

Original research paper

**FACTORS DETERMINING URBAN POVERTY OF FARMING
HOUSEHOLDS IN A TROPICAL REGION**

ABSTRACT

The study identified and estimated the factors that determine urban poverty using the Tobit regression model. The study was conducted in Uyo, the capital city of Akwa Ibom State, Niger Delta Region, Nigeria between February 2012 and July 2012. With the aid of questionnaire, primary data were obtained from 120 farming households using multi-stage sampling procedure. The participatory research involved 80 males and 40 females. Data were subjected to Tobit regression analysis. Results of Tobit regression showed that whereas sex of household head, farm size, ownership of assets, farm income, access to extension services and modern farming input, were inversely related to poverty depth; depending ratio, years of farming experience and marital status were directly related to poverty. Result further revealed that farm size, ownership of certain assets, access to modern farming inputs and farm income were negative but significant ($P < .01$). Dependency ratio and household heads farming experience were positively related to poverty depth and significant ($P < .05$) whereas access to extension services and sex of household heads were negatively related to poverty level and significant ($P < .05$). Expanding the size of cultivable lands, raising incomes from farming activities, and increasing the size of residential apartments could decrease the probability of being poor. Reducing the number of dependent household members and ensuring ready availability and accessibility of basic amenities like water supply and health facilities to urban households are some measures that could curb the likelihood of poverty in the region.

Keywords: Poverty, urban, households, Nigeria

1. INTRODUCTION

Of the world's 6 billion people, 2.8 billion live on less than US\$2 a day and 1.2 billion live on less than US\$1 a day and Sub-Saharan Africa has the highest poverty rates in the world [1]. Nigeria is one of the most resource endowed nations in the world but the country is among the poorest in the world [2]. Thus, there is a persisting paradox of a rich country inhabited by poor people which has been the subject of great concern for many years, but more especially in the last decade. The human poverty index HPI-I value for Nigeria of 38.8% by [3] ranks the country 75th among 103 developing countries. The bitter reality of the Nigerian situation is not only that poverty is rising by the day, but that more than 4 out of every 10 Nigerians live in conditions of extreme poverty of less than US\$1 per day. This amount of money will barely provide for a quarter of the nutritional requirements for healthy living [4]. The above revelation are shocking and worrisome considering the quantum of natural and human resources that abound in the country. This is a paradoxical situation, which was tagged "Poverty in the midst of plenty" by [5]. Although poverty is a rural phenomenon as most of the poor reside in the rural areas [6]; [7]; [8], the share of poor living in urban areas is rising with urbanization and more rapidly than for the population as a whole [9]. Sixty percent of urban growth are due to natural growth (i.e. a higher birth than death rates) while 40 percent are due to rural-urban migration and area expansion [10]. Rural-urban migration is often caused by a mix of pull and push factors. According to [11], pull factors make cities attractive to rural migrants. Cities often offer higher wages and better employment options, particularly for women, better and greater availability of services like health care, education, than rural areas. Cities also center on modern living and offer large varieties of cultural and social opportunities. [12] also reported that displacement by conflict, population pressure and stigma are some pull factors that causes rural-urban drift [11]. Akwa Ibom State, one of the six states that make up the Niger Delta region of Nigeria has witnessed unprecedented, uncommon and massive infrastructural development transformation within the past decade. This has caused astronomical influx of ruralities into the already populated urban areas. As rural exodus increase, these infrastructure and services cannot absorb the ever increasing number of people. This has led to the development of urban slums which manifest as overcrowded settlements with poor human living conditions. These poor living conditions manifest in poverty [13]. Consequently, for these households to increase their incomes and purchasing power, and in order to meet the food requirements of the increasing population, their poverty situation has to be curbed. But to formulate policies and develop programmes aimed at combating the ravaging woes of poverty, an understanding and study of the specific determinants of poverty of urban households is imperative. This however requires identifying the factors which influence urban poverty in the region.

2 METHODOLOGY

2.1 Study Area

The study was conducted in Akwa Ibom State, Nigeria. The state is located at latitude 4°32¹ and 5°32¹ North of the Equator and longitudes 7°28¹ and 8°25¹ East of the Greenwich Meridian and occupies a total land area of 7,246Km². With an estimated population of 3.9 million [14], the state is bounded to the North by Abia State, to the East by Cross River State, to the West by Rivers State and to the South by the Atlantic Ocean. For administrative convenience, the state is divided into 31 Local Government Areas and has 6 Agricultural Development Project (ADP) Zones viz: Oron, Abak, Ikot Ekpene, Etinan, Eket, Uyo. The study area is in the tropical rainforest region and has two distinct seasons viz: the rainy and short dry season. The annual precipitation ranges from 2000-3000mm per annum. Most of the inhabitants of urban communities in the study area are government employees, artisans and farmers who grow crops such as cassava, oil palm, yam, cocoyam, fluted pumpkin, okra, water-leaf, bitter leaf. In addition, some micro livestock are usually raised at backyards of most homesteads.

2.2 Data Source and Method of Data Collection

Primary data were used for this study and farm level intensive itinerary survey provided the basic cross-sectional data from 120 rural farming households in the study area. Data were collected from farming household heads for a period of 6 months using questionnaire. Primary data included data on household income, demographic, socio-economic characteristics of households heads, farm specific variables, environmental and living condition variables.

2.3 Sampling Procedure

Multistage sampling technique was used for selecting the representative urban households that were used for this study. The first stage was the random selection of 3 out of the 6 Agricultural Development Project (ADP) zones which are typically urban in Akwa Ibom State, Niger Delta, Nigeria. The second stage sampling was the random selection of 40 households per ADP zone to make a total of 120. The participatory research involved 80 males and 40 females.

2.4 Analytical Techniques

The Tobit regression, a hybrid of the discrete and continuous dependent variable was used to determine the impact of the explanatory variables on the probability of being poor. The model is expressed based on [15].

$$\begin{aligned} q_1 &= P_1 = X_i\beta + e_i \text{ if } P_i > P_i^* \\ &= 0 = X_i\beta + e_i \text{ if } P_i \leq P_i^* \\ i &= 1, 2, \dots, 120 \end{aligned} \quad (1)$$

Where q_1 is the dependent variable. It is discrete when the households are not poor and continuous when they are poor. P_i is the poverty depth/intensity defined as $(Z - Y_i/Z)$ and P_i^* is the poverty depth when the poverty line (z) equals the expenditure per adult equivalent. X_i is a vector of explanatory variable, β is a vector of unknown coefficient and e_i is an independently distributed error term.

The explanatory variables specified as determinants of urban poverty are:

- X_1 = Sex of the household head (D=1 if female, O if otherwise)
- X_2 = Age of the household head in years
- X_3 = Marital status of the household head (D=1 if married, O if otherwise)
- X_4 = Dependency ration (measured as ratio of the number of dependent household members younger than 12 years or older than 70 years old divided by the number between 12 and 70 years)
- X_5 = Tertiary Education (measured as number of years spent in tertiary institution)
- X_6 = Secondary Education (measured as number of years spent in secondary school)
- X_7 = Primary Education (measured as number of years spent in primary school)
- X_8 = Membership of household head in social organization (D=1 if yes, O if otherwise)
- X_9 = Asset Ownership (D=1 if yes, O if otherwise)
- X_{10} = Farming experience in years
- X_{11} = Farm size in hectares
- X_{12} = Off farm income in Naira
- X_{13} = Farm income in Naira
- X_{14} = Labour employed in all farm enterprises in mandays
- X_{15} = Agricultural loan in Naira
- X_{16} = Agricultural Enterprise (D=1 if crop only, O if otherwise)
- X_{17} = Access to Extension Service (D=1 if yes, O if otherwise)
- X_{18} = Access to modern farming input (D=1 if yes, O if otherwise)
- X_{19} = Rooms per person (Number of rooms per household member)
- X_{20} = Walking time to the nearest water source in minutes
- X_{21} = Walking time to the nearest health facility in minutes
- X_{22} = Walking time to the nearest market in minutes

The empirical model above was used to draw economic implications for poverty reduction strategies for urban farming households in Akwa Ibom State, Nigeria. Following a Tobit Decomposition Framework suggested by [16] and adapted by [7], the effect of changes in the explanatory variables (X_i) on the probability of being poor and the depth or intensity of poverty were obtained for urban farming households in the study area.

Let the expected value of the dependent variable across all observation be represented as $E(q_i)$, the expected value of the dependent variable conditional on the farm households being below the limit (zero poverty depth) be given as $E(q_i^*)$ and the probability of the farm household being the threshold (i.e. probability of poverty) be represented as $F(z)$ where z is $X\beta/\sigma$. The relationship between the variables are shown to be

$$E(q_i) = F(z) E(q_i^*) \quad (2)$$

For a change in the level of the independent variables, the effect on farm household poverty was broken down into two parts by differentiating equation (2) with respect to the specific poverty attribute changes shown in equation (2)

$$\delta E(q_i)/\delta X_i = F(z) [\delta E(q_i^*)\delta/X_i] + E(q_i^*) [\delta F(z)\delta X_i] \quad (3)$$

Multiplying through by $X_i/E(q_i)$, the relation in equation (3) was converted into elasticity forms as shown below:

$$\frac{\delta E(q_i)}{\delta X_i} \cdot \frac{X_i}{E(q_i)} = F(z) \cdot \frac{\delta E(q_i)}{\delta X_i} + E(q_i^*) \cdot \frac{\delta E(z)}{\delta X_i} \cdot \frac{X_i}{E(q_i)} \quad (4)$$

Rearranging equation (4) by using equation (2) we have

$$\frac{\delta E(q_i)}{\delta X_i} \cdot \frac{X_i}{E(q_i)} = \frac{\delta E(q_i^*)}{\delta X_i} \cdot \frac{X_i}{E(q_i^*)} + \frac{\delta E(z)}{\delta X_i} \cdot \frac{X_i}{F(z)} \quad (5)$$

Equation (5) shows that the total elasticity of a change in the level of any independent variable consist of 2 effects:

- (i) the change in the elasticity of poverty intensity for the poor households; and
- (ii) the change in the elasticity of the probability of being in poverty. These elasticities were therefore computed from equation (5) above.

3 RESULTS AND DISCUSSION

3.1 Determinants of Urban Households

In estimating the determinants of poverty among urban households, censored regression model made up 22 regressors was specified. The result shows that sigma (σ) 0.3843 with a z-value of 3.4010 is statistically significant ($P < .01$). This indicates that the model has a good fit to the data. The intercept is 0.5218 representing the poverty depth among urban households.

The analysis reveals that the coefficient of the sex of households' head is -0.0718. This implies that relative to the male-headed households, the level of poverty depth (0.5218) will be reduced by 0.0718 for female-headed households. Hence, having a poverty depth of 0.4500 as against 0.5218 for male headed households. This could be attributed to the fact that women are often engaged and involved in various off-farming and income generating activities that tends to increase their incomes.

The coefficient of the intercept dummy of the marital status of households head is 0.0323. This shows that the poverty level of households headed by married persons will be increased by 3.23 percent to become 0.5541 while households headed by unmarried persons will remain as 0.5218. This is so as married household heads' have a larger household size than the unmarried ones, which subsequently raises the dependency ratio.

The elasticity of dependency ratio is 0.1509, implying that a unit increase in the dependency ratio will raise the poverty depth by 15.09 percent. This is obvious since most dependents particularly children contribute less to family labour and income. The family on the other hand, spends money in educating and training them in school and crafts respectively. Result is in conformity with earlier empirical studies by [17]; [18]; [19]; [20]; [7]; whose findings showed that a larger sized household is associated with greater incidence of poverty.

The coefficient of tertiary education is -0.0718. This implies that the poverty depth is decreased by 7.18 percent for individuals in families whose heads have tertiary education to become 0.45. Household heads without formal education have a poverty depth of 0.5218. This may be due to the fact that highly educated household heads have the tendency to adopt improved farming techniques earlier and faster than the educated ones. This raises the productivity and incomes of the educated heads with subsequent improvement in welfare.

The coefficient of secondary education is -0.0252. This means that households whose heads have secondary educational attainment will have a lower poverty depth of 0.4966 relative to 0.5218 for those whose heads lack formal education. Again, the reason may be that educated household heads have a higher receptivity to new methods of agricultural production.

Primary education has a coefficient -0.0089. This means that the level of poverty will be reduced by 0.0089 for individuals whose head of households have primary education to become 0.5129 as against 0.5218 for individuals whose heads have no formal education. This result is synonymous with earlier empirical findings by [21] and [5] that people with low levels of human capital that is people among whom the rate of illiteracy is high and school education is low are particularly prone to be poor.

The ownership of certain assets by farming households also significantly affect the level of poverty. The elasticity of the intercept dummy for assets ownership is -0.2815 and significant ($p < .01$) implying that the depth of poverty is 0.2403 whereas it is 0.5218 for households lacking these assets. It means that the level of poverty is likely to be reduced with the ownership of these assets. This may be attributable to the fact that these assets indirectly provide cost savings in housing and transportation. Besides, during periods of financial difficulty, cars can be commercialized to generate money and houses used as collateral to obtain loan for business venture.

The regression coefficient for years of farming experience of the household head is 0.3902 and is positive significant ($P < .05$) meaning that a year increase in farming experience of the head of household will result in 0.3902 unit increase in poverty depth. This could be attributed to the fact that as the years of farming experience increase, the age of these households also increase. And since agricultural labour involve a lot of drudgery, the strength available for such work decreases as the experience in farming increases. This result in a reduction of farm holding with consequent reduction in farming income and increase in poverty. Farm size would be decreased as farming experience increases due to the paucity of labour in urban areas.

The variable farm size has a regression coefficient of -0.1356 and is significant ($P < .01$). This means that a hectare rise in farm size would decrease poverty depth by 0.1356. Since the quantity of farm output relates directly with the land area under cultivation, an increase in output would therefore cause a rise in income with consequent welfare improvement.

Farm income variable with an elasticity of 0.0522 is negative and significant ($P < .01$). The result is an indication that for every naira increase in farm income, the level of poverty will be reduced by 0.0522. Farm households are likely to generate more income and improve their wellbeing since an increase in the level of income accruable to them from farming activities increases the capacity to consume more and re-invest in farming and other economic activities.

The variable extension services with an elasticity of 0.1006 was negative as expected and statistically significant ($P < .05$). Result implies that poverty depth will be reduced by 10.06 percent to give 0.4212 for households having access to extension services as against 0.5218 for households without access to technical assistance.

The coefficient of modern farming inputs of -0.3078 is negative and significant ($P < .01$). This means that poverty depth will be decreased by 30.78 percent to become 0.214 for households having access to modern farming inputs. The poverty level for households without access to modern farming inputs is 0.5218. The reason for this is because the use of

improved farming inputs invariably increases the yield of farmers which raises farm income and improves wellbeing.

The elasticity of -0.2100 for the variable rooms per person is significant ($P < .01$) implying that a room increase per person will decrease the level of poverty by 0.2100 units. The reason for this is because overcrowded houses coupled with larger household are linked to poor households who lack the financial capacity to acquire larger houses or rent spacious apartment. This invariably increases the likelihood of poverty.

The walking time to nearest water source has a regression coefficient 0.414 meaning that for every minute increase in the walking time to the nearest water source, poverty depth will be increased by 0.0414 units. Hence, the nearer a household is located to water source, the less poor the household is likely to be.

The elasticity of walking time to the nearest health facility is 0.0831 and is significant ($P < .10$) meaning that the level of poverty will be increased by 0.0831 unit provided there is a minute increase in the walking time to the nearest health facility. This may be attributed to the fact that households located nearer health facilities have a higher propensity to access these facilities more readily than those farer from these facilities who may be incapacitated due to deplorable nature of roads and high transportation cost.

Table 1: Maximum likelihood estimates of the determinants of urban poverty

Variable	Coefficient	Standard Error	z-value
<u>Demographic</u>			
Sex of Household Head (X_1)	-0.0718	0.0335	-2.1433**
Age of Household Head (X_2)	0.0121	0.0281	0.4306
Marital Status of Household Head (X_3)	0.0323	0.0085	3.8000**
Dependency Ratio (X_4)	0.1509	0.0631	2.3914**
Tertiary Education (X_5)	-0.0718	0.0233	-3.0815***
Secondary Education (X_6)	-0.0252	0.0082	-3.0732***
Primary Education (X_7)	-0.0089	0.0048	-1.8542*
<u>Socio-Economic</u>			
Membership of Social Organization (X_8)	0.3131	0.4411	0.7542
Asset Ownership (X_9)	-0.2815	0.0695	-4.050***
<u>Farm Specific</u>			
Farming Experience (X_{10})	0.3902	0.1562	2.4981**
Farm Size (X_{11})	-0.1356	0.0333	-4.0721***
Off-Farm income (X_{12})	-0.0093	0.0152	-0.6118
Farm income (X_{13})	-0.0522	0.0113	-4.6195***
Labour employed (X_{14})	-0.0287	0.0183	-1.5683
Agricultural Loan (X_{15})	-0.6613	0.4621	-1.4311
Type of Enterprise (X_{16})	0.0775	0.0544	1.4246
Access to Extension Services (X_{17})	-0.1006	0.0423	-2.3783**
Access to Modern Farming Inputs (X_{18})	-0.3078	0.1150	-2.6765***
<u>Environmental</u>			
Rooms per person (X_{19})	-0.2100	0.0694	-3.0259***
Walking time to nearest water source (X_{20})	0.0414	0.0172	2.4070**
Walking time to nearest health facility (X_{21})	0.0831	0.0500	1.6620*
Walking time to nearest market (X_{22})	0.1121	0.0962	1.1653
Constant	0.5218	0.2017	2.5870***
Sigma (σ)	0.3843	0.1127	3.4010***

Source: Tobit Regression Results, 2012

***, **, * denote significance at 1%, 5% and 10%

3.2 Elasticity of Poverty in Urban Households

The response of urban households poverty to changes in every significant factor influencing it is better captured when expressed in percentage rather than the unit of measurements of the variable. Following the Tobit decomposition framework suggested by [16], the effect of changes in the explanatory variables (X_i) on the probability of being poor and the intensity of poverty were obtained as stated in the methodology. Table 2 shows the coefficients of the elasticities of the probability and intensity.

The elasticity of poverty with respect to dependency ratio is 0.1541 meaning that 100 percent rise in dependency ratio would lead to 15.41 percent rise in the probability of poverty (inelastic). The responsiveness of the intensity of poverty to a rise in dependency ratio is 0.0368 and is inelastic. This implies that 100 percent increase in dependency ratio would raise the intensity of poverty by 3.68 percent. The analysis reveals that an increase in dependency ratio increases the probability of poverty than its intensity.

The elasticity coefficient of the probability of being poor due to increase in household heads' years in farming is 0.2062 (inelastic) meaning that for 100 percent increase in farming experience, the probability of poverty depth increases by 20.62 percent. Similarly, a 100 percent rise in years of farming results in 11.30 percent increase in the intensity of poverty (inelastic). An increase in years of farming increases the probability of poverty more than its intensity.

The coefficient of elasticity of the probability of poverty to increase in farm size is -0.034 and is inelastic. Result implies that for every 100 percent increase in farm size, the probability of being poor is decreased by 3.34 percent. The elasticity of the intensity of poverty among urban households with respect to farm size is -0.0128. This means that poverty intensity can be reduced by 1.28 percent provided the size of farmland is increased by 100 percent. Both elasticity coefficients shows that they are inelastic to increase in farm size but on the whole, an increase in farm size results in a higher percentage reduction in the probability of being poor than its intensity.

The elasticity coefficient of the probability of poverty to increase in farm income is 0.2411 and is inelastic. This means that a 100 percent rise in farm income leads to 24.11 percent reduction in the probability of being poor. Conversely, the intensity of poverty has an elasticity coefficient of -0.2130, implying that intensity of poverty will be reduced by 21.30 percent if income rises by 100 percent. Irrespective of the inelastic nature of both probability and intensity of poverty, an increase in farm income decreases the probability of poverty more than its intensity.

The elasticity coefficient of the probability of poverty to an increase in number of rooms per person is -1.0062 implying that the probability of poverty will be curbed by 100.62 percent provided number of rooms per person is increased by 100 percent. This is the case of unitary elasticity. But the elasticity coefficient of the intensity of poverty as a result of increase in number of rooms per person is -0.3093. This means that for every 100 percent increase in rooms per individual, the intensity of poverty will decrease by 30.93 percent. The analysis reveals that an increase in the number of rooms per person decreases the probability of being poor more than its intensity.

The elasticity coefficients of the probability of poverty as a result of increase in walking time to nearest water source and health facility are 0.2500 and 0.0812 respectively. This implies that every 100 percent increase in the walking time taken to reach the nearest water source and health facility will result in 25 and 8.12 percent increase in the probability of poverty among urban households. Conversely, the intensity of poverty has elasticity coefficients of 0.1273 and 0.0351 due to increase in walking time taken to reach the nearest water source and health facility respectively. Results imply that if the walking time taken to reach the nearest water source and health facility are increased by 100 percent, the intensity of poverty will be increased by 37.73 and 11.63 percents respectively. Although the coefficients are inelastic, the probability of being poor responded more to increases in walking time taken to reach both the nearest water source and health facility.

Table 2: Coefficients of elasticities of probability and intensity of urban poverty among farming households

Variables	Elasticities of		Total Elasticity
	Probability of Poverty	Intensity of Poverty	
Dependency Ratio	0.1541	0.0368	0.1909
Farming Experience	0.2062	0.1130	0.3192
Farm Income	-0.2411	-0.2130	-0.4540
Farm Size	-0.0334	-0.0128	-0.0462
Rooms per Person	-1.0062	-0.3093	-1.3155
Walking time to nearest water source	0.2500	0.1273	0.3773
Walking time to nearest health facility	0.0812	0.0351	0.1163

Source: Derived from the Result of Tobit Regression, 2012

4. CONCLUSION

Results of the study reveal that the critical factors evaluated as determinants of urban poverty in the region were sex, marital status of household head, dependency ratio, education, asset ownership, farming experience, farm size and income, access to extension services and modern farming techniques, rooms per person, walking time to nearest water source and health facility. Findings also show that the probability of being poor responded more to increase in years of farming experience, dependency ratio, walking time to the nearest water source and health facility than its intensity whereas the probability of poverty responded less to increase in size of farm land, farm income and number of rooms per person decreased the probability than its intensity. Result underscores the need for appropriate policy intervention to encourage the ownership of comfortable and affordable houses.

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