Measuring of Household Economy, Poverty and Well-Being in Tanzania

Gabriel Simbila

The research paper aims to assess different categories of households which are prone to poverty due to low income and monitor the effects of a policy on the poor, using different perspective of household sector accounts as per the system of national accounts (SNA).
The accounts of the household sector cover different functions: the output of goods services, on the one hand, and allocation of an income to consumption and to saving on the other. (Lequiller & Blades, 2014).
The households are split in different key indicators in the household account such such as those dealing with unincorporated enterprises, non-market production and pensioners, versus their literacy level, income and low poverty incidence.

MANOVA technique is adopted to assess whether income, literacy and low poverty incidence can distinguish the groups which are prone to poverty. The groups are coded for 1s and 0s, where 1 represent unincorporated enterprises, pensioners, and non-market producers while 0 represent the incorporated, non-pensioners and market producers.


A credible measure of poverty can be a powerful instrument for focusing the attention of policymakers on the living conditions of the poor (Lines, n.d.). Thus, there is increasing demand by users for more and better data, and the findings of this research expected to provide a real situation of the poverty status among various population groups of the people in the country and their livelihoods.

**Keywords:** *Household Welfare and Poverty*


**INTRODUCTION**

The issue of poverty alleviation has become a matter of concern to many of the developing countries and Tanzania is inclusive. The fight against poverty is a long-standing agenda in the history of Tanzania, various initiatives and strategies were designed to eradicate poverty and increase economic growth. The Tanzania Development Vision 2025 designed in 1999, the National Poverty Eradication Strategy (NPES) designed in 1998 and Poverty Reduction Strategy Paper (PRSP) designed in 2000, set the goal of eradicating abject poverty by 2025. In the wake of Highly Indebted Poor Countries (HIPC) initiative, PRSP was developed as a short to medium term strategy that focused on interventions in priority sectors. The review of PRSP guided the formulation of the National Strategy for Growth and Reduction of Poverty (NSGRP)(Household Budget Survey, Main Report 2011/12)

## METHODOLOGY

### Data

In this paper I used data from the household budget survey (HBS 2017/18), conducted by the National Bureau of Statistics in every five years. About 9462 of households' sample were used in the analysis.

### Variable description

| Variable | Type | Description and coding |
|---|---|---|
| Producers | Binary | 1=non-market producers, 0=market producers |
| Working group | Binary | 1=pensioners, 0=non-pensioners |
| Enterprise | Binary | 1=unincorporated, 0=non-unincorporated |
| Literacy | Binary | 1=Ability to read, count and write and 0 otherwise |
| Income | continuous | |
| Low poverty incidence | Binary | 1=poor, 0=non-poor |

### Statistical analysis

In order to make a decision on the most appropriate model to use for the research findings, the MANOVA statistic tests were performed

A Three-Way Multivariate Analysis of Variance (MANOVA) technique is used to assess whether poverty incidence, income, and literacy can be distinguished in the groups of producers, working groups and enterprises which are prone to poverty (group separation). As MANOVA requires the assumptions that normality, linearity and homogeneity of variances to be met, I assumed that the independent variables; groups of producers ($X_{1i}$) which are non-market coded as 1, and market producers coded as 0; while working groups ($X_{2i}$) which are pensioners coded as 1 and non-pensioners coded as 0 , and enterprises ($X_{3i}$) which are unincorporated coded as 1 and 0 elsewhere, have a linear relationship with the dependent variables; income ($Y_{1i}$), literacy ($Y_{2i}$), and Lower poverty incidence ($Y_{3i}$).

The MANOVA model is equivalent to multivariate regression of $Y_{1i}, Y_{2i}....Y_{ni}$ on the dummy grouping variables $X_{1i}, X_{2i}...X_{ni}$ (Rencher, 2012). The MANOVA test of $H_0 : \mu_1 = \mu_2 = ......\mu_N$ where $\mu_s$ represent population mean vectors for all groups under the study.

The MANOVA test statistics are given as;

According to (Ghosh, 2007) Wilk's test which is given by;

$$\Lambda = \frac{|W|}{|T|} = \frac{|W|}{|B + W|}$$

Where; $|W|$ is a determinant for within groups sum of squares, and $|T|$ is the determinant for the total sum of square and B stands for between sum of square.

Roy test statistic is given by;

$$\theta = \frac{\lambda_1}{1 + \lambda_1}$$

Where; $\lambda_1$ is the largest eigen value of $B^{-1}W$.

Pillai test statistic is given by;

$$V^s = tr[(B + W)^{-1}W] = \sum_{i=1}^{s} \frac{\lambda_i}{1 + \lambda_i}$$

Lawley-Hotelling test statistic is given by;

$$U^s = tr[B^{-1}W] = \sum_{i=1}^{s} \lambda_i$$

| Source | Statistics | | df | F(df, | df2)= | F Prob>F | |
|---|---|---|---|---|---|---|---|
| Model | W | 0.9343 | 3 | 9.0 | 22981.9 | 72.32 | 0.0000 a |
| | P | 0.0659 | | 9.0 | 28335.0 | 70.68 | 0.0000 a |
| | L | 0.0702 | | 9.0 | 28325.0 | 73.61 | 0.0000 a |
| | R | 0.0677 | | 3.0 | 9445.0 | 213.18 | 0.0000 a |
| Residual | | | 9445 | | | | |
| Pensioner | W | 0.9977 | 1 | 3.0 | 9443.0 | 7.10 | 0.0001 e |
| | P | 0.0023 | | 3.0 | 9443.0 | 7.10 | 0.0001 e |
| | L | 0.0023 | | 3.0 | 9443.0 | 7.10 | 0.0001 e |
| | R | 0.0023 | | 3.0 | 9443.0 | 7.10 | 0.0001 e |
| Unincorporated enterprises | W | 0.9622 | 1 | 3.0 | 9443.0 | 62.95 | 0.0001 e |
| | P | 0.0196 | | 3.0 | 9443.0 | 62.95 | 0.0001 e |
| | L | 0.0200 | | 3.0 | 9443.0 | 62.95 | 0.0001 e |
| | R | 0.0200 | | 3.0 | 9443.0 | 62.95 | 0.0001 e |
| Non-Market | W | 0.9622 | 1 | 3.0 | 9443.0 | 123.73 | 0.0001 e |
| | P | 0.0037 | | 3.0 | 9443.0 | 123.73 | 0.0001 e |
| | L | 0.0393 | | 3.0 | 9443.0 | 123.73 | 0.0001 e |
| | R | 0.0393 | | 3.0 | 9443.0 | 123.73 | 0.0001 e |
| Residual | | | 9445 | | | | |
| | | e=exact, a= approximate, u=upper bound on F | | | | | |

The results of the MANOVA tests show a p-value of less than 0.05. and therefore, conclude that the MANOVA model is the most appropriate model for the data and the variables that associated with household income were less than the five percent level of significance.

**RESEARCH FINDINGS**

The findings indicate that the MANOVA statistical tests Wilk, Pillai, Lawley-Hotelling and Roy tests, can be distinguished in the groups of producers, working groups and enterprises which are prone to poverty (group separation).

Means of ps_low, Lower Poverty Incidence
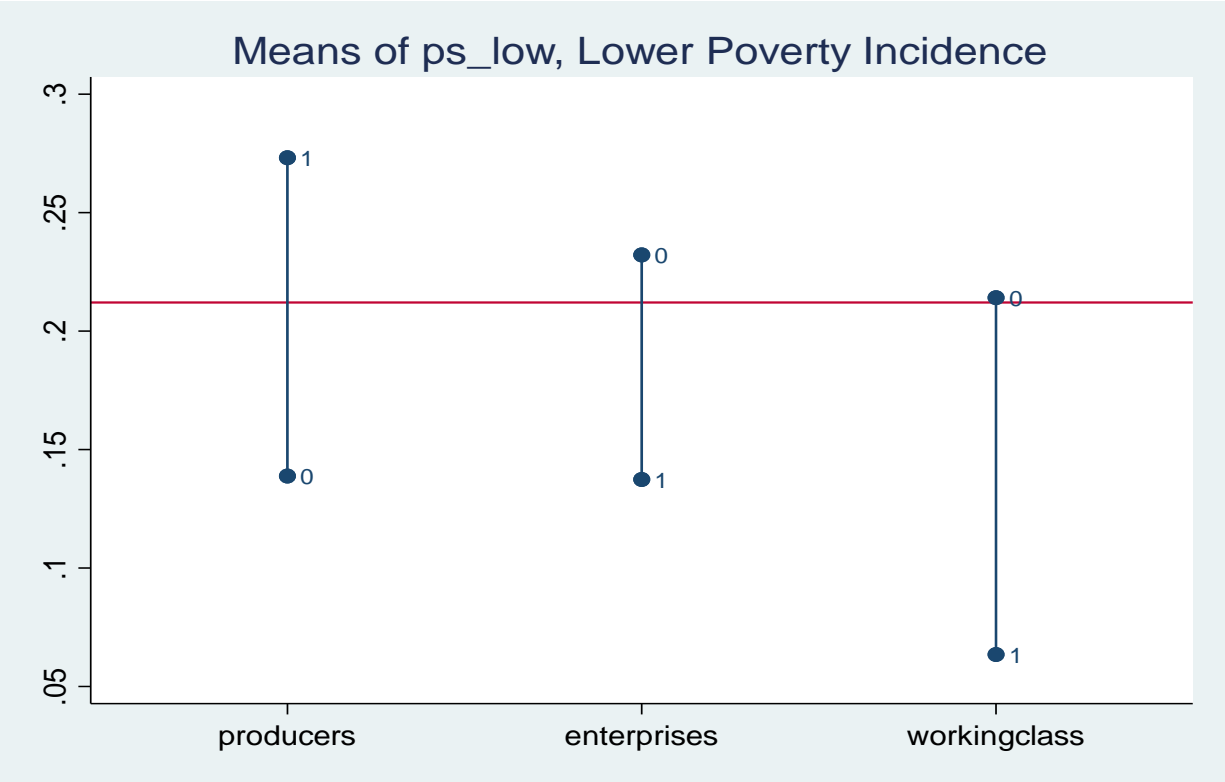
As per means of low poverty incidence the results shows that market producers, unincorporated enterprises and pensioners are less prone to poverty compared non -market produces, non-unincorporated enterprises and non-pensioners (p<0.005, graphs 1).

Means of total_income
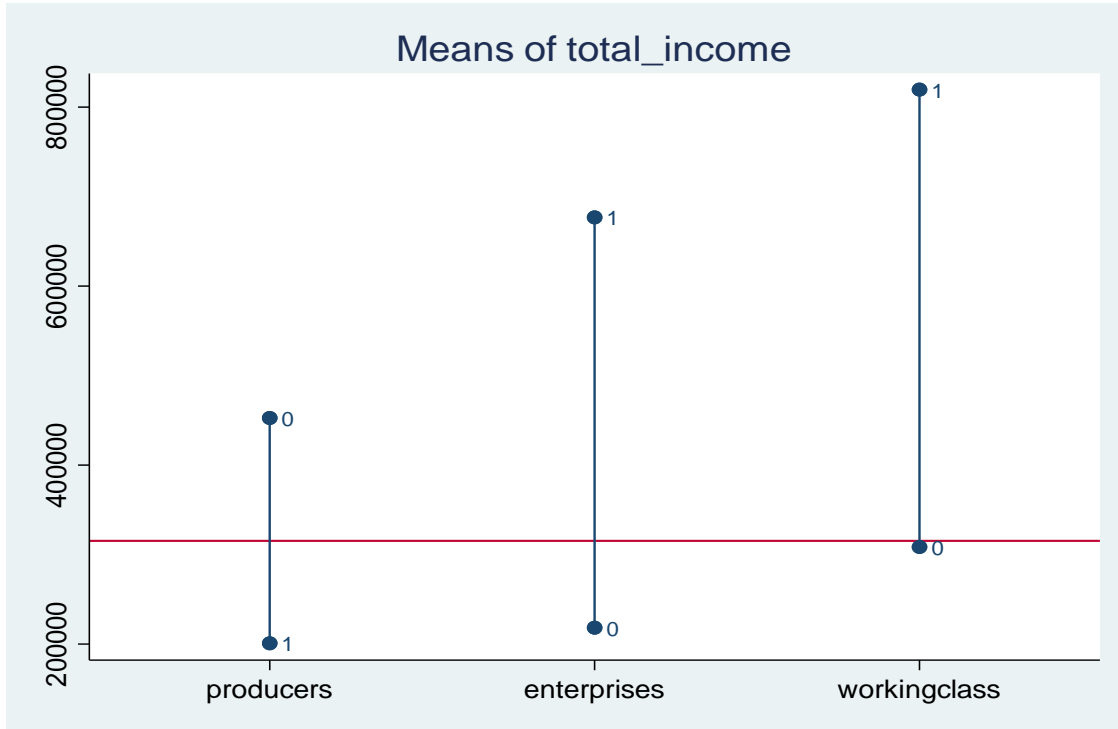
Regarding to the means of total incomes, the pensioners, unincorporated enterprises and market producers are having more income compared to non-pensioners, non-unincorporated and non-market producers. The results suggest that market producers, unincorporated enterprises and pensioners are less prone to poverty compared non -market produces, non-unincorporated enterprises and non-pensioners ($p<0.005$, graphs 2).

**Graph 3**



Means of literacy, Can [NAME] read and write in Kiswahili, English, and or any
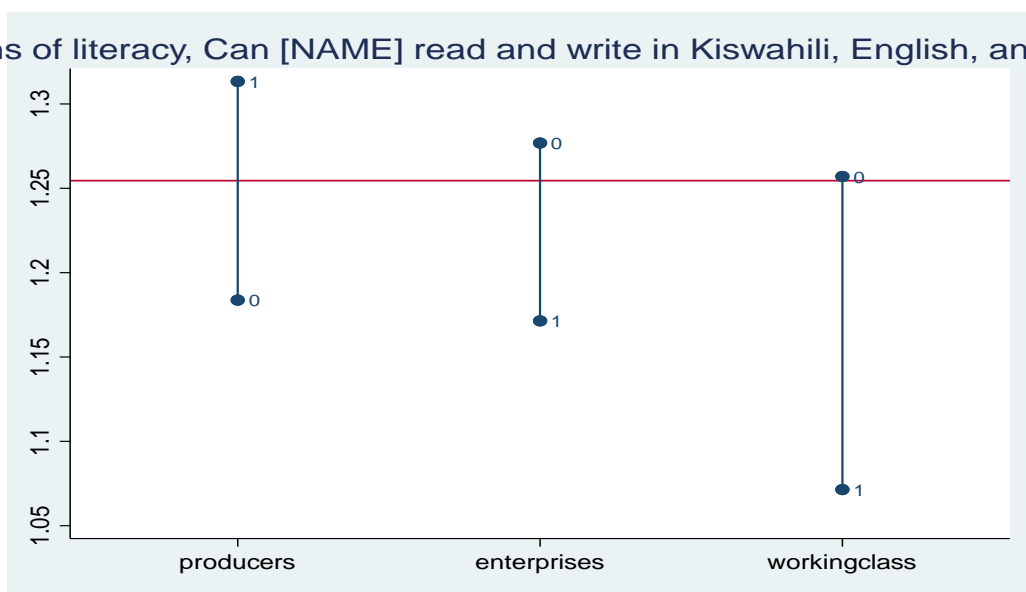
All statistical tests indicate there is a significant difference in terms of total income, low poverty incidence and literacy in all groups (p<0.05). The results also show that pensioners, unincorporated enterprises are less prone to poverty, thus having higher total income as compared to non-pensioners and non-unincorporated enterprises, while the non-market producers and market producers shows no much difference in terms of total income (p<0.05, graph 3)

**Concluding remarks:** The disaggregated data from household budget survey collected by National Bureau of Statistics can be used to analyse the poverty information. Thus, enabling government policies correcting social inequalities by redistributing resources from well off households to poorer households.

References:

Ghosh, A. K. (2007). Applied MANOVA and Discriminant Analysis. In *Journal of the American Statistical Association* (Vol. 102, Issue 479). https://doi.org/10.1198/jasa.2007.s203

Lequiller, F., & Blades, D. (2014). Understanding National Accounts: Second Edition. In *OECD Publishing*. http://dx.doi.org/10.1787/9789264214637-en

Lines, P. (n.d.). *L SMh13 3 Poverty Lines in Theory and Practice FILE COPY* (Issue 133).

Rencher, A. C. (2012). Methods of Multivariate Analysis, Second Edition. In *IIE Transactions* (Vol. 37). https://doi.org/10.1080/07408170500232784

United, T. H. E., Of, R., Bureau, N., Ministry, S., Dar, F., & July, S. (2014). *T a n z a n i a m a i n l a n d.*