Research Journal of Agricultural Economics and Development
Volume 3, Issue 1, 2024 (pp. 14-29)
www.abjournals.org

DETERMINANTS OF INCOME INEQUALITY SOURCES AMONG WOMEN IN RURAL OYO STATE, NIGERIA

Amao Olufunmilola[1] and Adenegan Kemisola (Prof.)[2]

[1]Department of Agribusiness Management, Oyo State College of Agriculture and Technology, Igboora, Oyo State, Nigeria.
E-mail: amaoolufunmi@yahoo.com

[2]Department of Agricultural Economics, University of Ibadan, Oyo State, Nigeria
Email: bumkem@yahoo.com

Cite this article:

Amao O., Adenegan K. (2024), Determinants of Income Inequality Sources among Women in Rural Oyo State, Nigeria. Research Journal of Agricultural Economics and Development 3(1), 14-29. DOI: 10.52589/RJAED-NHMGFRT9

Manuscript History

Received: 24 Jan 2024

Accepted: 5 Apr 2024

Published: 15 Apr 2024

ABSTRACT: *This paper applies the regression-based inequality decomposition approach to explore determinants of income inequality sources among women in rural Oyo State, Nigeria. A four-stage sampling procedure was used in the collection of primary data with purposive selection of two agricultural development programme zones in Oyo State of Nigeria. 150 respondents were eventually used for the study. Structured questionnaires and interview schedules were used to collect data. Data were analyzed using descriptive statistics and Shapley decomposition approach. Age and household size of women were 35.5±1.06 years and 8.0±0.59 persons, respectively. Most respondents (88.0%) were married and 43.3% were farmers with income of ₦24,196.76±11,897.90 per month. Sources that largely explain inequality were primary occupation (0.5551), farm size (0.2523) and household assets (0.0766) and the relative contributions of these factors sum up to 80%. Total inequality computed by the Gini index was 0.2206 and it implies that the contribution of the predicted residual term to income inequality in this case was 22.06%.The marginal contribution of the estimated income sources of the weighted mean with no negative values from level 1 to 12 were primary occupation, educational level, workers per household, number of assets and location with weighted marginal contribution of 0.0125, 0.0120, 0.0105, 0.0071 and 0.0053 respectively. Narrowing the gap between those at the top and the bottom of income distribution will reduce inequality in the households and the nation at large and that is the more reason this study needs attention because within group components overwhelmingly accounted for inequality compared to the between group components. The role of spatial inequality and policies that encourage entrepreneurship training and non-formal education for women in rural areas would be inequality reducing, and would tend to be more effective if additional policy instruments are used to target other sources of measured income inequality*.

KEYWORDS: Determinants, Income inequality, Rural, Women.

Article DOI: 10.52589/RJAED-NHMGFRT9
DOI URL: https://doi.org/10.52589/RJAED-NHMGFRT9

BACKGROUND TO THE STUDY

Growing inequality is one of the major challenges for a developing country, and Nigeria is not an exception. Income inequality has been extensively studied in economics and other social sciences for a long time. It has long been believed that poverty and inequality are interrelated. Munir and Sultan (2017) admitted that in a society where there is no equal distribution of resources, the poor become poorer and the rich become richer. This leads to an exacerbation of the income gap, thereby leading to a more economically inequitable household and society. The concentration of income in a few hands also impacts human capital formation and physical infrastructure, thereby aggravating the issue and creating a vicious cycle. It is also believed to have a deep impact on the economic growth indicators and is seen as a deterrent to the overall development of an economy (Organization for Economic Co-operation and Development, 2014).

Women in many countries have experienced increased freedom in defining what to do with their lives in recent decades, including participation in the labor market. However, this has not reduced their obligations in the domestic realm including participation in the labor market (Medeiros *et. al.*, 2007). Women play vital roles as mothers, producers, managers, community developers/organizers, among others. Their contribution to the social and economic development of societies is more than half as compared to that of men by virtue of their dual roles in the productive and reproductive spheres (Makama, 2013). Medeiros et al. (2007) buttressed that some women do much more paid work and earn more than others which results in 'within' income gap.

As at 2008, 1.2 billion of the 3 billion workers in the world were women and were working in the agricultural and service sector of the economy. Thus, indicating the existence of a global gender pay gap. Due to the patriarchal nature of many developing countries, women are repeatedly experiencing income inequality and poverty. Poor women are often marginalized and disadvantaged with respect to income inequality (Edwards, 2010). Other determinants such as age grade, level of education, type of occupation, household size and marital status within women's groups in rural areas cause unequal access to income. Women with grownups/wards have more opportunity of time for paid work than those with infants while women that are educated can manage their time better and earn more (Ruuskaneen, 2004; Amao, 2015).

Fapounda (2012) lamented on the ongoing economic crises and the gulf between the pace of job creation and the growth in the numbers of job seekers. This has worsened the employment situation for women and men alike. Women face greater vulnerabilities in the labor market because of their relative lack of education and training, the tendency to channel women into certain occupations, and the continuous heavy burdens of unpaid domestic work, child-bearing and child-care. These restrict the time and energy available for income-earning activities.This study looks at the role of female earnings in influencing overall income inequality as the contribution of how differences in demographic structure, particularly the number of single adult households, and patterns of female employment and earnings influence differences in overall levels of household income inequality.

Article DOI: 10.52589/RJAED-NHMGFRT9
DOI URL: https://doi.org/10.52589/RJAED-NHMGFRT9

To this end, existing demands on their time means that women may often lack the capacity to alter the way in which they work in response to economic incentives, to maximize productivity and efficiency, and to enter value chains and for commercial production. In addition, women's roles in the domestic sphere are difficult to substitute and women in rural areas are limited in their ability to expand their capacities through acquiring education and skills which contributes to income inequality and affects their standard of living. In terms of inequality decomposition by subgroups, Baye (2008) admitted that under different dimensions and indicators, group components overwhelmingly accounted for inequality compared to the between group components. Narrowing the gap between those at the top and the bottom of income distribution has become one of the government's main concerns. To achieve this goal, the sources and determinants of income inequality must be identified and analyzed appropriately. The approach employed in this study is regression-based inequality decomposition using the Shapley value decomposition framework (Wicaksono et al., 2017).

To this end, patterns of female employment and earnings influence differences in overall levels of household income inequality. In order to bridge the income gap among economically active aged women and reduce household income inequality, it is imperative to narrow the gap between those at the top and the bottom of income distribution among women. To achieve this goal, the determinants of income inequality must be identified appropriately and the constraints inhibiting them from working longer hours and earning less in paid work are identified with the aim of bridging the income gap among women. The main objective of this study is to analyze the determinants of income inequality sources among women in rural Oyo State, Nigeria.

The specific objectives of this study are to:

1. examine the socio-economic characteristics of women in the study area;
2. disaggregate income gap based on the women's occupation in the study area;
3. analyze the determinants of income inequality sources among women in the study area; and to
4. determine the marginal contributions of the estimated-income inequality sources among women in the study area.

Article DOI: 10.52589/RJAED-NHMGFRT9
DOI URL: https://doi.org/10.52589/RJAED-NHMGFRT9

THEORETICAL FRAMEWORK: INCOME INEQUALITY-SHAPLEY DECOMPOSITION APPROACH

Neoclassical economics views inequalities in the distribution of income as arising from differences in value added by labor, capital and land. Within income distribution is due to differences in value added by different classifications of workers. In this perspective, wages and profits are determined by the marginal value added of each economic actor (worker, capitalist/business owner, and landlord) (Hunt &Mark, 2014). Thus, rising inequalities are merely a reflection of the productivity gap between highly-paid professions and lowly-paid professions (Keen, 2011).

Studies have been undertaken to identify the causes of income inequality and to explore their impacts in detail. A specific sub-theme that has remained the cause of debates in academic circles for a long time is the Kuznets' inverted-U hypothesis (Kuznets, 1955). The hypothesis states that economic inequality increases as an economy develops, but then reduces beyond a certain peaked value. However, the hypothesis has been subjected to enormous empirical testing; while certain studies have confirmed the hypothesis, many others have criticized it (Lyubimov, 2017).

Shorrocks (1999) has proposed applications of the Shapley Value allocation method (Shapley, 1953), for the decomposition of inequality by factor components. The Shapley Value Approach is an allocation method that assigns the gains of a coalition of players among its members as a function of what they contribute to the coalition. As the contribution of a player depends on the order in which the player joins the coalition, the Shapley rule weights each possible coalition by its probability and assigns to every player the average of all marginal contributions that this individual can make to all coalitions.

In the inequality decomposition context, this technique implies considering the impact on overall inequality of eliminating each income source. Since there is no natural order of elimination, the average of the impacts over all possible sequences of elimination was done. Thus, in order to assess the effect of a given income sources on overall inequality; the before-after concept to the set of all possible combinations of income sources was applied, and takes the average of all contributions.

Conventional approaches to income decomposition typically follow Shorrocks (1980, 1982, 1984) and Bourguignon (1979). Under these frameworks, decomposition can be carried out either by population sub-groups or by factor components. Both produce 'within' and 'between' components (Wan & Zhou, 2004). Decomposition by factor components (or income sources) was employed by Adams (2001), Awoyemi and Adeoti (2004), Omonona (2006) and Oyekale et al.(2006) through source decomposition of Gini coefficients. The shortcoming presented by factor components is that it does not allow the decomposition of total inequality into components associated with each of the fundamental determinants because it only allows attributing total inequality to the income sources.

The new regression-based decomposition approach allows the quantification of the contribution of each factor of inequality while controlling for the effects of others. However, in spite of the potential advantages of a regression-based approach to inequality decomposition, there are several other limitations. These include large error term, its non-contributing towards overall inequality and absence of account for the contribution of

Article DOI: 10.52589/RJAED-NHMGFRT9
DOI URL: https://doi.org/10.52589/RJAED-NHMGFRT9

constant term to total inequality (Gunatilaka & Chotikapanich, 2006). The Shapley value decomposition however, circumvents the problem of a large residual and decomposes inequality completely into its contributory factors as it accounts for all parts of the income generating equation (Shorrocks, 1999).

Income inequality decomposition can be conducted by using several methods. The most popular method is by employing either population subgroups or factor components decomposition (Shorrocks 1980, 1982, 1984; Bourguignon, 1979). The example of population subgroup decomposition includes those that employ gender, age, and race differences in decomposition analysis. Despite its popularity, this method cannot control the contribution of other factors, thus undermining the contribution of other factors such as education and experience (Shorrocks &Wan, 2004). In a factor-component decomposition, we can attribute income inequality by the source of income such as wage income, investment income, and other income. Nevertheless, this method cannot explain the fundamental factors that contribute to the difference in income such as education, wealth, and other personal or family characteristics.

Fortunately, the other analytical framework—regression-based decomposition—makes it possible to overcome the limitation of the former. This framework was initiated by Oaxaca (1973) and Blinder (1973), and was then developed by Juhn et al. (1993) and Wan and Zhou (2004). By employing this method, we can control the contribution of several factors simultaneously as well as identify the contribution of fundamental factors in explaining inequality.

In this study, the source of income inequality was investigated by decomposing the inequality measure, i.e., Gini index, into factors that significantly contribute to those measures. The regression-based inequality decomposition will be employed in this study. In order to decompose the source of income inequality, the Shapley value decomposition framework proposed by Shorrocks (1999) and the method employed by Wan (2002) will be utilized in this study. By doing so, it is expected that we can contribute more to literature concerning income inequality as well as give some relevant feedback to policy makers.

METHODOLOGY

The Study Area

The study was carried out in Oyo State, Nigeria. Oyo State lies between Latitude 7^0 and 9.3^0N and Longitude 2^0 and 4^0E and is characterized by two climate seasons. These are the dry season between November and March and the rainy season between April and October. The state is made up of 33 Local Government Area (LGAs) with a population of 5,591,285 people (National Population Commission 2006). Oyo State is bounded in the North by Kwara State, in the South by Ogun State, in the East by Kwara and Osun States and in the West by the Republic of Benin. Oyo State is divided into four main agricultural zones, that is Oyo, Ogbomoso, Saki and Ibadan-Ibarapa Zones, with 7-9 LGAs per zone. The favorable climate of the area encourages farming. Both food and cash crops are grown in the state.

Population of the Study: Women of economic active age (16-65 years) were used for the study.

Article DOI: 10.52589/RJAED-NHMGFRT9
DOI URL: https://doi.org/10.52589/RJAED-NHMGFRT9

Sources of Data: Primary data were used for this study. Data used for the study were collected from the respondents with the use of a well structured questionnaire.

Sampling Procedure and Sample Size: The data were collected using a multi-stage sampling procedure to select respondents for the study. The first stage was the purposive selection of two ADP zones i.e Ibadan - Ibarapa Zone and Oyo Zone in Oyo State, Nigeria. The second stage was the purposive selection of two LGAs from each of the zones. These were Ido LGA and Ibarapa East LGA in Ibadan - Ibarapa Zone while Afijio and Atiba were selected in Oyo Zone. The third stage was the random selection of five (5) villages in each LGA, while the fourth stage was the selection of eight (8) women of economically active age from each of the LGAs. All together, 160 women were interviewed and 150 questionnaires were found worthy for the study and this information was gotten through ADP list of rural households.

Data Analysis: The tools employed for the analysis were Descriptive Statistics and Shapley Value Approach.

Shapley Value Approach

Using the Shapley value to generate the expected components of the different income sources that account for inequality in terms of marginal contributions, the basic idea hinges on the Shapley value concept as developed by Shorrocks (1999). According to the established rule, the entry of an extra factor in a set of factors permits the factor to benefit from a marginal gain or loss commensurate with what it brings into the set.

The Shapley value approach yields an exact additive decomposition of any inequality measure into its contributory factors. The inequality measure calculated on the predicted income values $I(Y|X_1,X_2,\ldots,X_k)$ is expressed as the sum of the contributory factors;

$I(Y|X_1,X_2,\ldots X_k) = \Phi(X_1, \lfloor) + \Phi(X_2, \lfloor) + \ldots + \Phi(X_k, \lfloor) \ldots\ldots\ldots\ldots\ldots$ (1)

The Shapley decomposition calculates the marginal impact of each factor $\Phi(X_k, I)$ i=1, 2…,k through the estimation of a sequence of regression models starting from the specification which includes all the regressors and then successively eliminating each of them. The overall marginal contribution of each variable is then obtained as the average of its marginal effects: since the contribution of any factor depends on the order in which the factors appear in the elimination sequence, this average is calculated over all the possible elimination sequences.

The contribution Φ

(X_i, I) of the factor X_i to the explanation of the inequality measure *I* is given by the following formula:

$$\phi(X_i, I) = \frac{1}{k!} \sum_{\pi \in \Gamma k} [I(Y \mid B(\pi, X_i) \cup \{X_i\}) - I(Y \mid B(\pi, X_i))] \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where $\lfloor (Y|X)$ is the inequality indicator calculated on the predicted income values from the regression on the vector of explanatory variables X;

Article DOI: 10.52589/RJAED-NHMGFRT9
DOI URL: https://doi.org/10.52589/RJAED-NHMGFRT9

$\prod_k$ is the set of all the possible orderings (permutations) of the k variables;

$B(\pi, X_i)$ is the set of the variables preceding X_i in the given ordering π

The calculation of each factor's contribution requires the estimation $2^k - 1$ of income generating models, and then the derivation of the inequality indicator *1* using the income predicted values for every model.

Finally, the proportion of unexplained inequality $I_R(Y)$ is obtained as the difference between the inequality measure calculated on the observed income values *I(Y)* and the same measure calculated on the predicted income values, as follows:

$\lfloor_k(Y) = \lfloor(Y) - \lfloor(Y/X_1, X_2, \ldots X_9)$ ……..(3)

X_1- $X_{9=}$ The exogenous variables

X_1= Age (years), X_2 = Educational level (years), X_3 = Marital status (married=1, 0 otherwise)

X_4 = Household size (Number), X_5= Location (rural=1, 0 otherwise), X_6= Number of Assets (yes= 1, o otherwise, X7=Farm size (hectares), X_8= Workers per household (number)

X_9= Primary Occupation (farmer=1, 0 otherwise)

$lnY = \alpha + \beta_1 AGE + \beta_2 EDU + \beta_3 MART + \beta_4 HHS + \beta_5 LOC + \beta_6 ASSET + \beta_7 FRMSIZE + \beta_8 WKERS + \beta_9 PRYOCC + \varepsilon$

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Women

The result of the socio-economic characteristics of sampled women in the study area is presented in Table 1. The table revealed that 27.3% of the respondents were less than 30 years, 32.0% were between ages 31 and 40 while 23.3% were between 41 and 50 while 17.3% were above 50 years of age. The mean age was 36 years and this implied that the majority of the women in the study area were in their economically active and productive age..

The educational status of the women revealed that 28.0% had no formal education, 42.7% had primary school education, 21.3% went to secondary school while 8% had tertiary education. It implies that the majority of them had primary school education. This concurred with the findings of a study of Adeyoola (2012) and Amao (2015) where over 75% of the women stopped schooling at the primary school level.

Primary occupation of the respondents revealed that 43.0% of the women were farmers, 41.3% were traders, civil servants made up 9.3% while 4.0% of the respondents were artisans. Their occupational status implied that about 85% of the respondents were farmers and traders as major occupations**.** This is in accordance with the findings by Kolev and Sirven (2011) that women tended to be underrepresented in the industry and service sectors and

Article DOI: 10.52589/RJAED-NHMGFRT9
DOI URL: https://doi.org/10.52589/RJAED-NHMGFRT9

overrepresented in agriculture.Secondary occupation of the women revealed that 54.0% of the women were engaged in trading while very few were farmers, civil servants and artisans. Expectedly, 88% were married, 4.0% were single, and 7.3% were widowed, while 0.7% were divorced/separated.

The household size of the respondents revealed that 8.7% had less than or equal to four (4) household members, 67.3% were between 5 and 9 household members, 22% had between 10 and 15 household members while 2.0% had a household size beyond 15 members. The average household size was 8 which can be regarded as large. The reason is that most of the women interviewed lived with extended families while some had polygamy households. This diverges from the findings by Adeyoonu (2012) in which 76.8% of the respondents had between 2 and 5 household size.

Table 1: Socio-economic Characteristics of Women

Variables	**Frequency**	**Percentages**	**Mean**	**Std**
Age				
Less than 30	41	27.3		
31-40	48	32.0		
41-50	35	23.3		
51 and above	26	17.3		
	150	**100**	**35.5**	1.06
Years of Schooling				
0 years(no schooling)	42	28.0		
1-6 years	64	42.7		
7-12 years	32	21.3		
Above 12	12	8.0		
	150	**100**	**64**	**.90**
Pry Occupation				
Farming	65	43.3		
Trading	62	41.3		
Civil servant	14	9.3		
Artisans	9	6.2		
	150	**100.0**	**63.5**	**.91**
Secondary Occ				
No sec. occupation	34	22.7		
Trading	81	54.0		
Farming	32	21.3		
Artisan	3	2.0		
	150	**100.0**	**34**	
Marital Status				
Single	6	6		
Married	132	88.0		
Widowed	11	7.3		
Divorced/separated	1	.7		

Article DOI: 10.52589/RJAED-NHMGFRT9
DOI URL: https://doi.org/10.52589/RJAED-NHMGFRT9

	150	**100.0**	**132**	.37
Household Size				
Less than 4	13	8.7		
4-9	101	67.3		
10-15	33	22.0		
Greater than 15	3	2.0		
	150	**100.0**	**8**	**.59**

Source: *Field Work, 2020*

Disaggregation of Income Gap Based on the Women's Occupation

Table 2 below showed the income generated by women in different professions in the study area. The result revealed that 4 farmers earned less than #10,000 in a month, 59 farmers earned between #10,000 and #30,000 in a month while 2 farmers earned between #30,001 and #50,000. The result for the traders revealed that 1 trader earned less than #10,000 in a month, 55 traders earned between #10,000 and #30,000 while 6 traders earned between #30,001 and #50,000 in a month. The income of civil servants revealed that 5 of them earned between #10,000 and # 30,000, 4 of them earned between #30,001 and #50,000, 2 of them earned between #50,001 and #70,000 while 3 of the civil servants earned over #70,000 in a month. The income for the artisans revealed that 7 of them earned between #10,000 and #30,000 while 2 of them earned between #30,001 and #50,000. In conclusion, the average income among women of different profession was₦24,196.76 while the very few earned over #70,000 who were civil servants in the study area.

Table 2: Disaggregation of Income Gap Based on the Women's Occupation

Total income/month(₦)	Farmers	Traders	Civil Servants	Artisans	**Total**
<10,000	4	1	-	-	5
10,000-30,000	59	55	5	7	126
30,001-50,000	2	6	4	2	14
50,001-70,000	-	-	2	-	2
>70,000	-	-	3	-	3
Total	65	62	14	9	**150**

Source: *Data Analysis 2020*

Determinants of Income Inequality Sources among Women: **Shapley Decomposition Approach Results**

To decompose measured income inequality by income sources, contributions of the various estimated factors were computed using Shapley value-based approaches. It is based on a set of axioms propounded by Shorrocks (1999). This was computed using Stata 12 and DASP 2.1 Software developed by Arrar (2006). This analytical tool has the merit of computing the weighted marginal contributions of an estimated income source in various coalitions of income sources. These weighted contributions exactly sum up to the considered inequality measure.

In Table 3, putting aside the constant term, the estimated income sources for primary occupation, assets, farm size, time for paid work and time for unpaid work had very high

Article DOI: 10.52589/RJAED-NHMGFRT9
DOI URL: https://doi.org/10.52589/RJAED-NHMGFRT9

income shares in that order. The emergence of assets/wealth contribution to income inequality is also found in Manna and Regoli (2012) and Wicaksono et al. (2017). The income sources: Household sizes, educational level, location and workers per household are also positive but very low. It further hosts inequality decomposition of the Gini index based on the Shapley value. Summarily, sources that largely explain inequality were primary occupation (0.5551), farm size (0.2523) and household assets (0.0766). The relative contributions of these factors sum up to 80%. Other sources that contributed in explaining inequality were household size, fraction of economically active household members, time for paid work, primary occupation, educational level and location in that order. The relative contributions of these regressed sources sum up to 19.5%.

The largest part of income inequality (50%) was explained by the primary occupation of the respondents. This implies that there is a wide gap in income generated from one occupation to the other. Few women in the civil service earn much more than those into farming and trading. Also, women with larger farm size utilize their farm size and earn more. Likewise, women with household assets earn much more and this also causes a wide gap within the women's group. In terms of location, rural residency contributed just about 0.1% in accounting for measured income inequality. This result indicates that location is much less essential as a determinant of inequality. Despite the fact that poverty is said to be higher in the rural areas, location is a minor determinant of income inequality in this study. Women in the study area combine other sources of income to fend for their household, especially women without infants.

Total inequality computed by the Gini index was 0.2206. The contribution of the predicted residual term to income inequality in this case is 22.06%. As indicated earlier, the residual term informs the policy makers on how much regressed-sources can explain the overall measured inequality. In this case, included variables accounted for over 80% of total inequality.

Table 3: Income Inequality by Sources

Execution time: 3621.08 second(s)

Inequality index: Gini index

Estimated inequality: 0.220621

Sources	Income Shares	Absolute Contribution	Relative Contribution
Primary occupation	0.4824	0.0508	0.5551
Educational level	0.0135	0.0005	0.0056
Household size	0.0892	0.0059	0.0643

Article DOI: 10.52589/RJAED-NHMGFRT9
DOI URL: https://doi.org/10.52589/RJAED-NHMGFRT9

Location	0.0119	0.0001	0.0013
Assets	0.1148	0.0070	0.0766
Farm size	0.0781	0.0231	0.2523
Workers per household	0.0235	0.0026	0.0287
Time for paid job	0.0222	0.0007	0.0073
Secondary occupation	0.0981	0.0011	0.0117
Time for unpaid work	0.0664	-0.0003	-0.0028
Constant term		0.0000	0.0000
Residual	0.0000	0.2206	0.2206
Total	**1.0000**	**0.0916**	**1.0000**

Source: *Data Analysis 2020*

Marginal Contributions of the Estimated Income-Inequality Sources Based on the Shapley Value Approach

The marginal contribution of the estimated income sources using the Gini index approach is deemed as the inequality index that behaves the best in reporting the results because it is good for decomposition by sources (Araar, 2006). These marginal contributions are based on the notion of the Shapley-value concept developed by Shorrocks (1999), where a regressed-income source joins a league of sources and the marginal contributions are calculated. The Shapley value-based component of each regressed-income source to measured income inequality is the weighted mean of the marginal contributions of the source in all configurations of sources including the residual. These contributions were generated by the DASP 2.1 software package (Araar, 2006; Baye-Epo, 2011). The level of entry indicates the position in which a regressed source is introduced to a set of already existing sources. The introduction of each source into a coalition of sources can be envisaged as a policy-mix.

Appendix I hosts marginal contributions of included and excluded regressed income sources to measured income inequality along different configurations of sources. The weighted mean of marginal contribution of primary occupation is about 0.0125 to measured income inequality of 0.2206, about 0.0031 is realized at level 1, that is, in the absence of other regressed-income sources and the predicted residual. As the effect of other regressed-income sources are progressively taken into consideration from level 2 through level 12, the sum of the remaining weighted marginal contributions of primary occupation was 0.0094. Whereas the source primary occupation at all levels of entry registered no negative variable, the implication here is that promoting recruitment of economically active women into formal

Article DOI: 10.52589/RJAED-NHMGFRT9
DOI URL: https://doi.org/10.52589/RJAED-NHMGFRT9

sector of the educated ones/ entrepreneurial training for the non-educated women would be equity augmenting, but promoting it alongside policies that curb inequality in other income sources would enhance its effectiveness.

The second estimated income source with the highest marginal contribution is educational level. The weighted marginal contribution for education was 0.0120, about 0.0029 was realized at level 1. Likewise, educational level at all levels of entry registered no negative. The implication here is that promoting only education for all would be equity augmenting, but promoting it alongside policies that curb inequality in other income sources would enhance the effectiveness of education for all policies. Other income sources that registered no negative values till level 12 were workers per household, number of assets and location with weighted marginal contribution of 0.0105, 0.0071 and 0.0053 respectively.

For household size, age, farm size, time for paid work and time for unpaid work, at certain levels of entry positive and negative values. The variable age when considered alone at level 1 has a weighted marginal impact of 0.0033. This amounts to 50% of the total impact of this source in explaining inequality, at level 8, the weighted marginal contribution of the sources was negative. Generally, a key result that can be identified from this reading is the role of spatial inequality. Policies that encourage entrepreneurship training and non-formal education for women in rural areas would be inequality reducing, and would tend to be more effective if additional policy instruments are used to target other sources of measured income inequality. The indication of this analysis is that packaging policy instruments to address the problem of inequality in the distribution of living standards would be more effective than implementing policies gradually.

CONCLUSION

This study investigated the determinants of income inequality sources among women in Rural Oyo State, Nigeria. The women were in their economically active age and they had a large household size. Their average income was too low except very few of them who are well educated and were in the formal sector.

Narrowing the gap between those at the top and the bottom of income distribution will reduce inequality in the households and the nation at large, that is why this study needs attention because within group components overwhelmingly accounted for inequality compared to the between group components

Sources that largely explain income inequality through the decomposition of shapley value approach were primary occupation, farm size and household assets in that order. The relative contributions of these factors sum up to 80% of total inequality, while other sources sum up to 19.5%. Total inequality computed by the Gini index was 0.2206 and it implies that the contribution of the predicted residual term to income inequality was 22.06%. As indicated earlier, the residual term informs the policy makers on how much regressed-sources can explain the overall measured inequality

The marginal contribution of the estimated income sources using the Gini approach behaves the best in reporting the results because it is good for decomposition by sources (Araar, 2006). The weighted mean with no negative values from level 1 to 12 were primary

Article DOI: 10.52589/RJAED-NHMGFRT9
DOI URL: https://doi.org/10.52589/RJAED-NHMGFRT9

occupation, educational level, workers per household, number of assets and location with weighted marginal contribution of 0.0125, 0.0120, 0.0105, 0.0071 and 0.0053 respectively.

The level of entry indicates the position in which a regressed source is introduced to a set of already existing sources. Generally, a key result that can be identified from this reading is the role of spatial inequality and policies that encourage Entrepreneurship training and non-formal education for women in rural areas would be inequality reducing, and would tend to be more effective if additional policy instruments are used to target other sources of measured income inequality.

POLICY RECOMMENDATION

- Education boosts reduces inequality; therefore, formal and informal education for women should be encouraged by the government and Non Governmental Organizations.
- Well-designed social programs such as distribution of land, training programs, gender equity in all levels of education and expanding education attainment, job-creation, employment services, childcare facilities, and reform of discriminatory laws will reduce income inequality and boost their well being.

APPENDIX I: Marginal Contributions of the Various Estimated Income Sources Based on the Shapley Value Approach

Variable	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Level 11	Level 12
Age	0.003274	0.001901	0.001107	0.000636	0.000346	0.000159	0.000035	-0.000050	-0.000111	-0.000160	-0.000214	-0.000294
Educational Level	0.002904	0.001885	0.001337	0.001037	0.00084	0.000756	0.000681	0.000624	0.000574	0.000524	0.000462	0.000371
Household Size	0.000827	0.000367	0.000170	0.000089	0.000057	0.000043	0.000037	0.000033	0.000030	0.000025	0.000011	-0.000027
Location	0.000823	0.000671	0.000574	0.000507	0.000459	0.000424	0.000397	0.000378	0.000365	0.000356	0.000351	0.000344
Number of assets	0.002077	0.001222	0.000794	0.000578	0.000464	0.000398	0.000355	0.000323	0.000296	0.000266	0.000224	0.000151
Farm size	0.000675	0.000268	0.000097	0.000029	0.000002	-0.000009	-0.000014	-0.000017	-0.000019	-0.000023	-0.000036	-0.000070
Workers per Household	0.002832	0.001817	0.001273	0.000975	0.000804	0.000697	0.000621	0.000561	0.000508	0.000452	0.000383	0.000282
Primary occupation	0.003103	0.002069	0.001495	0.001163	0.000955	0.000813	0.000705	0.000616	0.000537	0.000457	0.000368	0.000251
Timepaidwork	0.000052	0.000017	0.000005	0.000000	-0.000001	-0.000002	-0.000002	-0.000002	-0.000002	-0.000002	-0.000003	-0.000007
Time Unpaid work	0.003934	0.002521	0.001676	0.001152	0.000811	0.000580	0.000417	0.000298	0.000208	0.000134	0.000061	-0.000031

Article DOI: 10.52589/RJAED-NHMGFRT9
DOI URL: https://doi.org/10.52589/RJAED-NHMGFRT9

Constant term	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Residual	0.016339	0.014717	0.013698	0.013022	0.012547	0.012189	0.011910	0.011684	0.011494	0.011326	0.011166	0.010991

Source: ***Computed using STATA 12 and DASP 2.1 Software***

REFERENCES

Adams (Jnr.), R. H. 2001. "Non-farm Income, Inequality and Poverty in Rural Egypt and Jordan", PRMPO, MSN MC4- 415, World Bank, Washington DC 20433, January 2001.

Adeyoola, A.G. 2012. Gender Dimensions of Time Allocation of Rural Farming Households in Southwest Nigeria.*Current Research Journal of Social Sciences* 4(4): 269-276.

Amao O. 2015. Inequalities of Time Allocation among Male and Female Headed Households in Ibarapa East Local Government Area, Oyo State, Nigeria: The Welfare Implications. *Journal of Economics and Sustainable Development* ISSN 2222-1700(Paper) ISSN 2222-2855(Online) Vol: 6, No.10, 2015

Araar, A. 2006. On the decomposition of the Gini Coefficient: an Exact Approach, with Illustration Using Cameroonian Data, *Cahiers de recherché*, 0602, CIRPEE.

Awoyemi, T. T. and Adeoti, A. I. 2004. "The Decomposition of Income Inequality by Sources of Income: The Rural Nigerian Experience", African Journal of Economic Policy (AJEP), Vol II No 1, pg 1-16

Bourguignon, F., 1979. "Decomposable Income Inequality Measures"*Econometrica*, 47:901-20.

Baye F. M. and Epo B. N. 2011. Inequality Decomposition by Regressed-Income Sources in Cameroon Paper Prepared for the Special IARIW-SSA Conference on Measuring National Income, Wealth, Poverty, and Inequality in African Countries Cape Town, South Africa, September 28- October 1, 2011, pp2-27

Baye, F. M. 2008. "Exact Configuration of Poverty, Inequality and Polarisation trends in the Distribution of Well-being in Cameroon". Final report submitted to AERC research workshop, Nairobi, Kenya, 2008.

Blinder, A. S. 1973. Wage discrimination: Reduced form and structural estimates. *Journal of Human Resources* 8: 436–55.

Edwards R. B. (2010). 'Gender Inequality and Socioeconomic Development. An ECON7920 Economic Project submitted to the school of Economics, The University of Queensland.

Fapohunda, T M. 2012. Gender and Development: Challenges to Women Involvement in Nigeria's Development: *International Journal of Academic Research in Business and Social Sciences*, Vol. 2, No. 6, ISSN: 2222-6990

Guanatilaka R., Chotikapanich D. 2009, "Accounting for Sri Lanka's Expenditure Inequality 1980-2002: Regression-Based Decomposition Approaches", *Review of Income and Wealth*, 55 (4), pp. 882-906.

Hazlitt, H. 1988. Economics in One Lesson. Three Rivers Press. Chapter 20: Part 2 ISBN 978-0-517-54823-3.

Hunt, E. K.; L. Mark 2014. History of Economic Thought: A Critical Perspective. PHI Learning. ISBN 978-0765625991.

Juhn, C., K. M. Murphy, and B. Pierce. 1993. Wage inequality and the rise in returns to skill. *Journal of Political Economy* 101*:* 410–442.

Article DOI: 10.52589/RJAED-NHMGFRT9
DOI URL: https://doi.org/10.52589/RJAED-NHMGFRT9

Keen, Steve 2011. Debunking Economics - Revised and Expanded Edition: The Naked Emperor Dethroned?. Zed Books. p. 110. ISBN 978-1848139923

Lyubimov I., (2017), Income inequality revisited 60 years later: Piketty vs Kuznets, *Russian Journal of Economics*, 3, (1), 42-53.

Munir, K., & Sultan, M. (2017). Macroeconomic determinants of income inequality in India and Pakistan. *Theoretical and Applied Economics*, 24(4), 109-120.

Manna, R. and A. Regoli. 2012. Regression-based approaches for the decomposition of income inequality in Italy, 1998–2008. *Rivista di Statistica ufficiale* 1.

Makama, G. A. 2013. Patriarchy And Gender Inequality In Nigeria: The Way Forward in *European Scientific Journal June 2013 edition* vol.9, No.17 ISSN: 1857 – 7881 (Print) e - ISSN 1857- 7431 115

Medeiros, M., R.G. Osirio and J. Costa. 2007. "Gender Inequalities in Allocating Time to Paid and Unpaid Work: Evidence from Bolivia". Working Paper 495, The Levy Economics Institute Annandale-on-Hudson, NY 12504-5000. http://www.levy.org

Oaxaca, R. 1973. 'Male-Female Wage Differences in Urban Labour Markets.' *InternationalEconomic Review 14(3): 693-709.*

Omonona, B. T. 2006. "Source Income Determinants and Inequality among Rural Households in Kogi State, Nigeria", 2005 IFRGA 05 Research Report, July 2006.

Oyekale, A. S., Adeoti A.I, Oyekale, T.O. 2006. "Measurements and Sources of Income Inequality among Rural and Urban Households in Nigeria", PMMA Working Paper 2006-20, December 2006.

Organization for Economic Co-operation and Development (2014). Focus on Inequality and Growth. Retrieved from https://www.oecd.org/social/Focus-Inequality-and-Growth-2014.pdf.

Ruuskanen, O.P. 2004. More than two hands – Is multitasking an answer to stress?, in: Ruuskanen, O.P. (2004). An econometric analysis of time use in Finnish households, Unpublished PhD thesis, Helsinki School of Economics, Acta Universitatis Oeconomicae Helsingiensis.

Shapely, L.S. 1953. A Value N- Person Games In Annals of Mathematics Studies, Volume 28, edited by H.W Kuhn and A.W Tucker. Princeton: Princeton University Press, pp 307-317. Contributions to the Theory of Games, vol.2

Shorrocks, A. F. 1982. `Inequality decomposition by factor components', Econometrica, vol. 50, no. 1, pp. 193±211.

Shorrocks, A.F. (1980). 'The Class of Additively Decomposable Inequality Measures'. *Econometrica*,
48(6): 613-20.

Shorrocks, A.F. (1984). 'Inequality Decomposition by Population Subgroups'. *Econometrica*, 52: 1369-85.

Shorrocks A. F (1999): Decomposition procedures for distributional analysis: A unified framework based on the shapley value. Unpublished manuscript. University of Essex, Colchester.

Shorrocks, A. F. and G. H. Wan. 2005. Spatial decomposition of inequality (No. 2004/01). WIDER Discussion Papers/World Institute for Development Economics (UNU-WIDER).

Wan, G. H. 2002. Regression-based inequality decomposition: Pitfalls and a solution procedure (No. 2002/101). WIDER Discussion Papers/World Institute for Development Economics (UNU-WIDER).

Article DOI: 10.52589/RJAED-NHMGFRT9
DOI URL: https://doi.org/10.52589/RJAED-NHMGFRT9

Wan, G and Zhou, Z. 2004. "Income Inequality in Rural China: Regression-based Decomposition Using Household Data", Research Paper No 2004/51, World Institute for Development Economics Research (WIDER), Helsinki, Finland, August 2004.

Wicaksono, E., H. Amir, and A. Nugroho. 2017. The Sources of Income Inequality in Indonesia: A Regression-Based Inequality Decomposition. ADBI Working Paper 667. Tokyo: Asian Development Bank Institute. Available: https://www.adb.org/publications/sources-income-inequality-indonesia

Article DOI: 10.52589/RJAED-NHMGFRT9
DOI URL: https://doi.org/10.52589/RJAED-NHMGFRT9