MEASURES OF POVERTY INDEX AND VULNERABILITY IN GOMBE STATE, NIGERIA

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ABSTRACT

Poverty in Africa in general and Nigeria in particular is a complex and teething problem Mary antipoverty measures have failed to yield expected outcomes In fact, very few success stories have been recorded over time and space. The issue is that not only a significant proportion of the population live below the poverty line, but also the prevalence of poverty a becoming alarming. This is exactly the situation in Gombe state where over a decade of government concern has worsened the welfare of the residents. This makes people more vulnerable and prone to future shocks. This paper examines poverty and vulnerability of households using a unidimensional poverty approach with a view to providing a lasting solution and improvement in the welfare of the affected people. The paper uses Living standards measurement survey data to compute the prevalence of poverty, the depth of poverty and the share of food expenditure on total expenditure and how does that affect poverty status of the households. Using logistic regression model the paper reveals that poverty depth and prevalence increase at an alarming rate. In the same vein, the share of income to buy food takes the highest percentage of the selected households in the study area. This is an indication that the marginal propensity to consume is Equi proportional to the marginal propensity to save. This implies that households in Gombe state are likely going to remain poor if the reverse is not the case and that the member of poor people will always increase If a good policy measure is not taken, the already poor households will likely fall deep into poverty and will remain so for an indefinite period The paper recommends among other things creating employment opportunities to address poverty in the state. Encouraging free, compulsory and quality education both vocational and formal in other to address and cut down the depth at which poverty has prevailed amongst her community. The state government should subsidize the price of major food item to address the problem of food expenditure in the state, Government should aim at improving access to credit to both male and female in other to have an effective access to education.

Keywords: Poverty, vulnerability, prevalence, poverty head count, poverty gap

1.0   Introduction

Poverty is a state or condition in which a person or community lacks the financial resources and essentials to enjoy a minimum standard of life and well-being that is considered acceptable in society. Vulnerability is a basic aspect of well-being. Exposure to risk and uncertainty about future events and its adverse effects to wellbeing is one of the central views of the basic economic theory of human behavior, embodied in the assumption that individuals and households are risk averse. Poverty as a social problem. It is the oldest and yet unresolved social problem (Malumfashi, 2008). In Nigeria, the governments (Federal, State and Local governments) strives to reduce the rates of poverty in the country, but the depth take many measures and severity of the poverty is becoming worse. To determine whether a country is

truly developing or not is contingent upon question on what is happening to poverty, unemployment and inequality (Musa, 2018). The answer to this question in the context of Nigeria, revealed that, poverty rate has worsened from about 47% in 1970 to nearly 70% in 2007. This shows that nearly 71% of the populace live below $1 a day in addition, the 2010 Global monitoring report of the United Nations Education, Scientific and Cultural Organization (UNESCO) submitted, about 95% of Nigeria survive on less than 52 dollars daily while about 71% survive on less than 51 a day. This means that the income of two Nigerians is equivalent to the daily feeling of a cow in Europe (Oloyede, 2010). Poverty as a social problem has many faces. The Nigerian Senate had described the level of poverty in the nation as equivalent to time bomb that could consume the nation if allow to explode. They viewed the situation as disturbing, saying, "we need an effective social security system and a serious fight against corruption because the money that goes into few pockets is enough to provide jobs for our people" Furthermore, they also described the situation as a bleak future awaits the nation unless poverty is tackled, adding that since 1999 all the poverty alleviation programmes have not gone beyond Abuja (Daily Trust, 2017). Against this background, the World Bank includes Nigeria in the list of the top 15 poorest of nations with the highest incidence of poverty. It is said that our population of 162 million, 90 million live below the poverty level of 52 a day despite billions of dollars ja oil revenue. However, in 1980, only an estimated 27% of Nigerians lived in poverty. By 1990, it had grown to 70%. In 2011, over 58% of our population lives under the new poverty threshold of $1.25 a day. Human development indices commonly used to define poverty in the light of life expectancy, illiteracy, lack of clean and potable water, sanitation and others (Oloyede, 2017).

Despites government efforts towards addressing risk and vulnerability in formulating policies of poverty reduction there is dearth of empirical research on that area. This is so because a household facing a risky and likelihood of experiencing future loss of welfare. This is exactly what Ali (2013) examined multidimensional and determinants of poverty status among agro-pastoral households of Jigjiga district of the Somali National Regional State. The study focused more on measurement of poverty through educational index, health index and standard of living. Osondu and Obike (2017) conducted a study on comparative analysis of unidimensional poverty determinants among cassava producing households. The study concentrated on unidimensional measurement of poverty through income and consumption method. The study made no attempt to examine multidimensional poverty even though it was of paramount importance because there are different forms of denial experience of those living in poverty that are not adequately treated in the unidimensional poverty assessment. Ogwumike and Akinnibosun (2018) analyses both unidimensional and multidimensional determinants of poverty among farming households and the extent of the poverty status among farming households in Nigeria

1.1   Purpose of the Study

The purpose of this study is to assess poverty and vulnerability dynamics quantitatively in Nigeria. The specific objectives are to:

  i.   Examine the prevalence of poverty index in Gombe State
  ii.   Assess the depth of poverty index in Gombe State
  iii. Examine the share of food expenditure on total expenditure in Gombe State

2.0   Theoretical Framework

Recently, some studies have agreed that the cardinal and ordinal approach should be used to measure multidimensional poverty eradication continues to be one of the greatest challenges faced by policymakers around the world. Research on the conceptualization and

measurement of multidimensional poverty is particularly pertinent at this moment given the fact that international institutions like the European Commission and the United Nations are implementing the multidimensional approach to complement official unidimensional income or consumption poverty measures. The proposal by Alkire and Foster is perhaps the popular one since the United Nations Development Program (UNDP) adopted it as the MPI in 2010 as a replacement for the Human Poverty Index (HPI) While cardinal measures of this kind can potentially give very precise assessments of existing poverty levels tome might even say over precise), their construction is based on a wide range of debatable assumptions When the available variables cannot be measured in a cardinal scale, it is common to resort to their ordinal counterparts

For instance, they are much more reliable and robust and less prose to measurement errors than their cardinal counterparts to illustrate the ownership of different assets in the household is much easier to measure than the earnings of its members. In addition, since cardinal poverty measures are ill equipped to work with ordinal variables and these variables are often present when assessing multidimensional poverty it is particularly necessary to define the appropriate ordinal poverty measures Well-known indices that can be used with ordinal data are the multidimensional headcount ratio II (defined as the proportion of the population who is multi-dimensionally poor) and Alkire and Foster's adjusted headcount ratio' AM) (which corresponds to UNDP's MPI, see Alkire and Foster 2011). While the counting approach reflective of the number of deprivations irrespective of their nature.

The different dimensions have to be weighted according to the importance that is attached to them. Unfortunately, there are no clear (objective) rules on how to choose the most appropriate poverty cutoff levels and the choice of alternative weighting schemes may alter conclusions with respect to the poverty rankings of the populations we are analyzing2 One possible way of overcoming these limitations when using ordinal variables is to make use of the multidimensional first order dominance approach (FOD), which obviates the need for the analyst to apply an arbitrary poverty cutoff level, choosing dimensional weights or imposing a specific social welfare function

(Musa, 2021). As opposed to the previous cardinal and ordinal approaches that generate a poverty index measuring the poverty level of each country, the FOD approach makes all pair-wise comparisons between couples of countries to assess whether one country is at least as poor as another one. The robustness of the FOD approach, however, comes at a price in some occasions the comparisons between two countries are inconclusive, so the corresponding ranking can be incomplete. As can be seen, the different methodologies have their advantages and disadvantages. However, since their use has been quite sparse (very often working with a single or a quite reduced number of countries eg. Amdt et al. 2012) and disconnected from each other it is entirely unknown whether or not the different approaches provide a coherent and consistent picture of the multidimensional poverty rankings at the international level. The main aim of this paper is to investigate whether the poverty indices and the FOD approaches are essentially conveying the same message or if, on the contrary, they offer complementary views of the prevalence of multidimensional poverty across the developing world. To the extent that current international cooperation, development and aid programs are guided by the rankings derived from these measures, the issues analyzed in this paper are not a mere academic curiosity but have important practical and financial implications for the design of effective poverty eradication strategies.

The implications of having one level of association or another between alternative methodologies can be completely different. If the alternative methodologies turn out to be very highly correlated, we can safely conclude that our assessments of multidimensional poverty are not highly distorted when using one approach or the other. If this were the case,

it would suggest that the information provided by relatively simple ordinal indicators would essentially be the same as the one obtained from the more complex, and sophisticated cardinal indicators, so the former would constitute a reasonable, fast, and cost-effective alternative to the different latter. At the other extreme, a lack of significantly positive association between the two approaches would suggest that the cardinal and FOD perspectives might highlight complementary aspects of the same phenomenon poverty. In addition, such results would raise some red flags that would caution against a thoughtless use of existing Multidimensional poverty measures.

3.0   Methodology

Gombe State is in northeastern Nigeria, 0its capital is Gombe (sometimes known as Gombawa'. The split of the North-Eastern State formed the state in 1996, a contained what is now Bauchi State The state covers an area of 70,898 km with a population of 4,588,668 (2005 est.) and the State has 11 Local Government. There, the emirs of the former Sokoto Calphate have played a part in the politics of this area for nearly 120 years. Gombe State occupies the greater part of the savana and is located in the Northeastern corner of Nigeria. The State shares borders with the Adamawa, Bauchi, Taraba and Yobe states to the Northeast, Nigeria, Gombe State shares boundaries with Adamawa State to the South, Gombe State to the West and Yobe State to the North-West. Gombe state has the highest poverty rate in the Northeast caused by the insurgency. This has caused loss of human and material resources and displacement. As a result, poverty prevalence and rate is on the increase.

3.1   Sources of Data

Secondary data, a Household Survey from World Bank, and Nigeria Bureau of Statistics were used in Gombe state.

3.2   Sample Size

The sample size of the study comprises of 313 households in Gombe. This was calculated to be sufficient to produce regional estimates of poverty, agricultural production and other key indicators

3.3   Method of Data Analysis

The Logistic regression techniques were used for the analysis of the data collected. Models for mutually exclusive binary outcomes focus on the determinants of the probability p of the occurrence of one outcome rather than an alternative outcome that occurs with a probability of Logit regression model was used to determining measures of poverty and vulnerability in Gombe State. A dummy dependent variable (Poverty) is regressed on a series of socioeconomic characteristics that will be identified and included as explanatory variables. The dependent variable is the poverty status, which is one if poor, and zero otherwise (non-poor). The model of this study will be adopted from the works of Akinleye (2010), where Logit regression model was used to estimates the effect of selected variables on the poverty status among the farmers in Lagos State.

This work adopted logistics regression for data analysis Logit model is the appropriate regression analysis to conduct when the dependent variable is dichotomous (binary) Logistic regression is used to describe data and explain the relationship between one dependent binary variable and one or more nominal, ordinal, interval or ratio-level independent variables. The model was specified as follows:

Poverty Status f (Income, Consumption, Household size, Education, Health)   1

The Logit regression model is characterized by a binary dependent variable with mutually exclusive and exhaustive outcomes. The dependent variable is the poverty status of the respondents, which is one if poor, and zero otherwise. Following Maddala (1990), the model specification gives rise to a system of two probabilities as:

$$\text{Prob } (Y_i = j) = \sum 2 \; e^{\beta} jX_i / e^{\beta} kN_i \qquad\qquad 2$$

Where j = 0 or 1

Expanding equation 2:

$$\text{Pr ob } (Y_i = j) = e^{njx_i}/(e^{n0x_i} + e^{nix_i}) \qquad\qquad 3$$

The equations above have inter-determinacy problem and need to be removed. This calls that we assume that n0 in the denominator is zero i.e. n0 = zero. Then $e^{nX_i} = 1$, hence

$$\text{Pr ob } (Y_i = j) = = e^{njx_i}/(1 + e^{nix_i})$$

Then, the probability of being poor (j = zero or 1) is:

$$= 1/(1 + \sum e^{\beta kX_i})$$

$$\text{Prob } (Y_i = 0) =$$

$$\text{Pr ob } (Y_i = 1) = \qquad e^{\beta 1 X_i}/(1 + \sum e^{\beta kX_i})$$

Xi represents the vector of explanatory variables. According Maddala (1990), alternatively, a clearer specification for this Logit model can be written thus:

$$P_i = \beta k + \beta i X_i + e_i \text{-- } 4$$

Pi = Poverty status as determined in head count index analysis which is 1 if poor and 0 if non-poor

Bk = Intercept term

Bi = Coefficient of explanatory variables

Xi = explanatory variables

Ei = Disturbance term

The empirical model that are used for determining factors that influenced poverty status among Household in Gombe state, Nigeria

$$P_i = \beta k + \sum \beta i X_i + e_i \text{--}5$$

$$P_i = \beta k + \beta i X_i + \beta 2 X_{2i} + \beta 3 X_{3i} + e_i \text{--- } 6$$

Pi = Poverty status as determined in Head count index analysis which is one if poor and zero if non poor.

Bk = denotes the level of poverty determined by other factors not considered in the model

X1 = House-hold expenditure (food)

X2 = Poverty depth

X3 = Household expenditure per capital expenditure or total money value of household size (HHSZ) in number (number in persons).

4.0   Presentation of Result

4.0.1   Data Analysis

This study was conducted to assess Measures of poverty and vulnerability in Gombe State. Nigeria. The objectives and research questions were analyzed using inferential statistics (Logistic regression). The results were presented in tables and discussed according to the research questions and objectives.

Research Question One: What is the prevalence of poverty in Gombe State?

Table 4.1 Prevalence of Poverty in Gombe State

  Logistic regression

  Number of obs = 313

  LR chi2 (2) = 27.28

  Prob>chi2 = 0.0000

  Loglikehood-143.90426

  Pseudo R2 = 0.0918

Rururb	Odds Ratio	Std. Error	Z	P>z	195% conf.	Interval
Pcexp_dr_w2	1.000004	1.54e-0.6	2.29	0.022	1.000001	1.000007
hhtexp_dr_w2	1.000001	3.10e-07	3.21	0.001	1	1.000002
Cons	.0737359	.0213192	-9.02	0.000	.0418381	1299528

Source: Stata output

From table 4.1 above, the likelihood ratio chi-square of 27.28 with a p-value of 0.000 shows that the model as a whole fits significantly better than an empty model (i.e., a model with no predictors). However, it can be seen that the coefficients, standard errors, the z-statistic, associated p-values, and the 95% confidence interval of the coefficients. One can deduce that both the household expenditure and household per capital expenditure for study area (Gombe state) are statistically significant which means that both household expenditure and household per capital expenditure have affects in the rate of poverty in Boira rnoporatv poverty state with odd ratio 1.

Research Question 2: What is the depth of poverty in Gombe State?

Table 4.2 depth of poverty in Gombe State

  Logistic regression

  Number of obs = 313

  LR chi2 (2)-27.28

Prob>chiz = 0.0000

Pseudo R2 = 0.0918

Loglikehood = -143.90426

Poverty	Coef.	Std. Error	Z	P>z	[95% conf.	Interval]
Hhtexp_dr_w2	3.35e-06	1.54e-0.6	2.29	0.022	3.89e-07	1.61e-06
Hhtexp_dr_w2	9.98e-07	3.10e-07	3.21	0.001	5.14e-07	6.55e-o6
Cons	-2.607266	.0213192	-9.02	0.000	-3.173948	-2.040584

From table 4.2 above, the likelihood ratio chi-square of 27. 28.80 with a p-value of 0.0001 shows that the model as a whole fit significantly better than an empty model (te, a model with no predictors) Moreover, the table also displayed the coefficients, standard errors, z statistic, associated p-values, and the 95% confidence interval of the coefficients. We can deduce the household expenditure and household per capital expenditure has a significant impact on the depth of poverty in Gombe state. Which poverty depth is significantly influenced by the size and expenditure of household in the study area, as represented by the odd ratio of one?

Research Question 3: What are the share of food expenditure and total expenditure in Borno State?

Table 4.3 Share of Food Expenditure and Total Expenditure in Gombe State
Logistic regression
Number of obs = 313
LR chi2 (2) = 12.43
Prob>chi2 = 0.0021
Loglikehood = -65.475991
Pseudo R2 = 0.0861

Poverty	Odds Ratio	Std. Error	Z	P>z	[95% conf.	Interval]
Pcexp_dr_w2	.999996	3.43e-0.6	-3.10	0.022	.9999827	.9999961
Hhtexp_dr_w2	1.00009	2.99e-06	3.21	0.002	1.000003	1.000015
_cons	3.36478	1.677316	2.40	0.017	1.24558	8.93727

Source: Stata output

Logistic regression
Number of obs = 313
LR chi2 (2) = 12.43
Prob>chi2 = 0.0021
Loglikehood = -65.475991
Pseudo R2 = 0.0861

Poverty	Coef.	Std. Error	Z	P>z	[95% conf.	Interval]
Fdtby_dr_w2	-0.000106	3.43e-0.6	-3.10	0.002	-0.0000173	-3.90e-o6

Fdtexp_dr_w2	9.32e-06	2.99e-06	3.21	0.002	3.46e-06	-.0000152
_cons	1.204916	1.677316	2.40	0.017	-2196016	2.19023

Source: stata output

From table 4.3 above, the likelihood ratio chi-square of 12.34 with a p-value of 0.00 shows that the model as a whole fits significantly However, it can be seen that the coefficients, their standard errors, the z-statistic, associated p-values, and the 1955, confidence interval of the coefficients. One can deduce that total share on food and total expenditure of purchased and auto consumption food for Gombe state are statistically significant which means that both the total share on food and total expenditure of food purchased with auto food consumption does have impact in the rate of poverty in Gombe State with odd ratio 1, as shown by the percentage of food expenditure and total expenditure which is 8.6%.

The equation of the fitted model is total expenditure = exp (eta) (1+exp (eta)/ [1 + exp (eta)] where eta = 3.336478+1.0* total share on food with auto food consumption +0 999989* total expenditure of food purchased.

4.0   Findings of the study

Based on the result of the analysis, the following findings were made:

There is significant prevalence of poverty in Gombe state as indicated by the Chi- Square of 9.80 with a p-value of 0.074, the depth of poverty is significantly influenced by the size and expenditure of household in the study area, as represented by Chi-square of 27.28.80 with a p-value of 0.0001

There is also a significant impact of share of food expenditure on poverty rate in Gombe State, as revealed by Chi-square of 10.95 with a p-value of 0.0042

The first finding revealed a high prevalence of poverty in Gombe state. Supporting this finding is a study conducted by Ifeluninil (2014) examined Multidimensional Poverty measures in Nigeria. The study used the Core Welfare Indicator Questionnaire (CWIQ) and a non-monetary welfare indicator survey. The study revealed that poverty in Nigeria has no geographical frontier, with all the geo-political zones/groupings recording high measures of multidimensional poverty. He recommended that Government should target specific regions or states based on the poverty attributes they are most deprived, Government should incorporate other poverty attributes in their poverty eradication programmes instead of focusing primarily on moving people out of certain income poverty level.

The second finding revealed that the depth of poverty is significantly influenced by the size and expenditure of household in the study area, as represented chi-square of 27.28.80 with a p-value of 0.0001, where

Eta = 3.336478+1.0 *total share on food with auto food consumption 0.999989* total expenditure of food purchased. This also agreed with the findings of B.C. Asogwa, et al., (2012) who opined that 71.1% variation in poverty depth was explained by variations in the specified explanatory variables. Furthermore, at 5% level of significance, the factors that significantly influenced poverty depth among the respondents were farm total economic efficiency, household income, farm size, household size, age, education, farming experience, access to credit, gainful employment for household members, and membership of farmer association, extension contact and valuable farm asset. However, a sustained improvement in farm total economic efficiency and per capita income (via painful employment opportunities

for household members, as well as redistribution of household income to minimize income inequality would go a long way to reduce poverty depth among the respondents.

The third finding revealed 8.6% and 12.92% shares of food expenditure and total expenditure in Gombe State. This agrees with findings of Ifeluninal (2014) on the multidimensional nature of poverty. Poverty strategy should be region, location and area specific It should not be like silver bullet where one size fit all. Each location has its own specificity or peculiarity and policies should take into cognizance those attributes

5.0   Conclusion

Based on the findings within the limitation of this study, it was concludes that there is a prevalence of poverty, and that poverty is neither gender, occupational nor rural-urban issue but is mostly determined by the household size, household expenditure per capital

5.1   Recommendations

In the light of the above findings, the following recommendations were made

1. Gombe state government should create employment opportunities to address poverty in the state.
2. Gombe state should encourage free, compulsory and quality education both vocational and formal in other to address and cut down the depth at which poverty has prevailed among other community.
3. Gombe state government should subsidize the price of major food items to address the problem of food expenditure within the state. Additionally, Government should aim at improving access to credit to both male and female in other to have an effective access to education.

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