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# Rural versus Urban Household Consumption and Income Inequality in Tanzania

*Fulgence Dominick Waryoba*[*]

**Abstract**

The current study analyses household consumption and income inequality using two levels; varying-intercept and varying-slope hierarchical linear model (HLM). The findings revealed higher levels of average consumption and income among urban as compared to rural households. On average, urban households face higher inequality in both income and consumption than rural households. Consumption dispersion is also much closer to income dispersion in rural stratum than urban strata. The novelty of the current study is the analysis of strata estimates deviations from overall National Panel Survey (NPS) sample estimates using two levels HLM. However, the application of more than two levels HLM that includes other socio-economic factors will significantly impact the methodology.

**Keywords**: *consumption inequality, income inequality, multilevel mixed effect model, Tanzania*

## Introduction

Inequality has been a focal point of numerous welfare debates and a concern among several political leaders (Nolan & Valenzuela, 2019). Rising inequality weakens today's aggregate demand and lowers future growth because those at the bottom spend more than those at the top of income distribution. Nevertheless, societies with greater inequalities are less likely to make public investments that enhance productivity, especially if the rich believes that they do not need them, and that a strong government may use power to redistribute income (Stiglitz, 2016).

Consumption inequality is considered a good measure of material well-being than income inequality because consumption better reflects long-run resources. Income measures fail to capture disparities in consumption that results from family differences in assets accumulation or credit access. But, also, other measures of material hardships or adverse family outcomes are more severe for those with low consumption than those with low income (Meyer & Sullivan, 2013). From the urban-rural consumption inequality perspective, Tanzanian urban households have higher levels of total consumption and food consumption (TZS534,619 and TZS58,835) than rural households (TZS361,956 and TZS44,473), respectively (URT, 2019). However, these statistics do not reveal whether urban households are more or less unequal than rural households. The current study uncovered the extent of inequality of both food consumption and

[*]Department of Economics, St. Augustine University of Tanzania dominic.fulgence@saut.ac.tz

total expenditure in each stratum under descriptive analysis. Nevertheless, the Engel curve estimation revealed how close food consumption inequality is to total consumption inequality in each stratum. Section two of this study reviews inequality related literature. The study's methods and data sources and descriptions are explained in section three. The results and discussions are presented in section four, while section five concludes the study.

**Literature Review**

An Engel curve analysis of food consumption is considered a good measure of poverty showing the relationship between food consumption and total expenditure (Krishna, Holla & Guha, 2008). In this case, using food consumption and total expenditure provides an ideal measure of welfare. The debate in several studies (Krueger & Perri, 2006; Blundell & Etheridge, 2010; Heathcote, Perri & Violante, 2010; Jappelli & Pistaferri, 2010; Ahn et al., 2018) is on how close is consumption to income inequality. Consumption inequality is either far from (Aguiar & Bils, 2015), or close to (Cai, Chen & Zhou, 2010; Waryoba & Li, 2019), income inequality. Consumption response is less volatile than realized income to predicted income changes (Ahn et al., 2018). But, in negative shocks, consumption reduction is higher among uncertain than certain households (Amromin, De Nardi & Schulze, 2018).

Aguiar and Bils (2015) analysed the Engel curve using a two-stage least square approach. In their findings, an increase in consumption inequality mirrored income inequality to a great extent. Similar findings were established in Kwon and Ni (2023) after measurement error correction. Their study uncovered inequality differences between high- and low-income groups. The current study, however, used urbanization stratification, with the assumption that rural households have lower income than urban households.

Noghanibehambari and Rahnamamoghadam (2020) documented income and consumption inequality evolution in Iran from 2005 to 2015. Their study used several approaches like the Gini coefficient, variance of logs, the 90th–50th percentile ratio, and the 50th–10th percentile ratio. They revealed higher income inequality in all years and among rural and urban households, higher income inequality among rural compared to urban households, but insignificant consumption inequality differences. Inequality was more volatile in income than consumption like in Meyer and Sullivan (2018) and Pistaferri and Saporta (2012).

De Magalhães and Santaeulàlia-Llopis (2018) analysed consumption, income and wealth inequality in rural and urban Sub-Saharan Africa (SSA), specifically in Uganda, Tanzania and Malawi. They also compared these sub-Saharan African countries and the USA. Applying the variance analysis approach, they found low transition speed from income to wealth inequality; and from consumption to income inequality. The variation between rural and urban SSA, and between SSA and the USA revealed a negative correlation, and potentially a trade-off between

accumulation and consumption insurance. Inequality in consumption, income and wealth was lower among rural households than urban households. The researcher's limited knowledge suggested the absence of literature on household consumption and income inequality analysis under the hierarchical linear model (HLM). From the reviewed literature, the current study sorts the hypotheses as below.

*H1: Consumption inequality is higher among urban households than among rural households.*

*H2: Income inequality is higher among urban households than among rural households.*

*H3: Consumption inequality tracks income inequality closely among rural households.*

*H4: Consumption inequality is far less than income inequality among urban households.*

**Methodology**

The current study analysed survey data (Rabe-hesketh & Skrondal, 2006) that are complex due to stratification. These stratifications necessitated the use of HLM models (Lucas et al., 2014; Carey & Wang, 2001) that are effective in evaluating the effects caused by groupings. Groupings can lead into either different intercepts (Gelman & Hill, 2010), slopes (Tate, 2004), or both intercept and slope coefficients (Lee, 2003). The current study considered a varying-intercept, varying-slope model that evaluates grouping effects on both intercept and slope coefficients.

***The Varying-intercept, Varying-slope Model***

The National Panel Survey data are stratified into four major groups, namely Dar es Salaam, rest of urban, rural, and Zanzibar. According to Young (2013), urban households earn relatively higher income than rural households. In Table 2, urban households, as compared to rural households, have higher levels of both income and food consumption. Nevertheless, household income and the magnitude of consumption disparity, as indicated in Table 3, is unique for each stratum; implying unique slope coefficient for each stratum. As a result, the varying-intercept, varying-slope model is appropriate for consumption function analysis.

$$C_i = \alpha_{j[i]} + \beta_{j[i]} Y_i + \in_i \qquad (1)$$

For an individual household, $C_i$ is food consumption, $Y_i$ is income, $\alpha_{j[i]}$ is autonomous consumption, and $\in_i$ is the error term. The estimates for each stratum are given as:

$$\alpha_j = a_0 + b_0 u_j + \eta_{j1} \qquad (2)$$

$$\beta_j = a_1 + b_1 u_j + \eta_{j2} \qquad (3)$$

$$j = 1,2,3, \text{and } 4$$

The parameters $a_0$ and $a_1$ are intercept and slope coefficients for the fixed effect portion of the mixed effect model, which according to McCulloch and Searle

(2001), are equivalent to the parameters of conventional linear models. While parameters $b_0$ and $b_1$ are intercept and slope coefficients for the random effect portion of the mixed effect model, the stratum coefficients deviate from average estimates by the random effects portion of the mixed effect model. Depending on the random effect parameter's sign, the stratum coefficients can deviate either positively or negatively. The error terms, $\eta_{j1}$ and $\eta_{j2}$, according to Gelman and Hill (2010), are potentially correlated. Therefore, from the expression, a correlation exists between household income and autonomous consumption. The study derived equation (1) from Friedman's (1957) permanent income hypothesis (equation 3.5). The model has considered location issue, which in Friedman's (ibid.) view affects an individual's level of permanent income.

**Data Source and Data Description**

The National Panel Survey (NPS), collected by the Tanzania National Bureau of Statistics in collaboration with the World Bank, is an improved version of the National Sample Census of Agriculture (NSCA) as it involves a detailed household questionnaire to allow the construction of a full consumption-based welfare measure. In the first round, the sample size is small but with a detailed questionnaire overcoming what Lokina, Nerman and Sandefur (2011) considered as the weaknesses of the NSCA. The number of participants improved from 3265 in the first round to 3844 in the second round, and 4883 in the third round. The panel attrition bias, due to participants dropouts, exists in the NPS but at a minimum level; with a total attrition of 4.84 percent up to the third round (National Bureau of Statistics, 2014). However, the number of participants dropped in the fourth round to 3344. The fourth wave was not appended with previous surveys for incompatibility reasons. In the fourth wave survey, survey areas were not categorized as Dar es Salaam, rest of urban, rural and Zanzibar, but rather as numbers. Nevertheless, in the fourth wave survey, the groups were named as strata rather than area.

**Findings and Discussion**

***Household Income and Consumption Rationale***

The study used total household expenditure as household income because household income data are unavailable in all surveys. Total household annual expenditure reflects household income as it does not include the portion that goes to savings (Howe et al., 2009; Morris et al., 2000). By including expenditure on durables, total household expenditure turns out as a good proxy of household income. However, the question remains that if total household expenditure is used as household income, then where is household consumption? This study uses household food consumption as a proxy for household consumption. Food consumption is a daily household routine accounting for a large share of household expenditure compared to other household expenditure items as shown in Table 1.

**Table 1: The Annual Household Consumption Distribution in Percentage**

| Wave | Group | Food | Utilities | Housing | Health | Trans. | Comm. | Recreat. | Educ. | Others |
|---|---|---|---|---|---|---|---|---|---|---|
| 1st | National | 66.92 | 4.58 | 1.99 | 4.11 | 6.58 | 4.54 | .13 | 5.26 | 3.53 |
| 2008/ | DSM | 56.30 | 6.87 | 1.92 | 3.72 | 10.45 | 6.80 | .28 | 8.04 | 3.87 |
| 2009 | R. Urban | 61.77 | 5.67 | 2.41 | 3.65 | 6.81 | 6.34 | .26 | 5.90 | 4.08 |
| | Rural | 75.99 | 1.98 | 2.09 | 4.29 | 4.08 | 2.26 | .02 | 3.17 | 3.07 |
| | Zanzibar | 69.10 | 6.12 | 1.37 | 4.99 | 5.25 | 4.35 | 1.28e-04 | 4.69 | 3.55 |
| 2nd | National | 65.99 | 5.40 | 1.85 | 4.09 | 6.60 | 4.47 | .10 | 6.00 | 3.26 |
| 2010/ | DSM | 57.02 | 8.66 | 1.79 | 3.48 | 8.46 | 6.17 | .15 | 9.23 | 3.18 |
| 2011 | R. Urban | 61.28 | 6.44 | 2.00 | 4.21 | 7.36 | 5.65 | .16 | 6.91 | 3.57 |
| | Rural | 73.28 | 2.68 | 2.03 | 3.78 | 5.39 | 2.88 | .08 | 3.68 | 3.17 |
| | Zanzibar | 68.19 | 5.71 | 1.24 | 6.10 | 5.55 | 4.34 | .002 | 5.27 | 3.26 |
| 3rd | National | 66.91 | 5.26 | 1.77 | 3.71 | 7.14 | 4.42 | .08 | 5.50 | 3.37 |
| 2012/ | DSM | 56.79 | 8.94 | 1.76 | 3.68 | 10.11 | 6.00 | .16 | 7.02 | 4.03 |
| 2013 | R. Urban | 61.66 | 6.58 | 1.95 | 3.77 | 7.35 | 5.47 | .09 | 7.22 | 3.58 |
| | Rural | 74.52 | 2.27 | 1.89 | 3.83 | 5.64 | 3.35 | .04 | 3.33 | 2.91 |
| | Zanzibar | 69.14 | 6.25 | 1.02 | 3.21 | 5.94 | 3.30 | .01 | 7.43 | 3.33 |
| 4th | National | 67.11 | 5.76 | 1.94 | 3.85 | 7.64 | 3.72 | .09 | 5.00 | 3.54 |
| 2014/ | DSM | 56.65 | 9.80 | 2.26 | 3.91 | 11.18 | 4.89 | .17 | 6.05 | 3.70 |
| 2015 | R. Urban | 61.33 | 7.95 | 2.02 | 3.54 | 7.87 | 4.67 | .16 | 6.88 | 3.88 |
| | Rural | 74.67 | 1.88 | 1.99 | 4.08 | 5.74 | 2.83 | .04 | 3.90 | 3.28 |
| | Zanzibar | 69.98 | 7.29 | 1.24 | 3.48 | 6.87 | 3.19 | .01 | 4.13 | 3.56 |

**Source**: National Bureau of Statistics (2009; 2011; 2014; 2015)

Government welfare programs for the poor are mostly in terms of food. The Engel's law affirms that an item with larger expenditure share provides the best measure of a population's material standard of living (Pope, 2012). Therefore, household food consumption fits well as a proxy for household consumption. Households in rural areas have lower incomes than their urban counterparts. As a result, a large share of household income in rural areas is spent on food. Non-food household expenditure items, however, have larger shares in urban areas than in rural area. According to Pope's (2012) lecture on Engel's law, the share of food expenditure declines as income grows due to the addition of non-food items in household expenditure.

Except for health expenditure, other non-food household expenditure items—namely utilities, housing expenses, transport, communication, recreation, education, and others—have relatively larger shares in urban compared to rural areas. In the NPS, utilities item stands for household expenditure on water, kerosene, and lighting. Shares of household utilities expenditure are higher in urban than rural areas. Unlike urban households, rural ones are seldom supplied with clean water from water authorities. At the time the last survey was carried out, very few rural households were connected with electricity. Nevertheless, rural households connected with electricity do not have many electrical appliances like urban households, hence accounting for lower share of total expenditure. The share of household health expenditure is larger in rural than urban areas since frequent illnesses force rural households to use a large share of income on treatment. Rural

household health expenditures may not necessarily be larger than urban household health expenditure. But, since rural households have lower income than urban households, their health expenditure share exceeds that of their urban counterparts.

***Average Household Consumption and Income Growth***

The average household food consumption and income analysis in Table 2 indicates higher values in urban than rural areas. The analysis shows improvements of both food consumption and income in every successive survey.

**Table 2: The Growth and Value of Average Household Food Consumption and Income**

| Survey Wave | Group | Value | | 1 Wave Growth | | 2 Wave Growth | | 3 Wave Growth | |
|---|---|---|---|---|---|---|---|---|---|
| | | *Food* | *Income* | *Food* | *Income* | *Food* | *Income* | *Food* | *Income* |
| 1st Wave 2008/ 2009 | National | 1771046 | 2646401 | | | | | | |
| | DSM | 2637468 | 4684483 | | | | | | |
| | R. Urban | 1749121 | 2831497 | | | | | | |
| | Rural | 1537437 | 2023157 | | | | | | |
| | Zanzibar | 1643090 | 2377758 | | | | | | |
| 2nd Wave 2010/ 2011 | National | 2100213 | 3182690 | 18.59 | 20.26 | | | | |
| | DSM | 3084241 | 5409325 | 16.94 | 15.47 | | | | |
| | R. Urban | 2076085 | 3388115 | 18.69 | 19.66 | | | | |
| | Rural | 1797561 | 2452995 | 16.92 | 21.25 | | | | |
| | Zanzibar | 2142631 | 3142177 | 30.40 | 32.15 | | | | |
| 3rd Wave 2012/ 2013 | National | 2739218 | 4093647 | 30.43 | 28.62 | 54.67 | 54.69 | | |
| | DSM | 3855775 | 6789197 | 25.02 | 25.51 | 46.19 | 44.93 | | |
| | R. Urban | 2816688 | 4568458 | 35.67 | 34.84 | 61.03 | 61.34 | | |
| | Rural | 2397825 | 3217770 | 33.39 | 31.18 | 55.96 | 59.05 | | |
| | Zanzibar | 2786941 | 4030711 | 30.07 | 28.28 | 69.62 | 69.52 | | |
| 4th Wave 2014/ 2015 | National | 2857421 | 4257611 | 4.32 | 4.01 | 36.05 | 33.77 | 61.34 | 60.88 |
| | DSM | 3626632 | 6401946 | -5.94 | -5.70 | 17.59 | 18.35 | 37.50 | 36.66 |
| | R. Urban | 2839550 | 4629880 | 0.81 | 1.34 | 36.77 | 36.65 | 62.34 | 63.51 |
| | Rural | 2519976 | 3374910 | 5.09 | 4.88 | 40.19 | 37.58 | 63.91 | 66.81 |
| | Zanzibar | 3237334 | 4626232 | 16.16 | 14.78 | 51.09 | 47.23 | 97.03 | 94.56 |

**Source**: National Bureau of Statistics (2009; 2011; 2014; 2015)

Both food consumption and income improved in both rural and urban areas, except for Dar es Salaam, from the third to the fourth wave survey. The ill-growth in all strata, which is much worse in Dar es Salaam, contradicted the findings in Cai et al. (2010), who affirmed persistent growth of both income and consumption in urban China. One possible reason for this drop could be sample selection. The number of participants in Dar es Salaam dropped from 742 respondents in the third wave to 552 respondents in the fourth wave. It is possible that top income earners in the third wave were excluded in the fourth wave.

On the other hand, the negative average growth in both income and consumption may have resulted from income shocks, which according to Baker (2014), reduces household income and consumption. Because even for other strata, the growth

from the third to the fourth wave is lower than from the first to the second wave; or even from the second to the third wave. For instance, the rest of urban stratum has a growth rate of 0.18 percent for consumption; which is almost negligible compared to the growth from the first to the second wave, or from the second to the third wave. It clearly signals the presence of shocks suppressing household income and consumption as Cashin and Takashi (2016) found in Japan after new tax announcements. However, future studies need to explore factors behind the fourth wave food consumption and income reduction.

On the average, every stratum—except Dar es Salaam in the fourth wave—has shown improvement in household food consumption and income. The time from the first wave survey to the fourth wave survey was sufficient enough to make tremendous household consumption and income improvement. It was estimated that to reduce poverty by half in 2015, economic growth rate of about 6 to 7 percent was necessary (URT, 2010a). Programs like the Agricultural Sector Development Programme (ASDP) have been implemented since 2006. The implementation of the first and second National Strategy for Growth and Reduction of Poverty (NSGRP I and II) led into a growth rate of about 7 percent from 2005 to 2015, in line with the 6 to 8 percent target (URT, 2010b), thereby improving household food security. Average consumptions are greater in the fourth than in the first wave for both total and food consumption. Individuals are better off in the current than in previous periods. Nevertheless, in the same survey wave, urban households are better off than rural households.

***Intra-Stratum Household Inequality***

The smallest 1 percentile and the largest 99 percentile results in Table 3 indicate a very high inequality in each stratum. The intra-stratum household income inequality is higher than consumption inequality. Larger incomes are recorded in the Dar es Salaam stratum for both the smallest 1 percentile and the largest 99 percentile. Nevertheless, Dar es Salaam recorded wider gaps between the largest 99 percentile and the smallest 1 percentile than other strata.

On average, urban households recorded higher income values than rural households. Large standard deviations indicate higher inequality in Dar es Salaam than other strata. On the other hand, the rural stratum has lower incomes than all strata in all survey waves for both the smallest 1 percentile and the largest 99 percentile. Income inequality is not as wide in rural area as in urban area. Hence, inequality is higher in urban than rural areas.

Although, the rural stratum recorded larger values of the largest 99 percentile and smaller values of the smallest 1 percentile than other strata, the smaller standard deviations indicate that consumption inequality is also lower in rural than other strata. Nevertheless, the sample size is three times larger in rural than Dar es Salaam and other urban strata. These findings contend with De Magalhães and Santaeulàlia-Llopis (2018).

**Table 3: Intra-Stratum Household Consumption and Income Inequality**

| Survey Wave | Group | Consumption | | | Income | | | Obs. |
|---|---|---|---|---|---|---|---|---|
| | | *Smallest* | *Largest* | *Std. Dev.* | *Smallest* | *Largest* | *Std. Dev.* | |
| 1st Wave | DSM | 299973.3 | 1.56e+07 | 1929489 | 394421.2 | 3.90e+07 | 4111018 | 555 |
| 2008/2009 | R. Urban | 175590.4 | 1.46e+07 | 1345153 | 200940 | 2.35e+07 | 2414014 | 480 |
| | Rural | 78745.55 | 2.75e+07 | 1280182 | 128610.5 | 2.94e+07 | 1673960 | 1751 |
| | Zanzibar | 155977.5 | 5038980 | 870103.6 | 180610.8 | 1.11e+07 | 1493528 | 479 |
| 2nd Wave | DSM | 225931.9 | 1.57e+07 | 2034365 | 356237.4 | 5.75e+07 | 4696211 | 624 |
| 2010/2011 | R. Urban | 113211.9 | 1.66e+07 | 1498874 | 296871.4 | 2.97e+07 | 2840346 | 634 |
| | Rural | 0 | 1.76e+07 | 1347931 | 120609 | 1.81e+07 | 1940025 | 2053 |
| | Zanzibar | 120393.7 | 1.02e+07 | 1113503 | 302250.2 | 2.01e+07 | 2259510 | 533 |
| 3rd Wave | DSM | 193750.7 | 2.79e+07 | 2725911 | 787864.5 | 4.66e+07 | 5362632 | 742 |
| 2012/2013 | R. Urban | 159280.8 | 2.05e+07 | 2129881 | 217096.7 | 3.53e+07 | 3869992 | 850 |
| | Rural | 121727.8 | 2.90e+07 | 2005342 | 137501 | 3.17e+07 | 2819706 | 2702 |
| | Zanzibar | 285598.4 | 1.34e+07 | 1567156 | 473114.9 | 3.00e+07 | 2861546 | 589 |
| 4th Wave | DSM | 252996 | 2.45e+07 | 2470445 | 544914.4 | 4.54e+07 | 4860342 | 552 |
| 2014/2015 | R. Urban | 344181.5 | 1.37e+07 | 1934785 | 344181.5 | 2.47e+07 | 3517808 | 542 |
| | Rural | 178330 | 2.11e+07 | 1928916 | 252111.2 | 2.41e+07 | 2613017 | 1770 |
| | Zanzibar | 0 | 1.36e+07 | 1649135 | 67945.07 | 2.30e+07 | 2701547 | 480 |

**Source:** National Bureau of Statistics (2009; 2011; 2014; 2015)

***Household Consumption Function Estimates***

Since each stratum has unique household consumption and income disparity, the ratio of consumption inequality to income inequality is not stratum-independent. Each stratum has unique slope coefficient in the regression model. Nevertheless, the average values are also stratum-unique, which suggests the use of varying-intercept, varying-slope model of the multilevel mixed effect model or HLM.

The graphical analysis indicated the negative correlation between slope and intercept coefficients, i.e., steeper slopes corresponding to lower intercepts and vice versa. The rural stratum, which records lower levels of both food consumption and income, has a lower autonomous consumption than all other strata. As a result, steeper slopes correspond to rural, while gentle slopes correspond to the Dar es Salaam stratum.

The intercept-slope correlations in the last column of Table 4 conform to the graphical analysis of predicted household consumption function above. Higher consumption inequality to income inequality ratio implies lower autonomous consumption in a particular stratum.

The deviations of strata estimates from the national average show the effect of groupings on both intercept and slope coefficients. Stratum estimates do not have standard deviations since their individual significance depends on the overall significance. One of the advantages of HLM over OLS (Lee, 2003) is the ability to provide group estimates, even with small group sample size, from large overall sample estimates. The intercept and slope estimates deviation magnitudes are implied by the random-effect parameters $u_{\alpha_i}$ and $u_{\beta_{j[i]}}$ respectively. Positive random-effect parameters, as shown in Table 4, make group specific estimates exceed national level estimates.

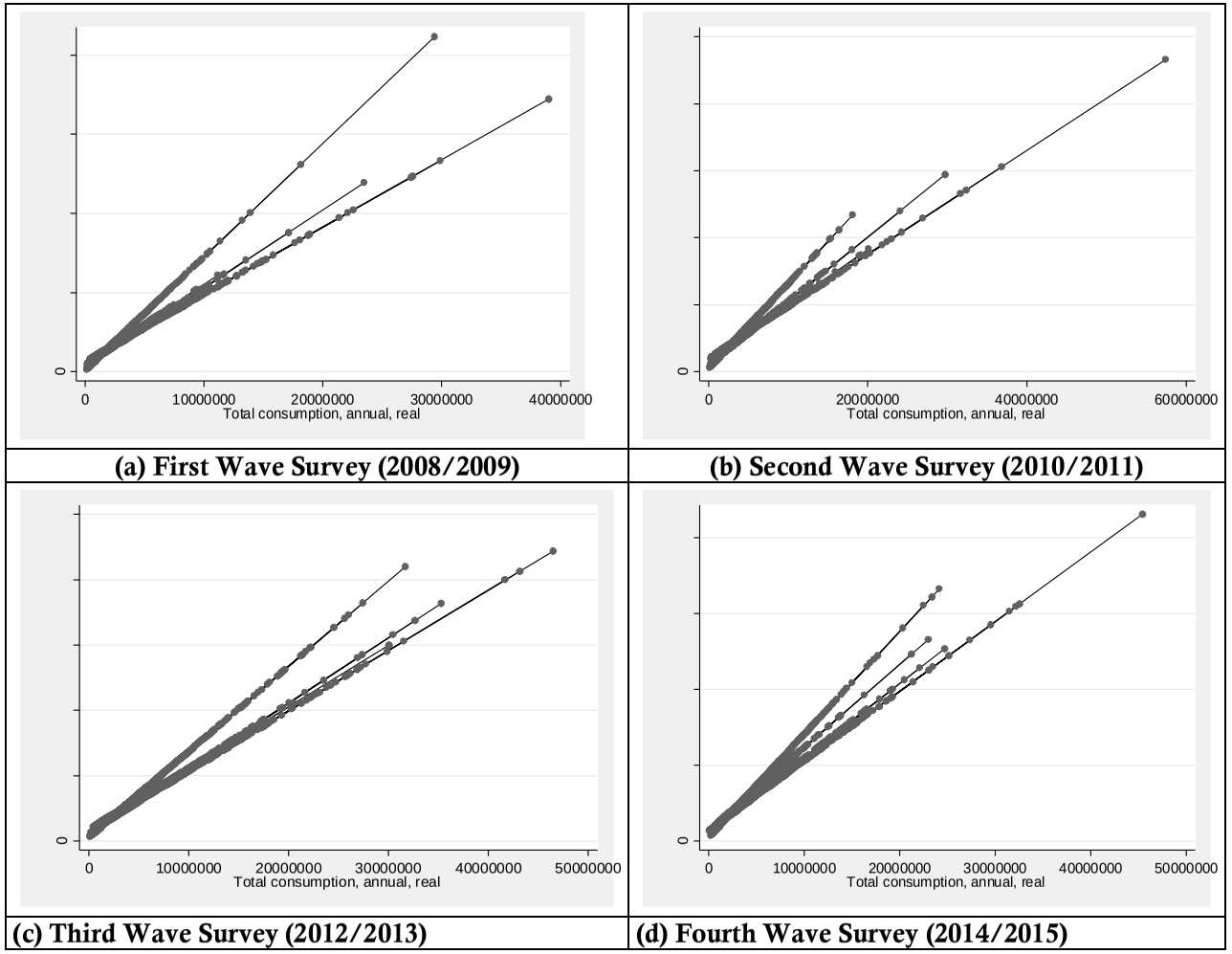


**Figure 1: Graphical Analysis of Predicted Food Consumption**

**Source**: National Bureau of Statistics (2009; 2011; 2014; 2015)

**Table 4: Mixed-Effect Household Consumption Function Estimates**

| Survey Wave | Group | Fixed-Effect Parameters | | Random-Effect Parameters | | |
|---|---|---|---|---|---|---|
| | | $\alpha_{j[i]}$ | $\beta_{j[i]}$ | $u_{\alpha_i}$ | $u_{\beta_{j[i]}}$ | $\psi_{(Y_i,\alpha_{j[i]})}$ |
| 1st 2008/09 | National | 381246.1*** | .5359*** | | | -.9556 |
| | | (101431.7) | (.0550) | | | |
| | DSM | 636655.5 | .4250 | 255409.4 | -.1109 | |
| | R. Urban | 370642.6 | .4925 | -10603.44 | -.0434 | |
| | Rural | 86748.93 | .7165 | -294497.2 | .1807 | |
| | Zanzibar | 430937.2 | .5095 | 49691.14 | -.0264 | |
| 2nd 2010/11 | National | 633282.3*** | .4779***(.0476) | | | -.9384 |
| | | (148283.1) | | | | |
| | DSM | 978520.5 | .3883 | 345238.2 | -.0896 | |
| | R. Urban | 462980.2 | .4792 | -170302.2 | .0014 | |
| | Rural | 248624 | .6310 | -384658.3 | .1531 | |
| | Zanzibar | 843004.5 | .4131 | 209722.2 | -.0648 | |
| 3rd 2012/13 | National | 608823.3*** | .5215*** | | | -.8969 |
| | | (113077.2) | (.0393) | | | |
| | DSM | 725769.1 | .4616 | 116945.7 | -.0599 | |
| | R. Urban | 542954.5 | .5001 | -65868.78 | -.0213 | |
| | Rural | 293379.5 | .6538 | -315443.8 | .1324 | |
| | Zanzibar | 873190.1 | .4703 | 264366.8 | -.0511 | |
| 1st&2nd | National | 499976.7*** | .5260*** | | | -.9331 |
| | | (94895.41) | (.0423) | | | |
| | DSM | 648435.4 | .4561 | 148458.7 | -.0699 | |
| | R. Urban | 444383.6 | .5047 | -55593.1 | -.0213 | |
| | Rural | 220763 | .6688 | -279213.7 | .1428 | |
| | Zanzibar | 686324.8 | .4745 | 186348.1 | -.0515 | |
| 2nd&3rd | National | 630614.1*** | .4918*** | | | -.9232 |
| | | (140068.9) | (.0429) | | | |
| | DSM | 956632.6 | .3926 | 326018.5 | -.0992 | |
| | R. Urban | 443218.6 | .4957 | -187395.5 | .0038 | |
| | Rural | 284828.8 | .6249 | -345785.3 | .1331 | |
| | Zanzibar | 837776.4 | .4541 | 207162.3 | -.0378 | |
| 1st,2nd&3rd | National | 526098.6*** | .5179*** | | | -.9339 |
| | | (107561) | (.0432) | | | |
| | DSM | 753661 | .4357 | 227562.4 | -.0822 | |
| | R. Urban | 439309.4 | .5005 | -86789.17 | -.0174 | |
| | Rural | 219947 | .6616 | -306151.6 | .1437 | |
| | Zanzibar | 691476.9 | .4737 | 165378.4 | -.0441 | |
| 4th 2014/15 | National | 543253.7*** | .5445*** | | | -.8858 |
| | | (100407.3) | (.0427) | | | |
| | DSM | 691505.6 | .4591 | 148252 | -.0854 | |
| | R. Urban | 582071.5 | .4900 | 38817.84 | -.0545 | |
| | Rural | 229867.4 | .6792 | -313386.2 | .1347 | |
| | Zanzibar | 669570.1 | .5497 | 126316.5 | .0052 | |

**Note**: *** indicates significant at 1 percent levels of significance, standard errors are given in parentheses
**Source**: National Bureau of Statistics (2009; 2011; 2014; 2015)

The findings contend with Mian, Rao and Sufi (2013), who uncovered large average marginal propensity to consume among low income households. That is, consumption inequality tracks income inequality more closely among low income households than among high income households. The slope coefficient for rural households is close to Waryoba and Li (2019), implying that smallholder sweet potato farmers provided a good representation of the rural population. The fact that Waryoba and Li (ibid.) concentrated on smallholder farmers makes their findings generalized for the whole economy as far as rural population is concerned. The results similarities also imply that total household expenditure is a good proxy for household income. The current study's HLM was correctly specified as it gave results almost similar to those under instrumental variable approach in Waryoba and Li (2019). The current study's findings are also similar to Cai, Chen and Zhou (2010) who concluded that consumption inequality in rural area tracks income inequality closely. As in Aguiar and Bils (2015) the ratio of consumption disparity to income disparity is smaller in urban areas compared to rural areas.

In rural areas, household income disparity is not much wider as they almost have the same source of income. Their main income source is agriculture, or the primary sector, which does not offer value addition. As a result, even if they have access to the market, their products fetch very low market prices. With lower income levels, food consumption is lower among rural than urban households. Even with this lower food consumption, rural households experience higher food to income ratio, which implies that their income is mostly spent on food consumption. On the other hand, urban households have higher income levels compared to their rural counterparts. However, their food consumption takes a small portion of their total spending compared to their rural household counterparts. With lower consumption than income inequality across strata and along surveys, the findings contend with Misra and Surico (2014), and Fisher et al. (2016).

***Sources of Consumption and Income Inequality***

This section included other expenditure items in the regression of the consumption function (Engel curve) above to check their influence on the magnitude of consumption inequality to income inequality ratio. Household members, in adult equivalent, positively influence food consumption, except in Zanzibar, with insignificant effect. From the correlation analysis, each household member contributes to household income (total expenditure). The rest of expenditure items reduce household food consumption because their presence reduces the share of food on total expenditure.

The fourth wave estimates comparison show larger estimates in Table 5 than in Table 4. Consumption to income inequality ratio has increased in every stratum. Since expenditure on non-food items increases as household income expands, their inclusion in household budget reduces household income available for food. A drop in income levels available for food among high income households reduces household income gaps. As a result, consumption to income inequality ratio increases when these expenditure items are taken into consideration.

**Table 5: The Fourth Wave Decomposed Consumption Function**

| Variable | Dar es Salaam | Rest of Urban | Rural | Zanzibar |
|---|---|---|---|---|
| Income | .8836***[.0354] | .8772***[.0351] | .9471***[.0057] | .9622***[.0090] |
| Health | -.8766***[.0875] | -.7819***[.0638] | -.9609***[.0191] | -.9571***[.0198] |
| Utilities | -1.103***[.1626] | -.8699***[.1009] | -1.291***[.0742] | -1.112***[.0321] |
| Transport | -.9578***[.0545] | -.8784***[.0792] | -.9724***[.0196] | -1.013***[.0237] |
| Communication | -.9433***[.1189] | -.9280***[.1706] | -1.111***[.0764] | -1.226***[.0733] |
| Education | -.9035***[.0600] | -1.031***[.0461] | -.9994***[.0293] | -.9547***[.0235] |
| Household Size | 80030***[25345] | 35566*[19263] | 7088*[3685] | 51.19[3966] |
| Constant | -40548[55945] | 192631[28518 | -65642***[10976] | -77.92[20740] |
| Observation | 552 | 542 | 1770 | 480 |
| Clusters Adj. | 63 | 68 | 222 | 55 |
| R-Square | .9664 | .9685 | .9886 | .9915 |

**Note:** Cluster adjusted standard errors are in brackets. The clusters for each stratum are displayed in the 11th row of the Table.

**Source:** National Bureau of Statistics, (2015)

Spending reduction on these items leads to an increase in household food consumption and income levels. Resources devoted to these items add to the amount of household income and, for some households, food consumed. Policies to reduce spending costs on these items have both favourable and detrimental outcomes. The beneficial effects include increased levels of income and food consumption, and reduced consumption inequality. The detrimental effect of these policies is increased income inequality. But the unfavourable effect of the policies is outweighed by the favourable effects. Although income inequality reduction is at the centre stage of welfare debates, it is good economics to increase the levels of household consumption and income, as well as reduce consumption inequality.

**Table 6: The Correlation with Income for the Fourth Wave Survey**

| Variable | Dar es Salaam | Rest of Urban | Rural | Zanzibar |
|---|---|---|---|---|
| Utilities | 0.6773 | 0.5832 | 0.2833 | 0.6061 |
| Health | 0.5068 | 0.3706 | 0.3197 | 0.3361 |
| Transport | 0.7102 | 0.5891 | 0.4692 | 0.6432 |
| Communication | 0.6120 | 0.5769 | 0.5192 | 0.6279 |
| Education | 0.6914 | 0.6472 | 0.4689 | 0.5490 |
| Household Size | 0.5541 | 0.4559 | 0.5425 | 0.4092 |
| **Observations** | **552** | **542** | **1770** | **480** |

**Source**: National Bureau of Statistics (2015)

From Table 5, it is easy to clarify that income coefficients among strata are close to each other and close to unit. The inclusion of spending items has disproportionately reduced income inequality among strata. The most affected stratum is Dar es Salaam as the coefficient moved from about 0.46 in Table 4 to about 0.88 in Table 5, an increase of nearly 100 percent. In the rural stratum, the coefficient moved from about 0.68 to about 0.95. Government support on these spending items in rural areas is vital for inter-regional inequality reduction. However, the fact that

income inequality highly decreased in urban than rural area indicates that these spending items highly impact urban dwellers. Government support on these spending items is as important among urban as rural households.

## Conclusion

The purpose of this study was to analyse consumption and income inequality among households in Tanzania. The findings confirmed that inequality exists between rural and urban households. Consumption and income levels are lower in rural than urban areas. Consumption inequality tracks income inequality more closely in rural than in urban areas. In the decomposed consumption function, income coefficient expansion was higher in urban than in rural area; implying that non-food items take larger shares of total spending among urban than rural households, and that high income households spend more on non-food items than low income households.

To reduce inequality, improvement in tax system is necessary to make effective transfers to low income households. Transfers increase the proportion of middle income households, whom Keeley (2015) considers to be the engine of development as they comprise most entrepreneurs. Improvement efforts to expand the current health and education services will ensure easy access by many low income households. The implementation of rural development projects will reduce the rural/urban income gap.

The NPS excludes statistics on education, wealth, employment and other socio-economic factors that affect inequality. Although a large portion of consumption variation was explained in the model, inclusion of these factors will significantly improve inequality literature. Nevertheless, more insights can be gained with the application of more than two levels HLM.

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