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# Marital Status, Household Size and Poverty in Nigeria: Evidence from the 2009/2010 Survey Data

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## Abstract

This paper examines the effect of marital status and household size, among other correlates, on poverty in Nigeria, using the Harmonized Nigeria Living Standard Survey (HNLSS) data of 2009/2010. Our results show that monogamous marriage, divorce/separation and widowhood are negatively and significantly correlated with the probability of being poor. However, monogamous marriage has the largest probability of reducing poverty in Nigeria. We also find that household size matters in determining poverty in the country: a one-person household negatively and significantly reduces poverty while addition of members to the household, progressively increases the probability of being poor. In addition, our results show that there is a significant concave (inverted-U shaped) relationship between age and poverty. Other variables found to significantly reduce the probability of being poor include: being a male, completion of post-secondary education, being in paid household employment, and residence in the North Central and South East geopolitical zones. Variables that increase the probability of being poor in Nigeria include rural residence, possessing no education, being a self-employed farmer, and residence in the North West geopolitical zone of the country. Based on the results, we recommend a number of policy interventions necessary to reduce poverty in Nigeria.

## 1. Introduction

Poverty is a complex, multidimensional, and universal socio-economic problem. The poor can be categorized, especially in the Nigerian context, as: (i) those households or individuals below the poverty level and whose income are insufficient to provide for basic needs and services; (ii) households or individuals lacking political contacts and other forms of support; (iii) people in isolated rural areas lacking essential infrastructure; (iv) female - headed households whose nutritional needs are not being adequately met; (v) persons who have lost their jobs and the unemployed; and (vi) ethnic minorities who are marginalized, deprived and persecuted economically, socially, culturally and politically (Anyanwu, 1997).

Poverty analysis and the studies of marital status are important in development economics and demography literature. Poverty, marital status and household size are three important aspects of welfare that are closely related. But, poverty reduction strategies require an effective assessment and a clear understanding of how these two key factors affect the welfare status of households, along with other covariates. We examine this issue by exploiting the 2009/2010 Harmonized Nigeria Living Standard Survey (HNLSS) data, covering 36 states and Abuja. It comprises a large sample size of 34,619 usable households. A comparison of this data set to previous National Consumer Surveys and the 2003/2004 Nigeria Living Standard Survey (NLSS) is summarized in Table 1.

The analysis is useful, first, to verify the relative role of marital status and household size and other factors in determining poverty status, and second, to recommend policy changes to reduce poverty incidence in the country.

**Table 1: Sample Sizes for National Consumer Survey (NCS) Data Sets, 1980 -2009/2010**

| Year | Sample Design | Urban | | Rural | | Total |
|---|---|---|---|---|---|---|
| | Three Stages-towns, EAs, | No | (%) | No | (%) | |
| 1980 | Households | 5,582 | 54.3 | 4,698 | 45.7 | 10,280 |
| 1985 | Two Stages- EAs, HHs | 5,273 | 56.6 | 4,044 | 43.4 | 9,317 |
| 1992 | Two Stages- EAs, HHs | 3,978 | 41.0 | 5,719 | 59.0 | 9,697 |
| 1996 | Two Stages- EAs, HHs | 3,037 | 21.1 | 11,358 | 78.9 | 14,395 |
| 2003/ 2004 | Two Stages- EAs, HHs | 4,646 | 24.2 | 14,512 | 75.8 | 19,158 |
| 2009/ 2010 | Two Stages- EAs, HHs | 9,348 | 27.00 | 25,271 | 73.00 | 34,619 |

Source: Federal Office Statistics (1999), National Bureau of Statistics (2005, 2010) and NBS Data Files.

Thus the further contents of the paper can therefore be outlined as follows. Section II discusses the poverty profile in Nigeria while Section III presents a brief review of the literature. Section IV presents the empirical estimates of the effects of marital status, household size and other correlates of poverty in Nigeria using the 2009/2010 Harmonized Nigeria Living Standard Survey (HNLSS) of 2009/2010 data set. Section V concludes the paper with policy implications.

## 2. Nigeria's Poverty Profile: Trend and Dimensions

### 2.1. Trend in Nigeria's Poverty Incidence

Figure 1 shows the national poverty levels from 1980 to 2010. Starting from 28.1 per cent in 1980, national poverty reached 66.9 per cent in 1996 before falling to 54.4 per cent in 2004 – and then reaching a peak in 2010 to 69 per cent. However, the population in poverty continues to rise – from 18.3 million in 1980 to 68.7 million in 2004 and 112.5 million in 2010 (Figure 2). Poverty food, absolute, relative and dollar per day – has been on the upwards trend (Figure 3).

**Figure 1: Nigeria - Trend in National Poverty Incidence, 1980-2010 (%)**
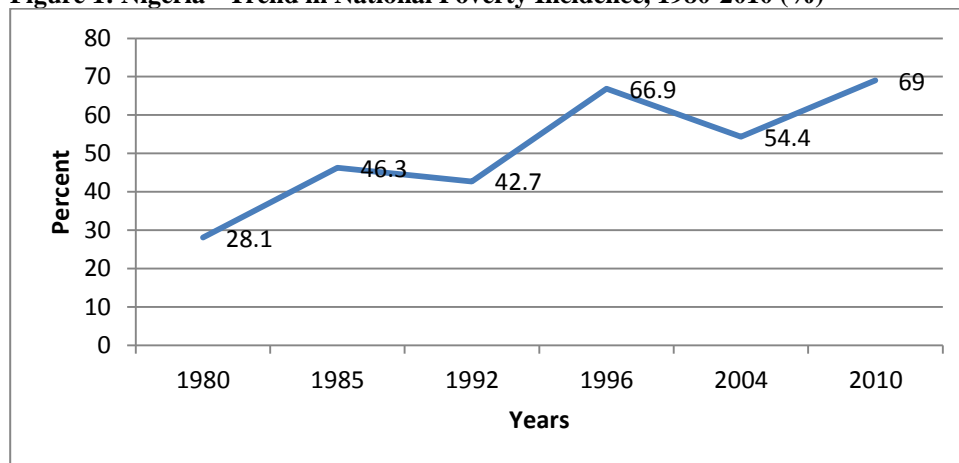


Source: Author's calculations, using Federal Office of Statistics and National Bureau of Statistics (NBS) Data.

**Figure 2: Poverty Incidence and Population in Poverty: 2004 versus 2010**
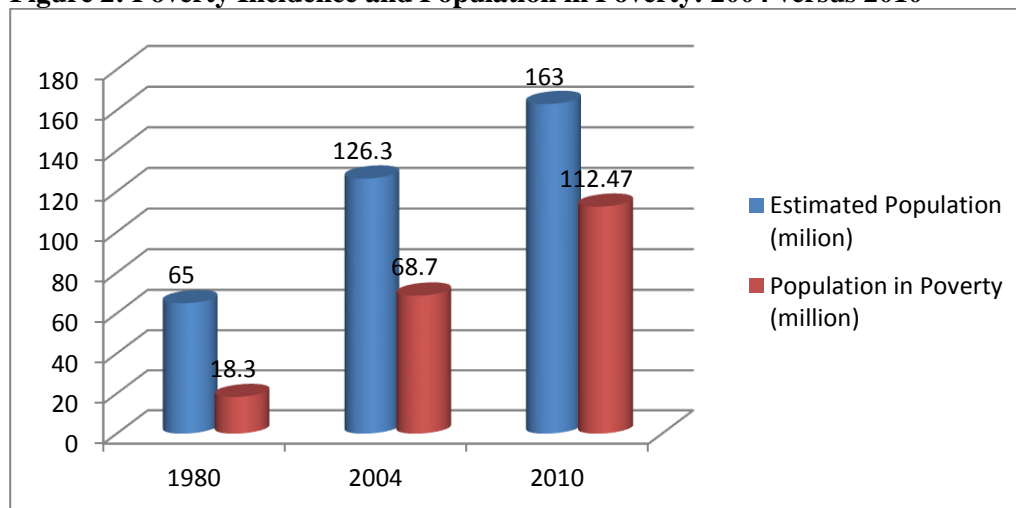


Source: Author's calculations, using National Bureau of Statistics (NBS) Data.

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**Figure 3: Poverty Incidence in Nigeria: 2004 and 2010**



Source: Author's calculations, using National Bureau of Statistics (NBS) Data.

Figure 4 presents the relative poverty incidence in urban and rural Nigeria from 1980 to 2010. Urban poverty was only 17.2 per cent in 1980 but reached a high of 59.3 per cent in 1996 before falling to 43.2 per cent in 2004 – still more than double its 1980 level. It reached a peak of 61.8 per cent in 2010. On the other hand, rural poverty stood at 28.3 per cent in 1980, reaching a high of 71.7 per cent in 1996 before decreasing slightly to 63.3 per cent in 2004, also more than double its 1980 level. As with the urban poverty, rural poverty reached a peak of 73.2 per cent in 2010. The Table also shows that in all the years, rural poverty incidence had dominated urban poverty. Thus, Nigerian poverty is largely a rural phenomenon. This is true for food, absolute, relative and dollar per day poverty as shown in Figure 5.

**Figure 4: Trend in Rural Versus Urban Poverty Incidence in Nigeria, 1980-2010 (%)**
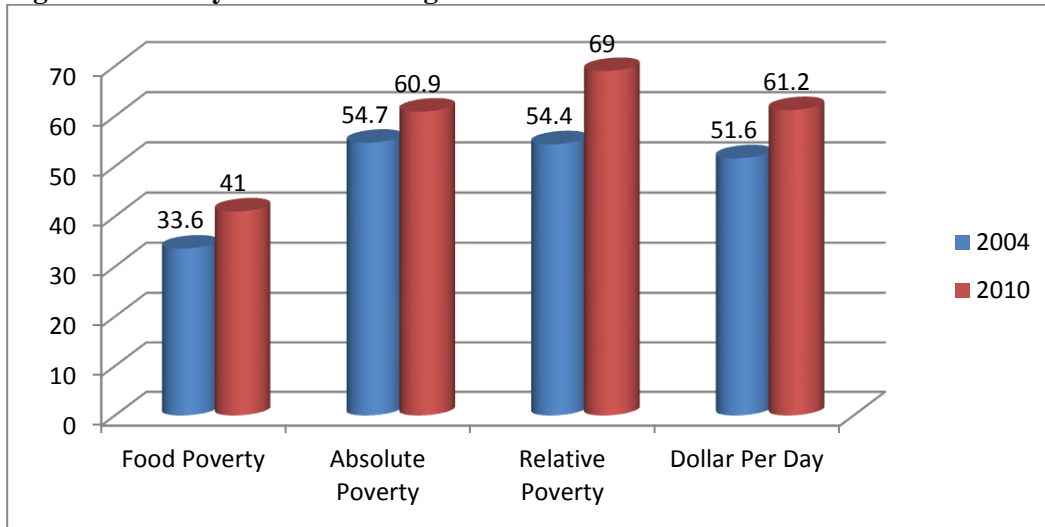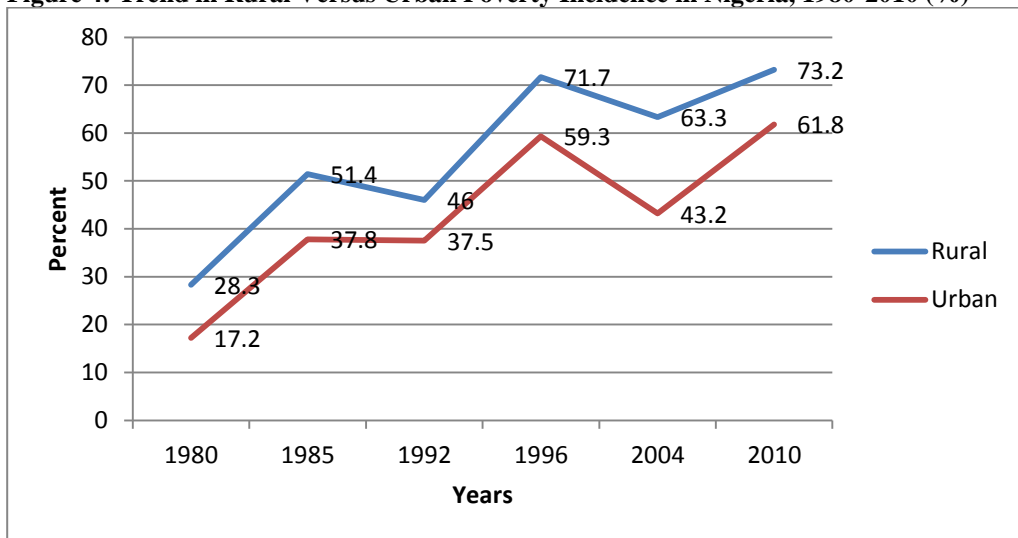


Source: Author's calculations, using Federal Office of Statistics and National Bureau of Statistics (NBS) Data.

**Figure 5: 2010 Poverty Incidence in Nigeria: Urban versus Rural**
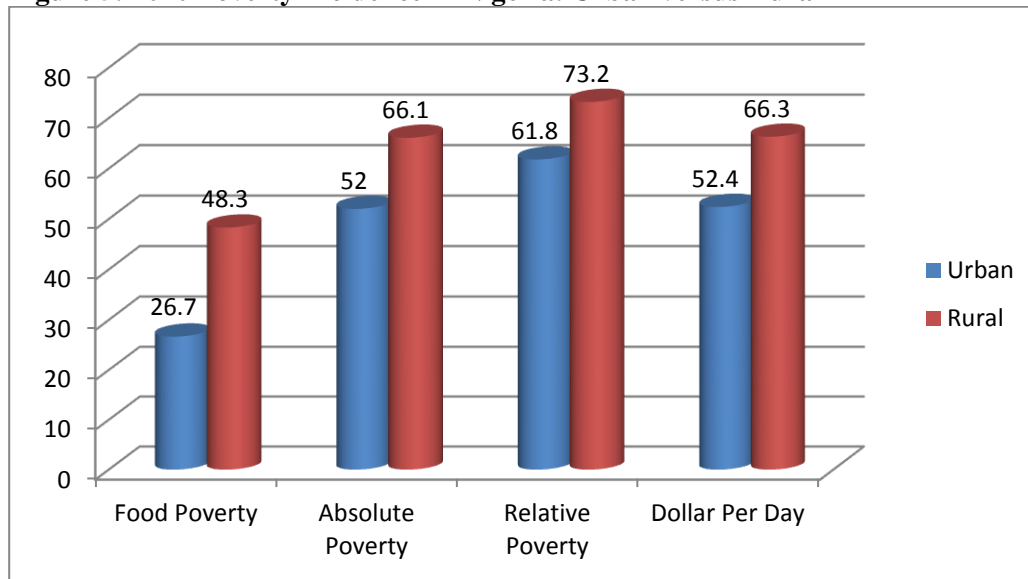


Source: Author's calculations, using National Bureau of Statistics (NBS) Data.

Nigerian poverty depth and severity are not only high but rising (Table 2). More importantly, rural poverty was more widespread, deeper, and more severe than urban poverty throughout the period, 1980-2010.

**Table 2: Depth and Severity of Poverty by Sector (%), 1980 - 2010**

| Sector | 1980 | | 1985 | | 1992 | | 1996 | | 2004 | | 2010 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Depth | Severity | Depth | Severity | Depth | Severity | Depth | Severity | Depth | Severity | Depth | Severity |
| National | 9.0 | 4.3 | 16.3 | 7.8 | 16.4 | 8.6 | 30.4 | 17.4 | 21.8 | 11.9 | 36.1 | 23.0 |
| Urban | 5.2 | 2.3 | 12.1 | 5.4 | 13.5 | 6.7 | 26.3 | 15.0 | 16.7 | 9.2 | 28.8 | 17.0 |
| Rural | 9.5 | 4.6 | 18.9 | 9.3 | 18.3 | 9.8 | 33.0 | 18.9 | 25.8 | 14.1 | 40.3 | 26.5 |

Sources: Source: Author's calculations from Federal Office of Statistics (FOS)/National Bureau of Statistics (NBS) Data.

## 2.2. Some Dimensions of National Poverty in Nigeria: 2010

### 2.2.1. Poverty Indices

The Pα index measures proposed by Foster *et al.* (1984), which can be used to generate the headcount ratio (α= 0), as well as the depth (α= 1), and severity (α= 2) of poverty, were used in this paper. The simplest and most common measure of poverty is the headcount ratio or the "incidence of poverty." The poverty headcount is the number of people in a population who are poor, while the poverty headcount ratio (H) is the fraction who are poor. That is:

$$H = (q/n) \qquad (1)$$

Where:

q = the number below the poverty line;
n = the population size

The poverty headcount and the headcount ratio are only concerned with the number of people below the poverty line. They are insensitive to the depth or severity of poverty and to changes below the poverty line.

That is, they do not satisfy the axioms of "strong monotonicity" or "distributional sensitivity." However, the headcount ratio is the most commonly used measure of poverty because of its simplicity and ease of calculation (Fields, 1997).

The Pα index proposed by Foster *et al.* (1984) incorporates some degree of concern about poverty through a "poverty aversion" parameter α.

The Pα class measure can be written as:

$$P\alpha = \frac{1}{n}\sum_{i=1}^{q}\frac{(Z-Y_i)^\alpha}{Z}. \qquad (2)$$

Where:
   $Z$ = poverty line
   $q$ = number of persons/households below the poverty line
   $Y$ = income of the person/household
   $\alpha$ = the FGT parameter which takes the value 0, 1, 2 depending on the degree of concern about poverty.
   $Z-Y$ = is the proportionate shortfall below the poverty line

This figure is raised to power α. By increasing the value of α, the "aversion" to poverty is measured. When there is no aversion to poverty, that is $\alpha = 0$, the index is simply:

$$P\alpha = \frac{1}{n}(q) = q/n = H. \qquad (3)$$

H is the headcount ratio, which measures the incidence of poverty. When $\alpha = 1$, Pα measures the depth of poverty; when $\alpha = 2$, Pα measures the severity of poverty.

The Pα index satisfies the Sen transfer axiom, which requires that when income is transferred from a poor to a richer household, measured poverty increases. Another advantage of the Pα measure is that it is decomposable by population subgroups. Thus, the overall measure of poverty can be expressed as the sum of group measures weighted by the population share of each group. That is,

$$P\alpha = \sum_{j=1} K_j P\alpha_j. \qquad (4)$$

Where:
   $j$ = 1, 2, 3, ... m groups,
   $K_j$ = population share of each group,
   $P\alpha_j$ = the poverty measure of each group.

From this, the contribution of each group $C_j$ to overall poverty can be calculated as follows:

$$C_j = \frac{K_j P\alpha_j}{P\alpha}. \qquad\qquad (5)$$

This property of the index implies that when any group becomes poorer, aggregate poverty will increase. In this paper, the $P\alpha$ index is used: Po (the headcount or poverty incidence), $P_1$ (the depth of poverty), and $P_2$ (the severity of poverty) were calculated. The contributions of various subgroups in the population to overall poverty were also calculated.

The index of poverty used in this section is headcount index (incidence). Table 3 shows the distribution of headcount poverty by marital status, household size, gender, education, age group, occupation groups, zone, and residence/location of the household in 2010.

### 2.2.2. Poverty and Marital Status

In 2010, poverty in Nigeria differed by marital status. Poverty was highest among married polygamous households (77.36 per cent), followed by married monogamous ones (69.80 per cent). The poverty incidence was 61.89 percent for the divorced and 54.74 per cent for those living together (co-habitation).

### 2.2.3. Poverty and Household Size

Nigerian poverty is high for large households. Tables 3 demonstrate that there is correlation between the levels of poverty and the size of the household. While households with one person showed the least incidence of poverty, households with more persons especially those with seven (7) persons and above showed the highest incidence of poverty. For instance, the incidence of national poverty with the least size (i.e. one person) was 22.60 per cent. This is against households with more than 7 persons whose incidence of poverty was estimated at 97.61 per cent in 2010.

### 2.2.4. Poverty and Gender

Poverty was more pronounced among male in 2010 (69.90 per cent) as against 61.12 per cent for the females. This has been the outcome since 2004 when national poverty of males was 56.5 per cent against 36.5 per cent for females.

### 2.2.5. Poverty and Education

Table 3 also shows that the level of education is an important determinant of poverty. In 2010, Nigerian poverty was high for those with little or no education. For instance, those with no education have a higher proportion of poverty than those with at least primary education. For instance, among those with no education, their proportion in terms of poverty was 75.32 per cent. For those with post-secondary (tertiary) education, their proportion was 56.46 per cent.

**Table 3: Headcount of Poverty by Marital Status, Household Size and Other Household Head Characteristics (%), 2010**

| Characteristics | Relative Poverty (%) |
|---|---|
| **Marital Status** | |
| Married (Monogamous) | 69.80 |
| Married (Polygamous) | 77.36 |
| Living Together | 68.69 |
| Divorced/Separated | 54.74 |
| Widowed | 61.89 |
| **Household Size** | |
| 1 person | 22.60 |
| 2 persons | 41.49 |
| 3-6 persons | 68.04 |
| 7+ persons | 79.61 |
| **Gender** | |
| Male-headed Household Head | 69.90 |
| Female-headed Household Head | 61.12 |
| **Education Level** | |
| None | 75.32 |
| Nursery | 80.16 |
| Primary | 69.74 |
| Secondary | 63.78 |
| Post-Secondary | 56.46 |
| **Age Group** | |
| 15- 19 | 53.33 |
| 20- 24 | 52.59 |
| 25- 29 | 54.15 |
| 30- 34 | 63.28 |
| 35- 39 | 69.00 |
| 40 -44 | 73.50 |
| 45 -49 | 72.91 |
| 50 -54 | 72.96 |
| 55 -59 | 70.68 |
| 60 -64 | 71.30 |
| 65+ | 64.19 |
| **Occupation** | |
| Govt. Employee | 61.05 |
| Employer | 61.10 |
| International Organization | 69.46 |
| International Cooperative | 69.81 |
| Local Cooperative | 83.39 |
| NGO | 62.11 |
| Paid Household Chores | 49.30 |
| Parastatal | 41.90 |
| Priv. Sector Apprentice | 56.90 |
| Self - Agriculture | 73.80 |
| Self - Non-agriculture | 68.20 |
| Self with Employees | 59.30 |
| Self without Employees | 65.11 |
| Unpaid Family Business | 66.56 |
| Others | 53.98 |
| **Zone** | |
| North East | 76.31 |
| North West | 77.76 |
| Central | 67.49 |
| South East | 67.05 |
| South West | 59.12 |
| South- South | 63.77 |
| **Residence/Location** | |
| Urban | 61.80 |
| Rural | 73.16 |
| **National** | 69.00 |

Source: Author's Computation from the Harmonized Nigeria Living Standard Survey (HNLSS) of 2009/2010.

### 2.2.6. Poverty and Age Groups

For poverty and age group, the figures generally show that levels of poverty increase as we move up the age ladder. However, after the age group 64 years, poverty tended to decline marginally (Table 3).

### 2.2.7. Poverty and Occupation Characteristics

Table 3 shows that occupation characteristics varied in 2010. While those in local cooperative jobs and self-employed farming had the highest incidence of poverty in 2010, those who worked in parastatals and as paid household workers had the lowest poverty rates.

### 2.2.8. Zonal Levels of National Poverty

Table 3 also shows the headcount poverty by zones. It shows that the North West (77.76 per cent) had the highest level of poverty in 2010, followed by the North East (76.31 per cent). South West zone had the least poverty incidence at 59.12 per cent. Thus, another key characteristic of Nigerian poverty by State is that poverty incidence is largest in the Northwest, followed by the Northeast of the country (Figures 6 and 7), even when measured for food, in absolute terms, relatively or by dollar per day (Figure 6).

**Figure 6: 2010 Zonal Incidence of Poverty**
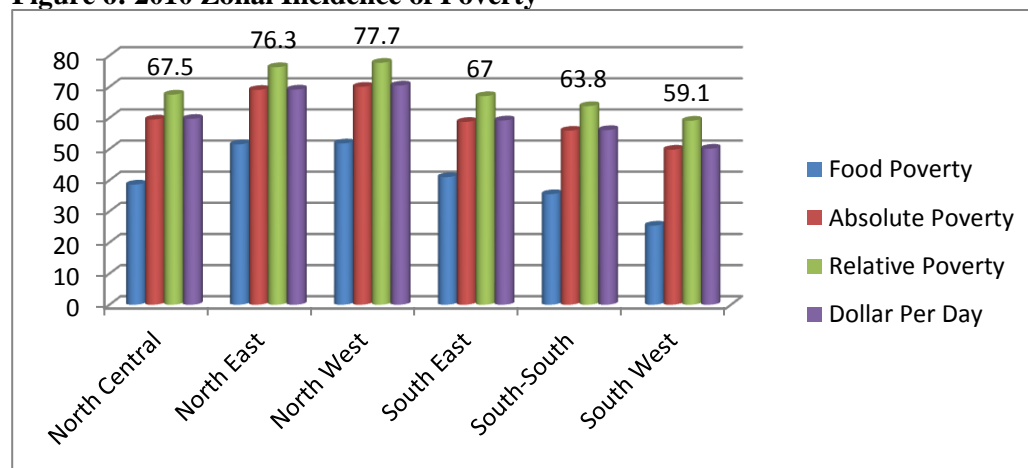


Source: Author's calculations, using National Bureau of Statistics (NBS) Data.

### 2.2.9. Poverty in the States and Federal Capital Territory (FCT)

While poverty incidence increased in twenty seven states (out of 36 and FCT) between 2004 and 2010, the highest increase was in Sokoto State whose headcount index rose from 76.81 per cent to 86.4 per cent during the period (Figure 7). Niger State at 43.6 per cent had the lowest – close to Osun State's 47.5 per cent.

**Figure 7:** Headcount of Poverty by State and FCT/Nation (%), 2004 and 2010
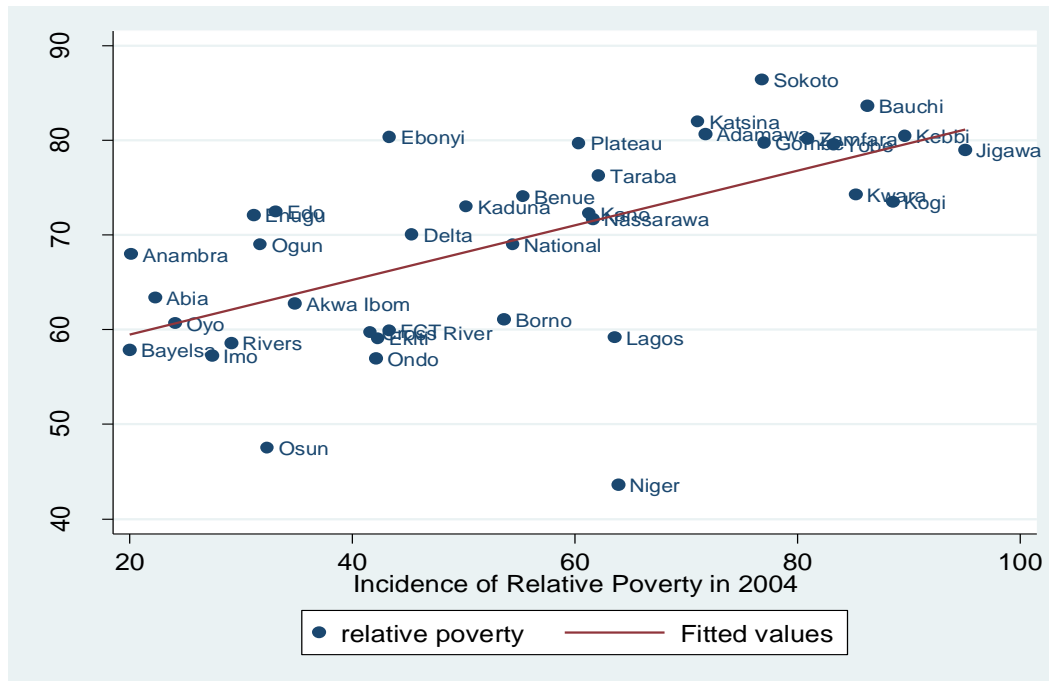


Source: Author's calculations, using National Bureau of Statistics (NBS) Data.

### 3. Brief Literature on The Poverty Impacts of Marital Status, Houshold Size, and other Correlates

- **Marital Status**

It has been posited that marriage brings an array of benefits (Waite and Gallagher, 2000): in economic terms, since marriage generally adds a potential earner to the household, it seems obvious that marriage should increase the economic well-being of members of the family, including the children. Married women living in male-headed households have the prospect of enjoying larger family income because these families have a larger number of earning members and especially a larger number of earning male members. A long-term marital relationship may also mean higher permanent income and a larger build-up of consumer durables, factors that could limit the extent of economic hardship experienced in downturns in the economy. In addition, married couples may be more easily able to draw on relatives for help in difficult situations (Lerman, 2002).

Indeed, as Grinstein-Weiss and Sherraden (2006) note, marriage has a number of important features that enhance wealth accumulation (Lupton and Smith, 2003; Schoeni, 1995; Waite, 1995; Waite and Gallagher, 2000; Wilmoth and Koso, 2002). One feature is that since marriage involves long-term commitment, it increases the productivity and the efficiency of the household through couples' specialization in specific skills and duties. The second is that the total product of a married couple is larger than the sum of the outputs of each produced separately. The third is that the requirements and expectations of married (versus single) life may encourage people to buy a house, save for children's education, and acquire cars and other assets. Fourthly, economies of scale in consumption suggest that a married couple can achieve the same utility with less combined expenditure than the sum of their individual consumption if living apart. The fifth is that married individuals may have access to many

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benefits such as health and life insurance provided by the partner's employment. Sixthly, studies show that that married men earn more than unmarried men. Lastly, marriage expands one's social network and social support, which often result in additional opportunities and benefits that lead to saving (Grinstein-Weiss and Sherraden, 2006). Also, married couples pool their incomes and more frequently save for children's futures.

In addition to the above reasons, married men tend to spend less time and less of the family's money outside the home.  In fact, recent estimates by the U.S. Bureau of the Census (2012) show that in 2011, 6.2 percent of married-couple families, 31.2 percent of families with a female householder, and 16.1 percent of families with a male householder lived in poverty.

A number of studies have shown that marriage has a large effect on reducing the risk of poverty. They show that unmarried individuals and single-parent families are more likely to live in poverty than their married counterparts (Blank, 1997; Furstenberg, 1990; Garfinkel and McLanahan, 1986; U.S. Bureau of the Census, 2001, 2012; White and Rogers, 2000). This because, compared to unmarried couples, married people save much higher portions of their income and accumulate more assets. Consequently, married-couple households have significantly higher wealth than other types of households (Waite, 1995; Wilmoth and Koso, 2002) while marriage is associated with a higher probability of attaining affluence over the life course when compared with nonmarriage (Hirschl, Altobelli, and Rank, 2003).

- **Household Size**

On the other hand, the literature is also full of evidence that large households are associated with poverty (Lanjouw and Ravallion, 1994; Szekely, 1998; Anyanwu, 1997, 1998a, 2005, 2010, 2012; and Gang, Sen and Yun, 2004). 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 so that they will have high probability of getting support when they are old. Also, as Schultz (1981) had indicated, high infant mortality rates among the poor tends to provoke excess replacement births or births to insure against high infant and child mortality, which will increase household size.

There are some cultural issues and thinking on household size and population that are peculiar to Nigerians. For example, apart from the tradition of polygamy, which is more prevalent in the Moslem North but dying in other parts of the country, there is also the belief that children are "gifts from God" in a male-dominated society. In addition, Nigeria is still conceived as a "high birth, high death" society where many people think that they need to have as many children as possible since they do not know which will survive.

Following micro-economic arguments, in Nigeria, children are considered as an essential part of the household's work force to generate household income, and as insurance against old age. However, a high number of children and their participation in household production are likely to impede investment in their human capital (i.e. education and health), maintaining the low-income status of the household, and thereby creating or perpetuating a poverty-fertility trap. Indeed, by "acquiring" children the share of household resources available for each member decreases. Moreover, newly born children may decrease the productivity of the mother either by taking more resources (such as food) from her or hampering her work prospects.

Thus, the perceived benefits and costs of children, and hence the fertility behavior, depend on economic forces, social organizations, and cultural patterns. In this sense, poverty-household size relationship is contingent upon social and institutional characteristics, such as education, family planning and health services. However, the impact of household size on poverty may essentially be an empirical question, even with micro data as economic entities differ in their peculiar characteristics.

- **Gender**

It is generally argued that women are more prone to poverty due principally to low education and lack of opportunity to own assets such as land. The feminization of poverty – a phenomenon, which is said to exist if poverty is more prevalent among female-headed households than among male-headed households – has been the focus of many studies in recent times (see Bastos et al, 2009). Some of the reasons advanced for this existence of feminized poverty include: the presence of discrimination against women in the labor market, or that women tend to have lower education than men and hence they are paid lower salaries (see Anyanwu, 2010, 2012).

- **Education**

In addition, the literature shows that education increases the stock of human capital, which in turn increases labor productivity and wages. Since labor is by far the most important asset of the poor, increasing the education of the poor will tend to reduce poverty. In fact, there appears to be a vicious cycle of poverty in that low education leads to poverty and poverty leads to low education (see also Bastos et al, 2009). The poor are unable to afford their education, even if it is provided publicly, because of the high opportunity cost that they face. Many times they cannot attend school because they have to work to survive. Indeed, Plamer-Jones and Sen (2003) and Anyanwu (2005, 2010, 2011) have found, rural households in India whose main earning member does not have formal education or has attended only up to primary school are more likely to be poor than households whose earning members have attended secondary school and beyond. However, Sadeghi et al (2001) have noted higher levels of education were not seriously needed in rural areas where only a few well-educated people live.

- **Age**

It is argued that poverty increases at old age as the productivity of the individual decreases and the individual has few savings to compensate for this loss of productivity and income. However, the relationship between age and poverty may not be linear, as would be expected that incomes/expenditures would be low at relatively young age, increase at middle age and then decrease again. Thus, according to the life-cycle hypothesis, we would expect that poverty is relatively high at young ages, decreases during middle age and then increases again at old age (Datt and Jolliffe, 1999; Rodriguez, 2002; Gang, Sen and Yun, 2004).

- **Occupation/Employment**

The literature indicates that there is a complicated relationship between labor market mechanisms and poverty. On the one hand, it has been argued that there might be a positive relationship between employment and poverty based on the possibility that increasing employment requires a fall in real wages; this lowers real income and therefore leads to an increase in poverty (Agénor, 2005). It is also argued that the positive effect may be particularly high if the expansion in employment (induced by

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lower real wages and output growth) is skewed toward low-paying jobs. On the other hand, however, the poor often generate a significant share of their income from labor services. Higher levels of earnings resulting from higher employment levels enable workers to spend more on education and skill formation of their children as well as requisite infrastructure, thus raising the productive capacity of the future workforce, and creating necessary conditions for achieving higher levels of economic growth, leading to poverty reduction (Islam, 2004).

The World Bank (2004) shows that in the MENA countries, poverty is not associated with unemployment. It concludes that public sector and regular private wage work appear to offer protection from poverty. Casual and nonwage wage work as well as self-employment and work for family-run enterprises are generally strongly associated with poverty in most countries for both urban and rural areas. The World Bank therefore posits that poverty is not strongly associated with an absolute lack of work (the unemployed and those who are out of the labor force) but rather with unstable or inadequate employment.

Anyanwu and Erhijakpor (2012) show that for all-Africa, the combined male and female as well as the separate female samples, higher levels of youth employment, lower poverty whereas the quadratic of youth employment tend to increase it. Also, Ray *et al.* (2010) and Tomlinson and Walker (2010) show strong negative links between individual and household employment patterns and poverty. According to Tomlinson and Walker (2010), for example, it is work that protects against recurrent poverty (and this safeguard increased with the severity of poverty types). However, there is also evidence that that employment has become a less secure means of exiting poverty (McQuaid *et al.*, 2010), suggesting that other factors also contribute to poverty.

- **Location of Residence**

Location of residence also matters. In particular, due to more job opportunities in urban areas, poverty tends to be lower in urban than rural areas. A number of recent studies, including the World Bank (1990, 2001) and the African Development Bank (2002) have indicated that poverty in Africa (and other developing countries) is higher in rural areas than in urban areas. Some of the reasons advanced for this include that historically government policy has been biased against rural areas; rural areas are heavily dependent on agricultural production, which in Africa is characterized by low labor productivity and hence low incomes; and natural disasters such as flooding and drought tend to affect rural areas more heavily than they affect urban areas.

## 4. Effects of Marital Status, Household Size and other Correlates on Poverty in Nigeria; 2010

### 4.1. Methodology and Empirical Specification

In this section, we investigate the effect of marital status, household size and other household characteristics on poverty in Nigeria in 2010. This is with a view to addressing the related question of whether and how poverty can be sustainably reduced as well as distilling the lessons learned for tackling the problem of poverty in the country and perhaps elsewhere in Africa.

The discussions in section 3 above have relied largely on tabulated data, exploring relationships between variables without holding other factors constant. Although many of the relationships in the

data seem clear, correlations among key variables potentially could obscure the relationship between poverty and a single factor of interest. Consequently, it is useful to analyze the impact of these variables on poverty holding all other factors constant. This implies the need to separate the effects of correlates.

We approach this problem through the application of multivariate analysis, using a logistic regression in accordance with the basic principles of discrete choice models on the 2009/2010 data. In order to explore the correlates of poverty with the variables thought to be important in explaining poverty a logistic regression model was estimated, with dependent variable being the dichotomous variable of whether the Nigerian household is poor (1) or not poor (0). The explanatory variables considered important in the analysis of poverty were: marital status; demographic characteristic (household size), personal characteristic (age and its square); gender - household is male- or female-headed); educational attainment (no education, nursery, primary, secondary, and post-secondary); occupation/employment; and geographical residence (zones − North East, North West, North Central, South East, South West, and South South).

Thus, in the model, the response variable is binary, taking only two values, 1 if the Nigerian household is poor, 0 if not. The probability of being poor depends on a set of variables listed above and denoted as x so that:

$$\Pr ob(Y = 1) = F(\beta' x)$$
$$\Pr ob(Y = 0) = 1 - F(\beta' x)......(4.1)$$

Using the logistic distribution we have:

$$\Pr ob(Y = 1) = \frac{e^{\beta' x}}{1 + e^{\beta' x}}$$
$$= \Lambda(\beta' x).........(4.2)$$

where $\Lambda$ represents the logistic cumulative distribution function. Then, the probability model is the regression:

$$E[y / x] = 0[1 - F(\beta' x)] + 1[F(\beta' x)]$$
$$= F(\beta' x).......(4.3)$$

The dependent variable is defined as 1 if average per capita household expenditure is below the poverty line and 0 if it is above the poverty line (see also Anyanwu, 1997, 1998a, 2005, 2010, 2011, 2012; Anyanwu and Erhijakpor, 2009, 2010; and Gang, Sen and Yun, 2004).

Since the logistic model is not linear, the marginal effects of each independent variable on the dependent variable are not constant but are dependent on the values of the independent variables (see Greene, 2003). Thus, to analyze the effects of the independent variables upon the probability of being poor, we looked at the change of odds ratio as the dependent variables change. The odds ratio is defined as the ratio of the probability of being poor divided by the probability of not being poor. This is computed as the exponent of the logit coefficients ($e^{\beta}$). All odd ratios greater than one means that the

associated variables are positively correlated with the probability of being poor while odd ratios lower than one means that the associated variables are negatively correlated with the probability of being poor. The results provide strong support for the descriptive analysis above.

### 4.2. Empirical Results

Our empirical results for the 2010 national data are summarized in Table 4.

- **Marital Status and Poverty**

Our results indicate that monogamous marriage, being divorced/separated, and widowhood have statistically significant negative effects on the probability of being poor. In fact, being in monogamous marriage reduces the odds of being poor by 0.687 times; for the divorced/separated by 0.669 times and for widows by 0.686 times. These translate to probabilities of 0.84, 0.03, and 0.11, respectively, of not being poor, given other variables. Thus, monogamous marriages have the highest probability of reducing poverty in Nigeria.

With respect to divorce and separation in the US, Ananat and Michaels (2008) find evidence that some women who divorce, rather than moving lower in the income distribution, move towards the top of the income distribution, possibly due to re-marriage outcomes or to moving in with their parents, a roommate or sibling. In addition, women further compensate through private (e.g. alimony and child support) and public (e.g. welfare) transfers, and by increasing their own labor supply. Further, since divorce reduces the family size, it may be possible for a woman to entirely offset the loss of her husband's income so that her material well-being is undiminished.

Some analysts and human rights advocates opine that widowed women are vulnerable and prone to lose rights of access to properties they enjoyed during the lifetime of then husbands (Human Rights Watch, 2003; Strickland, 2004; Izumi, 2007; Doss et al., 2012). They conclude that such alienation (including "property grapping" by family members) from property (such as land, housing, etc.) is linked to poverty (Carter and Barrett, 2006).

However, in a recent study, Peterman (2012), in a sample of 15 Sub-Saharan African countries, shows that about 47% of widows or their children received properties after the death of their husbands. This reached a high of 66% in Rwanda, 60% in Namibia, 57% in Senegal and Nigeria, and 53% in Tanzania. Indeed, only women in polygamous marriages are less likely to report inheriting any properties. This was true for both the pooled sample and for most of the individual 15 countries, including Nigeria. Peterman (2012) also finds that property inheritance by widows is significantly and robustly associated with higher welfare outcomes (per capita consumption and value of household stocks) in Kagera, Northwest Tanzania. However, taken separately, widowhood (as well as being divorced or being separated) is negatively and robustly associated with welfare outcomes in the region.

- **Household Size and Poverty**

As Table 4 shows, we find that household size is significantly related to poverty in Nigeria. One-person households have significant negative impact on poverty with odds ratio of 0.449 and probability of being at 0.14. However, as household size increases beyond one person, the higher the positive impact on poverty. For example, the odds of two-person household increasing poverty are 2.567 times and 4.731

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times for seven-plus-person household, given other variables. These translate to the probabilities of being poverty at 0.53 and 0.21, respectively. Our results are consistent with those of Schoummaker (2004) for Sub-Saharan Africa, Aassve et al (2005) for developing countries, Kates and Dasgupta (2007) for Africa, and Rhoe et al. (2008) for Kazakhstan in Central Asia.

**Table 4:  Marital Status, Household Size and Other Covariates of Poverty in Nigeria: 2010**

| Variables | Coefficient | z-value | Odd Ratio |
|---|---|---|---|
| **Marital Status** | | | |
| Married- Monogamous | -0.376 | -2.26** | 0.687** |
| Married- Polygamous | -0.282 | -1.29 | 0.754 |
| Living Together | | | |
| Divorced/Separated | -0.402 | -2.24** | 0.669** |
| Widowed | -0.377 | -2.19** | 0.686** |
| **Household size** | | | |
| 1-person HH | -0.801 | -16.97*** | 0.449*** |
| 2-person HH | | | |
| 3to 6-person HH | 0.943 | 25.75*** | 2.567*** |
| 7+-person HH | 1.554 | 33.75*** | 4.731*** |
| **Location/Residence** | | | |
| Urban | | | |
| Rural | 0.263 | 8.41*** | 1.301 |
| **Age** | | | |
| Age | 4.304 | 5.85*** | 74.019*** |
| Age squared | -0.572 | -5.88** | 0.564*** |
| **Gender** | | | |
| Male | -0.145 | -2.86** | 0.864** |
| Female | | | |
| **Education** | | | |
| None | 0.200 | 5.93*** | 1.221*** |
| Nursery | 0.246 | 0.55 | 1.279 |
| Primary | | | |
| Secondary | -0.031 | -0.80 | 0.969 |
| Post-Secondary | -0.341 | -7.33*** | 0.711*** |
| **Occupation** | | | |
| Govt. Employee | 0.012 | 0.18 | 1.013 |
| Employer | 0.119 | 0.48 | 1.126 |
| Intl. Organization | 0.161 | 0.96 | 1.175 |
| Intl. Cooperative | 0.082 | 0.30 | 1.086 |
| Local cooperative | 0.163 | 0.70 | 1.177 |
| NGO | 0.154 | 0.83 | 1.166 |
| Paid HH Chores | -0.895 | -2.57** | 0.409** |
| Parastatal | -0.281 | -1.53 | 0.755 |
| Priv. Sector Apprentice | -0.158 | -1.62 | 0.854 |
| Self - Agriculture | 0.074 | 1.33 | 1.077 |
| Self - Non-agriculture | 0.133 | 2.10** | 1.142 |
| Self with Employees | -0.176 | -1.48 | 0.839 |
| Self without Employees | 0.087 | 1.29 | 1.091 |
| Unpaid Family Business | 0.136 | 0.74 | 1.146 |
| Others | 0.155 | 1.56 | 1.167 |
| **Zones** | | | |
| North East | | | |
| North West | 0.210 | 5.16*** | 1.234*** |
| North Central | -0.164 | -3.73*** | 0.849*** |
| South East | -0.119 | -2.41** | 0.888** |
| South West | -0.036 | -0.75 | 0.964 |
| South South | -0.054 | -1.13 | 0.948 |
| **Constant** | -8.035 | -5.92*** | |
| Pseudo R$^2$ = 0.1125 | | | |
| LR chi2(22) = 4395.41 | | | |

| Prob > chi2 = 0.0000 |  |
|---|---|
| Log likelihood = -20381.919 |  |
| N = 34431 |  |

Thus, additional children or persons, on average, causes a substantial decline in household savings rates and levels, increases the financial costs of bearing and raising children, reduces the work participation and wage income of mothers, and reduces the proportion of school-age children attending school. The ultimate result is a vicious cycle of poverty, particularly in large-population areas.

- **Rural-Urban Location and Poverty**

Our estimates confirm that Nigeria's poverty is largely a rural phenomenon – just as the descriptive statistics above show. This is because our results show that there is a statistically significant positive effect of rural dwelling on the probability of being poor. This means that that the probability of being poor increases if the household is located in a rural area. From the odds ratio results in Table 7, residing in rural areas increases the odds of being poor by 1.301 times more with the probability of not being poor estimated at 0.73. These results agree with those of Rhoe et al. (2008) for Kazakhstan.

- **Age and Poverty**

The results show that age and its quadratic form do matter in determining poverty in Nigeria. This conforms with the argument of both non-linearity and that as the level age increases, the higher the level of poverty. Thus, our finding shows that age increases poverty incidence but at a decreasing rate. This means that in Nigeria, incomes/expenditures are low at relatively young age, increasing at middle age and then decrease again at old age.

- **Gender and Poverty**

Our results show that gender does matter in determining poverty in Nigeria. They show that male-headed households are less likely to be poor than female-headed households. These results conform with the observation by Bastos et al (2009) that poverty is not a gender neutral condition as women and men experience poverty in distinctive ways. Being a male reduces the odds of being poor by 0.864 times more with the probability of not being poor estimated at 0.85.

- **National Poverty and Education**

Our results indicate that having no education significantly increased the level of poverty in Nigeria. On the other hand and more pleasantly, holding a post-secondary education in Nigeria significantly reduces poverty. From the odds ratio results in Table4, not having any formal education increases the odds of being poor by 1.221 times more with the probability of being poor estimated at 0.47. But possessing a post-secondary education decreases the odds of being poor by 0.71 times more with the predicted probability of not being poor estimated at 0.12.

- **National Poverty and Occupation/Employment**

Our results show that paid household work has a significant negative effect on the level of poverty in Nigeria while self-employment farming has significant positive effect on poverty. Being a paid house employee decreases the odds of being poor by 0.409 times more with the predicted probability of not being poor estimated at only 0.001. On the other hand, being a self- employment farmer increases the odds of being poor by 1.42 times more with the predicted probability of not being poor estimated at 0.01.

- **Zonal Location and Poverty**

Our results indicate that zonal location matters in explaining poverty in Nigeria. Location in the North Central and South East zones of Nigeria has a statistically significant negative effect on the probability of being poor. Contrariwise, the results show that location in the North West zone increases the probability of being poor. From the odds ratio results in Table 5, in 2010, being a resident of the North Central and South East reduces the odds of being poor by 0.849 and 0.888 times more with the probability of being non-poor estimated at 0.16 and 0.13, respectively. But living in the North West increases the odds of being poor by 1.234 times more with the predicted probability of being poor estimated at 0.24.

## 5. Policy Proposals for the Reduction of Poverty in Nigeria

Our results and analyses above suggest that policy interventions are necessary to reduce poverty in Nigeria. Our results indicate that monogamous marriages tend to reduce poverty in Nigeria. First, while government cannot legislate marriage structure given the heterogenous nature of the country and the need to promote freedom of choice, public and private sector policies can be used to increase the number and proportion of high quality monogamous marriage rates among Nigerians. This will be an important strategy for poverty reduction in the country. Actions that can be used include, governments at both the local, state and federal levels providing economic incentives for couples to marry and stay married. The Federal Government should also establish a "Healthy Marriage Initiative" to fund marriage education programs for couples who desire these services. This will help to strengthen marriage as a social institution and promote marital quality, both as ends in itself and as ways to reduce poverty in the country. However, effective enforcement of the country's population policy with respect to the number of children per woman, among others, would be imperative if this measure is going to be beneficial to poverty reduction.

Second, given that property inheritance helps widows and divorced women to reduce poverty, the government, at the national level, should embark on policy reforms to guarantee women's rights to equal inheritance under the law, and to increase women's legal literacy so that they are able to claim what is rightfully theirs. Such policies should also support women's ownership claims to property in the event of divorce. In addition, the federal and state governments should institute legal reforms to make family and community norms on property rights and inheritance more gender-equitable and hence remove barriers to women's ability to make use of inherited land and other assets. Provisions should include land-titling and other asset-titling schemes where couples are identified as joint owners. Concurrently, community organizations and NGOs should implement community-based legal aid programs to help women access justice systems at the grassroots level.

Third, given that poverty increases with the number of household members (or family size), there is urgent need to intensify family planning services efforts and activities in Nigeria so as to improve knowledge, acceptance and practice (KAP) of family planning. This will involve not only increased financial outlay but also research on fertility determinants as well as decentralized planning, delivery and supervision of

family planning services (Anyanwu et al, 1998b, c). Governments at various levels need to address the problems of low access to contraceptives by married couples and high child mortality. A clear focus on healthcare and the structural issues, with free or subsidized contraceptives for married couples who lack access and scaled up public health education will go a long way in reducing population/family size and its poverty-related costs.

The issue of rapidly rising population has become more pertinent given increased international and expert attention in recent times This is in the light of the rapid increase in the nation's population from 88 million in 1991 to about 160 million in 2010 with a projection to hit 213 million in 2050.

Fourth, given our empirical evidence that being female increases the probability of being poor, there is a need to focus on gender-based poverty interventions (World Bank, 1995; UNDP, 2005), especially among female-headed households in Nigeria. Thus, in Nigeria, "headship" should seriously be considered a useful criterion for targeting anti-poverty interventions. In addition, the literature has identified a number of possible policy instruments to empower women, including, guaranteed employment schemes, labor market training, greater access to health, nutrition and education through increased social investments, affirmative action, and land and property rights reforms, especially to benefit rural dwellers (particularly women). Improving access to education, for example, can reduce gendered disadvantages both by increasing individual productivity and by facilitating the movement of poor people from low-paying jobs in agriculture to higher-paying jobs in industry and services. Making agriculture attractive with modern inputs and easy access to credit, which will help to increase productivity in the sector will also be helpful. More importantly, public spending on education (as well as on health and other human capacity), when targeted at women, especially the poor, increases the chances for women to access formal jobs and thus break free from poverty trap. Increasing educational levels (and its quality) should be accompanied by a strong investment climate to ensure that productive jobs are created for the newly educated and women (and men) (Anyanwu, 2012).

Fifth, in the educational sector, there is very urgent need to re-orientate the thinking and value system of both parents and their children through mass educational campaign regarding the importance of education and the need for parents to insist on their children (male and female) going to school (at least up to first degree) before seeking employment or going into business. In addition, apart from quantitative expansion (including through private participation and public-private partnership), there is urgent need for a fundamental reform of content (e.g. curriculum reforms, availability of school books equipment/facilities, and other teaching materials) towards more emphasis on skill acquisition and problems faced by the poor. It will also be necessary to devise means to assist poor households with school fees, textbooks and other school materials for their children. Non-formal education programs should also be expanded to help the poor gain literacy and most importantly, to acquire skills. These will have to be complemented with increased employment opportunities through public works and infrastructural development so as to encourage children to go to school and hence have greater assurance of finding jobs on graduation, thus reducing their probability of being poor.

Sixth, the fact that many occupations/employment are not poverty-reducing while farming is poverty-enhancing, points to measures to increase quality jobs. That farming is poverty-accelerating can be explained by the vicious cycle of poverty given low capital, inadequate inputs and lack of access to modern techniques both in the farms and other non-farm occupations. Investing in the agricultural sector to reduce poverty should be a matter of great priority. There is also need to encourage productivity and access in both farm and non-farm occupations through direct input supply, strengthening and expanding of

agricultural research and extension services, adapting agricultural technology and extension services to poor farmers, and by improving physical infrastructure such as rural roads and irrigation. At the same time income sources diversification should be encouraged.

Seventh,, government should design socio-economic policies to promote long-term quality and productive employment. Government can assist rural dwellers in particular through increased and broadened National Agricultural and Rural Development Bank's, Community Banks' and Employment Creation Fund's financial assistance for micro- and small-scale enterprises, complemented by school curricula orientation towards skill acquisition, among other measures.

Eight, since poverty in Nigeria does have important spatial implications, geographic targeting (especially in the North West and rural areas) can play an important role in government anti-poverty efforts. Moreover, geographically targeted programs are attractive partly because they are more cost-effective than untargeted programs. Thus, making financial capital, physical infrastructure (especially roads and electricity) and technological innovation available in poor zonal and rural areas will lead to important contribution to government's efforts to reduce poverty in Nigeria.

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