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Does Gender Inequality Affect the Wealth and Income Distribution Among the Household Member?
Evidenced from Tanzania HIV Impact Survey (THIS2015/2016)

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Abstract

In order to address the issue of wealth distribution in household more attention need on gender inequality (GI). In this study, we examine whether gender issue affects a household's income and wealth distribution in Tanzania. This study was a cross-sectional type using data set from Tanzania HIV impact Survey (THIS 2015/2016), that relied on 15,780 sampled households' respondents who lived both in rural and urban areas.

The study use ordered logit regression model to realize the end results, which found that, gender inequality significant the influence the wealth distribution on top of other social and economic variables like age of head of household (25 to 34 years), household technological level, and household location. The results interpreted that, one unit increase in gender inequality (i.e., going from 0 to 1), we expect a 2.1 increase in the log odds of being in a higher level of wealth distribution. Our study end results deliver new insights into wealth distribution from a micro-level, bottom-up perspective. They are appropriate for policy makers since they indicate that stimulating gender equality can have a favorable impact on wealth distribution for sustainable development.

Key word: Gender Inequality: Wealth distributions and household

Background

Wealth distribution in Tanzania Mainland is widespread and both rural men and women face deficits in the quantity and quality of employment and income generating opportunities (Sawo (2020). However, rural women are often more disadvantaged than their male counterparts (Balestra, et al (2018). It is well documented that the ownership of assets improves the lives of the women and men who own and control them Doss, et al (2017). According to Alwang, et al (2019) the associations between asset ownership and reduced poverty and heightened security have been extensively researched, as has the relationship between asset accumulation and economic and political power. There are several studies conducted worldwide related to issue wealth distributions (Vermeulen, (2018); Achdou, et al (2017); Balestra, et al (2018) and Fernández-Villaverde, et al (2019) these studies general found that, women receive, on average, lower employment incomes than men, they more often work part-time or not at all, and they carry out the lion's share of unpaid work in the home. Lusasi, et al (2020) provides the supportive judgment that, in developing countries including Tanzania gender inequality practices in different economic activities.

Since several decades, gender inequality has been at the core of the policy debate concerning development agenda (Heise, et al 2019). The gender and income inequality are more likely influenced each other i.e., gender inequality normally led to an evenly income distribution (Alwang, *et al* (2019). Other studies such of (Colciago, *et al* (2019); Balestra, et al (2018and Doss, et al (2017)) pin out other factors which may influence on income and wealth distribution such as education level of household and household location, income, labor market, inheritances and financial decision.

In this study, we review the existing evidence from cross-country studies of an evenly wealth distribution among member of household and assess whether gender inequality may affect and how this evidence can be used to inform policy.

Objectives and Significant of the Study
The mainly objective of the study is to examine whether the gender inequality does affect the household wealth distribution in Tanzania. Specifically, the study to dig deep assesses the impact of level high school attendance share for male and female on wealth distribution. Secondly, household individual level attitude index on gender inequality on wealth distribution and lastly to assess the impact of other control variables on wealth distribution.

Empirical Literature Reviews
Balestra, et al (2018) conducted a study on the inequalities in household wealth across OECD countries. The study used quantitative secondary data obtained from OECD Wealth Distribution Database. The descriptive research design was employed in realization of end results. The findings revealed that, firstly wealth concentration is twice the level of income inequality. Secondly, up to a quarter of all households report negative net worth (i.e., liabilities exceeding the value of their assets) in a number of countries and lastly, more than one in three people are economically vulnerable, as they lack liquid financial assets to maintain a poverty-level living standard for at least three months. However, there is a gap in the studies as they do only descriptive analysis and totally ignore the inferential part which normally shows the factors for accordance of phenomena. Also, the study conducted in developed economies only. Hence, our study will be going to fill gap by introducing regression analysis.

Deere, et al (2019), did the study about gender and the distribution of wealth in developing countries. Their thesis uses also secondary data from different survey conducted among those countries on income and wealth issues. The study uses only descriptive research approach to compare and contrast in issued gender with wealth distribution and income gap by gender. The final results show that, there are statistically significant in gender asset gap among household in developing country. Also, the study pins out that; there are constraints on women's asset ownership with particular attention to the role of legal marital and inheritance regimes. The study only does descriptive research design approach without consider inferential technique approach. According to Gujarat (2004), before inferential

statistics is performed, (regression analysis) data characteristics, features and their nature must be determined since it's an indication for best model selection and better coefficient estimates.

Grabka, et al (2015) made supportive argument on wealth distribution within couples. The study uses secondary data collected from German Socio-Economic Panel Study (SOEP). The data sorted were unique individual micro level. The study employed both descriptive and inferential research design in realization of end results. The study found that, demographics, income, labor market, inheritances, financial decision-making in the partnership appred to be statistically significant influence the income gap among couple. However, there is a gap in their study as it looks only in urban area where somehow there is evenly distribution of wealth than rural where mostly men have all say about wealth of household and women are not considered inheritance. Therefore, the study fills the gap by conducting the study in both rural and urban areas.

Stöckl et al (2021) employ survey secondary data from Demographic Health Survey (DHS) conducted a study gender inequality issue and wealth in Tanzania. The study adopts only descriptive research design in testing the study hypothesis. The study end results show that, firstly education inequality persists but has been declining between rural and urban areas and particularly between Dar es Salaam and other regions. Secondly, gender inequality in education has also consistently been on the decline across different age ranges, more so for older individuals than younger ones. Lastly the study also found that, wealth inequality declining too. Like most of the study, also this study does only descriptive design and ignoring inferential statistics which is very important in showing the weight (coefficient) of each factor which may affect education and wealth inequality.

Study gap
A lot has been done in this field related to income and wealth distributions (Meer, et al (2021); Moll, et al (2021); Chauvel, et al (2019) and Maliti, (2019) based on these studied there are several gaps emerged such as some conducted their study in urban area while other consider only descriptive research design. Also, a lot has been done in on gender inequalities such as gender inequality in access to land (Agarwal, (2019), gender inequality in access to employment and earnings Espi, et al (2019), gender inequality in ownership (Colley et al, 2021) and gender inequality in freedom expression (Albiero et al 2020) and Sia et al, 2020). All these inequalities channeled through education and nothing has been done on issue of gender inequality in education as moderate means of other inequality. Therefore, the study fills the gap by access gender inequality in education and its effect of income distribution among Tanzania households.

Methodology
Research Design
The study design consents scholars to refine the research approaches that will be appropriate for the subject matter and set up their studies up for success (Rahi, 2017). Based on our research objectives,

the study will use both descriptive and explanatory research design. Descriptive design seeks to explain characteristics and feature of data while explanatory design seeks to establish causal relationship between variables. The emphasis of explanatory study is to study situation or a problem in order to explain the relationships between variables (Tobi, et al 2018). The choice of this design is because the study aims to determine the relationship between variables.

The Study Area

This study conducted in Tanzania main land whose headquarter is Dodoma (Salum, 2020).The area was selected for this study because 80% of its population are living in rural areas were still there a lot traditional and custom which put up men than women especially in owning and heritage of land (Maliti, 2019).As according to URT (2019) in Tanzania, statistics of in 2017 show that 75% of all men head of households were own fixed asset such as land and buildings while for women were only 25%. Hence there is a need to explore more on issue of gender and income distributions.

Sampling Procedures and Sample Size

Our study uses secondary data gathered from Tanzania HIV Impact Survey (THIS2016/2017). They adopt stratified multistage survey sampling design, were strata defined by sub-national geographic division used in each respective country (e.g., region/province) and on stage wise, the study follows three stages where by first stage with each stratum involved randomly selection Enumeration Area (EAs) through probability proportional to population size, the second stage involved the randomly selection of household within selected EAs, and the last stage within selected households.

Variables

Independent Variable:

Household Wealth/Income

Our study use household as unit of wealth analysis as recommended in many literatures of wealth and other human behavior (Day et al, 2020). In THIS2016/2017survey, the issue of household wealth must be captured on questions related to household asserts. Household wealth is defined as the total household assets divided by the number of adults. Total household assets are measured as the sum of all types of assets, including land, housing (primary residency and other real estate).

On the other hand, the issue of household income on the survey the income level of household is captured by using proxy such as the total income which household has received inform of rental, income which household has received in form of pension and other form. The total of all money received by household at a given month represent the household income. The variable "Total income" was generated as sum of three variables which were (i) that represent rental income household receive monthly, (ii) representing pension received by household and (iii) representing other income received by household. Then after specifically, we define household income as a family's total income from all sources divided by the number of adult family members.

Dependent Variables

Gender inequality (GI) concept refer as an unequal treatment or perceptions of individuals based on their gender. Furthermore, LeSuer, (2022) provide some supportive argument about several way of measure gender inequality at micro level from survey data such as legal rights, life expectancy, education and employment. However, at macro level UNDP (2003) use gender empowerment measurement (GEM) and gender-related development index (GDI) to measure gender inequality crosswise countries.

One of the most prevalent measures suggested by Ho, et al (2020) uses secondary education accomplishments in given household as a measure of gender inequality. In Tanzania, ordinary secondary level (o-level) is free for all and compulsory education, henceforth it is a suitable choice for exploring gender inequality from an education perspective. The highest education accomplished by women is o-level and above while their age is above eighteen years then recorded as gender equality otherwise gender inequality in Tanzania.

On issue of gender inequality, the information was retrieved from the household information's related to gender of head of household and secondary school attendance based on gender.

Other Dependent Variables

Age of Head of Household (AGE):

This refers to the age of member of household. It is continuous variable with unit of measurement years. Kissel, at el (2005) on their study, data suggest that older sero positive individuals are not at an increased risk for HIV-related cognitive impairment when normal age-related cognitive changes are considered.

Education Level of Household Member (EDUC):

This refers to the highest level of education which member of household attained. The responses are in categorical variable that takes 1 for primary level, 2 for secondary level and 3 for degree level. Hargreaves *et al* (2018) argue that, the educated person has chance of acquiring more income via employment and then accumulate more wealth than uneducated one.

Household Size

The household size refers to the number of persons (irrespective of age) living as an economic unit. According to Klepac, et al (2020) the household size has two faces with age, firstly if the household members are on working population, then large household size influence positively household income level and wealth accumulation. On the other hand, if household members by made by many dependent i.e. (children and olds) then larger household size influence negative household income and wealth accumulation.

Household Technology Level

The household technological level, it accounts for technology used by household in daily economic activities. Household technological level determines productivity level which account for income level and wealth distributions.

Household Behaviour

Drink containing alcohol (ALCH): This refers to whether the head of household or any member uses alcohol. It is continuous variable considering number of bottles of alcohol consumed. Wu, at el (2011), discus that alcohol's effects on the liver could potentially affect the metabolism of ARV medications, which may account for the associations between alcohol and HIV disease progression.

Household Location

Location refers to whether the household are in rural or urban and Sakah, et al (2019) pinpoint out that, in rural areas most of household are poor than in urban areas and they have possibility of accumulate few wealth than their counterpart.

Data Management and Analysis

The data which used are in quantitative format which make easy for both descriptive and inferential statistics data analysis. Descriptive statistics performed including frequency, mean and standard deviation. For each objective, quantitative research method was employed on secondary data. Therefore, the dependent variable was be income and wealth distribution while independent variable will be gender inequality on top of other control variables such as education level of household and household location, labor market, inheritances and financial decision.

Diagnostic Statistical Test

This refers as among of statistical technique which conducted prior any statistical analysis for the aim of assessing the characteristics and nature of data (Freeman, et al (2019). Chang, et al (2021), made supportive argument that, the diagnostic test results help much on model selection and other further statistical analysis. Normally the selection of types of diagnostics tests be contingent much with nature and types of data used. In cross section data, the study checks for normality, heterescadasity, Multicollinearity and stationarity. The tables below show the diagnostics tests results.

Normality test

According El Bouch, et al (2022) normality test refers as prior diagnostic statistic test which used to judge whether data set of the study are normally distributed or not i.e., the study data are well-modeled by a normal distribution.

Table 1: Normality test

Variable	Obs	W	V	z	Prob>z
Wealth Distribution	40,055	0.25621	1.20E+04	25.854	0
Gender inequality	13,049	0.99963	2.342	2.294	0.01088
Age Household Head	14,811	0.95843	289.403	15.327	0
Education Household Head	10,592	0.89702	538.82	16.863	0
Household Size	38,680	0.82292	2687.552	21.8	0
Household Technological Level	38,678	0.99994	0.864	-0.404	0.65681
Household Behaviour	13,003	0.99993	0.454	-2.13	0.98341
Household Location	40,067	0.99997	0.411	-2.456	0.99297

Source of Data: Author Computation from Study Data

The results in table1 below show that, only three variables are normally distribution while other five are not. Variables like household level of technology, household behaviour and household location they are normally distribution as their p-value greater than selected alpha level of 0.05 while the least other five variables were found not follow normal distribution. According to Ghosal, et al (2020) the logarithm transformation changes non-normal to normal, however due to binary response nature of variables doesn't favor the method and to account for that study employ robust standard error in regression analysis.

Heteroscedasticity Test

This refers crucial diagnostic test statistics which also is among important assumption of classical linear regression model to have best coefficient estimations (Ker, et al 2019). According to Rubio-Aparicio, et al (2020), the concept refers as occur when the variance of the error term conditional on independent variable are not constant (varies over time).

Table 2: Heteroscedasticity Test

Variable	Obs	Pr (Skewness)	Pr (Kurtosis)	adj chi2(2)	Prob>chi2
resid	2,654	0.2121	0	30.35	0

Source of Data: Author Computation from Study Data

The results in table 2 above show that: variance of error term is not constant among variable as probability of chi- square (0.00) is less than stated alpha level (0.05). Based on these results, normal regression model with non-constant variance would provide best coefficient estimates. However, we employ the robust standard error in regression analysis to account the non- constant variance.

Multicollinearity Test

According to Oke, et al (2019), Multicollinearity refers as statistical phenomena which happen when two or more independent variable in multiple regression models is tremendously linearly associated. Obite, et al (2020) provides judgment that; the concept refers as a state of very extremely inter-relationships among regressors in multiple regression models. The Multicollinearity coefficient index

normally varies from 1 to -1 by which perfect positive correlation are indicated by 1 otherwise -1 and the problem are detected when the index in absolute term is greater than 0.5. According to Kalnins, A. (2018) represent various statistical errors which my come across due to presence of Multicollinearity among regressors, these are like change in the signs as well as in the magnitudes of the regression coefficients.

Table3: Multicollinearity Test

	Gender inequality	HHAge	HHEduc	HHSIZE	HHtech	HHbehv	HHloc
Gender inequality	1						
Age Household Head	-0.303	1					
Education Household Head	0.8648	-0.2733	1				
Household Size	-0.0826	0.2686	-0.0772	1			
Household Technological Level	-0.3227	0.1173	-0.3094	-0.0264	1		
Household Behaviour	-0.0732	0.0752	-0.0757	0.0335	0.0547	1	
Household Location	-0.2125	0.185	-0.1895	0.0397	0.4684	0.0333	1

Source of Data: Author Computation from Study Data

The results show that, there are only two independent variables which where correlate each other as the correlation coefficient found to be 0.8648 above cut point value of 0.5. According to Bayman, et al (2021) the problem of Multicollinearity normally solved by dropping one among correlated variables as these were variable of interest we retained and there is possibility of obtained wrong coefficient sign.

Model Specification

A multiple regression model used, links independent variables to dependent variable as follows
$$\text{wealth\_}Distritution = B_0 + B_1 GI + B_2 HHage + B_3 HHEduc + B_4 HHsize + B_5 HHtech$$
$$+ B_7 HHbehaviour + B_8 HHlocation + \varepsilon i$$

Where **Y** is the independent variable
, $X2....X5$= are dependent variable

εi is error term

Results and discussion

Table4: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Wealth Distribution	14,807	2.888161	1.382109	1	5
Gender inequality	2,654	0.178975	0.383404	0	1
A ge"15-24"	14,811	0.064412	0.245493	0	1
Age "25-34"	14,811	0.250287	0.433193	0	1
Age "35-44"	14,811	0.26001	0.438654	0	1
Age "45-54"	14,811	0.176355	0.381135	0	1
Age "55-64"	14,811	0.122882	0.328312	0	1
Age "65 +"	14,811	0.126055	0.331923	0	1
Primary Education	10,592	0.7973	0.40203	0	1
Secondary_O_Level	10,592	0.167579	0.37351	0	1
Secondary_O_Level	10,592	0.015389	0.1231	0	1
University Education	10,592	0.019732	0.139084	0	1
Lower_HHsize ("1 to 2 members")	14,811	0.610357	0.487686	0	1
Average_HHsize ("3 to 4 members")	14,811	0.292688	0.455012	0	1
High_HHsize ("5 to 29 members")	14,811	0.096955	0.295906	0	1
Household Technological Level	14,810	1.732816	0.442504	1	2
Household Behaviour	13,003	0.387911	0.487293	0	1
Household Location	14,811	1.650327	0.476883	1	2

Source of Data: Author Computation from Study Data

The result in table 4 above shows that, wealth distribution variable had a mean value of 2.9which is above 2.5 cut point value. This indicates that, majority of household followed in higher wealth distribution than lower hence data skewed right. Furthermore, the standard deviation found to be 1.4 which illustrates very low-level variation in wealth distribution among households.

For Gender inequality (GI), the variable had a mean of 0.18 which is below cut pont of value 0.5 value. This indicates that, majority of household in rural areas observed gender inequality with very low variation of outcome among households (standard deviation (SD)=0.4).

Table5: Ordered Logit Regression Analysis Results Income Distribution

Wealth Distribution	Coef.	Robust Std. Err.	z	P>z	[95% Conf	Interval]
Gender inequality	2.112867	0.475927	4.44	0*	1.180067	3.045666
Age"15-24" (Age 1)	-0.10787	0.188941	-0.57	0.568	-0.47818	0.26245
Age "25-34" (Age 2)	0.48275	0.152635	3.16	0.002*	0.183591	0.78191
Age "35-44" (Age 3)	0.264142	0.138184	1.91	0.056	-0.00669	0.534978
Age "45-54" (Age4)	0.220074	0.147037	1.5	0.134	-0.06811	0.508262
Age "55-64" (Age 5)	0.05147	0.165294	0.31	0.756	-0.2725	0.37544
Age "65 +" (Age 6)	0	(omitted)				
Primary Education	0	(omitted)				
Secondary_O_Level	-0.74528	0.486509	-1.53	0.126	-1.69882	0.208259
Secondary_A_Level	-0.79122	0.931721	-0.85	0.396	-2.61736	1.034918
University Education	0	(omitted)				
lower_HHsize ("1 to 2 members")	-0.11	0.172832	-0.64	0.524	-0.44874	0.228746
Average_HHsize ("3 to 4 members")	0.076357	0.183936	0.42	0.678	-0.28415	0.436866
High_HHsize ("5 to 29 members")	0	(omitted)				
Household Technological Level	-4.77642	0.186872	-25.56	0*	-5.14269	-4.41016
Household Behaviour	-0.01492	0.081273	-0.18	0.854	-0.17421	0.144376
Household Location	-2.2686	0.10222	-22.19	0*	-2.46895	-2.06825
/cut1	-14.6183	0.448356			-15.4971	-13.7396
/cut2	-13.3455	0.4438			-14.2153	-12.4757
/cut3	-11.3534	0.431445			-12.199	-10.5078
/cut4	-7.2655	0.31762			-7.88803	-6.64298

Source of Data: Author Computation from Study Data

$$
\begin{aligned}
\text{Wealth \_Distribution} \\
= 2.1GI - 0.10Age1 + 0.48Age2 + 0.26Age3 + 0.22Age4 + 0.051Age5 \\
- 0.75O\_level + 0.78A\_level - 0.11L\_HHsize + 0.076A\_HHsize - 4.8HHtech \\
- 0.01HHbeh - 2.3HHloc
\end{aligned}
$$

Result and discussion

The likelihood ratio chi-square of 1470.97 with a p-value of 0.0000 and 13 degree of freedom tells us that our model as a whole is statistically significant, as compared to the null model with no predictors. The pseudo-R-squared of 0.3534 is also given. This is highly significant, and tells us that Gender Inequality (GI) and other variables have a significant effect on the wealth distribution. The positive coefficient for Gender Inequality means that the likelihood of wealth distribution.

In the table we see the coefficients, their standard errors, z-tests and their associated p-values, and the 95% confidence interval of the coefficients. Only Gender Inequality (GI), household head being

with age range 25 to 34 years, household technological level and household location are statistically significant while the lest are not. So, for Gender Inequality (GI), we would say that for a one unit increase in gender inequality (i.e., going from 0 to 1), we expect a 2.1 increase in the log odds of being in a higher level of wealth distribution, given all of the other variables in the model are held constant. For a one unit increase in age group (25-34 year) (i.e., going from 0 to 1), we would expect a 0.48 increase in the log odds of being in a higher level of wealth distribution, given that all of the other variables in the model are held constant. Lastly for a one unit increase in household level of technology and location we would expect 4.8 and 2.3decrease log odds of being in a higher level of wealth distribution respectively, by holding other variables constant.

Conclusion and Recommendation

This study aimed to analyze and evaluate empirically the effect of gender inequality on income and wealth distribution among household in Tanzania. Using cross-data estimation, we have examined empirically how various indicators of gender inequality affect income and wealth distributions. As result found that, gender inequality (GI) is statistically significant influence income distribution among household as p value of (0.00) is less than 0.5% chosen significant level. This channeled due to unequal change between women and men in access to education led to poor household resource utilization.

First, government and policy makers should encourage equal access to educational resources to both men and women. Presently, there is a noticeable bias of males over females in terms of o-level school archived, which is shown to be negatively associated and reduce the probability of higher wealth distributed in household and national at large. Also, after analyses of data the end results show that regional attitude powerfully favors males over females both in the career measure and combined measure. For instance, it is usually believed that males are preferred in terms of career potential. Furthermore, the general agreement that gender can be connected with resource utilization behaviours, it is also necessary to promote gender equality in a broader sense. Of course, more studies in this area are needed.

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