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Determinants of Households' Poverty and Vulnerability in Bayelsa State of Nigeria

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ABSTRACT: *This paper analyzed household poverty and vulnerability to poverty in Bayelsa state of Nigeria using National Bureau of Statistic 2009-10 NLSS data. A poverty line of N22393.62 was constructed. Results from FGT model showed poverty incidence, gap and severity to be 25, 14.26 and 8.6 percents respectively. Out of the total population 59.73% were vulnerable. Whereas 34.35% constituted vulnerable people from non-poor households (transient poverty) 25.38% were vulnerable people from poor households (chronic poverty). While the Odds ratios after the logistic regression showed that the major determinants of poverty in Bayelsa state were household size, per capita expenditure on education, per capita expenditure on health and per capita expenditure on food, the marginal effect after tobit showed that together with the determinants of poverty households with more people between the ages of 15 and 60, female headed, primarily engaged in the agricultural sector, and being headed by people with lesser years of schooling are the important determinants of vulnerability. Therefore to guard against vulnerability women empowerment, subsidization of agricultural inputs, provision of unemployment benefits/grants, social overhead for the aged, etc was recommended.*

KEYWORDS: *Determinants of Households Poverty, Logistic Regression Model, Three-Stage Feasible Generalized Least Squares, Tobit Regression Model, Vulnerability Index*

JEL CLASSIFICATION: *C21, C24, C25, I32*

I. INTRODUCTION

In Nigeria, the issue of poverty has been a very serious one, especially when one looks at the vast wealth the country controls, which has qualified the situation to be paradoxically described as suffering in the midst of plenty. Apart from overwhelming evidence, which suggests that, the country belongs to the group of the lower-income countries (GNP per capita of $US269 at PPP in 2000), the incidence of poverty has continued to rise with each passing day. Thus, poverty incidence that was just 15 percent of the population in 1960 rose to 28.1% in 1980 and further to 43.6% in 1985. The incidence of poverty dropped minimally to 42% in 1992 only to rise to 67% in 1996, 74.2% in 2000 and 92.5% in 2010 ([1] [2]; [3]; [4]). Supposing, that in 2012 poverty had remained at its 2010 level more than 150 million people would be poor. These scenarios clearly reveal that in absolute or numerical term, the number of poor people is annually increasing which perhaps explains why there have been agitations in various quarters of the country in the form of anti-government groups.

This study focuses on Bayelsa state of Nigeria. Previous poverty reduction programs in Bayelsa state though scanty and scabby, and hijacked by scrupulous individuals did not achieve their objectives and this has raised some important questions. First, does it mean that the state lacks sufficient capacity to mitigate the social risks faced by households and communities? Second, has the state not paid sufficient attention to the issue of risk and uncertainty that are important for the understanding of the dynamics that often lead households to perpetual poverty? Third, is it that those at risk of becoming poor have not been properly targeted? Therefore, to fully address poverty, there is the need for a more comprehensive and disaggregated approach that focuses on vulnerable groups. This becomes important given the diversified nature of risk that households face at the different regions and sectors of the economy. For instance, farming households face serious risks from, degraded land, input shortages, disease outbreak and low prices for agricultural products. Also, some rural and urban areas are known for conflict and communal clashes which has displaced some individuals and communities. Widows often suffer brutality from the hands of their brothers-in-law and social exclusion, and the aged after retirement often find it difficult to support their own lives talk more of catering for a household. Importantly, [5] argued that the need for addressing vulnerability in any human development strategy in conjunction with poverty is twofold. First, not being vulnerable has some intrinsic value. This is because for a person to be considered non-poor, he must not only have enough to live a comfortable life today, but he must

also possess some good prospect today that he will have enough to live a comfortable life tomorrow. Second, addressing vulnerability has instrumental value. Because of the many risks household face, they often experience shocks leading to a wide variability in their income. In the absence of sufficient assets or insurance to smoothing consumption, such shocks may lead to irreversible losses, such as distress sale of productive assets, reduced nutrient intake, or interruption of education that permanently reduces human capital, thereby locking their victims in perpetual poverty.

This study is justified because gaining a thorough understanding of the poor and vulnerable groups is important for the formulation of an effective strategy for reducing poverty and for designing social protection programs. Furthermore, for any poverty alleviation program to thrive, the following questions have to be answered: (i) what proportion of the people are poor? (ii) How far are the poor from the poverty line? (iii) what is the gap between the averagely poor and the poorest poor? (iv) what are the determinants of poverty in the given society? and (v) if there is a shock in the form of a fall in income who is likely to become poor? Putting it differently, who are the vulnerables? Once these questions are answered correctly then one will be able to know who the poor are, where they live, why they are poor and who is at risk of falling into poverty. By examining the incidence, depth, severity, determinants of poverty and vulnerability to poverty in Bayelsa this paper will provide answers to the above questions in the context of concern and contribute to the existing body of knowledge.

This study attempts to pursue three objectives.

[1] To generate the poverty vulnerability indices of the households using expected and variance of consumption expenditures.
[2] To decompose poverty and vulnerability across socio-economic groups using the actual and expected consumption expenditures.
[3] To analyze the factors that explains households' condition of being poor currently and of being expected to be poor in the future.

Expected results from this study are adjudged to be relevant to poverty policy formulation in Bayelsa state for using the most recent national survey data (2010). Also, by decomposing poverty across different socio-economic/demographic groups, using the actual and expected consumption and analysis of factors explaining probability of being vulnerable to poverty, our understanding of socio- economic/demographic groups to be considered as vulnerable groups will be broadened for government interventions through design and implementation of pro-poor reforms.

II. CONCEPTUAL ISSUES AND LITERATURE REVIEW

2.1 Conceptual Issues

2.1.1 Poverty Concept and Measurement Issues

Unarguably, poverty is a multidimensional concept. Poverty encompasses different dimensions of deprivation that relate to human capabilities, including consumption and food security, health, education, rights, voice, security, dignity, and decent work. Whereas [6] contended that the ample variety of poverty situation worldwide has led to an equally large number of essays in terms of definition, measurement, and policies, [7] observed that the complexity of measurement mirrors the complexity of definition. This complexity becomes more severe when participatory methods are used and people are required to define their own indicators of poverty. [8], therefore, explained that the definition of what is meant by 'poverty', how it might be explained, and who constitute 'the poor' are ferociously contested issues.In the heat of the foregoing it is pertinent to point that at the heart of the debate about defining poverty stands the question of whether poverty is largely about material needs or whether it is about a much broader set of needs that permit well-being [8].The former position concentrates on the measurement of consumption, usually by using incomes as a proxy.

The use of the income-poverty approach, or the poverty line, is strengthened by the fact that the majority of national governments and development agencies use the concept for their analyses of poverty and anti-poverty policies ([6]; [1]). But [9] acknowledged that income is an inadequate measurement of welfare. This is because many forms of deprivation which very poor people experience are not captured by income-poverty measures.In addition, research studies have shown that new layers of complexity were added in the 1980s. These include the incorporation of non-monetary aspects, such as powerlessness and isolation, vulnerability to a sudden dramatic decrease in consumption levels, ill-health and physical weakness, social inferiority, and humiliation. Such dimensions of poverty are significant in their own right and are also essential analytical components for the understanding of poverty ([6]; [8]).

Borrowing a leaf from the work of [6], the general definition requires qualification regarding the concepts of absolute and relative poverty. While absolute poverty is theoretically associated to the vital minimum, the concept of relative poverty incorporates the concern with inequality or relative deprivation, where the bare minimum is socially guaranteed. Absolute poverty implies the inability to attain a minimum standard of living or poverty line. [10] defined absolute poverty as "a condition of life degraded by diseases, deprivation, and squalor." On the other hand, the essence of poverty, in relative term, is 'inequality'. This implies that poverty can also be described as relative deprivation [11]. [6], however, notes that the persistence of chronic deprivation of basic needs nowadays makes absolute poverty the obvious priority in terms of definition, measurement, and political action from the international point of view.[12] explains the concept of all-pervasive poverty. According to him, poverty is all-pervasive, where the majority of the population lives at or below income levels sufficient to meet their basic needs, and the available resources, even when equally distributed, are barely sufficient to meet the basic needs of the population. He reiterates further that pervasive poverty leads to environmental degradation. This is because people eat into the environmental capital stock to survive. This, in turn, undermines the productivity of key assets on which the livelihood depends. It should also be noted that where extreme poverty is all-pervasive, state capacities are necessarily weak. The Human Poverty Approach has been advanced by the United Nations Development Programme (UNDP) in its Human Development Reports. UNDP uses this conceptual framework to specify some basic human capabilities, which, if absent, could result to poverty. It includes the capability to "lead a long, healthy, creative life and to enjoy a decent standard of living, freedom, dignity, self-respect, and the respect of others [13].

The measurement index method of conceptualizing poverty has also been recognized in the existing literature ([6]; [7]; [14]). As [15] observed, measuring poverty though a herculean task has become the rule. In terms of measurement, [6] espouse that defining the relevant and operational poverty concepts and choosing the adequate measurement procedures is the result of a sensible and informed analysis of social reality.[6] states further that measuring poverty is a matter of identifying the essential causes of poverty in a given society. Is it widespread and affects the majority of the population or is it locally concentrated? Which are its roots? Is it a traditional syndrome or does it result from economic and technological changes? What are its main features? And who are the poor in terms of some essential characteristics? This overall information on poverty syndrome is the key element for adopting concepts and measurement instruments that seem the most appropriate to a specific context in terms of social reality and data gathering possibilities. In light of the foregoing this study adopts income poverty as its poverty measure in Bayelsa state.

2.1.2 Vulnerability to Poverty

Exposure to risks, whether idiosyncratic or covariate, is a major reason for assessing vulnerability of households to poverty. [16] made it clear that vulnerability is conceived as the prospect of a person becoming poor in the future if currently not poor, or the prospect of continuing to be poor if currently poor. Although vulnerability and poverty are conceptually closely related the former is defined independently of the later. Poverty has to do with the ex post realization of a stochastic variable such as wellbeing with respect to a socially determined minimum threshold (poverty line), while vulnerability is the ex ante expectation of that variable relative to this threshold. Therefore vulnerability is seen as expected poverty, akin to the safety-first risk measures developed by [17].

Vulnerability as an area of economic research has been widely explored by scholars using panel cross-sectional data in a way that separates the chronically and transitorily poor. However, due to the limitations imposed by a dearth of reliable panel data in developing countries vulnerability analysis from single panel data in such a way that utilizes the variance of consumption to estimate the expected poverty of households is now unavoidable. Also, some studies have analyzed vulnerability to poverty by focusing on the poverty incidence, gap and severity among households that are considered to be vulnerable, either due to their geographical location, occupation and socio-economic/demographic characteristics (elderly, orphans, internally displaced populations, landless laborers, rural people, female, widowed, etc [3]. [18] argued that the concept of vulnerable groups explains the risk of labour market marginalization and social exclusion, which is able to subject affected households to chronic poverty. These include people who are long-term unemployed, and also others who are inactive but not registered as unemployed. It includes workers who are in an employment with high risk of losing their jobs. Once people in vulnerable groups become unemployed, they have higher risk of long-term unemployment (Watt, 1996).

In the absence of timely interventions, a vicious circle that may regressively lead to economic destitutions and social exclusion may be formed. [16] submitted that empirical estimation of vulnerability

measure requires the definition of the time horizon over which an assessment is to be made, choice of an indicator of well-being, definition of a threshold for well-being, determination of a probability threshold such that a person or household will be considered vulnerable if that person's probability of shortfall exceeds the cut-off point.

2.2 Literature Review

[19] and [20] developed quantitative measures of vulnerability, as the ex ante risk of facing poverty in the future. They defined vulnerability as the probability that a household will find itself consumption-poor in the near future employing different types of data and empirical methodology. [19] estimated vulnerability using panel data from two waves of the Indonesian survey of 1997 and 1998 and that half of their sample was vulnerable to poverty, although only 20 per cent of the population was defined as poor in the first year. [20] using cross-sectional data from the mini-SUSENAS in Indonesia in December 1988 and a three-stage feasible generalized least squares procedure to estimate the inter temporal variance of the log of consumption on household characteristics showed that at the national level 23 per cent of Indonesians were poor, and 45 per cent vulnerable.

They further showed that the highly vulnerable were rural dwellers and were most likely to live in remote areas. [21] employed the same technique to panel data from Sichuan, (the most populous province in China) between 1991 and 1995 and found that vulnerability was highest for those households in the lowest income and consumption quintile. Households in Sichuan were also found to be vulnerable to poverty even when their average incomes/consumption were well above the poverty line. [3] adopted the [22] methodology and showed that 87% of Nigerians were vulnerable to poverty and that 68.5% of the population was highly vulnerable, whereas only 31.5% of the population had low mean vulnerability. They noted that: (i) building a strong and virile governance structure can help reduce vulnerability in Nigeria; a pro- poor growth macroeconomic policy environment that would allow the vulnerable and the poor to make use of their hidden assets would also go a long way. The literature reviewed shows that there currently exists a dearth of empirical evidence as regards vulnerability studies in Nigeria, especially in the Niger Delta region. This study will, therefore, fill the gap in knowledge and literature on vulnerability issues in Nigeria by focusing on Bayelsa state in the Niger Delta Region of Nigeria.

III. METHODOLOGY

3.1 Data

This study used secondary data that were collected during the National Living Standard Survey (NLSS) of households carried out between 2009 and 2010. That is the latest national data collected by the Federal Republic of Nigeria on different aspects of households' activities. The sample design adopted a multi-stage stratified sampling. At the first stage, from each State and the Federal Capital Territory (FCT, Abuja) clusters of 120 housing units called Enumeration Area (EA) were selected at random. In the second stage 10 housing units from the selected EAs were randomly selected. A total of 600 households were randomly chosen in each of the States and 300 from the FCT, summing up to 21,900 households in all [4]. However, some households did not fully complete the questionnaires. Therefore, data were available only for 19,158 households. In Bayelsa state data were available for 524 households. Households' characteristics were appropriately weighted for cross-sectional differences. It was the weighted dataset for Bayelsa state that was adopted for this study.

3.2 Model Specification

3.2.1 Poverty Index

The poverty measure that was used in this analysis is the class of decomposable poverty measures by Foster, Greer and Thorbecke (FGT). They are widely used because they are consistent and additively decomposable [23].The FGT index is given by

$$P_\alpha = \frac{1}{N}\sum_{i=1}^{q}\left[\frac{Z - Y_i}{Z}\right]^\alpha \quad . \quad . \quad . \quad (1)$$

where; Z is the poverty line defined as 2/3 of the Mean Per Capita Household Expenditure (MPCHHE), Yi is the poverty indicator/welfare index per capita in this case per capita expenditure in increasing order for all households; q is the number of poor people in the population of size N, and α is the poverty aversion parameter that takes on the values zero, one or two. Income poverty line is constructed as 2/3 of mean per capita household total expenditure. when $\alpha=0$, P_α measures the proportion of people in the population whose per capita

expenditure on food and non-food items fall below the poverty line (poverty incidence). when α=1, P_α measures the depth of poverty-how deep below the poverty line is the averagely poor (poverty gap). when α=2, P_α measures how farther the core poor are from the poverty line compared to the averagely poor (the severity of poverty)

3.2.2 Determinants of Poverty

A logistic regression model was employed to estimate the probability that a household is income poor if its per capita consumption expenditure is below the constructed poverty line given her socioeconomic characteristics.

$$\ln L(Yi) = \beta' X + u_i \quad . \quad . \quad . \quad (2)$$

Equation (2) is a log-likelihood function showing the log-likelihood that a household is poor given its socioeconomic characteristics X, where: Yi =1 if HHPCE < Z and Yi = 0 otherwise; β' is a vector of parameters to be estimated; X is a vector of explanatory variables (poverty correlates) comprising of gender, sector (rural and urban), age, minimum years of schooling, occupation, household size, household expenditure on health and household expenditure on education. It is important to note that sector is a dummy variable that takes the value of 1 if household dwells in the urban area and 0 otherwise; and u_i= error term.However, since equation (2) is a log-likelihood function it measures the log of odds ratio that a household is poor which does not make real sense and so we relied on equation (3) the likelihood function to measure the odds ratios of a household being poor as follows:

$$L\left[\frac{Y_i = 1}{Y_i = 0}\right] = L\left[\frac{P_i}{1 - P_i}\right] = e^{\beta' x} \quad . \quad . \quad . \quad (3)$$

Which is the ratio of the probability that a household is poor, P_i to the probability that the household is non-poor, 1-Pi.

3.2.3 Vulnerability as Expected Poverty and its Determinants

In order to determine the effect of some household characteristics on households' consumption expenditures, the approach of [22] that had been widely used to generate vulnerability indices when single point consumption data are available was used. Suppose that the stochastic process for generating per capita consumption expenditure C_i for the ith household is specified as:

$$lnC_i = \boldsymbol{X_i\beta}' + \varepsilon_i \quad . \quad . \quad . \quad (4)$$

where C_i is per capita expenditure (i.e. food and non-food consumption expenditure) for the ith household at time t+1, X_i represents a bundle of observable household characteristics and other determinants of consumption, β is a vector of coefficients of household characteristics to be estimated and ε_i is a mean-zero disturbance term that captures idiosyncratic shocks that contribute to different per capita consumption levels. The consumption model in (4) assumes that the disturbance terms has mean zero, but varies across households. Therefore the variance of the disturbance term violates the OLS assumption of constant variance (homoscedasticity) thus heteroscedastic, and it is represented as:

$$\sigma_{0,i}^2 = \boldsymbol{X_i\theta} + \alpha + \omega_i \quad . \quad . \quad . \quad (5)$$

Therefore to correct for heteroscedasticity and obtain efficient estimates of β and θ we adopted the three-stage feasible generalized least squares (FGLS) method in estimating equations (4) and (5). First, we estimated equation (4) using OLS to obtain estimated ε_i and obtained its squared values as estimated variance σ_i^2. Second, we regressed the variance obtained in step one on the household socioeconomic characteristics as shown in eqn. (5) using OLS and obtained the estimated variance and used them to correct eqn. (5) as shown below:

$$\frac{\sigma_{0,i}^2}{\sigma} = \left(\frac{\boldsymbol{X}_i}{\sigma}\right)\theta + \alpha\left(\frac{1}{\sigma}\right) + \frac{\omega_i}{\sigma}$$

Which we can rewrite for convenience as:

$$\sigma_{0,i}^{*2} = X^{*}\theta + \alpha^{*} + \omega_i^{*} \quad . \quad . \quad . \quad (6)$$

The variances from eqn.(6) are homoscedastic, thus the estimated parameters thereof are now efficient we therefore obtained the estimated variance from eqn. (6) and used it to correct eqn. (4) as follows:

$$lnC_i\left(\frac{1}{\sigma^{*}}\right) = \delta\left(\frac{1}{\sigma^{*}}\right) + \beta'(X_i/\sigma^{*}) + \varepsilon_i(1/\sigma^{*})$$

which can be rewritten as

$$lnC_i^{*} = \delta^{*} + \boldsymbol{X}_i^{*}\boldsymbol{\beta}' + \varepsilon_i^{*} + u \quad . \quad . \quad . \quad (7)$$

We estimated eqn(7) using OLS this gives us efficient estimates of the parameter **β**. We then generated the expected consumption expenditure for each household by taking expectations from eqn. (7). The expected consumption expenditures thus generated are compared to the constructed poverty line. Households whose consumption expenditure are less than the poverty line are classified as vulnerable group and those that are greater or equal to the poverty line are non-vulnerable. A logistic regression model was estimated to generate Vulnerability as Expected Probability of being poor in the future as follows: first we estimated the log-likelihood function in eqn(8) and the probability that a household is poor is generated as shown in eqn.(9)

$$ln\,L(lnC_i^{*} < lnZ) = \beta' X + u_i \quad . \quad . \quad . \quad (8)$$

$$VEP = Pr(lnC_i^{*} < lnZ) = e^{\beta' X + u_i} \quad . \quad . \quad . \quad (9)$$

We finally estimated the tobit censored regression model shown in eqn. (10) to examine the determinants of vulnerability using the expected probability threshold of 0.5 as left hand limit.

$$VEP_i = \theta_0 + X_i\theta \; if \; (lnZ - lnc) > 0.5; \; and$$

$$VEP_i = 0 \; if \; (lnZ - lnc) \leq 0.5 \quad . \quad . \quad . \quad (10)$$

Equation (10) is a tobit model it measures the probability that a household will be poor in the future given its current socioeconomic characteristics, **X**. This type of model was first developed by [24].

IV. RESULTS AND DISCUSSION

4.1 Poverty and Vulnerability Profiles in Bayelsa State of Nigeria

The constructed poverty line is N22393.62 household per capita consumption expenditure. The poverty incidence, P_0 is 0.2538 (=1/524 *$(133)^0$), while the poverty gap (depth), P_1 is 0.14260266 (=74.72379/524) the severity index, P_2 is 0.08612625 (=45.13015/524). The constructed poverty line of N22393.62 implies that households that are unable to mobilize at least N22393.62 of financial resources for each household member per month to meet his or her consumption needs are relatively poor. Tables 4.1 and 4.2 revealed that about 25 percent of respondents were poor and 59.73% were expected to be in the future (vulnerable). Also while 22.52% of households were poor and headed by male 54.39% were vulnerable and headed by male and whereas 2.86% were poor and headed by female 5.34% were vulnerable and headed by female. On decomposing according to sector we found that 2.67% were poor and dwell in rural areas while 5.92% were vulnerable and dwell in rural areas. Also, 22.71% were poor and dwell in urban areas but 53.82% were vulnerable and dwell in urban areas too. The distribution according to occupation showed that 18.13% were poor and had their primary occupation in the agricultural sector and 41.98% who also had their primary occupation in the agricultural sector were vulnerable. Furthermore, while 7.25% were poor and had their primary occupation in the other sectors the vulnerable that had their primary occupation in the other sectors constituted 17.75% of the population (see Tables 4.1 and 4.2).

Table 4.1: Poverty Profile

Classification of Poverty	**Frequency (%)**	
Non-poor	391 (75)	
Poor	133 (25)	
Gender	**Male**	**Female**
Non-poor	331(63.17)	60 (11.45)
Poor	118 (22.52)	15 (2.86)
Sector	**Rural**	**Urban**
Non-poor	35 (6.68)	356 (67.94)
Poor	14 (2.67)	119 (22.71)
Occupation	**Agriculture**	**Others**
Non-poor	223 (42.56)	168 (32.06)
Poor	95 (18.13)	38 (7.25)

Source: Author's computation

Table 4.2: Vulnerability Profile

Classification of Vulnerability	**Frequency (%)**	
non-Vulnerable	211 (40.27)	
Vulnerable	313 (59.73)	
Gender	**Male**	**Female**
non-Vulnerable	164 (31.30)	47 (8.97)
Vulnerable	285 (54.39)	28 (5.34)
Sector	**Rural**	**Urban**
non-Vulnerable	18 (3.44)	193 (36.83)
Vulnerable	31 (5.92)	282 (53.82)
Occupation	**Agriculture**	**Others**
non-Vulnerable	98 (18.70)	113 (21.56)
Vulnerable	220 (41.98)	93 (17.75)

Source: Author's computation

Furthermore, the poverty gap (depth) of 0.1426 means that the averagely poor need to mobilize about 14.26 percent of N22393.62 financial resources to escape poverty while the severity index of 0.086 implies that the core poor needs to mobilize 8.6 percent of N22393.62 more of financial resources to escape poverty. Further revelations from the poverty and vulnerability profiles are shown on table 4.3. It is observed that all poor households and 46.04% of non-poor households were vulnerable given their current socio-economic characteristics. This is a serious source of concern for policy makers. These results imply that if things remain the way they are today, 59.73% of Bayelsans are expected to be poor in the future. Out of the total population 34.35% constitutes the vulnerable from non-poor households and 25.38% constitutes vulnerable from poor households. These results showed that poverty in Bayelsa state is both transient and chronic. The vicious cycle of poverty is expected to remain unabated as all poor households are expected to remain poor unless there is a serious positive shock somewhere. These are serious concerns for policy formulation.

Table 4.3: Dynamics of Poverty

Classification of households		**Poverty**		**Total (%)**
		Poor (%)	Non-Poor (%)	
Vulnerability	Vulnerable	133 (25.38)	180 (34.35)	**313 (59.73)**
	Non-Vulnerable	0 (0.00)	211(40.27)	**211 (40.27)**
	Total	**133 (25.38)**	**391 (74.62)**	**524 (100.00)**

Source: Author's computation

4.2 Determinants of Poverty and Vulnerability

On the determinants of poverty the odds ratios after logit in Table 4.4 showed that female headed households and households that dwell in urban areas are less likely to be poor. Households headed by holder people, who have spent more years schooling with higher per capita expenditure on education, health and food and are occupying more rooms are also less likely to be poor. Factors that aggravated poverty are household size, number of people between the ages of 15 and 60 years and being in the agricultural sector. However, only household size, per capita expenditure on education, per capita expenditure on health and per capita expenditure on food were found to be statistically significant, implying these factors are the major determinants of poverty in Bayelsa state.

Table 4.4: Third Stage FGLS Regression

lnC	**Coef.**	**Std. Err.**	**T**	**P>t**
Gender	8.672027	6.074564	1.43	0.154
Sector	-2.676361	6.350232	-0.42	0.674
Occupation	-16.05415	4.131192	-3.89	0.000
ageyrs	.001339	.0043669	0.31	0.759
yrsch	.0100543	.0035783	2.81	0.005
hhsize	-.0414619	.0068491	-6.05	0.000
age1560	-.0319025	.0431061	-0.74	0.460
pcexedu	.0000266	4.71e-06	5.64	0.000
pcexh	.0000171	1.20e-06	14.33	0.000
hhpcfd	.0000389	1.51e-06	25.75	0.000
roomsocc	-.0166051	.0131203	-1.27	0.206
_cons	9.664314	.1115437	86.64	0.000
Number of obs		524		
F(11, 512)		135.86		
Prob >F		0.0000		
R-squared		0.7448		
Adj R-squared		0.7393		

Source: Authors' computation

The marginal effect after logit showed that provided a household head has reached a threshold age of approximately 47 years and has completed a minimum of 6 years of schooling a year's increase in age and years of schooling reduces the probability that the household is poor by 0.00045% and 0.00071% respectively. Also, provided the household per capita expenditure on education, health and food has reached a threshold of N1236.25, N3985.95 and N16795.8 per month a naira increase in per capita expenditure on education, health and food reduces the probability that the household is poor by approximately 0.0000099%, 0.0000073% and 0.0000086% respectively. On the other hand, provided a household size and number of people between the ages of 15 and 60 years has reached a threshold of 5 and 5, an addition of one more person increases the probability that the household is poor by 0.0036% and 0.0029% respectively. On Vulnerability, the signs of its determinants showed in table 4.4 are similar to those of poverty, however they are qualitatively different. All the included household characteristics significantly explain vulnerability, except for sector, age of household head and number of people between the ages of 15 and 60. This showed that although gender, occupation, years of schooling, number of people between the ages of 15 and 60, and rooms occupied are not important determinants of poverty they significantly determine vulnerability in Bayelsa state. Specifically the results showed that female headed households, households whose primary occupation is in the agricultural sector, and households headed by people with lesser years of schooling are more at risk of becoming poor in the future (vulnerable) if there is an economic shock. The robustness check results showed both the logit and tobit regressions to be statistically significant

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Table 4.5: Determinants of Poverty and Vulnerability

Variable	Logit Odds ratio	dy/dx after Logit	dy/dx after Tobit	X
Gender	.9979079	-2.47e-07	-.0544**	.14313
Sector	.6290103	-.0000666	-.0360	.906489
Occupation	2.447414	.0000991	.114***	.60687
ageyrs	.9613625	-4.64e-06	-.0012	46.8855
yrsch	.9417019	-7.08e-06	-.0031**	6.6355
hhsize	1.357659***	.000036	.0187***	4.88168
age1560	1.275828	.0000287	-.0.00115	4.83969
pcexedu	.9991632***	-9.87e-08	-.000041***	1236.25
pcexh	.9993798***	-7.31e-08	-.000032***	3985.95
hhpcfd	.999268***	-8.63e-08	-.000038***	16795.8
roomsocc	.9428335	-6.94e-06	.0086*	2.28626
LR chi2(11)	430.56		878.19	
Prob > chi2	0.0000		0.0000	
Log likelihood	-81.558221		99.124	
Pseudo R2	0.7252		1.2916	

***(**)* Significant at 1% (5%) and10% levels

Source: Authors' Computation

V. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study has so far examined poverty and vulnerability in Bayelsa state, poverty incidence, gap, severity and its determinants, and the determinants of vulnerability. Based on our results we conclude that income poverty in Bayelsa state is not a more serious issue if we consider the fact that only about 25 percent of households are income poor however, the issue becomes very worrisome when we consider the fact that about 59.73% of the people are at risk of becoming poor in the future given their current socioeconomic characteristics, and that all those in the agricultural sector, all female headed households and all rural dwellers are also expected to be poor in the future. We also showed that the averagely poor have to mobilize financial resources up to 14 percent of N22393.62 household per capita expenditure per month to escape poverty while the core poor have to mobilize additional 8.6 percent of N22393.62 financial resources for each household member per month to achieve the same fit. We further showed that income poverty in Bayelsa state is neither gender, occupational nor rural-urban issue but vulnerability is. The important determinants of poverty were showed to be household size, per capita expenditure on health, education and food while those of vulnerability included, gender, occupation, years of schooling, household size, per capita expenditure on education, health, and food, and number of rooms occupied by the household. It is thus obvious that the dynamism of household poverty in Bayelsa state is a more serious case than the static one and that poverty in Bayelsa state is both transient and chronic.

5.2 Recommendations

Base on the foregoing we recommend that, to reduce poverty in Bayelsa state concerted efforts should aim at encouraging free, compulsory and quality education at least up to the basic level, easily accessible and quality healthcare services, a population policy that would encourage a married couple to have at most three children or at most a household size of 5, and the enabling environment that encourages hard-work and small and medium scale business to thrive. To guard against future poverty these efforts should include empowering women and those in the agricultural sector, providing unemployment benefits/grants, and social overhead for the aged.

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