



# Are larger households really poorer?

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## Abstract

An empirical study was conducted in Akwa Ibom State, Niger Delta Region of Nigeria to establish a relationship between household size and poverty. A total of 150 rural farming households were sampled using the multistage sampling procedure and primary data were obtained with the aid of questionnaires. Data were analyzed using the Foster, Greer, Thorbecke weighted poverty measure and stochastic dominance analysis. Results reveal that all the three sub-groups' poverty incidence were statistically significant and different at ( $P < 0.10$ ). Findings also showed that the t-values of only two sub-groups poverty incidence of dependency ratio were significant ( $P < 0.10$ ). Results further revealed that there was first order stochastic dominance as the cumulative density function of households with less than 5 family members stochastically dominated those of households with more than 10 household members. Policy decision aimed at limiting the number of children strictly to that which parents can adequately cater for, is likely to improve living standards and reduce poverty.

**Keywords:** Poverty, Household Size, Questionnaire, FGT, Stochastic Dominance Analysis, Nigeria

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## 1. Introduction

Nigeria is one of the most resource endowed nations in the world but the country is among the poorest in the world ranking 75<sup>th</sup> out of 103 countries on the Human Development Index (Etim and Patrick, 2010; Etim and Edet, 2014). Nigeria has a population of more than 160 million - the largest in Africa and a fast growing economy. The agricultural sector which is a very important sector of the economy employs approximately two-thirds of the country's total labour force and provides a livelihood for about 90 percent of the rural population (Etim and Edet, 2014). But despite the countries abundance in agriculture and oil resources, poverty is widespread and deepening, and is especially severe in rural areas where up to 80 percent of the population lives below the poverty line.

Nigeria is the single largest country in sub-Saharan Africa, accounting for between 21 percent and 30 percent of the number of ultra, medial and subjacent poor people living in the sub continent (Ahmed et al., 2007), and is the home of one-fifth of all Africans (DFID, 2008). Besides, it is the 13th largest oil producer in the world with 32 billion barrels of oil reserves in the world sufficient for 37 years and gas reserves that can last for 110 years at 2005 rates of production. Nigeria is the second largest economy in Africa, after South Africa, with an annual GDP of US\$71 billion and if the combined income from oil and gas were distributed equally to all Nigerians, it would come to about 50 cents per person per day (DFID, 2008; Etim and Etim, 2013).

Most of the poor in Nigeria live in the rural areas (FOS 1999), and studies on poverty are linked to agriculture (Canagarajah et al., 1995; FOS, 1999; Khan, 2001; Okunmadewa, 2001; Etim, 2007). Studies by (Musgrave, 1980; Lipton, 1983; World Bank, 1991; Lanjouw and Ravallion, 1994; Schubert 1994) have shown that a large sized household is associated with greater incidence of poverty. A study by FOS (1999) using the National Consumer Surveys (NCS) revealed that among farming households, larger sized households have higher poverty incidence than their non-farming counterparts. This tends to show that large family size in farming households does not necessarily translate to increasing household income. As the number of household members continue to increase, the resulting rise in population has led to the development of informal and unkempt settlements, which manifest as overcrowded dwellings with poor human and living condition. According to Etim and Edet (2013), these poor living conditions manifest in poverty. Consequently, for these households to increase their incomes and meet the food demands of the increasing household sizes, their poverty situation has to be reduced. But to take sensible policy decisions aimed at combating the ravaging woes of poverty, an understanding and empirical study of the relationship between poverty and household size is imperative. This however requires the decomposition of the population into mutually exclusive sub-populations to allow for comparison of poverty over the sub-groups.

## 2. Methodology

### 2.1. Study area, sampling and data collection procedure

This study was carried out in the state of Akwa Ibom, Niger Delta, Nigeria. Akwa Ibom state is located at latitude 4°33' and 5°53' and longitude 7°25' and 8°25' East and its total area is 7,246km<sup>2</sup>. The population of the state is about 3.9 million (NPC, 2006), and it is bordered by Abia State in the north, Cross River State in the east, Rivers State in the west and the Atlantic Ocean in the south. The state has 31 Local Government Areas and 6 ADP (Agricultural Development Project) zones viz: Abak, Oron, Etinan, Ikot Ekpene, Eket and Uyo.

This study was conducted in the rainforest zone which has two seasons: the short dry and the rainy season. The range of the annual precipitation in the area is 2000-- 3000mm. The majority of the rural people in the study area are farmers and the cultivated crops include oil palm, cassava, cocoyam, yam, okra, fluted pumpkin, bitter-leaf, waterleaf, etc. Also, some micro livestock are raised at backyards of most homesteads.

For this study, primary data were used and the basic cross sectional data from 150 rural farming households were collected using farm-level intensive itinerary survey. Data collection were accomplished through structured questionnaire. The data were mainly on socio-economic characteristics of households, household income and expenditure, and their heads, farm specific variables.

For selecting the representative farm households, multi-stage sampling was used. First, we randomly selected 3 out of the 6 ADP Zones in Akwa Ibom State. Then, we randomly selected 5 villages per ADP zone and came up with a total of 15 villages. In addition, a total of 10 households were selected randomly to come up with a total of 150 households.

## 2.2. Analytical techniques

To quantitatively assess poverty in the study area, Foster, Greer and Thorbecke (FGT) weighted poverty index was employed (Foster et al., 1984). The cause for this choice was its decomposability of the population into mutually exclusive sub-populations. This allowed us to compare poverty among various sub-groups which were mutually exclusive. United Nations UN (2001) mentioned that an important aim of a poverty measure is to perform poverty comparison.

The FGT measure for the subgroup *i*th  $P\alpha_i$  is given as:

$$P\alpha_i = n^{-i} \sum_{j=1}^{q_i} \left( \frac{z - Y_{ji}}{z, O \max} \right)^\alpha \dots\dots\dots 1$$

where

- $P\alpha_i$  = weighted poverty index for the *i*th subgroup
- $n_i$  = total number of households in the *i*th subgroup households in poverty
- $Y_{ji}$  = per adult equivalent expenditure of household *j* in sub group *ij*
- $z$  = poverty line
- $\alpha$  = the degree of concern

When  $\alpha$  is equal to zero, it implies no concern and for the incidence of poverty the equation gives the head count ratio (the proportion of the farming households that are poor).

That is

$$P\alpha_i = ni^{-1} \sum_{j=1}^{qi} \left( \frac{z - Y_{ji}}{z, O \max} \right) = qi/ni \dots\dots\dots 2$$

When  $\alpha$  is equal to 1, it shows uniform concern and then

$$P_{1i} = ni^{-i} \sum_{j=1}^{qi} \left( \frac{z - Y_{ji}}{z, O \max} \right)^1 \dots\dots\dots 3$$

This can measure the poverty depth (the proportion of expenditure shortfall from the poverty line) which is otherwise called the poverty gap the average difference between the income of the poor and the poverty line (Hall and Patrinos, 2005).

When  $\alpha$  is equal to 2, the distinction between the poor and the poorest can be made (Foster et al., 1984; Assadzadeh and Paul, 2003). Then

$$P_{2i} = ni^{-1} \sum_{j=1}^{qi} \left( \frac{z - Y_{ji}}{z, O \max} \right)^2 \dots\dots\dots 4$$

The equation obtains a distribution sensitive FGT index which is called the poverty severity. It shows the extent of the distribution of expenditure among the poor.

The following equation gave us the FGT measure for the whole group or population:

$$P_\alpha = \sum_{i=1}^m \frac{P\alpha_i n_i}{n} \dots\dots\dots 5$$

where

- $P\alpha$  = weighted poverty index for the whole group
- $m$  = the number of subgroups while
- $n$  and  $n_i$  = the total number of households in the whole group and the  $i$ th subgroup, respectively.

The following equations was used to determine the contribution ( $C_i$ ) of each subgroups weighted poverty measure to the whole groups weighted poverty measure;

$$C_i = \frac{n_i P\alpha_i}{n P\alpha} \dots\dots\dots 6$$

The test of significance of  $P\alpha_i$  (subgroup poverty measure) relative to the  $P\alpha$  (whole group poverty measure) was given according to Kakwani (1993) by the following equation to check whether there is a significant difference between the  $P_\alpha$  measure of a subgroup  $i$  with another  $j$ ..

$$t = \frac{P_{\alpha}i - P_{\alpha}}{SE(P_{\alpha}i)} \dots\dots\dots 7$$

Microsoft Excel Package was used to calculate the weighted poverty measures (Pα) and their corresponding standard errors.

The descriptive statistics used for this study include graphical analysis and frequency distribution. Graphical analysis was used in the stochastic dominance analysis. The stochastic dominance analysis relies on the cumulative distribution function and poverty lines in order to see the sensitivity or otherwise of the Pα measure to changes in poverty threshold. Frequency distribution was used to show the occurrence of a given sample grouped into classes.

Following World Bank (1996), the poverty line used for this study is defined as the two - thirds of mean household expenditure (adult equivalent). But Similer et al. (2004) argued that since children’s food requirements are less than those of adults; (the opposite may be true for other goods and services, such as education), consumption is sometimes expressed in adult equivalent units (AEU).

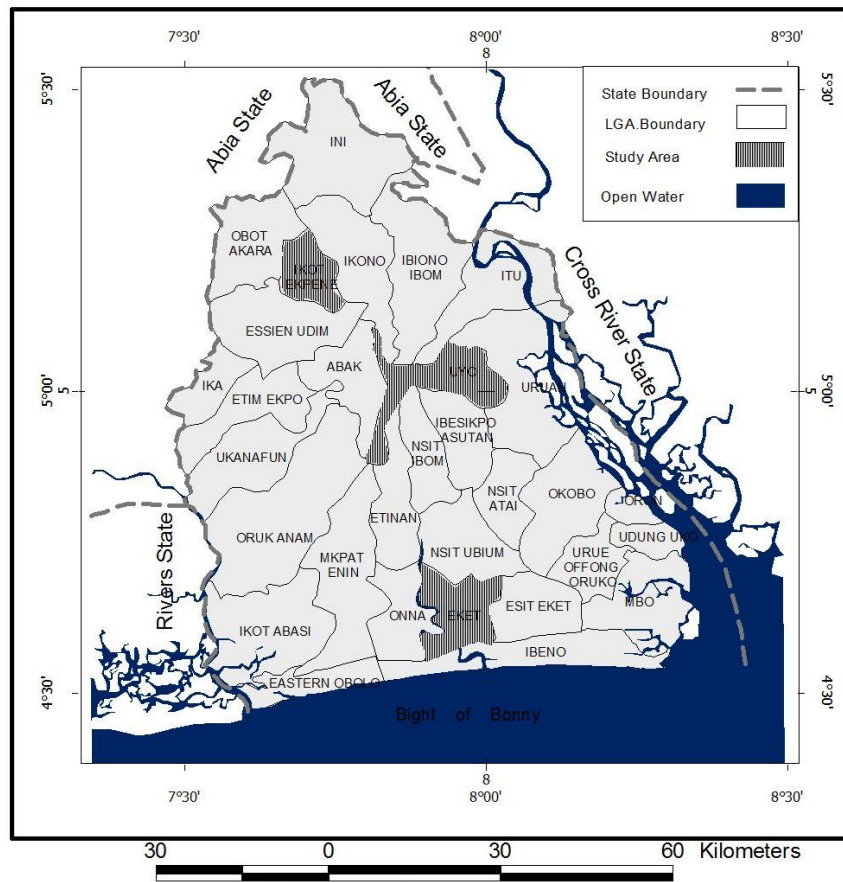


Figure 1. Akwa Ibom State Showing ADP sampled local government areas

### 3. Results and discussion

#### 3.1. Derivation of the poverty line

**Table 1.** Mean Household expenditure (Adult equivalent)

<b>Item</b>	<b>Amount (N) Per month</b>	<b>Percentage expenditure</b>
Food	677.34	53.58
Clothing	201.30	15.92
Healthcare/medication	134.34	10.63
Education	107.00	8.47
Energy	144.11	11.40
Total	1264.09	100

In the analysis of poverty the first step is to determine the poverty line. Table 1 shows the average amount expended on basic consumption items of the farm households in the study area. The mean per adult equivalent household expenditure is ₦1264.09 and the poverty line is ₦842.73.

Results on Table 2 shows the comparison of poverty by household size. Farm households were decomposed into 3 sub-groups viz 1-5, 6-10 and 11-15 members. Whereas 28 percent of households with less than 5 members were poor, 72 percent of households with more than 10 members were in poverty. Results reveal that all the three sub-groups' poverty incidence were statistically significant ( $P < 0.10$ ). This means that poverty incidence in the 3 sub-groups are different from that of whole group. The results of the analysis on Table 3 further reveal that there are significant differences in the poverty incidence of all the possible pairs of household size ( $P < 0.10$ ). This implies that the incidence of poverty is influenced by the household size. The contribution of 1-5 members sub-group to the whole group's poverty incidence is 4 percent whereas it is 41 and 55 percent for the 6-10 and 11-15 members sub-groups respectively. In general, results show that as the household size increases, the extent of poverty as well as their contribution to the whole group poverty also increases. The reason may be attributable to the fact that increased household sizes imply more dependents who rarely contribute to household income.

Findings are however synonymous with World Bank (1991), Lanjouw and Ravallion (1994), Schubert (1994), World bank (1996), Dercon and Krishnan (1998), Similer et al. (2004) and Edet and Etim (2013).

Since greater household size imply more dependents, households were further decomposed by dependency ratio into four classes as shown in Table 4. Results show that the incidence of poverty was lowest (32 percent) in households without dependents and highest (80 percent) in households with dependency ratio above one. Result is consistent with earlier findings by Musgrave (1980); FOS (1999) that a larger sized household is associated with greater poverty incidence. Fifty-one percent of households with dependency ratio of one and less than one were poor respectively. The t-values of two sub-groups (namely zero and above one dependency ratio) poverty incidence were significant ( $P < 0.10$ ). The contribution to the

whole group's incidence are 11, 29, 15 and 45 percent respectively by households with zero, less than one, exactly one and above one dependency ratio.

**Table 2.** Comparison of Poverty by Household Size

Household Size	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Contribution to		
				P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>
1 – 5	0.28 (-3.81)***	0.08 (-2.51)**	0.06 (-2.91)**	0.04	0.04	0.06
6 – 10	0.51 (2.11)**	0.25 (0.82)	0.28 (0.21)	0.41	0.41	0.38
11 – 15	0.72 (1.72)*	0.53 (0.13)	0.51 (3.21)***	0.55	0.55	0.56
All	0.57	0.48	0.44	1.00	1.00	1.00

Figures in parentheses are t-values of  $P \propto$  \*\*\*Significant at 1%, \*\* at 5%, \* at 10%

**Table 3.** Poverty by Household Size

Household Size	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>
1-5 vs 6-10	-5.13***	-2.51**	-2.62**
1-5 vs 10-15	-4.52***	-3.18***	1.13
6-10 vs 11-15	-1.98*	2.53*	-2.69***

\*\*\*Significant at 1%, \*\* at 5%, \* at 10%

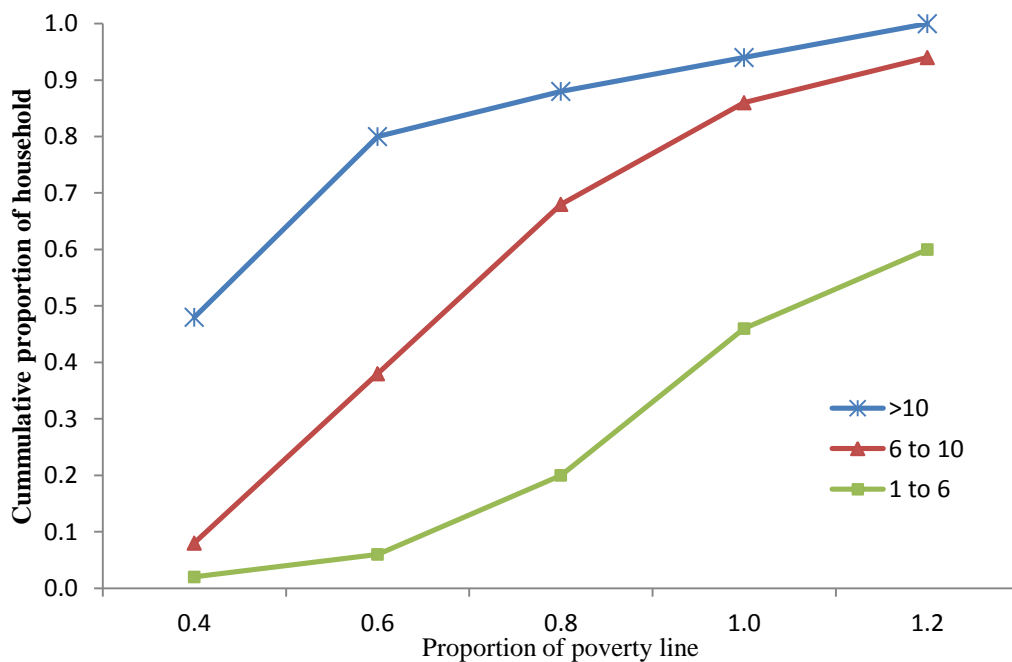
Table 5 shows that all the possible sub-groups of dependency ratio were significant ( $P < 0.01$ ) in poverty incidence except zero versus one dependency ratio and 0.01 – 0.99 versus one dependency ratio. This implies that the incidence of poverty is influenced by the dependency ratio.

Generally, the extent of poverty was highest among households with more than one dependency ratio and least among households with zero dependency ratio. The reason for this may be attributable to the fact that the more the dependency ratio, the more likely is the burden of the jobless household members on those employed and hence poverty increases with increased dependency ratio. This is particularly so today where children's contribution to family labour has been reduced due to need for children to acquire basic education and skills which take substantial and greater part of their time.

**Table 4.** Comparison of Poverty by Dependency Ratio

Dependency Ratio	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Contribution to		
				P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>
Zero	0.32 (1.88)*	0.27 (-0.21)	0.29 (-1.90)*	0.11	0.11	0.10
0.01 -0.99	0.51 (0.67)	0.47 (0.04)	0.53 (0.06)	0.29	0.29	0.28
1.0	0.51 (0.50)	0.48 (0.00)	0.51 (0.03)	0.15	0.14	0.14
1.0-2.0	0.80 (2.54)***	0.71 (2.08)**	0.69 (1.24)	0.45	0.46	0.48
All	0.57	0.48	0.44	1.00	1.00	1.00

Figures in parentheses are t-values of P ∝ \*\*\* Significant at 1%, \*\* at 5%, \* at 10%



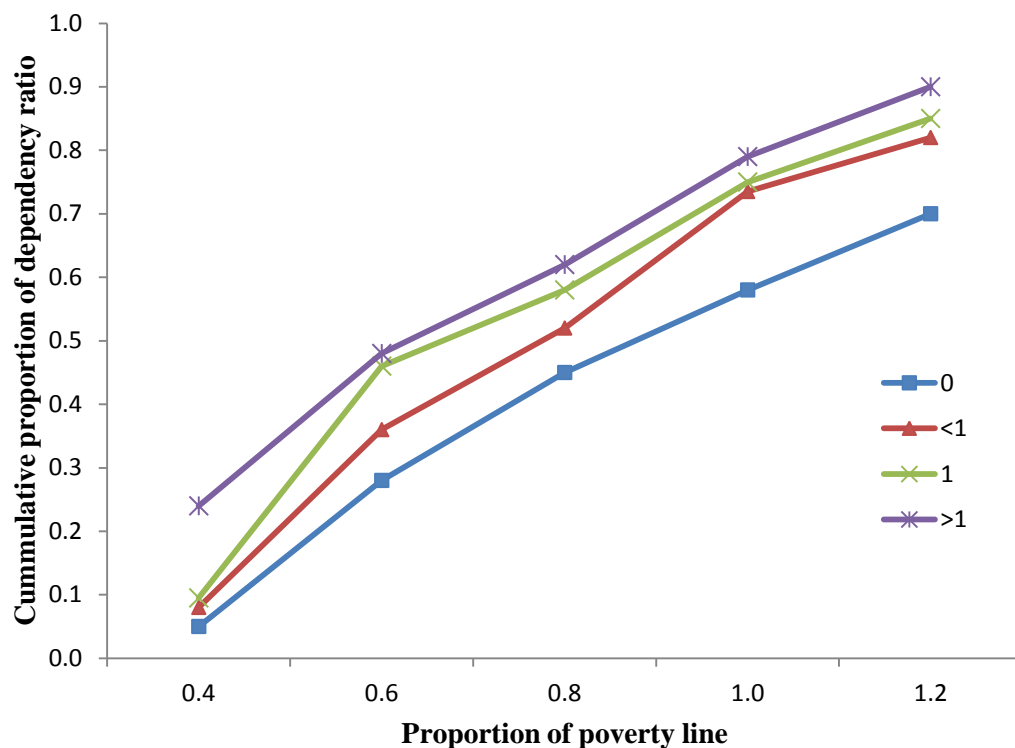
**Figure 2.** CDFs of individual PAEE by household size



**Table 5.** Poverty by Dependency Ratio

Dependency Ratio	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>
Zero vs 0.01 – 0.99	-9.50***	-1.67*	0.32
Zero vs 1.0	-1.12	-0.21	0.25
Zero vs 1.0 – 2.0	9.60***	-0.65	5.71***
0.01 – 0.99 vs 1.0	0.00	0.08	-0.17
0.01 – 0.09 vs 1-2.0	4.14***	-0.43	-0.23
1.0 vs 1.0 – 2.0	5.80***	-0.33	-0.22

\*\*\*Significant at 1%, \*\* at 5%, \* at 10%.



**Figure 3.** CDFs of individual PAEE by Dependency

#### 4. Conclusion

The role of family size in poverty reduction among rural farmers cannot be overemphasized. The study was conducted to show the extent of poverty among different family size sub-groups. Using the Foster, Greer, Thorbecke weighted poverty index and the stochastic dominance analysis. Results of the study indicated that poverty levels increased with larger size of households. Findings also show that the severity of poverty also

follow similar trend. Results suggest the need for policy concerns to focus more on birth control measures as a check for increasing population and panacea for poverty reduction.

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