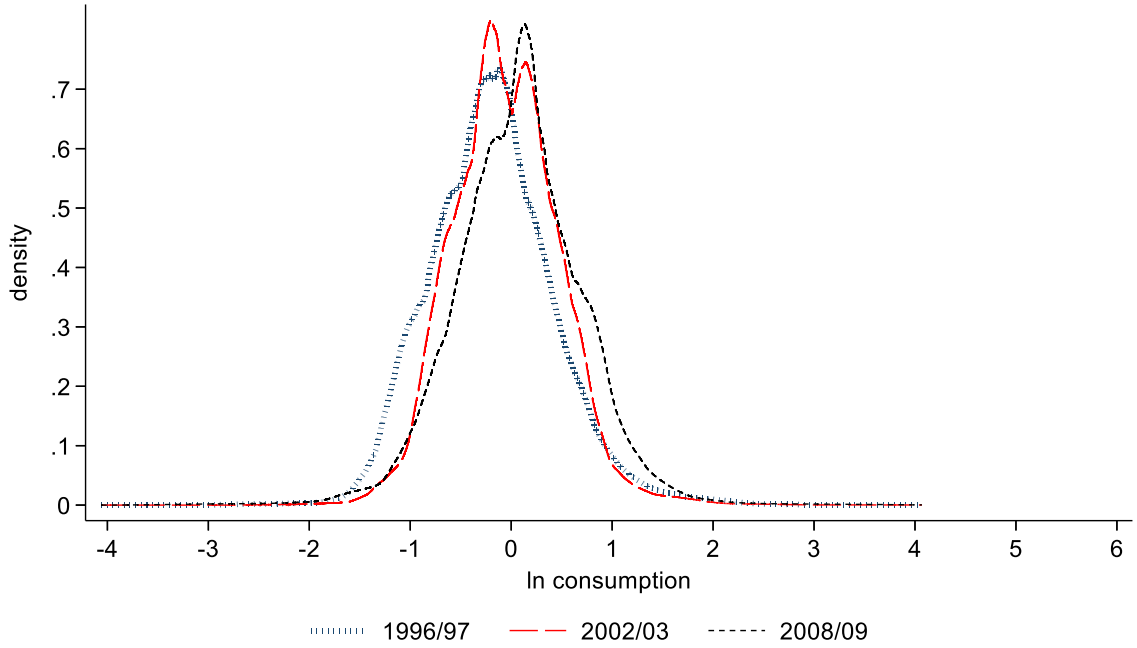
2014/15
2019/20
2022/23

Rural north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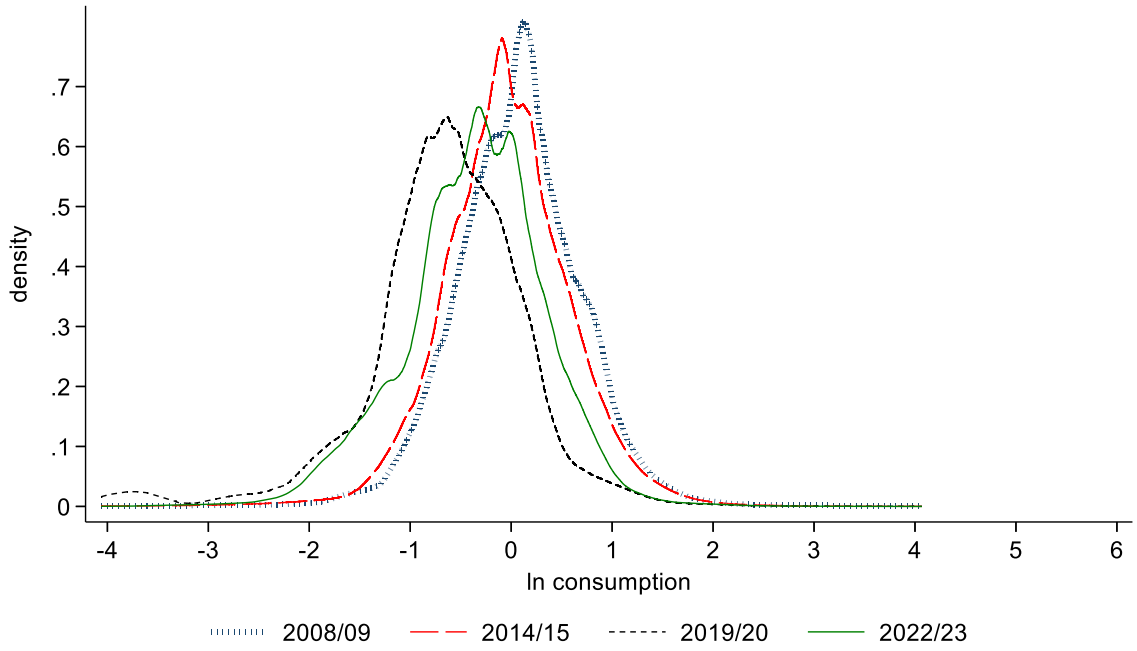
2002/03
2008/09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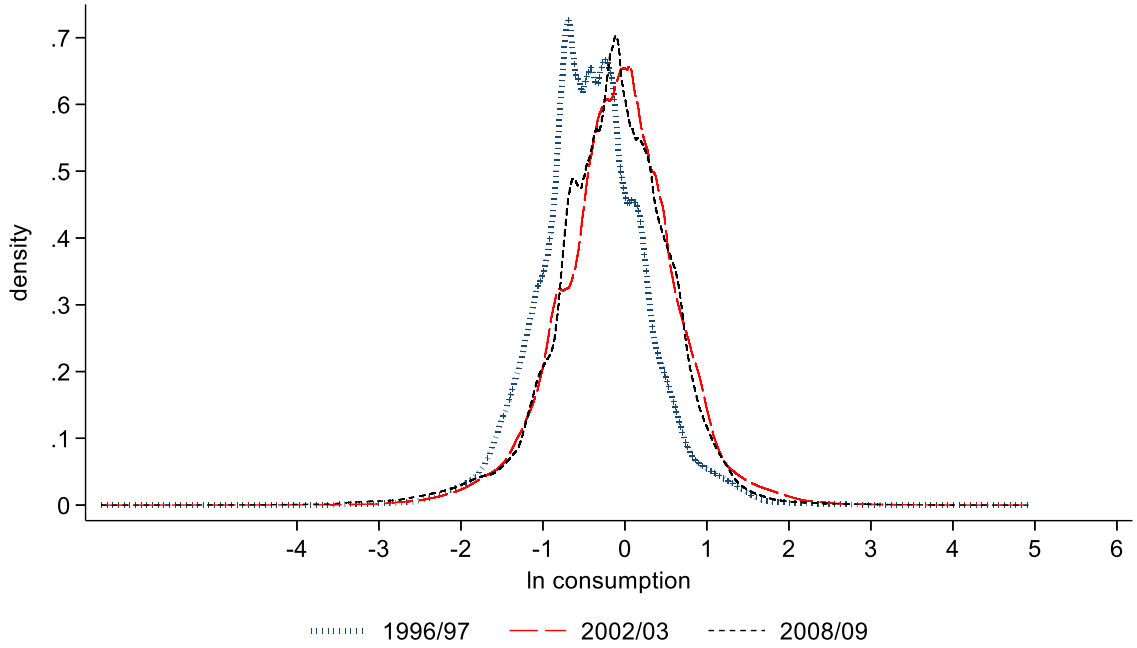
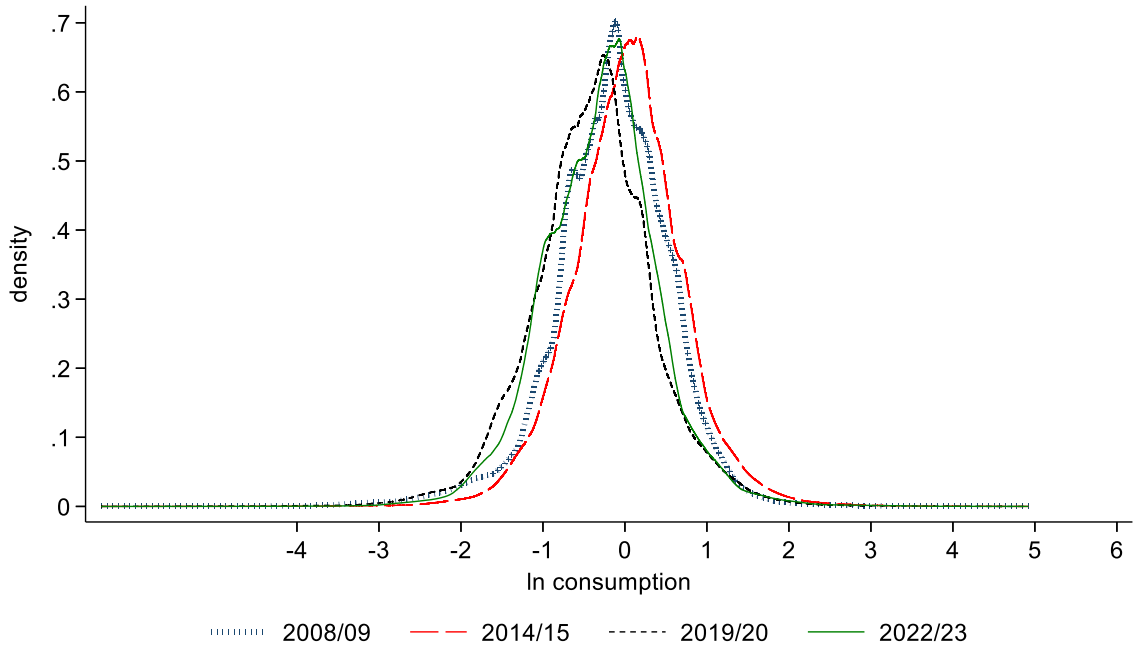
ln consumption
2008/09
2014/15
2019/20
2022/23

Other rural

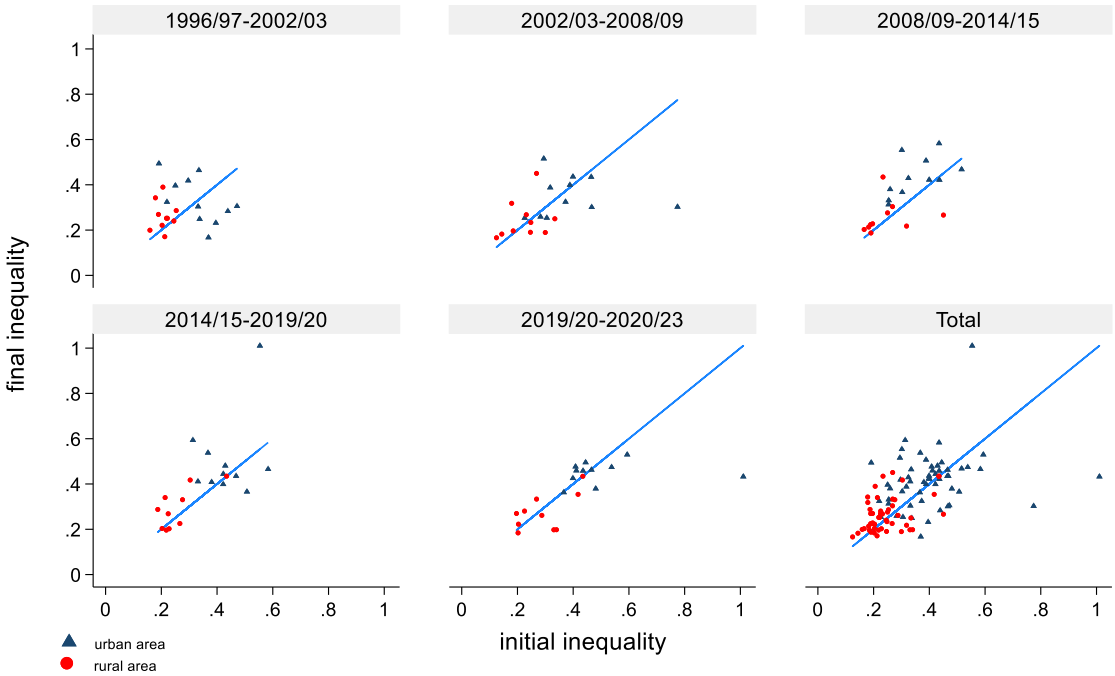




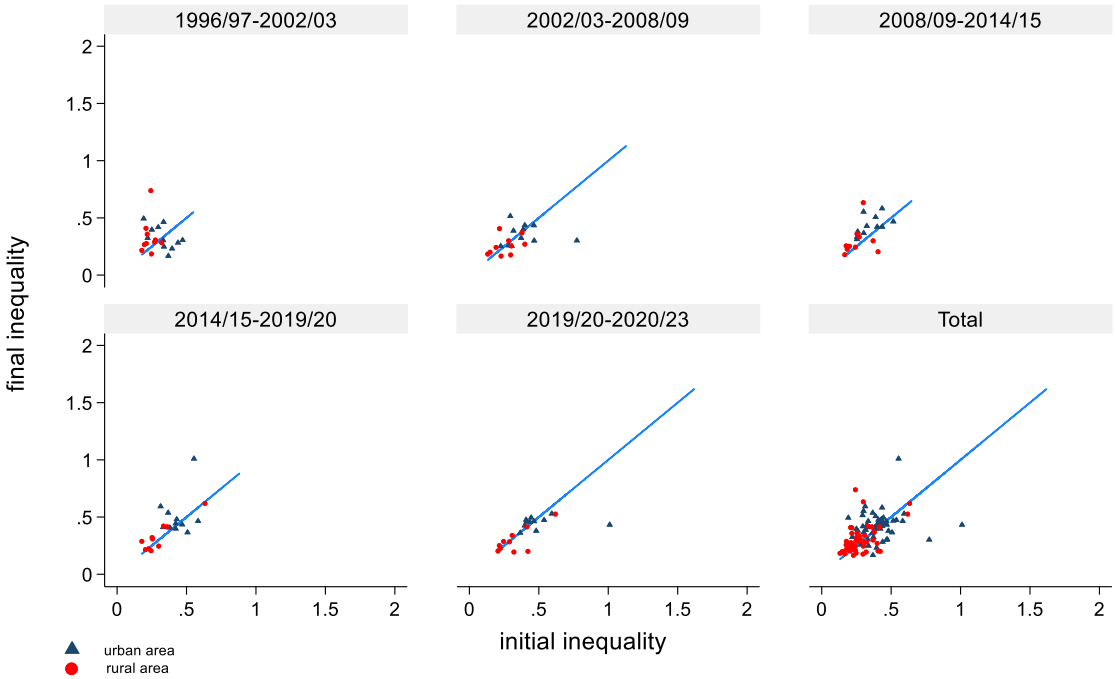
Source: own construction using household budget surveys.

Figure A4: Inequality by area and period (Entropy measures)

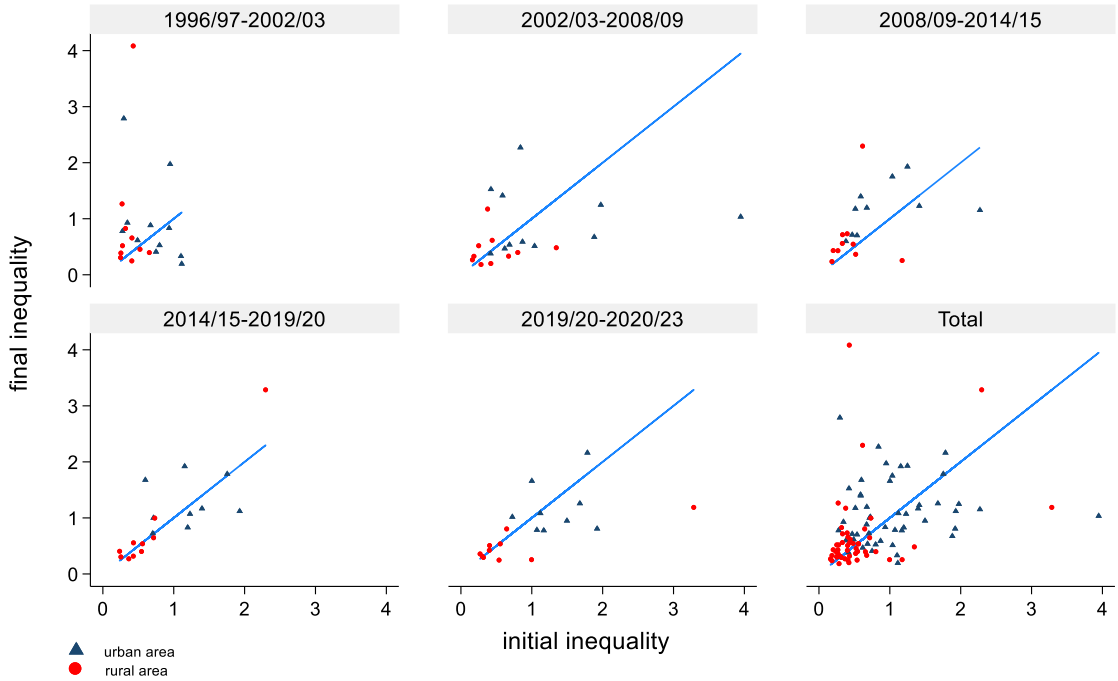
MLD (GE_0)



Theil (GE_1)



GE_2 (half the square of the coefficient of variation)



Note: the graph for each period maps the initial and final inequality measures for real consumption. Triangles refer to urban areas and circles to rural areas. The straight lines represent no change in inequality. A marker falling above (below) the line indicates an increase (decline) in inequality over the period. Estimates for 1996/97-2002/03 are based on the 1996/1997 classification of urban-rural areas; the rest are based on the 2002/03 classification. The last graph (Total) maps the changes for all periods altogether. For GE_2, omitting a few values out of range: Urban Nampula (2008/09-2014/15 and 2014/15-2019/20), Urban Tete (2014/15-2019/20 and 2019/20-2020/23), Urban Gaza (2019/20-2020/23).

Source: own construction using household budget surveys.

Appendix B: Consumption inequality: comparison with World Bank's estimates

The previous analysis was entirely based on the PLEASe methodology used in the official national poverty assessments. Notably, the resulting consumption distributions substantially diverge from some numbers reported in World Bank's publications that use the first five household surveys with a different methodology. This brief comparison relies on data for Mozambique reported in the World Bank's poverty assessment (WB PA, World Bank 2023b) for 2002/03-2019/20, the Poverty and Inequality Platform (PIP, World Bank 2023c) for 1996/97-2019/20, and the Subnational Poverty and Inequality Database (SPID, World Bank 2024) for 2008/09-14/15.[28]

Table B1 below provides information on mean consumption and poverty rates from WB PA and PIP and their replication with the data used in this study. Consumption is measured before any price adjustment (nominal) and after spatial and seasonal price adjustments (real).

The trends in mean consumption and poverty rates (with World Bank's national and international poverty lines) are broadly consistent with the data used in this study between 2002/03 and 2014/15 but with significant discrepancies in 1996/97 and 2019/20. In both cases, but especially in the latter, the World Bank estimated a higher level of consumption and lower poverty than in this study. The consequence is a more modest decline in poverty in the first period and a larger increase in poverty between 2014/15 and 2019/20.

Table B1: Mean consumption and poverty rates in World Bank's publications and their replication in this study

	Mean consumption 2017 USD			International poverty rate %				National poverty rate %			
	PIP	This study		IPL	PIP	This study		NPL	WB PA	This study	
		nominal	real	USD		nominal	real	Metical		nominal	real
1996/97	1.59	1.46	1.46	2.15	82.7	85.0	85.2	--	--	--	--
2002/03	1.77	1.77	1.77	2.15	80.6	80.6	78.8	9.30	60.3	66.4	60.3
2008/09	2.12	2.11	2.11	2.15	70.8	71.0	69.7	18.78	58.7	58.1	54.1
2014/15	2.87	2.92	2.95	2.15	64.6	63.5	55.9	25.85	48.4	49.1	38.8
2019/20	2.10	2.79	2.81	2.15	74.4	67.0	62.5	40.03	62.8	55.5	48.8

Note: IPL = International Poverty Line in 2017 USD (PPP), with consumption deflated using the CPI. NPL=The World Bank's national poverty line. Nominal consumption in this study is before any spatial or temporal price adjustment. Real consumption (used in the main text) is after spatial and temporal price adjustments. WB PA is the World Bank's (2023c) Poverty Assessment; WB PIP is the World Bank's (2023b) Platform on Poverty and Inequality.

Source: own construction using household budget surveys, PIP, and WB PA.

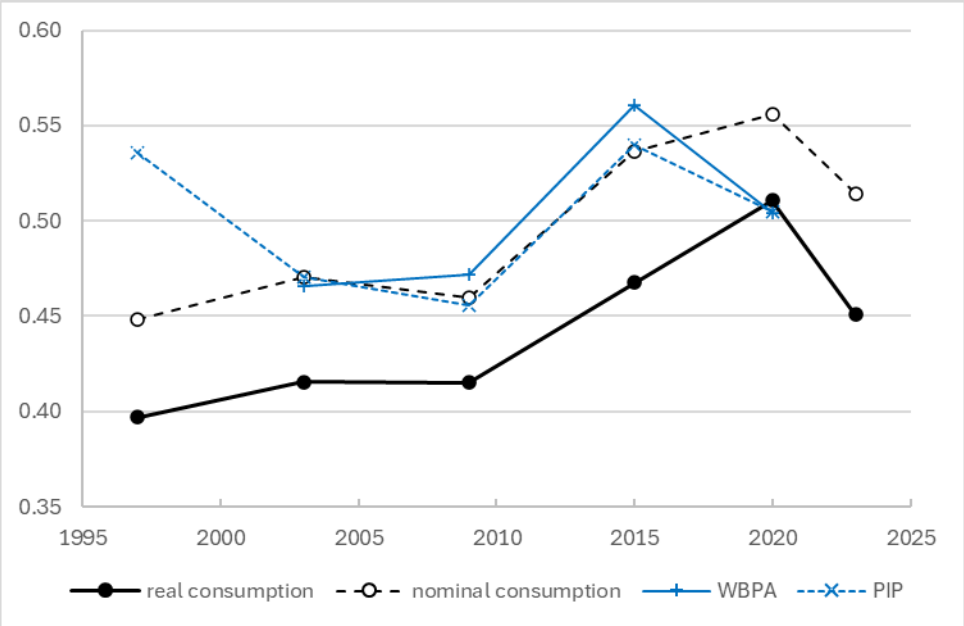
Figure B1 shows both World Bank's trends for the Gini index (WB PA and PIP), alongside the estimates used in this study for real and nominal consumption. Regarding the latter, the trend in nominal consumption is roughly similar to the trend in real consumption, indicating that the primary trend discussed in this study is not driven by the spatially asymmetric evolution of prices (while the seasonal variability has only a minimal impact on inequality). However, the distribution of nominal consumption is more unequal because, as expected, prices tend to be higher in more affluent areas, as spatial price indices reported in Table B2 suggest. The main difference between nominal and real consumption distribution stems from the much higher consumption share held

[28] An earlier World Bank's (2018) poverty assessment pointed out minor differences in how the government and the World Bank estimated food and non-food consumption in the 2014/15 survey.

by the top 5 percent, derived from their overrepresentation in the most expensive areas (as the ventile and decile consumption distributions in Tables B3 and B4 show).

The discrepancy between our study and the World Bank's analysis previously found for mean consumption and poverty can also be observed in the inequality trend in the latter, with inequality declining between 1996/97 and 2002/03 and, mainly, between 2014/15 and 2019/20, as opposed to the increase observed in both periods in this study. Notably, the inequality trends from the World Bank's publications roughly correspond to the trend in nominal consumption between 2002/03 and 2014/15. Still, the level of inequality in 2019/20 is closer to our estimate for inequality in real consumption. However, the large value for the Gini index reported by PIP for 1996/97 does not correspond with any welfare measure in our study.

Figure B1: The trend in inequality using various welfare measures (Gini index)



Note: WB PA is the World Bank's (2023c) Poverty Assessment, and WB PIP is the World Bank's (2023b) Platform on Poverty and Inequality.

Source: own construction using household budget surveys, PIP, and WB PA.

Table B2: Spatial price indices (PLEASe methodology)

Area	1996/97	2002/03	2008/09	2014/15	2019/20	2022/23
Urban areas						
Niassa & Cabo Delgado	1.09	0.95	0.99	1.15	1.15	1.08
Nampula	0.88	0.73	0.91	0.91	0.88	0.79
Zambezia & Sofala	1.39	1.07	0.97	0.92	0.89	1.01
Tete & Manica	1.28	1.26	1.22	1.16	0.97	0.96
Inhambane & Gaza	1.52	1.22	1.11	1.12	1.09	1.22
Maputo Province	1.58	1.90	1.50	1.43	1.38	1.60
Maputo City	1.55	1.92	1.66	1.38	1.31	1.59
Rural areas						
Niassa & Cabo Delgado	0.74	0.85	0.88	1.02	0.97	0.79
Nampula	0.61	0.67	0.72	0.68	0.76	0.52
Zambezia & Sofala	0.87	0.72	0.74	0.67	0.72	0.79
Tete & Manica	0.85	0.86	0.98	0.84	0.89	0.93
Inhambane & Gaza	1.15	1.01	1.02	0.97	1.07	1.19
Maputo Province	1.32	1.55	1.27	1.29	1.30	1.53

Source: own construction using household budget surveys.

The primary source of discrepancy between data used in this study and World Bank's publications comes from the upper tail; the ventile distribution in WB PA, shown in Table B3, indicates a large decline in the concentration of consumption at the top 5 percent of the distribution between 2014/15 and 2019/20 that is not found here, neither in nominal nor real terms. A similar discrepancy is found for the top decile reported in PIP (Table B4). Like with the Gini index, the ventile and decile distributions reported by the World Bank are similar to the nominal consumption distribution in this study in 2002/03, 2008/09, and 2014/15 but much closer to the real consumption distribution in 2019/20. Table B5 also shows similar mean consumption by province in the World Bank's subnational database SPID and nominal consumption in this study for 2008/09-2014/15.

Table B3: Ventile consumption shares in Mozambique

	2014/15				2019/20			
	This study			WB PA	This study			WB PA
	Real (1)	Nominal (2)	Nominal (3)		Real (1)	Nominal (2)	Nominal (3)	
1	0.8	0.6	0.6	0.6	0.6	0.5	0.5	0.6
2	1.2	1.0	1.0	1.0	1.0	0.9	0.9	1.0
3	1.5	1.2	1.2	1.2	1.3	1.1	1.1	1.3
4	1.8	1.4	1.4	1.3	1.6	1.3	1.4	1.6
5	2.0	1.6	1.6	1.6	1.8	1.5	1.5	1.7
6	2.2	1.8	1.8	1.7	2.0	1.7	1.7	1.9
7	2.5	2.0	2.0	2.0	2.2	1.9	1.9	2.2
8	2.7	2.2	2.2	2.1	2.4	2.1	2.1	2.3
9	2.9	2.5	2.4	2.3	2.6	2.3	2.3	2.7
10	3.2	2.7	2.7	2.5	2.9	2.6	2.6	2.9
11	3.5	3.0	3.0	2.8	3.2	2.8	2.8	3.1
12	3.7	3.3	3.3	3.1	3.5	3.1	3.1	3.5
13	4.1	3.6	3.6	3.4	3.8	3.5	3.5	3.9
14	4.5	4.1	4.1	3.9	4.2	3.9	3.9	4.3
15	5.0	4.6	4.6	4.3	4.8	4.4	4.4	4.8
16	5.6	5.3	5.3	5.0	5.4	5.1	5.1	5.5
17	6.5	6.3	6.3	6.0	6.3	6.2	6.2	6.5
18	7.7	7.9	7.9	7.5	7.9	8.0	8.0	8.2
19	10.3	11.0	11.1	10.7	11.0	11.6	11.5	11.2
20	28.5	33.8	34.0	37.0	31.6	35.4	35.3	30.8
All	100	100	100	100	100	100	100	100

Note: (1) real consumption, adjusted for intra-survey price variability over time and spatially, used in this study. (2) Nominal consumption, only adjusted for intertemporally price variability. (3) Nominal consumption with no price adjustment. WB PA is World Bank's (2023c) Poverty Assessment (estimates inferred from the corresponding cumulative shares in 'Annex 2. Inequality'); WB PIP is World Bank's (2023b) Platform on Poverty and Inequality.

Source: own construction using household budget surveys and WB PA.

Table B4: Decile consumption shares in Mozambique

	This study (real consumption)					PIP				
Decile	1996/97	2002/03	2008/09	2014/15	2019/20	1996/97	2002/03	2008/09	2014/15	2019/20
1	2.5	2.4	2.2	2.0	1.6	1.5	2.1	1.9	1.6	1.6
2	3.9	3.8	3.7	3.3	2.9	2.5	3.3	3.3	2.6	2.9
3	5.0	4.8	4.8	4.2	3.7	3.3	4.2	4.2	3.4	3.7
4	5.9	5.7	5.8	5.1	4.6	4.1	5.1	5.2	4.2	4.6
5	6.9	6.7	6.8	6.1	5.6	5.0	6.0	6.3	5.1	5.6
6	8.1	7.9	8.0	7.2	6.7	6.2	7.0	7.5	6.1	6.8
7	9.5	9.2	9.4	8.6	8.1	7.8	8.4	9.0	7.6	8.3
8	11.5	11.2	11.5	10.6	10.1	10.4	10.4	11.1	9.8	10.5
9	14.8	14.8	14.8	14.2	14.1	15.4	14.2	14.6	14.1	14.9
10	31.9	33.6	33.1	38.7	42.6	43.8	39.4	36.8	45.5	41.2
Total	100	100	100	100	100	100	100	100	100	100

	This study (nominal consumption)				
Decile	1996/97	2002/03	2008/09	2014/15	2019/20
1	2.1	2.1	2.0	1.6	1.4
2	3.4	3.3	3.1	2.6	2.5
3	4.4	4.2	4.2	3.5	3.2
4	5.3	5.1	5.2	4.3	4.0
5	6.2	6.0	6.2	5.1	4.9
6	7.4	7.1	7.4	6.2	5.9
7	9.0	8.3	9.0	7.7	7.4
8	11.0	10.4	11.2	9.9	9.5
9	14.9	14.3	14.7	14.2	14.2
10	36.4	39.3	37.0	45.0	46.8
Total	100	100	100	100	100

Source: own construction using household budget surveys and PIP.

Table B5: Mean consumption by province (2017 constant international dollars)

	2008/09			2014/15		
	SPID	This study		SPID	This study	
		nominal	real		nominal	real
Niassa	2.6	2.6	2.8	2.1	2.0	2.0
Cabo Delgado	2.1	2.1	2.3	2.6	2.7	2.6
Nampula	1.7	1.7	2.1	1.8	1.7	2.3
Zambezia	1.3	1.3	1.6	1.6	1.6	2.2
Tete	2.2	2.1	2.0	2.5	2.5	2.9
Manica	2.0	1.9	1.8	2.5	2.5	2.8
Sofala	1.8	1.7	2.0	2.4	2.4	3.0
Inhambane	2.0	2.1	2.1	2.8	2.9	2.8
Gaza	1.8	1.8	1.8	2.6	2.7	2.7
Maputo Province	2.7	2.8	2.0	6.7	6.9	5.0
Maputo City	6.4	6.4	3.9	10.9	11.3	8.3

Note: SPID is the Subnational Poverty and Inequality Database (World Bank 2024). CPI-PPP-adjusted is the survey's nominal consumption adjusted by PPP (21.98802 M/USD) and yearly CPI (PPP and CPI from PIP).

Source: own construction using household budget surveys and SPID.