Covariates of Multidimensional Poverty in Nigeria

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Abstract

This study examined the multidimensional poverty status of households in Nigeria using one of the most recent available household survey data, the 2018 Demographic Household Survey data. The data was analyzed using descriptive statistics, the fuzzy sets measures as well as the Tobit regression model. The results showed that 59.44% of the household heads were between 31 and 50 years of age with the mean age being 43.96 years, implying that most of the household heads were within their economically active years and, as such, should be less vulnerable to poverty than households with older heads. It also showed that the male gender, which is typically favoured over the female in terms of economic opportunities and, hence, is less vulnerable to poverty, accounted for 85.69% of the household heads. Also, 41.53% of the household head population had no formal education while 17.84%, 31.84% and 8.79% had primary, secondary and higher education respectively. This high proportion of household heads in the sample with no formal education as well as the generally low educational attainment presents a significant barrier to poverty alleviation Assets ownership influenced the poverty score of each household head as household heads with fewer assets tended to have higher poverty scores. Moreover, male headed households owned more assets than female headed households. The study concluded that other dimensions to poverty measurement in individuals and households, such as health, education and living standards, were as important as the monetary measures. It was recommended that in order to reduce poverty in households, basic social amenities, healthcare facilities and welfare support needed to be provided for households.

Keywords: Multidimensional poverty, Fuzzy sets, Tobit regression, Nigeria
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1. Introduction

Poverty, as opined by Salami *et al*. (2017) and Amao *et al*. (2017), is the inability to meet basic human necessities crucial for meaningful existence, including food, shelter, clothing, and medical care. This condition can be seen in absolute or relative senses. According to the United Nations (2019), absolute poverty denotes severe deprivation of fundamental needs such as food, water, sanitation, health, shelter, education, and information, transcending mere income considerations to encompass access to essential services. Conversely, relative poverty, as explained by the United Nations (2019), is a social construct, reflecting the economic gap between individuals within a specified domain, thereby emphasizing inequality over material deprivation.

While traditional poverty measures often rely on single-dimensional metrics like income, there is a growing recognition of the importance of multidimensional assessments in capturing the true scope of poverty. The Global Multidimensional Poverty Index (2018) categorizes poverty across three primary dimensions: Health, Education, and Living Standards, each comprising distinct indicators. The Multidimensional Poverty Index (MPI) offers a comprehensive evaluation of poverty across various domains, revealing that deprivation extends beyond financial constraints to encompass factors like illiteracy, hunger, lack of shelter, and unemployment (Etim and Udoh, 2013). Consequently, government interventions aimed at poverty alleviation must address both monetary and non-monetary dimensions in order to effectively address the Sustainable Development Goals (SDGs) and optimize resource allocation towards the most vulnerable populations (Mohammed and Ab-Rahim, 2021).

The prevalence of multidimensional poverty is very high, with over 1.3 billion individuals worldwide classified as multidimensionally poor in 2016, a substantial portion of whom reside in sub-Saharan Africa (UNDP, 2019). Factors such as slow economic growth, conflict, institutional weaknesses, and insufficient redistribution mechanisms contribute to the escalating poverty rates in this region (World Bank, 2018). Nigeria, in particular, grapples with a significant poverty burden, with over half of its population classified as multidimensionally poor in 2016 (UNDP, 2019). The COVID-19 pandemic has exacerbated this issue, with global poverty levels projected to surge due to the pandemic's socio-economic repercussions (World Bank, 2021). The latest poverty estimates from the Nigerian Bureau of Statistics (NBS) indicate that 63% of Nigerians are poor based on the 2022 Multidimensional Poverty Index.

Despite Nigeria's abundant natural resources, poverty remains pervasive, with the poverty rate escalating over the years (Dauda, 2019). The northern states and rural areas bear the brunt of this burden, with poverty incidence, intensity, and severity persisting at alarming levels (Sulaimon, 2020). Notably, Nigeria holds the unwanted distinction of hosting the world's largest population of individuals living in extreme poverty, underscoring the urgent need for comprehensive poverty analysis and intervention strategies (World Data Lab, 2020; Muhammad, 2019).

This study focuses on a multidimensional assessment of poverty in Nigeria using the most recent, nationally representative data set (the Demographic and Health Survey data, DHS, 2018) which also effectively captures the various dimensions of poverty. While many studies on poverty have relied on single-dimensional measures such as income, this study

employs multidimensional metrics including housing, sanitation, health, education, and assets to provide a more comprehensive understanding of poverty in Nigeria. The analysis in this study, therefore, reflects varying levels of deprivation, adding depth to poverty analysis. Furthermore, by exposing the rural-urban and geopolitical divides in poverty levels, this study adds a critical perspective to poverty analysis in Nigeria. This has great potential to drive policy discourse as well as provide guidance in addressing regional peculiarities that contribute to poverty in Nigeria. Furthermore, a Tobit regression model was estimated to identify the determinants of multidimensional poverty, offering insights into the socio-economic factors driving deprivation.

This study's robustness is ensured through its methodological rigor to ensure the validity of its findings. The study recommends that targeted interventions are needed to address regional and gender disparities, promote education, improve access to healthcare, and enhance asset ownership. However, the study is limited by its reliance on cross-sectional data, which precludes an analysis of poverty dynamics over time. Also, the unavailability of more recent data on the scale of the 2018 Nigerian Demographic and Health Survey Data (NHDS) means that the study has had to rely on relatively non-recent information. However, its findings remain highly valid.

The estimated results revealed that rural areas and the northern regions of Nigeria experienced significantly higher levels of multidimensional poverty compared to urban centers and southern regions. Moreover, female-headed households and those with lower educational attainment faced greater deprivation. Asset ownership and proximity to health facilities also emerged as critical factors influencing poverty levels. These findings not only confirm that the poverty landscape in Nigeria has remained largely unchanged, but also provide granular insights into its spatial and demographic dimensions, adding value to the existing body of literature.

The remainder of this study is organized as follows. Section 2 presents the literature review of the study comprising the theoretical framework, empirical literature review and conceptual framework while section 3 contains the data source and analytical techniques employed. Section 4 is an exposition of the results obtained from the study as well as their discussion while section 5 presents the conclusions reached by the study as well as its policy recommendations.

2. Literature Review

2.1. Theoretical Framework

This study is supported by three main poverty-related theories which explain the main underpinnings of multidimensional poverty as follows:

2.1.1. Cultural Theory of Poverty

The cultural theory of poverty argues that poverty arises from specific cultural norms, values, and behaviors that perpetuate cycles of deprivation. Oscar Lewis first conceptualized the "culture of poverty" to describe how poverty subcultures develop distinct ideologies that are transferred across generations. These subcultures, often observed in economically marginalized communities and individuals, embody beliefs and practices that hinder individuals from escaping poverty. Critics like Valentine (1968) and Moynihan (1965) have debated whether these behaviors are symptoms of poverty or

causative factors. Proponents, such as Charles Murray, argue that governmental welfare programs inadvertently sustain poverty by fostering dependency, reinforcing Asen's (2002) assertion that the fight against poverty often evolves into a battle over welfare policies.

2.1.2. Human Capital Theory of Poverty

The human capital theory attributes poverty to a lack of skills, knowledge, and education, which directly influence an individual's productivity and earning potential. Introduced by Theodore Schultz and Gary Becker, this theory posits that education is an investment that enhances economic outcomes, benefiting individuals and society at large. According to Pineda (2018), younger individuals are more likely to experience poverty due to insufficient human capital, while older individuals may lack the time or opportunity to build new skills. The theory assumes a direct relationship between education, productivity, and income, suggesting that strategic investments in education and skill acquisition are essential for reducing poverty.

2.1.3. Structural Theory of Poverty

Structural theories highlight systemic social, economic, and political structures as the root causes of poverty. Researchers like Beeghley (2000) and Brady *et al*. (2007) emphasize that economic inequalities, labor market segmentation, and unequal access to resources perpetuate poverty despite individual efforts. In developing nations like Nigeria, structural factors such as inflation and wage disparities exacerbate poverty. These theories also argue that economic growth can alleviate poverty by fostering job creation, urbanization, and improved living standards, as evidenced by China's dramatic poverty reduction through industrialization and urban development (Ravallion and Chen, 2007). However, disparities in income distribution and opportunities remain critical challenges in addressing poverty globally.

2.2. Empirical Literature Review

Previous studies on poverty in Nigeria (such as Ibrahim & Ladan, 2014; Mamman *et al*., 2015) have primarily focused on income and expenditure metrics, with the United Nations Development Programme (UNDP) setting a poverty line at $1.90 per day. However, this monetary approach has been criticized for not accounting for other dimensions of poverty, such as education, health, and living conditions. As a result, recent research has shifted towards multidimensional poverty measures, which incorporate these factors to offer a more comprehensive understanding of poverty. Tools like the Human Development Index (HDI) and the Multidimensional Poverty Index (MPI) have emerged as alternatives to income-based measures, assessing poverty through dimensions such as education, health, and living standards.

The MPI, introduced by Alkire *et al*. (2015), combines indicators related to education (schooling and attendance), health (nutrition and child mortality), and living standards (sanitation, water, and assets) to provide a more complete assessment of poverty. Studies such as Ajekaiye *et al*. (2014) and Amao *et al*. (2017) have employed these multidimensional frameworks to analyze poverty across various regions in Nigeria. Findings highlight that factors like education, health, and living conditions significantly contribute to poverty, with rural areas and households in the northern zones experiencing

higher poverty rates. For instance, Amao's study found that living conditions contributed the most to multidimensional poverty, followed by education and health.

Additionally, the World Bank's Multidimensional Poverty Measure (MPM) has shown that non-monetary factors such as access to education and infrastructure greatly influence poverty, with the global poor population increasing by 50% when these factors are considered. The inclusion of basic services and infrastructure in poverty assessments reflects a broader understanding of well-being, revealing that poverty is not solely about income but also about access to essential services. Studies like those by Oyekale *et al*. (2009) and the World Bank (2018) highlight the importance of addressing multidimensional poverty, particularly in rural areas, to ensure sustainable development and improved quality of life.

2.3. Conceptual Framework

The dimensions of poverty considered in this study were housing, sanitation, health, education and assets with each dimension captured by specific measurable indicators of well-being at the household level. Housing, for instance, was proxied by indicators such as the building materials that dwellings were made from as well as the cooking fuel employed by households. On the other hand, the indicators of sanitation were the nature of toilet facilities and the water sources used by households. Health was proxied by the use (or otherwise) of mosquito nets, distance to health facilities and the availability of medical health insurance. Similarly, education was captured by the level of attainment by the household head while the ownership (or otherwise) of different household assets was used to measure the assets dimension of multidimensional poverty in the study. The quality of each indicator for a household as well as their ownership (or otherwise) of assets were the determinants of their poverty status.

3. Methodology

3.1.Data Source

The data used for this study was from the 2018 Nigerian Demographic and Health Survey (NHDS). The survey was conducted by the National Population Commission (NPC) of Nigeria with technical assistance from the International Classification of Functioning, Disability and Health (ICF) and funding from the United States Agency for International Development (USAID). Information from a total of 29,992 out of the 42,000 households in the data was used for analysis.

3.2.Analytical Techniques

3.2.1. The Fuzzy Sets Approach

The fuzzy set theory is a mathematical theory of generalized sets that naturally connects to specific varieties of mathematical fuzzy logics, which are non-classical logics with similar truth degrees. The concept of fuzzy sets is a technological instrument for more precisely mathematically understanding the application and impact of hazy concepts.
The mathematical fuzzy logic developed by Zadeh (1965), in contrast to the crisp-set logic of a standard poverty line (being either poor or non-poor), identifies the degree of membership to the set of the poor measured on a scale from 0 to 1, whereby 1 indicates full membership and 0 full non-membership to the set.

Each variable must be calibrated before converting selected poverty indicators into an indication based on fuzzy set logic (Ragin, 2008). Once calibrated fuzzy set poverty indicators have been developed, the question of how to combine the several selected indicators into a single meaningful metric emerges (aggregation problem). The standard (strong) intersection, the weak intersection, and the bounded difference are all included in the fuzzy intersection aggregation functions. The standard (strong) union, the weak union, and the bounded sum are all included in the fuzzy union aggregation functions. Aggregation functions based on the logical 'and' and 'or' can be generalized using weighted or unweighted averaging operators.

The relationship between the intersection aggregation functions is $\mu_{A \cap B} \leq \mu_{A\text{-}B} \leq \mu_{\underline{A} \cap \underline{B}}$ and between the union aggregation function is $\mu_{A \cup B} \leq \mu_{A+B} \leq \mu_{\underline{A} \cup \underline{B}}$. Zadeh (1965) defined a fuzzy set as a class having a range of membership grades. As a result, given a population A of n homes [$A = a_1, a_2, a_3, ...a_n$], the impoverished households B comprise any household $a_i \in B$. In some of the five poverty characteristics, these families exhibit some degree of poverty (X).

The multidimensional poverty ratio of a household, $\mu_B (a_i)$, which show the level of welfare deprivation and membership to set B is defined as the weighted average of x_{ij},

$$\mu_B(a_i) = \sum_{j=1}^{m} x_{ij} w_j \,/\, \sum_{j=1}^{m} w_j \qquad (1)$$

w_i is the weight attached to the j-th attribute.

The weight w_j represents the degree of deprivation in relation to x_j. It is an inverse function of impoverishment, and the lower the number of households and the more the weight, the greater their deprivation. In practice, this is a weight that Cerioli and Zani proposed that the aforementioned property be fulfilled (1990). This may be the case expressed as follows:

$$w_j = \log[\sum_{i=1}^{n} g(a_i) \,/\, \sum_{i=1}^{n} x_{ij} g(a_i)] \geq 0 \quad (2)$$

Ideally, $g(a_i)/\sum_{i=1}^{n} g(a_i) > 0$ and $g(a_i)/\sum_{i=1}^{n} g(a_i)$ is the relative frequency represented by the sample observation a_i in the total population. Therefore, when $x_{ij}=0$, the welfare attribute should be removed.

3.2.2. The Tobit Regression Model

A Tobit model was estimated for the determinants of multidimensional poverty among the respondents. This model was chosen given that the dependent variable (the multidimensional poverty index) is a censored variable that, theoretically, takes on values between 0 and 1 and, as such, is not a truly continuous variable. Therefore, a Tobit model would be more appropriate for this purpose than an Ordinary Least Squares (OLS) regression model which could make predictions outside the allowable range. The Tobit model accommodates the limitations of the model by accounting for the censoring in the dependent variable, ensuring more accurate and meaningful estimates. It is expressed as follows:

$$Y^* = \boldsymbol{X}\beta + \varepsilon \qquad (3)$$

Y^* = Poverty Score
β_0 = Constant term
β_i = Vector of parameters to be estimated
$\boldsymbol{X}$ = Vector of explanatory variables
ε = Independent distributed error term

The major independent variables specified in the model are as follows:
X_1 = Residence (Rural = 0, Urban = 1)
X_2 = Sex (Male = 0, Female = 1)
X_3 = Age (in years)
X_4 = Age Squared (in years)
X_5 = Household size
X_6 = No Formal Education (No Formal Education = 1, 0 otherwise)
X_7 = Primary education (Yes = 1, 0 otherwise)
X_8 = Secondary education (Yes = 1, 0 otherwise)
X_9 = Tertiary education (Yes = 1, 0 otherwise)
X_{10} = Married (Yes = 1, 0 otherwise)
X_{11} = Agricultural Worker (Yes = 1, 0 otherwise)
X_{12}= Live close to health facility (Yes = 1, 0 otherwise)
X_{13} = Region (North Central = 1, 0 otherwise)
X_{14} = Region (North East = 1, 0 otherwise)
X_{15} = Region (North West = 1, 0 otherwise)
X_{16} = Region (South East = 1, 0 otherwise)
X_{17} = Region (South South = 1, 0 otherwise)
X_{18} = Region (South West = 1, 0 otherwise)

4. Results and Discussion

4.1.Geographical Distribution of Respondents

Figure 1 presents the distribution of the respondents in the sample of 29,992 households used for this study from the NDHS 2018 survey

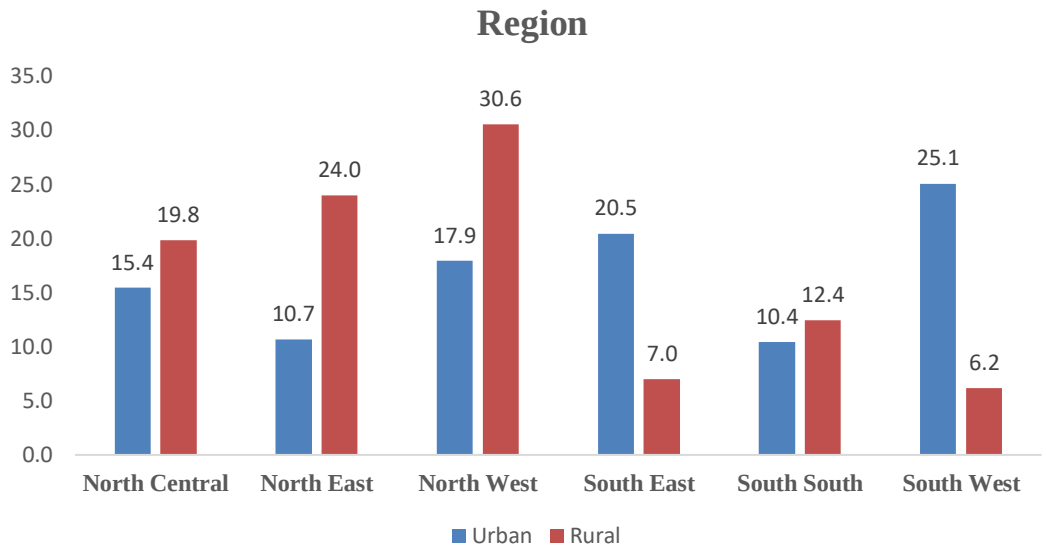

Figure 1: Distribution of Respondents by Location and Geopolitical Zone (GPZ)

4.2.Socioeconomic Characteristics of Respondents

Most (59.44%) of the household heads were between 31 and 50 years of age with the mean age being 43.96±12.64 years, indicating a prevalence of economically active household heads in the sample. As opined by Dercon (2009), households with younger, economically active heads usually experienced less poverty than those with older heads (who suffer declining productivity), thereby suggesting that most of the households in the sample would be less vulnerable to poverty. However, poverty could still persist due to external constraints such as limited access to credit, low income diversification or large household sizes. Further, there were more male household heads (85.69%) than female in the survey. Typically, male-headed households tend to be less vulnerable to poverty due to sociocultural norms that give preference to men with regards to assets acquisition, credit access, employment, among others (Chant, 2008).

Moreover, educational attainment was shown to still be quite low in the country with as high as 41.53% of the respondents not having any formal education. This low educational attainment is significantly worse in the rural areas which holds over 50% of the respondents with no formal education as revealed in Figure 2. Education is a critical determinant of poverty status, as it determines earning capacity, productivity, access to information, among other key factors. The high proportion of household heads in the sample with no formal education indicates a significant barrier to poverty alleviation, as education is positively correlated with better employment opportunities and higher wages (Glewwe, 2002). Moreover, going by UNESCO (2010) the low educational attainment of most of the household heads (for example, only 8.79% had higher education) means that most of them would have limited opportunities for upward mobility economically, making them more vulnerability to poverty trap and both subsistence and income insecurity. Table 1 presents a summary of some key socioeconomic attributes of the sampled households.

Table 1: Selected Socioeconomic Characteristics of Respondents

Variables	Percentage (n = 29,992)	Variables	Percentage (n = 29,992)
Age		**Sex**	
≤ 30	14.72	Male	85.69
31 – 50	59.44	Female	14.31
51 – 70	22.70	**Educational Attainment**	
71 – 90	2.98	No Formal Education	41.53
>90	0.15	Primary	17.84
Mean	43.96±12.64	Secondary	31.84
Marital Status		Higher	8.79
Never Married	3.04	**Household Size**	
Married	87.76	1 – 7	69.86
Widowed	3.62	8 – 14	25.92
Divorced	1.56	15 – 21	3.69
Living with Partner	3.14	22 – 28	0.48
No longer living with partner	1.88	>31	0.06
		Mean	6.62±3.37

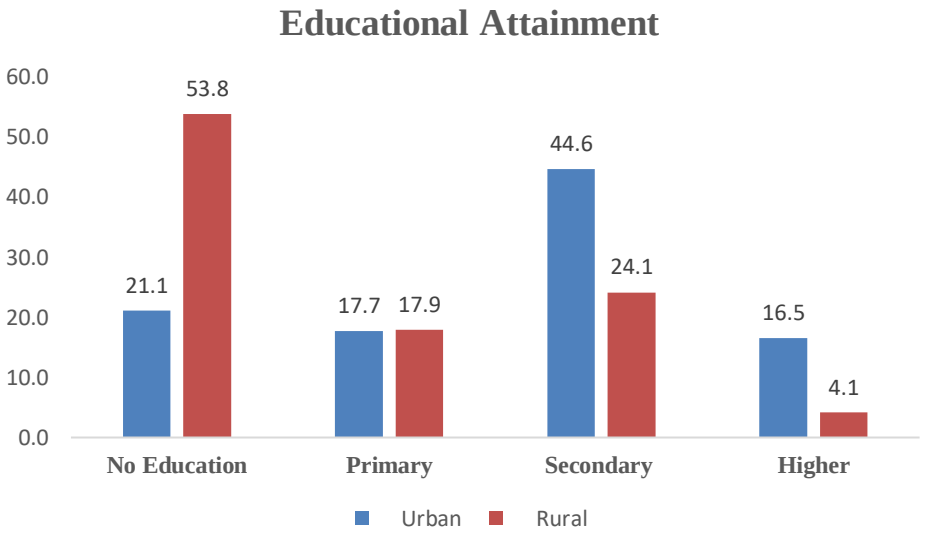

Figure 2: Decomposition of Educational Level of Respondents by Location

According to Oyekale *et al*., (2008), this high prevalence of household heads with no formal education can be attributed to the high population of rural household heads in the sample, majority of whom may not consider formal education as important as their primary activity of farming.

With regards to their livelihoods, Table 2 shows that agriculture was the source of livelihood for the majority (43.76%) of the household heads. This is expected as agriculture remains the mainstay of the Nigerian economy, and particularly the rural areas, from which a large number of the respondents were selected. With respects to assets ownership, 84.61% of household heads did not own a house while 83.82% also did not own land. Most respondents (71.0%) did not report having any problem accessing the health care facility they use.

Table 2: Livelihood-Related Characteristics of Respondents

Variables	Percentage (n = 29,992)	Variables	Percentage (n = 29,992)
Occupation		**House Ownership**	
Professional Workers	4.78	Does not own	84.61
Administrative Workers	1.04	Alone only	3.67
Office/Support Workers	1.09	Jointly only	9.07
Sales Workers	39.49	Both alone and jointly	2.64
Service Workers	6.38	**Land Ownership**	
Maintenance Workers	0.17	Does not own	83.82
Agricultural Workers	43.76	Alone only	5.65
Production Workers	3.11	Jointly only	8.66
Transport Workers	0.08	Both alone and jointly	1.87
Others	0.13		
Distance to Health Facility			
Major Problem	29		
Not a major problem	71		

4.3.Dimensions and Indicators of Multidimensional Poverty

Following Alkire and Foster (2010), the dimensions used were housing, sanitation, health, education and assets. Each dimension was equally weighted and the total score attainable for a household was 4. The dimensions as well as the indicators of each are presented in Table 3.

Table 3: Dimensions and Indicators of Multidimensional Poverty in the Study

Dimensions	Indicators	Dimensions	Indicators
Housing	Floor Material	Assets	Land Ownership
	Wall Material		House Ownership
	Roof Material		Bicycle
	Cooking Fuel		Motorcycle
Sanitation	Toilet Facility		Television
	Toilet Shared		Car
	Water Source		Refrigerator
Health	Mosquito Nets		Bank Account
	Distance to Health Facility		Internet
	Medical Health Insurance		Mobile Telephone
Education	Education of Household head		Radio
	Literacy Level		Electricity

4.4.Multidimensional Poverty Index of Households (The Fuzzy Sets Index)

The Average Multidimensional Poverty Index (AMPI) was estimated using the fuzzy sets methodology as described in section 3 based on the five dimensions in Table 3. It reveals the depth of poverty being experienced by a household. Poverty Incidence (PI), on the other hand, was determined by using the AMPI as the poverty line – any households with AMPI at or above the AMPI were classified as poor while those below the AMPI was classified as non-poor. In other words, a higher value of AMPI indicates a greater level of multidimensional poverty and vice versa. The Poverty Incidence (PI) reflects the proportion of individuals in each region or urban-rural category who experience

multidimensional poverty. A higher value of PI suggests a higher percentage of the population living in poverty. Table 4 presents the decomposition of multidimensional poverty in Nigeria, disaggregated by region and urban-rural classification.

Overall, Nigeria had an AMPI of 0.430, indicating a substantial depth of multidimensional poverty. The Poverty Incidence was 0.451, meaning that approximately 45.1% of the population experienced multidimensional poverty. It can also be seen that both the depth (AMPI = 0.499) and incidence (PI = 0.480) of poverty in rural Nigeria were higher than in the urban centers. Etim and Udoh (2013) similarly concluded that multidimensional poverty was more prevalent in rural Nigeria than in the urban centers owing largely to poor access to basic infrastructure and services as well as lower educational attainment among residents. Low public investment in the rural areas in Nigeria also exacerbates the poverty problem (Oyekale, 2008).

Comparing rural and urban areas across all GPZs, a similar outcome was observed as rural regions generally exhibited higher levels of multidimensional poverty than urban areas. For example, in the North East region, the rural AMPI was 0.628 compared to 0.372 in urban areas, indicating a significant disparity in poverty levels between rural and urban populations. Among the regions, the North East stood out with the highest levels of multidimensional poverty, as evidenced by its highest AMPI values across both rural and urban areas. Conversely, the South West region generally had the lowest levels of multidimensional poverty with an AMPI of 0.289. These results are in consonance with the report of the UNDP (2019) which stated that the North East region of Nigeria consistently shows the highest levels of monetary and multidimensional poverty due to persistent insecurity, weak governance, and underdeveloped infrastructure. With regards to the rest of the northern region, Mohammed and Ab-Rahim (2021) revealed that educational and health deprivations account for the significantly higher poverty in the region than in the south of the country. On the other hand, Dauda (2019) attributed the relatively lower poverty in the South West region to higher levels of urbanization, infrastructure and economic activity.

There are notable outcomes in Poverty Incidence between regions and urban-rural categories. For instance, the South-South region has a relatively high PI in both rural (44.8%) and urban (43.7%) areas compared to the national average. In this regard, Amao *et al*. (2017) observed that the oil-rich South-South region of Nigeria often displays unique poverty dynamics, as it often shows a relatively high poverty incidence despite the huge revenue generated from the region. This is due to resource mismanagement and environmental degradation which has been shown to deprive farmers of their livelihoods. Overall, the table highlights regional disparities in multidimensional poverty within Nigeria, with rural areas consistently experiencing higher levels of poverty compared to urban areas, and certain regions exhibiting higher poverty levels than others.

Table 4: Decomposition of Multidimensional Poverty in Nigeria

Region	Pooled		Rural		Urban	
	AMPI	PI	AMPI	PI	AMPI	PI
Nigeria	**0.430**	**0.451**	**0.499**	**0.480**	**0.316**	**0.403**
North Central	0.408	0.437	0.458	0.475	0.301	0.377
North East	0.574	0.501	0.628	0.487	0.372	0.432
North West	0.484	0.514	0.531	0.504	0.351	0.447
South East	0.356	0.406	0.378	0.398	0.343	0.420
South South	0.349	0.448	0.379	0.459	0.288	0.437
South West	0.289	0.381	0.347	0.444	0.265	0.374

4.5 Determinants of Multidimensional Poverty

Table 5 shows the result of the Tobit regression model for the determinants of multidimensional poverty. The negative coefficient (-0.0362673) of the "residence" variable indicates that residing in urban areas is associated with lower multidimensional poverty compared to rural areas. As the World Bank (2018) and Etim and Udoh (2013) also submitted, this suggests that individuals living in urban areas tend to experience lower levels of deprivation across multiple dimensions (such as education, health, and living standards) compared to those in rural areas due to better infrastructure, access to basic amenities and economic opportunities in the urban areas. On the other hand, the positive coefficient of "sex" (0.0154795) suggests that being female is associated with higher multidimensional poverty than being male. This implies that, on average, women may face greater deprivation across various dimensions of poverty than men in Nigeria; a situation that can be attributed to systemic gender inequalities that are prevalent in Nigeria (UNDP, 2019) which result in lower access to assets and economic opportunities for women as Oyekale *et al*, (2008) found.

The negative coefficient for age (-0.0014196) suggests that older individuals tend to have lower multidimensional poverty. This is due to their having acquired many assets over the years during which they have been economically active which reduces their multidimensional poverty scores. However, the positive coefficient for age squared (0.0000152) indicates a non-linear relationship, implying that the rate at which poverty decreases with age diminishes as individuals grow older and as such, the older individuals get in Nigeria, the higher the probability they will become multidimensionally poor. This results from their increased vulnerability due to their declining physical ability, economic opportunities and fewer social safety nets as stated by Amao *et al*. (2017). With regards to educational attainment, the results suggest that higher levels of education are associated with lower multidimensional poverty. This implies that individuals with higher levels of education tend to have better outcomes across various dimensions of poverty compared to those with lower levels of education. This aligns with the findings of Mohammed and Ab-Rahim (2021) who argued that higher educational attainment enhances job prospects, income levels, and improves overall well-being, leading to lower poverty.

The coefficients for the different marital statuses (Married, Widowed, Divorced, and Residing with partner) all suggest varying degrees of negative association with multidimensional poverty, indicating that being married at some point in one's life might provide access to more economic resources, resulting in a reduced likelihood of being poor. The findings of Dauda (2019) align with these results as he noted that marriage provides economic stability and pooled resources, reducing the likelihood of poverty.

Table 5: Parameter Estimates of the Covariates of Multidimensional Poverty

Variables	Coefficient	Standard Error	t values	P>t	Variables	Coefficient	Standard Error	t values	P>t
Residence	-0.0362673	0.0012539	-28.92	0.000***	Land Ownership	-0.0042186	0.0017925	-2.35	0.019**
Sex	0.0154795	0.0021149	7.32	0.000***	Professional Workers	-0.0060687	0.0034662	-1.75	0.080*
Age	-0.0014196	0.0002413	-5.88	0.000***	Administrative Workers	-0.0021	0.0056947	-0.37	0.712
Age Squared	0.0000152	0.00000242	6.29	0.000***	Sales Workers	-0.0017142	0.0025284	-0.68	0.498
No Education	0.0523777	0.0030858	16.97	0.000***	Service Workers	-0.0000242	0.0031627	-0.01	0.994
Primary	0.0281311	0.0028642	9.82	0.000***	Agricultural Workers	0.0236009	0.0027518	8.58	0.000***
Secondary	0.0132402	0.0023242	5.70	0.000***	Construction Workers	-0.0036182	0.0037734	-0.96	0.338
Higher	-0.1991259	0.0039065	-50.97	0.000***	Distance to health facility	-0.0190198	0.001213	-15.68	0.000***
Never Married	0.0029996	0.0038763	0.77	0.439	Household Size	-0.0006901	0.0001639	-4.21	0.000***
Married	-0.0043256	0.0025483	-1.70	0.090*	Floor Material	0.061887	0.0019729	31.37	0.000***
Widowed	-0.0065713	0.0037779	-1.74	0.082*	Wall Material	0.1908722	0.0015968	119.54	0.000***
Divorced	-0.015874	0.0049029	-3.24	0.001***	Roof Material	0.2247035	0.00172	130.64	0.000***
Residing with partner	-0.011014	0.0022193	-4.96	0.000***	Toilet Facility	0.0725812	0.0017587	41.27	0.000***
Employed	-0.0153373	0.002425	-6.32	0.000***	Constant	0.3285754	0.0195017	16.85	0.000
House Ownership	-0.0028784	0.0018198	-1.58	0.114					
Prob> chi^2 = 0.0000					Pseudo R^2 = - 4.2006				
LR chi^2 (36) = 48345.13					Number of Observations = 29,992				
Log likelihood = 29927.074									

***, **, * = significance at 1%, 5% and 10% respectively

The results further showed that being employed in agriculture would likely result in a significantly higher level of poverty compared to other categories, as indicated by the positively significant coefficient (0.0236009) of the variable. This is not surprising given the generally low wages/incomes across the agricultural value chain in Nigeria. In a similar vein, Sulaimon (2020) observed that agricultural workers in Nigeria are often trapped in cycles of poverty due to low wages, inadequate access to markets, and poor infrastructure.

It was also shown that assets ownership is generally associated with a lower chance of being multidimensionally poor. For instance, the negative coefficient associated with owning a land (-0.0042186) suggests that the variable is associated with lower multidimensional poverty, indicating that access to land contributes to improved living standards and reduced deprivation across various dimensions of poverty as land can be put to various economic uses that can improve household welfare. This also aligns with the results obtained by Etim and Udoh (2013) who also found that Nigerian households who owned land were less vulnerable to economic shocks, especially when they put their lands to productive uses.

5. Conclusion and Recommendations

The analysis of multidimensional poverty in Nigeria shows that it is still a very serious problem in the country. Nigeria's AMPI of 0.430 and a Poverty Incidence of 0.451 underscore the substantial extent of multidimensional poverty within the country. This indicates that a significant proportion of the population faces deprivation across various dimensions, including education, health, living standards, and access to basic services.

Rural areas bear a disproportionately heavy burden of poverty compared to urban centers, as evidenced by higher AMPI values and Poverty Incidence rates. This rural-urban disparity is consistent across all geographic zones, with rural regions consistently exhibiting higher levels of poverty. The North East region was seen to be particularly vulnerable, with the highest levels of multidimensional poverty, especially in its rural areas. Furthermore, the study showed that gender disparities play a significant role in shaping the poverty landscape, with women experiencing higher levels of multidimensional poverty compared to men. This highlights the need for gender-sensitive policies and interventions aimed at empowering women through education, economic opportunities, and access to resources.

Education emerges as a critical determinant of poverty, with higher levels of education associated with lower multidimensional poverty. Thus, investments in education infrastructure, access to quality education, and skill development programs are essential for breaking the cycle of poverty and promoting inclusive growth.

The findings also shed light on the importance of asset ownership, such as land ownership, in reducing multidimensional poverty. Policies that promote secure land tenure, access to credit, and support for asset-building initiatives can empower households and contribute to poverty reduction efforts. Significantly, the study also showed that being employed in agriculture increased the probability of a household being multidimensionally poor. Based on the results of this study, the following recommendations are made:

- **Targeted Interventions**: Given the disparities between rural and urban areas and among regions, interventions should be tailored to address the specific needs of each locality. For instance, rural development programs focusing on agriculture and infrastructure could alleviate poverty in rural regions, while urban programs might target education, healthcare, and job creation.
- **Gender-Sensitive Policies**: The finding that being female is associated with higher multidimensional poverty underscores the importance of gender-sensitive policies. Efforts should be made to empower women through education, employment opportunities, and access to resources, thereby reducing gender disparities in poverty.
- **Education**: Policies aimed at improving educational attainment should be prioritized, as higher levels of education are associated with lower multidimensional poverty. This could involve increasing access to quality education, reducing dropout rates, and promoting lifelong learning opportunities. Moreover, social safety nets, vocational training, and financial literacy programs could help individuals reduce their vulnerability to poverty.
- **Agricultural Development**: Given the positive coefficient associated with agricultural work and poverty, efforts to enhance agricultural productivity and income should be prioritized. This could involve investments in agricultural technology, infrastructure, and market access, as well as supporting smallholder farmers and agribusinesses.
- **Asset Ownership**: Policies aimed at promoting asset ownership, such as land ownership, should be encouraged. Secure land tenure, access to credit, and support for land redistribution programs can empower households and contribute to poverty reduction efforts.

Addressing these recommendations and implementing targeted policies, can help the country to make significant strides in reducing multidimensional poverty and improving the well-being of its population.

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