Full Length Research Paper

Trend and determinants of multidimensional poverty in rural Nigeria

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Government continues to initiate programmes to address the challenge of poverty in Nigeria. This paper investigates the poverty levels over time using the multidimensional approach and estimates its determinants; using the National Living Standard Survey data of 2004 and 2010. The Alkire-Foster methodology and the Logit model were employed for analysis. The result showed that 70% of rural households are headed by males, are still in their economically active years and practice agriculture. Also, more than one third have no education. The adjusted headcount ratio, headcount ratio and the intensity of poverty increased in 2010 relative to 2004. The absolute and percentage change in poverty reveals that change is higher for the headcount ratio than the intensity of poverty. The health, asset and education dimensions contributed most to poverty. Agriculture has the highest adjusted poverty incidence. Being in a female headed household, increased household size, working in the agriculture sector and residing in the northern zones increase the probability of being poor. Education, working in non-agricultural sector and services, residing in South West and South East zones reduce the probability of being poor. Effort should be targeted at reducing the number of poor households; and the health, asset and education dimensions require special attention; as well as those engaged in agriculture and resident in the northern regions of the country.

Key words: Multidimensional poverty, Alkire-Foster, logit, rural Nigeria.

INTRODUCTION

The Nigerian economy has experienced substantial growth in the last decade. The real GDP growth rate rose from 2.7% in 1998 to 5.3% in 2006 and increased to 7.2% in 2011 (NBS, 2010; CIA, 2012). In spite of improvement in the country's economic growth, Nigeria suffers from high levels of poverty and it is widespread. Poverty incidence has risen over the years and was estimated to be about 69% in 2010 (NBS, 2010). The country retrogressed to become one of the 25 poorest countries at the threshold of the twenty-first century from a ranking among the richest 50 in the early-1970s. Poverty incidence was quite alarming when measured using international poverty line, which is population below $1.00 in terms of Purchasing Power Parity PPP, and was estimated as 61.2% in 2010. Those who live on less than $1.25 a day was 64.41% in 2003/2004 and 68% in 2010 (World Bank, 2011). In Nigeria, poverty is especially severe in rural areas where social services and infrastructure are limited (IFAD, 2012). Poverty incidence rose from 16.2 to 43.1% in the urban sector and from

28.3 to 63.8% in the rural sector between 1980 and 2004 respectively. For over four decades in Nigeria, all attempts to put the rural areas on course of development have not been successful (Oyeranti and Olayiwola, 2005). Conditions have continued to worsen and poverty has become a major issue in the rural areas of the country in spite of its potentials and rich natural resource endowment.

The Government at various levels has continued to make efforts to transform the economy and reduce poverty. Some of these programmes include: Directorate of Food, Road and Rural Infrastructure (DFRRI), Better Life Programme (BLP), National Directorate of Employment (NDE), Agricultural Development Programme (ADP), National Agricultural Land Development Programme (NALDP), Family Support Programme (FSP), Family Economic Advancement Programme (FEAP), Poverty Eradication Programme (PEP) and National Poverty Eradication Programme (NAPEP). The latest of this is the National Economic Empowerment Development Strategy (NEEDS), State Economic Empowerment Development Strategy (SEEDS) and Local Economic Empowerment Development Strategy (LEEDS). Most of these programmes were bureaucratic and unable to effectively address the needs of the rural people.

Several studies have estimated poverty in Nigeria from the unidimensional approach (World Bank 1996; FOS, 1999; Olaniyan, 2000; Omonona, 2001; Olaniyan and Abiodun, 2005; Okunmadewa et al., 2005). Some employed multidimensional approaches (Oyekale et al., 2007; Oni and Adepoju, 2011; Ataguba et al., 2011). Few studies have also focused on rural poverty using these approaches (Oyekale et al., 2007; Oni and Adepoju, 2011; Ologbon, 2012). These studies on multidimensional poverty in rural Nigeria have employed the Fuzzy set to estimate the capabilities of rural households. While these studies have been able to identify the number of poor, it does not take into account the intensity of deprivations among the poor (Alkire and Roche, 2011); and violates dimensional monotonicity. An exception is the study by Ologbon (2012) which estimated poverty in the riverine areas using the Alkire- Foster method. Following Alkire et al. (2011) and Ologbon (2012), this study attempts to estimate rural poverty over time for the entire country; applying the Alkire- Foster method which is essentially rooted in the capability approach. This methodology will not only give the incidence and intensity of poverty but also identify deprivations driving poverty. This will inform policy makers on possible areas where interventions are required to lift the poor out of poverty.

Objective

1. Estimate the poverty status of rural households over time.
2. Identify factors that influence the poverty status of

households.

Measurement of poverty

Alkire and Foster's (2007) methodology includes two steps: An identification method (ρk) that identifies 'who is poor' by considering the range of deprivations they suffer, and an aggregation method that generates an intuitive set of poverty measures ($M\alpha$) that can be broken down to target the poorest people and the dimensions in which they are most deprived.

The notation $y = [y_{ij}]$ denote the $n \times d$ matrix of achievements, where n represents the number of households, d is the number of dimensions, and $y_{ij} \geq 0$ is the achievement of household $i= 1, 2…..,n$ in dimensions $j= 1,2,…d$. The identification method involves considering the vector c of deprivation counts obtained from the deprivation cut-off, z (first cut-off); which is then compared against a poverty cutoff k (second cut-off) to identify the poor, where $k = 1…d$.

Hence, the identification method ρ is defined as $\rho_k(y_i; z) = 1$ whenever $c_i \geq k$, and $\rho_k(y_i; z) = 0$ whenever $c_i < k$. It means that a household is poor if deprived in at least k number of dimensions. When k=1, then the identification criterion corresponds to the union approach whereas at $k= d$, the identification criterion corresponds to the intersection approach. A common alternative is to take a cutoff that lies between 1 and d. Finally, the set of households that are multidimensional poor is defined as $Z_k = \{i: \rho_k(y_i; z)\}$. The ρ_k is referred to as a dual cutoff method[1] because it first applies the within dimension cutoff z_j to determine which household is deprived in each dimension, and then the across dimension cutoff k to determine the minimum number of deprivations suffered by an household to be considered multidimensional poor.

Multidimensional poverty measure

The headcount ratio or the percentage of households that are poor $H= H(y;z)$ is defined by:

$H=q/n$ (1)

Where $q = q(y; z)$ is the number of households in the set z_k, as identified using ρ_k. While it is easy to compute, it violates dimensional monotonicity in which case, if a poor household becomes deprived in an additional dimension, the headcount ratio does not change. Alkire and Foster (2007) proposed a headcount measure that is

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[1] For detailed description of the methodology, see Alkire et al. (2011)

adjusted by the average number of deprivations experienced by the poor.

In this regard, a censored vector of deprivation counts c_k is defined so that if $c_i \geq k$, then $c_i(k) = c_i$; and if $c_i < k$, then $c_i(k) = 0$. This means that in $c(k)$, the count of deprivations is always zero for households that are not poor, while households that were identified as poor keep the original vector of deprivation counts c_i. Then, $c_i(k)/d$ represents the shared possible deprivations experienced by a poor household i, and hence the intensity of poverty (deprivations shared across the poor) is given by:

$$A = |c(k)|/(qd) \tag{2}$$

The adjusted headcount ratio $M_0(y; z)$ is given by:

$$M_0 = HA \tag{3}$$

The adjusted headcount ratio has other properties including dimensional monotonicity, deprivation focus, poverty focus and subgroup decomposability in addition to standard properties of a poverty measure. The dimensional monotonicity implies that A rises when a poor household becomes deprived in an additional dimension even though the headcount remains the same. Similar to the headcount ratio H, M_0 satisfies decomposability.

M_0 can be decomposed by population subgroups. The decomposition is expressed as:

$$M_0(x, y; z) = \frac{n(x)}{n(x,y)} M_0(x; z) + \frac{n(y)}{n(x,y)} M_0(y; z) \tag{4}$$

Where x and y corresponds to two subgroups with size $n(x)$ and $n(y)$ and total population size $n(x,y)$. The overall poverty is the weighted average of subgroup poverty levels, where weights are subgroup population shares.

It is also possible to break down overall multidimensional poverty measure to reveal the contribution of each dimension j. Once the identification step has been completed, all members of the $M_0(y; z)$ family can be broken down into dimension subgroups. Then, $M_0(y; z)$ can be break-down into dimensional groups as:

$$M_0(y; z) = \sum_{i=1}^{n} \mu\left(g_{*j}^0(k)\right) / d$$

(5)

Where g_{*j}^0 is the j column of the censored matrices $g^0(k)$. Once the identification has been applied, and the non-poor rows of g^0 have censored to obtain $g^0(k)$, , for each j, $\left(\mu\left(g_{*j}^0(k)\right) / d\right) / M_0(y; z)$ can be interpreted as the post-identification contribution of dimension to overall multidimensional poverty.

Changes over time

The change in poverty over two time periods can be due to the effect of changes in the incidence of poverty or intensity of poverty or the interaction between the two (Alkire et al., 2011). This change can be assessed by considering either the absolute change across the two time periods and/or the percentage change across the two time periods. The absolute change is the difference in the level of any focal indicator across two time periods. The percentage change in poverty expresses the change relative to the initial poverty level. For two time periods t_x and t_y where t_x is less than t_y and w is a vector of the relative weights of the indicators; these changes are estimated as:

Annual Absolute Change in Poverty (Mo) is:

$$\Delta M_o(X, Y; z, k, w) = \frac{[M_o(Y; z, k, w) - M_o(X; z, k, w)]}{t_y - t_x} \tag{6}$$

Annual percentage change in poverty (Mo):

$$\delta M_o(X, Y; z, k, w) = 100 \times \frac{[M_o(Y; z, k, w) - M_o(X; z, k, w)]}{(t_y - t_x) M_o(X; z, k, w)} \tag{7}$$

METHODOLOGY

Scope of study

Nigeria is the most populous country in Africa and the ninth most populous country in the world providing habitation for 1.9% of the world's population as at 2005. The population of the country rose from about 88.5 million in 1991 to 140 million in 2006 (FRN, 2007) and 168.8 million in 2012 (World Bank, 2012). The study area is rural Nigeria with a population of 77,803,783 in 2010 (World Bank, 2012). Nigeria is made up of 36 states and a Federal Capital Territory (FCT), grouped into six geopolitical zones: North Central, North East, North West, South East, South South and South West.

Source and type of data

The study uses secondary data comprising mainly of the National Living Standard Survey (NLSS) data in 2004 and 2010. The NLSS survey data is a national representative data and provides data on household's socio-economic and demographic data. The data used in this paper are age, gender, marital status, primary occupation, household size, educational attainment and geo-political zones. Others are household's type of dwelling, floor material, wall material, roof material, fuel for cooking, source of lighting, toilet type and source of drinking water. In addition, data on if household head ever attended school or has at least six years of formal education, any member suffer any form of illness or activities stopped due to illness, household asset ownership and land ownership were obtained.

Table 1. Dimensions, indicators, deprivation cutoffs and weights of MPI.

Dimension (Weight)	Indicator (Weight)	Deprivation cut-off
Housing (1/5)	Type of dwelling (1/30) Floor material (1/30) Wall material (1/30) Roof material (1/30) Fuel for cooking (1/30) Source of lighting (1/30)	Households living in a single room, house with no flooring (that is, a mud or dung floor) or inadequate roofing and wall material. (United Nations, 2003). Households using firewood, coal as main source of cooking fuel and those without electricity, solar and other improved sources as main lighting material.
Sanitation (1/5)	Toilet type (1/10) Source of drinking water (1/10)	Households using unimproved sanitation facilities such as pit latrine without slab, open pit latrine, bucket toilet and hanging toilet(United Nations, 2003), and households using water from an unimproved source such as open wells, open springs or surface water. (United Nations, 2003)
Education (1/5)	Ever attended school (1/10) Household head with at least six years of formal education.(1/10)	Household head that has not attended any form of schooling and households without household head having at least 6 years of formal education. (United Nations, 2003).
Health (1/5)	Suffer any form of illness (1/10) Activities stopped due to illness. (1/10)	Household heads that suffer from any form of illness and stopped activities as a result of such illness
Assets (1/5)	Asset ownership (1/10) Land ownership (1/10)	The household does not own more than one of the following assets: bicycle, radio, telephone, television, a house and does not own agricultural land

Analytical technique

The Alkire-Foster methodology explained under the measurement section is used to estimate the multidimensional poverty. The dimensions and indicators considered are listed in Table 1.

Dimensions and cut-offs

The determinants of poverty are estimated using the logit model. The model is specified as:

$$z_i = b_0 + \sum_{j=1}^{k} b_k x_{ij} + \varepsilon_i \qquad (8)$$

Z_i is the poverty status of the ith household represented with a dummy; 1 if poor and 0 otherwise. j =1, 2, ……k are the vectors of the predictor variables explaining poverty b_0, b_k are the parameters to be estimated while ε_k is the error term.

The predictor variables X, are: Gender of household head, age of household head, marital status, primary occupation of household head, educational attainment of household head, Household size and geo-political zones.

RESULTS AND DISCUSSION

Socio-demographic characteristics

Table 2 presents the socio-demographic characteristics of households. The patterns of distribution of socio-demographic characteristics of households are similar in the years considered (2004 and 2010). The male household heads represent 86% of all households in both years. This agrees with the pattern of household headship in Nigeria. Aigbokhan (2000) reported a similar result with only 13.5% of household heads being female. Similarly, the heads of households are mostly within ages 20 and 59 years representing 76.8% in 2004 and 73.7% in 2010. This means that they are still in their economically active years which enables them engage in diverse means of livelihood. Households with sizes between 4 to 6 persons represent about 40% in each year; followed by those with 7 to 9 persons. Only a quarter has household sizes of seven and above which means that most of the households are not excessively large in size. Over 60% had no education in 2004 but it reduced in 2010 to 44.8%. However, much of the reduction is due to increase among those with primary education in 2010. Although, the reduction is large but over one-third still have no education. There is need for increased literacy among household heads and also access to education beyond primary level. Agriculture remains the primary occupation for about 70% of rural households. This agrees with the description of the rural sector as mostly an agrarian society as stated by Okunmadewa (2002).

Household poverty estimates

The multidimensional poverty estimates are based on five dimensions: Housing, sanitation, education, health and assets as shown in Table 1; with equal weights assigned to all. For each dimension, thresholds were set which is

Table 2. Socio economic Characteristics of Rural Households.

Category	2004 Frequency	Percentage	2010 Frequency	Percentage
Gender				
Male	12552	86.5	21624	86.7
Female	1960	13.5	3317	13.3
Age(years)				
0-19	36	0.2	109	0.4
20-39	4552	31.4	8202	32.9
40-59	6585	45.4	10180	40.8
>= 60	3339	23.0	6450	25.9
Marital status				
Married	11529	79.4	21641	86.8
Divorced	557	3.8	706	2.8
Widowed	1660	11.4	2593	10.4
Never married	766	5.3	1	0.0
Household size				
1-3	4948	34.1	9321	37.4
4-6	6147	42.4	10076	40.4
7-9	2450	16.9	4237	17.0
10 and above	967	6.7	1307	5.2
Educational attainment				
No education	9252	63.8	11184	44.8
Primary education	2837	19.5	7853	31.5
Secondary education	1575	10.9	3890	15.6
Tertiary education	848	5.8	2014	8.1
Primary occupation				
Agriculture	11132	76.7	17444	69.9
Services	1109	7.6	3889	15.6
Non agriculture	2271	15.6	3608	14.5
Region				
North Central	2751	19.0	4217	16.9
North East	2732	18.8	4338	17.4
North West	3122	21.5	6869	27.5
South East	2351	16.2	3583	14.4
South South	2363	16.3	3860	15.5
South West	1193	8.2	2074	8.3
	N = 14512		**N= 24941**	

the first cutoff; to identify if the household is deprived in that dimension. A second cutoff, k was set which states the number of dimensions in which a household can bedeprived to be considered MPI poor.

Table 3 presents the estimated poverty indices based on different cut-offs, k. It can be observed from the table that from 2004 to 2010, the headcount and the adjusted headcount ratio decreased with increase in k. This agrees with the findings of Batana (2008). With the number of deprivations experienced by the households at K equals 1, the head count ratio H is about 100%. This shows that there is no household that is not deprived in at least one

Table 3. Household multidimensional poverty indices.

K	2004			2010		
	$M_0 = HA$	H	A	$M_0 = HA$	H	A
1	0.566	0.997	0.568	0.646	0.999	0.647
2	0.552	0.927	0.595	0.640	0.970	0.660
3	0.427	0.615	0.694	0.553	0.750	0.735
4	0.210	0.252	0.833	0.342	0.400	0.855
5	0.040	0.040	1.000	0.108	0.108	1.000

Table 4. Changes in MPI, headcount ratio and intensity of poverty at K=3.

	M_0		H		A	
Year	2004	2010	2004	2010	2004	2010
	0.427	0.553	0.615	0.750	0.694	0.735
Annual absolute change	0.021		0.022		0.006	
Annual percent change	4.92		3.65		0.984	

Table 5. Relative contributions of dimensions to MPI at K=3.

Year	Housing contribution (%)	Sanitation contribution (%)	Education contribution (%)	Health contribution (%)	Assets contribution (%)
2004	13.56	17.13	19.43	27.49	22.39
2010	13.87	16.77	20.59	25.87	22.90

dimension. At k = 3, 61.5% are estimated poor in 2004 but this increased to 75% by 2010; similarly, the adjusted headcount ratio increased in 2010. However, the intensity of poverty increases with increase in K, that is, the share of dimensions in which the poor are deprived increases with K. Although, the multidimensional household poverty index is decreasing with increase in K, it is because the number of households that are poor is reducing but the intensity of poverty among the poor is increasing.

Following Alkire and Roche (2011), poverty estimates at K=3 over time were compared and all the poverty measures reveal an increase in their estimates. This means that poverty is increasing and is due to both increase in headcount, H (a change in the percentage of people who are poor) and the intensity, A (a change in the share of deprivations in which the poor are deprived) of poverty among the poor. The adjusted headcount increased from 0.427 in 2004 to 0.553 in 2010.

The annual absolute change and percent change in poverty reveals that the change is higher for the headcount ratio than the intensity of poverty as shown in Table 4. Alkire et al, (2011) posited that in Lesotho, Kenya and Nigeria, change in MPI is achieved by reduction in headcount and barely by reduction in intensity of poverty. This implies that while the country increases effort to

reduce the intensity of poverty, greater effort should be made to get people out of poverty

The relative contribution of dimensions to poverty is shown in Table 5. The pattern in both years is the same and it reveals that health contributed most to poverty followed by asset and education. The contribution of health to poverty reduced in 2010 relative to 2004; but the opposite was the case for education. In spite of this, it is imperative to tackle rural poverty by giving attention to these priority areas as International Fund for Agriculture Development, IFAD (2001) emphasized that increasing access to assets. They defined assets to include education, health, land, and housing and considered it crucial for broad–based growth and poverty reduction.

Change in poverty indices by geopolitical zones (GPZ)

The change in poverty indices over time by GPZ is shown in Table 6. Arranging in order of decreasing poverty is North West, North East, North Central, South East, South South and South West. North West records the highest poverty rate and the annual percentage change in all the indices. It also records an increase in poverty from 2004 to 2010. However, North East has the highest intensity of

Table 6. Changes in MPI, headcount ratio and intensity of poverty at K=3 by GPZ.

Geo-political zones	Year	M_0	H	A
North Central	2004	0.170	0.173	0.983
	2010	0.182	0.181	1.006
Annual absolute change		0.002	0.001	0.004
Annual percentage change		1.176	0.771	0.389
North East	2004	0.205	0.192	1.068
	2010	0.216	0.212	1.019
Annual absolute change		0.0018	0.003	-0.008
Annual percentage change		0.894	1.736	-0.765
North West	2004	0.259	0.268	0.966
	2010	0.292	0.295	0.990
Annual absolute change		0.0555	0.0045	0.004
Annual percentage change		2.124	1.679	0.414
South East	2004	0.170	0.173	0.983
	2010	0.118	0.122	0.967
Annual absolute change		-0.0086	-0.0085	-0.0026
Annual percentage change		-5.098	-4.913	-0.271
South South	2004	0.162	0.157	1.032
	2010	0.139	0.136	1.022
Annual absolute change		-0.0038	-0.0035	-0.0016
Annual percentage change		-2.366	-2.229	-0.161
South West	2004	0.053	0.052	1.019
	2010	0.053	0.053	1.00
Annual absolute change		0.000	0.0002	-0.0032
Annual percentage change		0.000	0.321	-0.310

poverty though it reduced in 2010. The North West and North East are worst affected by poverty in the country. Studies have reported that northern regions of the country have high poverty levels relative to the southern regions (Odusola, 1997; Okunmadewa et al., 2005; NBS, 2009). Over time, in the South East and South South, the headcount and the intensity reduced. The South East recorded the highest annual percentage reduction in poverty. Although, the South West is the least poor, there is still increase in incidence. This means that the interventions in the zone have not impacted positively to reduce poverty in the zone, although there is a decline in intensity.

Decomposition by gender

In Table 7, poverty indices increased for both gender over time. While more female headed households were poor in 2004; equal number was poor in 2010. This reflects that a higher proportion of male headed households became poor in 2010. The annual percentage change in headcount and intensity increased for male headed households but only the percentage change in headcount increased for female headed households. In all, irrespective of gender, there is annual percentage increase in headcount and adjusted headcount ratio. However, the percentage change in the intensity of poverty reduced for female and is estimated as -0.179.

Decomposition by occupation

With respect to occupation, poverty was highest among those engaged in agriculture, followed by services and lastly by those engaged in Non-agriculture related occupation in both 2004 and 2010. In Agriculture, poverty incidence was very high at 0.663 in 2010. Southgate et al. (2007) asserted that the impact of the household head being primarily involved in agriculture is linked with high poverty rates, hunger, and malnutrition and also recent analysis of poverty has shown that poverty is disproportionately concentrated among households whose primary livelihood lie in agricultural activities (Federal

Table 7. Changes in MPI, Headcount Ratio and Intensity of Poverty at K = 3.

Variable	Year	M_0	H	A
Occupation				
Agriculture	2004	0.628	0.739	0.985
	2010	0.663	0.671	0.988
Annual absolute change		0.006	-0.011	0.003
Annual percentage change		0.928	-1.533	0.051
Non-agriculture	2004	0.156	0.148	1.057
	2010	0.166	0.161	1.031
Annual absolute change		0.002	0.002	-0.004
Annual percentage change		1.068	1.464	-0.409
Services	2004	0.196	0.186	1.054
	2010	0.171	0.168	1.018
Annual absolute change		-0.004	-0.003	-0.006
Annual percentage change		-2.126	-1.613	-0.569
Gender				
Male	2004	0.408	0.618	0.660
	2010	0.553	0.751	0.736
Annual absolute change		0.024	0.022	0.013
Annual percentage change		5.923	3.587	1.919
Female	2004	0.429	0.579	0.741
	2010	0.553	0.754	0.733
Annual absolute change		0.021	0.029	-0.001
Annual percentage change		4.817	5.037	-0.179

Republic of Nigeria, 2007). In a similar finding, Amao and Awoyemi (2009) reported an inverse relationship between non-agriculture activities and poverty. Nonetheless, agriculture recorded a decrease in annual percentage change in headcount (-1.53) but the intensity of poverty increased (0.05). More attention must target reducing intensity of poverty while enhancing effort to continue to reduce its incidence. This shows that if poverty is reduced substantially in the agricultural sector, rural poverty will fall since over half of rural households are engaged in the agricultural sector. This contrasts the situation for those in services where both the incidence and intensity is reducing over time. It should be noted that the intensity of poverty for those in services and non-agriculture is higher than those in agriculture; therefore intervention should be made to further reduce these intensities.

Determinants of household poverty in rural Nigeria

Multivariate analysis

Table 8 shows the Logit regression estimates of the determinants of household poverty. The MPI obtained for poverty cut-off (k) equals three (0.427 in 2004 and 0.553 in 2010) was taken as the poverty line to classify households into poor and non- poor. Results from the analysis of logistic regression model shows that the chi square value is significant at 1% level which confirms that the model is a good fit for the data.

The factors that increase the probability of being poor are female headed households, household heads that are more than 60years old, household sizes that are four or more, households in north-west, north-east, south-south and year 2010. Those that decrease the probability of being poor are having household heads between ages 20 and 59 years, being practitioners in the non-agriculture or services sector, having household head that have no education or belonging to south west and south east geopolitical political zone.

Households headed by females have a higher probability of being poor. A female headed household increases the likelihood of being poor by 0.019 and is significant at 1%. Similar findings have been reported by Apata et al. (2010), Bastos et al. (2009) and World Bank (1999). The presence of discrimination against women in the labour market, or that women tend to have lower education than men and hence they are paid lower salaries as opined by Bastos et al. (2009). Also, females are not as privileged as their male counterparts in terms of asset ownership and accumulation (World Bank, 2001;

Table 8. Determinants of household poverty in rural Nigeria.

Predictor variables	Coefficients	Marginal effects
Gender of household head		
Male	0.0819*	0.0199*
Female	(0.0490)	(0.0118)
Age of household head (years)		
0-19	1	1
20-39	-0.0890***(0.0182)	-0.0218***(0.0459)
40-59	-0.0574***(0.0100)	-0.0141***(0.0459)
>=60	0.0025** (0.0011)	0.0006**(0.0460)
Marital status		
Not Married	1	1
Married	-0.0611(0.0890)	-0.0149(0.0216)
Divorced	0.1164(0.1089)	0.0282(0.0261)
Widowed	-0.0518(0.1007)	-0.0127(0.0248)
Household size		
1-3	1	1
4-6	0.1591***(0.0277)	0.0390***(0.0068)
7-9	0.2000***(0.0362)	0.0493***(0.0089)
>9	0.2159***(0.0532)	0.0534***(0.0133)
Primary occupation		
Agric. related	1	1
Non-agriculture	-0.6128***(0.0327)	-0.1518***(0.0080)
Services	-0.4666***(0.0358)	-0.1157***(0.0089)
Educational level		
No education	1	1
Primary education	-1.1159***(0.0264)	-0.2718*** (0.0061)
Secondary education	-1.9482***(0.0352)	-0.4368***(0.0060)
Tertiary education	-2.7548***(0.0559)	-0.5261***(0.0054)
Geo-political zone		
North Central	1	1
North East	0.2936***(0.0395)	0.0706***(0.0089)
North West	0.0562*(0.0351)	0.0137*(0.0085)
South East	-0.0877*(0.0407)	-0.2157*(0.0100)
South South	0.2094***(0.0046)	0.0516***(0.0096)
South West	-0.1261***(0.0482)	-0.0310***(0.0119)
Year		
2010	0.3843***(0.0252)	0.0944***(0.0061)
Constant	1.1254***(0.2000)	
Number of observations	39,453	
LR chi^2 (21)	7691.35	
Log likelihood	-23126.895	
Prob>chi^2	0.0000	
Pseudo R^2	0.1426	

*** $P < 0.01$ **$P < 0.05$ *$P < 0.1$; *Standard errors in parenthesis.

Olorunsanya, 2009). Such differential access to productive asset and inputs leads to inequality in welfare. Consequently female headed households continue to suffer in poverty.

Being between the ages of 20 to 59 years reduces the probability of being poor relative to the base category of 0 to 19 years; while being above 60 years increases the probability of being poor. The marginal effect estimates show that the greatest reduction in the probability of being poor is between ages 20 and 39 years. The marginal effect of the age group 20 to 39 years is -0.022, indicating that a change in age category from the base category (0 to 19 years) to 20 to 39 years category significantly reduce poverty by 0.022. Studies carried out in Nigeria by Nzenwa and Oboh (2005), Olubanjo et al. (2007) reported that age of household head had a positive effect on poverty. Babatunde et al. (2008) also posited that prevalence of poverty is higher among the older age group. These studies show that it is difficult to make a general conclusion on the effect of the age of household head. However, this study shows that while increase in age reduces probability of being poor initially, at a threshold, it increases it.

Generally, large household size reduces welfare in most regions of the country. The larger the household size, the poorer the household. Results show that household size had positive correlation with the probability of a household being poor for household sizes from four and the coefficients are significant at 1%. The marginal effect increases with increased household sizes. The estimates are 0.0390, 0.0493 and 0.0534 for households with sizes of 4 to 6 persons, 7 to 9 persons and greater than 9 persons, respectively. Thus, household poverty increases with increasing size of the household. This position is consistent with Omonona (2010) who posited that large household size are associated with poverty and Lipton (1999) also maintained that small households are less likely to be poor than others. Also, similar findings were reported by Schoummaker (2004), Aassve et al. (2005), Kates and Dasgupta (2007). The absence of well-developed social security systems and low savings in developing countries (especially those in Africa) tends to increase fertility rates, particularly among the poor, in order for the parents to have some economic support from children when parents reach old age. This is one of the rationales for parents to increase the number of children as children serve as a form of informal insurance for their parents when old.

Relative to agriculture, other occupations reduce the probability of being poor. The marginal effects for non-agricultural activities[2] and services are -0.1518 and -0.1157, respectively. This implies that non-agricultural activities have the highest probability of reducing poverty followed by services. This position is similar to the findings of Anyanwu (2010) that occupation has a high correlation with poverty in Nigeria. Also, past studies have also identified that most of the poorest households in Sub Saharan Africa are found working in agriculture (Ikpi, 1989; Ayoola et al., 2000; Okunmadewa, 2002; Spencer, 2002; Alayande and Alayande, 2004; Poulton et al., 2005; Apata, 2006).

Education significantly decreases the probability of being poor. The estimated marginal effects reveal that the likelihood of being poor is further reduced also by increasing levels of education. Apata et al. (2010) and Palmer-Jones and Sen (2003) reported same result for rural South-west Nigeria and India respectively.

Anyanwu (2012) emphasized the importance of regional location in explaining poverty in rural Nigeria. The North East, North West and South South geo-political zones of the country has a statistically significant positive effect on the probability of being poor relative to the North Central zone. On the contrary, the results show that South West and the South East zones decrease the probability of being poor. The marginal effect estimates are 0.0706, 0.0516 and 0.0137 for North East, South South and North West respectively which shows that households in the North East have the highest probability of increasing poverty. Also, households in the South East and South West decrease the probability of being in poverty with estimated marginal effects of 0.2157 and 0.03 respectively. There is an increase in the probability of being poor in 2010 relative to 2004 which means that there is an increase in the probability of becoming poor over time.

Conclusion

Households are mostly male headed and over 70% of rural households are in their economically active years. Although, there is reduction in the number of household heads without education, over one-third are still without any form of education. Household sizes are moderate with only a quarter with more than seven persons. Agriculture remains the primary occupation in rural households. The adjusted headcount ratio, headcount ratio and intensity of poverty increased in 2010 relative to 2004. The absolute change and percentage change in poverty reveals that the change is higher for the headcount ratio than the intensity of poverty. The health, asset and education dimension contributed most to poverty. Both the headcount and the intensity of poverty increased for male headed households while only the headcount increased for women. Agriculture has the highest adjusted poverty incidence in both years, but the incidence reduced in 2010 while the intensity remained high. The significant factors that increase the probability of being poor are being a female headed household, increased household size, working in the agriculture sector, residing in North West, North East and South South geo-political zones. The significant factors that decrease the probability of being poor are working in non-agricultural sector and services, having education, residing in South West and South East geo-political zones.

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[2] Non–agricultural activities are paid government employment, international and local cooperatives, private employers, parastatals, NGOs. Services are mainly artisans.

This implies that programmes should be targeted to reducing the number of poor rural households. Targeted programmes in health and education dimensions will reduce poverty substantially. Improving asset of rural households can be achieved by improving access to resources and enforcing policies that define rights to these resources. Educational training should go beyond the primary level. The agricultural sector requires more attention to reduce poverty in the sector. Particularly rural households in Northern Nigeria and South South geo-political zones require more attention to bring them out of poverty.

Conflict of Interests

The author(s) have not declared any conflict of interests.

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