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Macroeconomic Determinants of Poverty in Nigeria: Econometric Assessment of Selected Variables

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Abstract

Nigeria is a nation of contradictions; it is a rich nation with poor people and there is widespread poverty amidst plenty. This study examined the relationship of selected macroeconomic variables (inequality, unemployment, inflation and fertility rate) with poverty in Nigeria for the period 1991 to 2022. It made use of Autoregressive Distributed Lag regression method and Granger causality test. The result shows that fertility as well as lagged values of inflation and unemployment are significantly related to poverty but inequality does not. In addition, out of these variables, it is only unemployment that Granger causes poverty and the relationship is weak. Consequently, it was concluded that fertility has significant impact on poverty in Nigeria; unemployment and inflation have delayed but significant impact on poverty, and poverty has significant impact on both fertility and unemployment. Inequality has no significant relationship with poverty. In line with the findings, it was recommended that poverty reduction strategies that emphasizes fertility education, labour intensive investment strategies and entrepreneurship development should be prioritized by relevant development actors such as the government and Civil Society Organisations.

Keywords: Poverty, Inequality, Unemployment, Inflation, Fertility

JEL Classification: I32; O10; O13

1. Introduction

Nigeria is a nation that combines both riches and poverty. It has a rich endowment of natural resources, yet, the country's profile with regard to poverty creates the impression of a nation in distress. The economy is characterised by relatively high gross domestic product (fourth highest in Africa) but low per capita income (among the lowest globally). There is high incidence of poverty in Nigeria with over two – third of the populace being classified as poor. The national poverty headcount ratio rose from 28.1 per cent in 1980 to 69.0 per cent in 2010 and, according to the World Bank (2018), nearly 50 percent of Nigerians live below the international poverty threshold of $2 per day (Abiodun, Amao, Oluwatusin&Farayola, 2020).

The Nigeria Multidimensional Poverty Index (MPI) Survey (2022) reveals that 63 percent of the population (133 million people) are multidimensionally poor. Nigeria has a Multidimensional Poverty Value of 0.257 implying that Nigeria's poor people experience a little over one-quarter of all possible deprivations.This situation remains a paradox since it suggests that the wealth of the nation seems not to have impacted positively on the life of majority of the citizenry (Egunjobi, 2014).

Poverty has dual causal factors namely: structural causes and transitional causes (Yahie, 1993).Structural causes include things like poor skills, scarce resources, geographical disadvantage, and other socio-political factors. Transitional causes include ineffective structural adjustment reforms, poor domestic economic policies that creates adverse effects like inflation, inequality, unemployment etc., natural calamities such as drought and earthquakes; and man-made disasters such as wars and environmental degradation (Narayan, Patel, Schafft, Rademacher and Koch-Schutte, 2000). Musa, Magaji, Eke and Yakeen (2022) describe the structural causes as being long term in nature and transitional causes as the actual causes of poverty. Obadan (1997) suggested that in Sub-Sahara Africa (SSA), poverty is mainly caused by lack of access to adequate credit, employment opportunities and physical assets like land and capital. However, the poverty problem in Nigeria is considered to be beyond poor access to resources and opportunities alone, a host of other micro and macro factors such as; high inequality in the distribution of societal resources, poor state of basic social and economic infrastructure such as roads and power, neglect of the agricultural sector, high population growth rate, poor state of educational and health services, and price instability, have been suggested as the main causes of poverty in the country.

At the theoretical level, inequality contributes to poverty in that "for any given level of mean income, higher inequality tends to imply higher poverty as smaller shares of resources are obtained by those in the lowest deciles or quintiles of the population" (Ajani, 2008**).** High income inequality, particularly those due to inequality of opportunities in a society, limits educational opportunities for intelligent but underprivileged individuals, hampers social justice,increases instability, depresses investment and hurts sustainable economic growth (Lee and Lee, 2018). Similarly, increasing rate of unemployment in a country adds to the poverty problem. Unemployment is generally regarded as a serious obstacle to economic progress; it wastes manpower resources and leads to welfare loss in form of reduced output, lower income and wellbeing (Idenyi, Elom-Obed, Johnson and Thomas, 2017). Unemployment is thus a high social cost for individuals and high economic cost for the society (Sanchis-i-Marco, 2011). Persistently high levels of unemployment are the economic cost that hampers long-run growth and generate higher poverty rates (World Bank, 2005; Castells-Quintana and Royuela, 2012).

Economists have different opinions on the effect of inflation on people's welfare. Whilehigh level of inflation is generally considered as having negative effects on the economy, there is the argument that moderate rate of inflation may be good for the economy as it incentivise investment and enterprise. However, inflation is regarded as an influential determinant of poverty. According to Cardoso (1992), inflation can enhance poverty in two ways; firstly, the inflation tax can lead to reduction in disposable income, and secondly, real wages may become reduced as nominal wages may not rise as fast as prices duringrapid inflation periods.

The relationship between fertility and poverty can be complex and ambiguous depending on the net effect of income and structural changes on fertility. Income changes have a positive effect on fertility while structural changes in the economy have negative effect. If the income effect is more than the structural effect, fertility will increase and poverty will worsen, and vice versa (Odusola, 2018). On the other hand, poor economic conditions also affect fertility behaviour strongly as economic pressures may force couples to reduce their family size. Odusola (2018) asserts that besides low income, lack of access to social services such as education promotes the tendencies for early marriages and limited knowledge of family planning practices thereby enhancing fertility.

Although most empirical studies assessing the determinants of poverty suggest a positive association between macroeconomic variables and poverty, contention still exist as to which macro variable is of relevance. Inegbedion and Obadiaru (2022), Muhammad and David (2019) and Egunjobi (2014) all found the existence of a positive association among unemployment, inequality and poverty. In other words, as these variables rises, the level of poverty also rises. Doguwa (2012) also determined that at a threshold of between 10.5% – 12%, inflation becomes inimical to economic growth in Nigeria. However, Adelowokan, Maku, Babasanya and Adesoye (2019) found no relationship between the variables.

Hence, this study attempts to assess the relationship between four selected macroeconomic variables (inequality, unemployment, inflation, fertility) and poverty in Nigeria. The paper has five sections with this introduction as Section 1. Section 2 addresses the relevant conceptual, theoretical and empirical literatures while Section 3 contains the research methodology. Results of data analysis are presented in Section 4 along with the discussion. Section 5 concludes the paper along with recommendations.

2. Literature Review

Conceptual Clarifications on Poverty

Poverty is multidimensional in nature as it affects many aspects of the human conditions, hence, a universally accepted definition of poverty is elusive. However, there is a general agreement that poverty implies pronounced deprivation in well-being (World Bank, 2000). There are several dimensions to this including material deprivation as measured by lack of income and consumption, and non-material deprivation such as lack of access to health care, education, and basic human rights. Hence, poverty is often conceptualized based on various criteria. In this wise, four perspectives are prominent in the definition of poverty viz: (i) lack of access to basic need, (ii) lack of or impaired access to productive resources,(iii) inefficient use of common resources and (iv) outcome of an exclusion mechanism (Olayemi, 2012; Ajakaiye and Adeyeye, 2001).

In terms of access to basic needs, poverty is perceived in material terms as lack of possession of sufficient income for securing basic goods and services. Specifically, the poor consist of those individuals or households in a society that are incapable of purchasing a specified basket of basic goods and services (Ajakaiye and Adeyeye, 2001). In this regard, the World Bank (2014) define poverty as inability to meet the basic necessities of life. This monetary or income definition is the most popular conceptual of poverty. However, in recent times, conceptual perception of poverty that takes other areas of human needs apart from income into consideration have become popular. The multi-dimensional perspective thinks of poverty

in terms of non-monetary human deprivations such as education, health, living standards, and unemployment. In this regard, multidimensional measure of poverty recognises that "a person who is poor can suffer multiple disadvantages at the same time – for example, they may have poor health or malnutrition, a lack of clean water or electricity, poor quality of work or little schooling" (Multidimensional Poverty Index, 2022).

As the outcome of the inefficient use of common resources, poverty may arise from a weak policy environment, infrastructural deficiency, poor access to technology or credit, and so on, all of which lead to low productivity, decline in economic growth and poverty(Ajakaiye & Adeyeye, 2001). In terms of exclusion, poverty emerge from some(privileged) groups in the society using certain mechanisms such as legal rights, customs and traditions to exclude "problem groups" from taking part in economic development (Okoroafor & Nwaeze, 2013).

Stylized Facts on Poverty and Its Determinants in Nigeria

The incidence of poverty is high in Nigeria with over two-third of the populace being classified as poor. The national poverty headcount ratio rose from 28.1 percent in 1980 to 69.0 percent in 2010 (Kolawole & Omobimtan, 2014) and, according to the World Bank (2018), nearly 50 percent of Nigerians live below the international poverty threshold of $2 per day, while the jobless rate peaked at 23.1 percent (Abiodun, Amao, Oluwatusin & Farayola, 2020). Furthermore, poverty rates vary significantly between rural and urban dwellers and among the geopolitical zones: poverty is higher in rural areas than in urban areas and in the Northern regions than the Southern parts. In 2010, the poverty rates in the North-West and North East geo-political zones were 77.7 per cent and 76.3 per cent respectively and these were the highest poverty rates in the country for that period.The South-West geo-political zone recorded the lowest poverty rates with 59.1 per cent (Kolawole & Omobimtan, 2014).

Table 1: Poverty Incidence in Nigeria, Selected Years 1980 – 2010

Category	1980	1985	1992	1996	2004	2010
National	28.1	46.3	42.7	65.6	54.4	60.9
By Region						
North East	35.6	54.9	54.0	70.1	72.2	76.3
North West	37.7	52.1	36.5	77.2	71.2	77.7
North Central	32.2	50.8	46.0	64.3	67.0	67.5
South East	12.9	30.4	41.0	53.5	26.7	67.0
South West	13.4	38.6	43.1	60.9	43.0	59.1
South South	13.2	45.7	40.8	58.2	35.1	63.8
By Location						
Urban	17.2	37.8	37.5	58.2	43.2	61.8
Rural	28.3	51.4	46.0	69.3	63.3	73.2

Source: Kolawole & Omobimtan, (2014)

With regard to non-monetary poverty, key results from the Nigerian Multidimensional Poverty Index (MPI) Survey (2022) reveals that 63 percent of the population were multidimensionally poor. The country's Multidimensional Poverty Value of 0.257 indicates that in Nigeria poor people experience a little over 25 percent of all possible deprivations. Multidimensional poverty is higher in rural areas than in urban areas and in the Northern region than in the South (Table 2).

Table 2: Multidimensional Poverty in Nigeria, 2022

Category		MPI Value	MPI Incidence (%)	MPI Intensity (%)	Population Share (%)	Number of Poor People (million)
National		0.257	62.9	40.9	100.0	132.92
By Region	North Central	0.272	66.3	41.0	14.4	20.19
	North East	0.324	76.5	42.4	12.7	20.47
	North West	0.324	75.8	42.7	28.4	45.49
	South East	0.183	49.0	37.3	10.5	10.85
	South South	0.250	62.6	39.8	14.8	19.66
	South West	0.151	40.0	37.7	19.2	16.27
By Location	Urban	0.155	42.0	36.9	30.4	26.94
	Rural	0.302	72.0	41.9	69.6	105.98

Source: Compiled from National Bureau of Statistics, NBS (2022), Nigeria Multidimensional Poverty Index (2022).

In general, monetary poverty incidence is smaller than multidimensional poverty incidence in Nigeria. For example, according to the 2018/19 national monetary poverty line, 40% of the people are income poor while the Nigerian Multidimensional Poverty Incidence (2022) indicates that 63% are multi-dimensionally poor (NBS, 2022).

Theoretical Issues

Due to the multiplicity of causative factors in relation to poverty, there are many theories that have been suggested as theoretical anchor for analysing the nexus between poverty and its causal factors. Among these are the efficiency wage theory, the theory of real wage rigidities, social exclusion theory, dualism theory and human capital theory.The basic efficiency wage hypothesis states that workers' productivities depend positively on their wages (Katz, 1982).The rationale behind the theory is that workers differ in quality, hence, wages are paid according to workers' productivity. Since an employer care about wages, he attempts to minimize wages relative to workers' productivity and highly productive workers earn higher wages than workers with low productivity.

The real wage rigidities' theory highlights the importance of real wage rigidities in explaining labour-market dynamics at business cycle frequencies. On the basis of the assumption that real wagesadjust more easily upward than downward, the theory opined that real wage rigidities account for high volatility of employment and vacancies, low volatility of real wages and the negative relationship between unemployment and productivity growth at low frequencies (Benigno, Ricci, and Surico, 2010).

Social exclusion describes a "state in which individuals are unable to participate fully in economic, social, political and cultural life, as well as the process leading to and sustaining such a state" (United Nations, 2016). The social exclusion theory affirms that certain members of a country become poor when they are deprived the benefit of sharing from the commonwealth of such a country i.e. social exclusion leads to poverty among the excluded people *while also preventing poverty reduction*.Social exclusion emphasizes the denial of right to "resources, rights, goods and services, and the inability to participate in the normal relationships and activities available to the majority of people in a society, whether in

economic, social, cultural or political arenas"(Department For International Development, DFID,2005). This denial could be in the form of employment, social amenities, security to lives and properties and many others which could elevate their status within the country. Social exclusion hurts people materially by "causing them to be denied access to resources, markets and public services" (DFID,2005).

Dualism theory submits that the society is dual in nature; traditional and modern; and that the poor are the cause of their poverty by remaining traditional (rural) rather than modern. The theory identifies three forms of dualism namely: social dualism, technological dualism and financial dualism(urban) (Jhingan, 2007). The theory is characterized by the existence of two parallel institutional production sectors; in the traditional sector the principle of vicious circle of poverty seems to be institutionalized and is characterized by static low equilibrium conditions, a subsistence life style and cultural value which seems to work in opposition to economic growth and development (Ajakaiye and Adeyeye, 2001). The modern sector is dominated by technological investment, innovation, foreign trade and investment and hard work which promotes economic growth and development.

Human capital theory argues that education and training are investments that add to productivity. Hence, the level and distribution of schooling across the population determines the distribution of earnings while the supply and demand of educated people determines the earnings inequality in a society (Becker & Chiswick 1966; Mincer 1974). Thus, the model predicts a positive association between educational inequality and income inequality in a society (Velichkovska & Georgievski, 2022; Nabassaga, et al., 2020).

Empirical Review

Most of the studies that attempted to unravel the macro determinants of poverty submit that macroeconomic variables such as inequality, unemployment, inflation and fertility tend to be positively correlated with poverty. In other words, high rate of these macroeconomic variables are associated with high rates of poverty.

Ncube, Anyanwu & Hausken (2013) studied the effect of income inequality on economic growth and poverty in the MENA region for the period 1985- 2009 using pooled OLS for panel data from the region. They found that income inequality increases poverty. Anyanwu (2013) examines the correlates of poverty with multivariate models using data on 43 African countries for the period, 1980 to 2011. He found that higher levels of income inequality and inflation, among other variables, leads to increase in poverty in Africa. Egunjobi (2014) attempts to determine the nature of the relationship between poverty and unemployment in Nigeria over the period 1977 – 2010 using the co –integration technique, error correction modelling and causality test. The study discovered that unemployment has a positive influence on poverty, although, a causal link could not be established for the two variables. Anorie & Okorie (2017) re-examined the relationship between unemployment rate and poverty incidence in Nigeria using secondary data for the period 1980-2015. The study used correlation analysis and Granger causality tests to analyse collected data. The results show a positive and significant relationship between unemployment and poverty in Nigeria with unemployment granger causing poverty. Muhammad and David (2019), using a logistic regression model, studied the relationship between poverty and unemployment in Niger state, Nigeria. The data consisted of 102 randomly collected cross-sectional data from the three

geopolitical regions in the state. The findings show that there is a positive relationship between poverty and unemployment.

Aderounmu et al. (2021) used data from the World Development Indicators (WDI) over the period 1992 - 2016 to look at the significant factors affecting Nigeria's poverty rate. The Autoregressive Distributed Lag (ARDL) model was used to analyse the data. According to the findings, unemployment causes a small short-term increase in poverty while inflation causes a small short-term decrease in poverty. Inegbedion & Obadiaru (2022) using a longitudinal survey of four perceived poverty predictors viz: unemployment rate, inflation rate, population, and inequality in income distribution, attempted to determine the predictors of poverty in Nigeria for the period 1980-2019. They employed Johansen's cointegration test and vector error correction methodology. The findings showed that unemployment rate and inflation rate are significant predictors of poverty in the short run, while unemployment is a significant predictor of poverty in the long run.

While opinions differ, majority of evidence suggest that inflation rate increases the incidence of poverty. Siyan, Adegoriola, & Adolphus (2016) examined the influence of unemployment and inflation on poverty in Nigeria between 1980 and 2014 using the VAR model and granger causality. Theyfound that increase in poverty in Nigeria is due to previous high inflation and unemployment rates. Murjani (2019) examined the response of poverty to inflation, unemployment, and economic growth using the ARDL methodology. The findings reveal that, inflation, unemployment, and economic growth all have a major impact on poverty in the long run. Danlami, Bin Hidthiir and Hassan (2020) investigates the nature of causality between inflation and poverty in Nigeria for the period 1980-2016 using the Toda-Yamamoto causality test. The results reveal a bidirectional causality between inflation and poverty. Isiaka & Olayiwola (2022) examined the relationship between Nigeria's inflation rate and poverty incidence in Nigeria and the role of borrowing costs in the relationship for the period 1981 to 2020. They used secondary data obtained from World Bank Development Indicators and the Central Bank of Nigeria (CBN) Statistical Bulletin for analysis. They found that inflation rate has a positive correlation with poverty with lending rate moderating the relationship.

Mussa (2009) investigates the impact of fertility on poverty in rural Malawi. He accounted for endogeneity of fertility by using son preference as an instrumental variable and found that fertility increases the probability of being objectively poor. In addition, he also found that when poverty is measured subjectively, the results are opposite to those of objective poverty. Aigheyisi and Oligbi (2019) investigated the growth effect of adolescent fertility rate in Nigeria for the period 1981 to 2016 using ARDL bounds test and error correction methodology, Fully Modified Ordinary Least Squares and CCR analytical techniques. Their results indicate that,both in the short and long run, adolescent fertility negatively affects economic growth in Nigeria.Wietzke (2020) examines the effects of demographic variables on poverty using time series data for 140 countries. He found a strong effect of lagged fertility on country-specific poverty rates. In addition, the effect was robust across several specifications and data sets and was stronger in countries with larger fertility differentials in the early transition stages.

3. Methodology

The empirical model follows the pattern of Sinnathurai (2013)who modelled poverty (poverty incidence) in developing countries as a function of economic growth, agricultural employment, industrial employment and dependency ratio. In the present study however,poverty (POV) is modelled as a function of inequality (INEQ), unemployment (UEMP), inflation (INFL) and fertility.The functional form of the model is stated as follows:

$$POV_t = f\ (INEQ_t, UNEM_t, INFL_t, FRTL_t) \ldots\ldots\ldots\ldots 1$$

The functional relationship is transformed into an econometric model as stated in equation 2.

$$POV_t = \lambda_0 + \lambda_1 INEQ_t + \lambda_2 UNEM_t + \lambda_3 INFL_t + \lambda_4 FRTL_t + \mu_t \ldots\ldots\ldots 2$$

The pre estimation tests carried out showed that the variables of the model are of different orders of integration, i.e. some were I(0) while others were I(1) series, and on this basis, the ARDL technique was selected for the model. The ARDL formulation of model 2 is presented below:

$$\Delta POV_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \Delta POV_{t-1} + \sum_{i=1}^{n} \alpha_2 \Delta INEQ_{t-1} + \sum_{i=1}^{n} \alpha_3 \Delta UNEM_{t-1} + \sum_{i=1}^{n} \alpha_4 \Delta INFL_{t-1} + \sum_{i=1}^{n} \alpha_5 \Delta FRTL_{t-1} + \beta_1 POV_{t-1} + \beta_2 INEQ_{t-1} + \beta_3 UNEM_{t-1} + \beta_4 INFL_{t-1} + \beta_5 FRTL_{t-1} + e_t \ldots\ldots\ldots 3$$

Where POV_t= poverty incidence proxied by Headcount ratio (%), $INEQ_t$= Income inequality proxied by percentile of income inequality, bottom 50% shares, (%), $UNEM_t$ = Total percentage share of Unemployment (modelled ILO estimate) (%), $INFL_t$= Consumer price index inflation rate, (%), $FRTL_t$= Fertility rate, total (births per woman) (%), μ_t = error term

Δ is the difference operator and $\alpha_1 – \alpha_5$ as well as β_1- $\beta_5$are the parameters of interest. The parameters $\alpha_1 – \alpha_5$ explain the short run coefficients while the parameters $\beta_1 – \beta_5$ explain the long run coefficients.

The a priori expectations are summarized as follows: Inequality is expected to have a positive relationship with poverty level i.e.$\frac{\partial POV}{\partial INEQ}$>0, Unemployment rate is expected to exert a positive effect on poverty i.e. $\frac{\partial POV}{\partial UNEM}$>0, Inflation rate is expected to vary directly with poverty incidence i.e.$\frac{\partial POV}{\partial INFL}$>0 , Increase in fertility rate is expected to raisepoverty incidence i.e.$\frac{\partial POV}{\partial INFL}$>0, In other words, poverty is expected to vary positively with all the variables of the model. The data used for analysis covered the period 1991 to 2022 and were obtained from the World Bank's World Development Indicators (WDI).

4.Results

The resultsof the data analysis are presented in Tables 1 – 5.

Pre Estimation Tests

Table 3: Descriptive statistics

Variables	POV_t	$INEQ_t$	$UNEM_t$	$INFL_t$	$FRTL_t$
Mean	159.8067	0.134131	4.175906	18.41968	5.927438
Median	156.6765	0.137700	3.899000	12.94178	6.073500
Maximum	200.9770	0.148900	5.999000	72.83550	6.426000
Minimum	111.5570	0.110400	3.700000	5.388008	5.237000
Std. Dev.	22.93199	0.013628	0.667430	16.24845	0.347437
Skewness	0.164141	-0.390776	1.792386	2.159182	-0.655922
Kurtosis	2.455491	1.599643	4.860038	6.622813	2.282878
Jarque-Bera	0.539012	3.429098	21.74711	42.36405	2.980264
Probability	0.763757	0.180045	0.000019	0.000000	0.225343
Sum	5113.815	4.292200	133.6290	589.4296	189.6780
Sum Sq. Dev.	16302.16	0.005758	13.80936	8184.378	3.742082
Obs.	32	32	32	32	32

Source: *Author's Computation*

Table 3 shows the summary statistics of the variables in the model. It reveals that the mean and median of all the variables in the data set lie within the maximum and minimum values indicating that there were no outliers. Poverty, unemployment and inflation are positively skewed while inequality and fertility are negatively skewed. The variables are also highly symmetrical since their means are greater than their medians. The values of the kurtosis for all the variables are positive suggesting a relatively peaked distribution while the kurtosis value for unemployment and inflation are greater than 3 suggesting that these variables are leptokurtic in nature. The values of the Jarque-Bera statistic show that only unemployment and inflation are normally distributed, other variables are not normally distributed.

Table 4: Correlation Matrix

Variables	POV_t	$INEQ_t$	$UNEM_t$	$INFL_t$	$FRTL_t$
POV_t	1.0000				
	[----]				
$INEQ_t$	0.6775*	1.0000			
	[5.0458]	[----]			
$UNEM_t$	0.4694**	0.4683**	1.0000		
	[2.9118]	[2.9030]	[----]		
$INFL_t$	-0.1721	-0.5644	-0.0480	1.0000	
	[-0.9566]	[-3.7452]**	[-0.2635]	[----]	
$FRTL_t$	-0.6838	-0.8440	-0.8153	0.3908	1.0000
	[-5.1333]*	[-8.6220]*	[-7.7138]*	[2.3260]**	[----]

*Note: *, **, and *** are 1%, 5%, and 10% probability levels of significance.*

Source: *Author's Computation*

The result of the correlation analysis is presented in Table 4. It shows the absence of the problem of multicollinearity since the correlation coefficients for the relationship among the variables are below 0.70 for most of the variables. The result also showed that while the association between inflation and poverty, and fertility and poverty were negative, the association between poverty and inequality, and poverty and unemploymenton the other hand were positive. All the relationships among poverty and the dependent variables are statistically significant except that between poverty and inflation.

Table 5: ADF Unit root test results

Variable	Level		First Difference		Order
	Constant	Constant & Trend	Constant	Constant & Trend	
POV_t	-1.5640	-2.017	-5.4578	-5.3663	I(1)
	[-2.9604]	[-3.5628]	[-2.9639]*	[-3.5683]**	
$INEQ_t$	-3.9083	-0.2219		-6.1951	I(0)
	[-2.9639]*	[-3.5683]		[-3.5683]**	
$UNEM_t$	-0.0200	-0.2674	-3.5039	-3.9492	I(1)
	[-2.9639]	[-3.5628]	[2.9639]**	[-3.5683]**	
$INFL_t$	-2.0796	-2.5455	-5.3973	-5.3651	I(1)
	[-2.9604]	[-3.5628]	[2.9639]*	[-3.5683]*	
$FRTL_t$	0.1554	-1.3583	-3.0208	-3.9492	I(1)
	[-2.9677]	[-3.5742]	[2.9677]**	[-3.5683]**	

*Note: *, **, ***, and [] denotes 1%, 5%, 10% and test critical values respectively.*
Source: Authors' Computation, 2024

The result of the unit root test showed that all the variables, except inequality, are non-stationary at levels. However, after taking their first difference, all the non-stationary variables became stationary showing that they are I(1) series while inequality is I(0) series. The implication is that there is a mixed order of integration in the general unit root test.

To decide the appropriate lag length for the ADF unit root test, there is need to determine the Vector Autoregressive (VAR) optimal lag length criteria through the order of the Autoregressive (AR) process and this is shown in Table 6. The table reveals that the study relies on AIC to proceed at one maximum lag while using the ADF unit root test.

Table 6: VAR Lag Length Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-143.8123	NA	0.014004	9.920821	10.15435	9.995530
1	63.31873	331.4097	7.67e-08	-2.221249	-0.820051*	-1.772994
2	98.80906	44.95442*	4.44e-08*	-2.920604*	-0.351742	-2.098803*

Source: Authors Computation

Consequently, given the variables for each of the models, the ARDL bounds test results is shown in Table 7.

Table 7: ARDL Bound Test

Test Statistic	Value	K	Sig.	I(0)	I(1)
F-statistic	4.182562	4	10%	2.2	3.09
			5%	2.56	3.49
			2.5%	2.88	3.87
			1%	3.29	4.37

Source: Authors Computation

The F-statistic indicates the significance of the bounds test; if the F-statistic is less than the lower bound; then, there is only short-run joint movement among the variables in the model and if the F-statistic is greater than the upper bound there is a long run relationship. The test is indeterminate if F-statistic falls between the two bounds (Pesaran et al., 2001). Accordingly, Table 5 reveals that there is a long-run co-integration among the series in the model.The ARDL long-run and ECM short-run estimates for the model are shown in Table 8.

Table 8: Estimates of Poverty and Its Determinants in Nigeria

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Long-run Estimates:ARDL				
POV_{t-1}	0.335803	0.229686	1.462011	0.1620
$INEQ_t$	4836.044	3435.023	1.407864	0.1772
$INEQ_{t-1}$	-7034.820	4559.418	-1.542921	0.1413
$INEQ_{t-2}$	2523.875	1930.893	1.307103	0.2086
$UNEM_t$	16.85173	14.50909	1.161460	0.2615
$UNEM_{t-1}$	-66.62947	16.80848	-3.964040	0.0010
$UNEM_{t-2}$	26.09774	16.36143	1.595077	0.1291
$INFL_t$	0.117028	0.195936	0.597278	0.5582
$INFL_{t-1}$	0.450531	0.204660	2.201369	0.0418
$FRTL_t$	-233.5070	86.47761	-2.700202	0.0152
$FRTL_{t-1}$	322.0483	145.5305	2.212927	0.0409
$FRTL_{t-2}$	-170.0724	98.91058	-1.719456	0.1037
Constant	629.1952	263.5999	2.386933	0.0289
Adj. R-Sq.	0.869907		F-statistic	17.15981
D-W stat.	2.900154		Prob. (F-statistic)	0.000000
Short-run Estimates:ECM				
$D(INEQ_t)$	4836.044	1705.465	2.835615	0.0114
$D(INEQ_{t-1})$	-2523.875	1503.690	-1.678454	0.1115
$D(UNEM_t)$	16.85173	8.678627	1.941751	0.0689
$D(UNEM_{t-1})$	-26.09774	9.206258	-2.834782	0.0114
$D(INFL_t)$	0.117028	0.143110	0.817748	0.4248
$D(FRTL_t)$	-233.5070	58.26491	-4.007678	0.0009
$D(FRTL_{t-1})$	170.0724	53.85554	3.157937	0.0057
ECT_{t-1}	-0.115750	0.018259	-6.339494	0.0000
Adj. R-Sq.	0.665507		D-W stat.	2.900154

Source: Authors computation

Table 8 shows that one-period lagged value of unemployment, one-period lagged value of inflation, fertility and its one-period lagged value have significant long run effect on poverty;

while inequality, lagged value of unemployment and fertility have short run effects on poverty. The ECT term is significant and lies between -1 and 0 as expected. The ECT term coefficient of -0.12 implies that 12 percent of any movements into disequilibrium are adjusted for within one period. To determine the nature and direction of causality among the variables, the Granger Causality test was carried out and the result is presented in Table 9.

Table 9: Pairwise Granger Causality of Poverty and Its Determinants in Nigeria

Null hypothesis:	F-Statistic	Prob.	Obs.	Causality direction
$POV_t \rightarrow INEQ_t$	0.30029	0.7432	30	No causal relationship
$INEQ_t \rightarrow POV_t$	2.50025	0.1024		
$POV_t \rightarrow UNEM_t$	6.60295	0.0050	30	Unidirectional relationship*
$UNEM_t \rightarrow POV_t$	3.14898	0.0603		
$POV_t \rightarrow INFL_t$	1.65439	0.2115	30	No causal relationship
$INFL_t \rightarrow POV_t$	0.22408	0.8008		
$POV_t \rightarrow FRTL_t$	6.29845	0.0061	30	Unidirectional relationship
$FRTL_t \rightarrow POV_t$	0.25110	0.7791		

*Note: *The relationship becomes bidirectional at 10%*
Source: Authors Computation

The table shows that there is a unidirectional relationship from poverty to unemployment and from poverty to fertility at 5% level. However, at 10% level the relationship between poverty and unemployment becomes bidirectional. The direction of causality thus suggests that, largely, it is poverty that Granger causes unemployment and fertility rather than the reverse case.

Table 10: Post Estimation Diagnostic test results

Test	Statistic value	Prob.
Jacque-Bera Normality test	0.175357	0.916055
Breusch-Pagan-Godfrey heteroscedasticity test	0.466228	0.9084
Ramsey RESET test	4.249564	0.0559

Source: Authors Computation

The diagnostic test includes the Jacque-Bera normality test (X^2_N), Breusch-Pagan-Godfrey heteroskedasticity test (X^2_H) and the Ramsey RESET test. The normality test revealed that the variables are normally distributed, the Breusch-Pagan-Godfrey heteroskedasticity test showed that the variables have constant variance while the CUSUM and CUSUM squares test shows that there is structural stability in the model as both lies within the 5% level of significance (Figure 10).

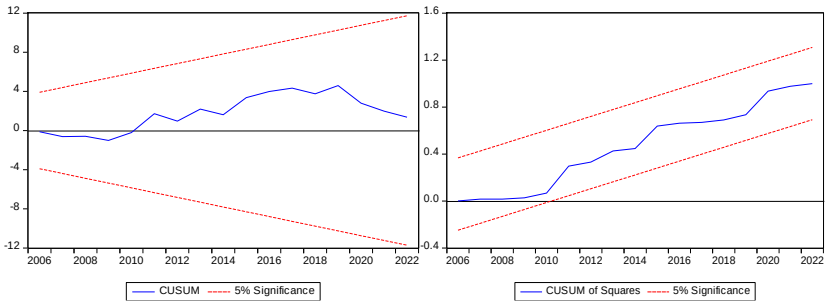

Figure 1. Model structural stability test.
Source: Authors Computation

The main finding of this study therefore is that fertility as well as lagged values of inflation and unemployment have significant relationship with poverty in Nigeria while inequality does not.Out of these variables, it is only unemployment that Granger causes poverty and the relationship is weak. However, poverty Granger causes both unemployment and fertility implying that increasing rate of poverty contributes significantly to the prevalence of high unemployment and high fertility rate in the country.

The findings concerning inequality align with Adelowokan, Maku, Babasanya & Adesoye (2019), it however contradicts most previous studies like (Anyanwu, 2013; Ncube, Anyanwu & Hausken, 2013) which conclude that inequality impact significantly on poverty. With regard to unemployment and inflation, the findings that a relationship exist between the variables and poverty is in line with most previous studies (Aderounmu, 2014; Siyan, Adegoriola, and Adolphus, 2016; Murjani, 2019; Inegbedion and Obadiaru, 2022; Isiaka and Olayiwola, 2022) which conclude that these variables have significant relationship with poverty. The findings that fertility leads to poverty aligns with Wietzke (2020) who observed an inverted U-shape relationship between fertility and poverty. The findings that poverty causes fertility aligns with the findings of Odusola (2001) who found that fertility in the Northern and Southern parts of Nigeria conforms with spatial distribution of poverty.

5. Conclusion and Recommendations

This study examined the relationship between poverty and four of its presumed determinants namely inequality, unemployment, inflation and fertility within the Nigerian context and for the period 1991 to 2022. Based on the findings of the study, it was concluded that fertility has significant impact on poverty in Nigeria; unemployment has a delayed but significant impact on poverty and poverty has significant impact on both fertility and unemployment. Inequality has no significant relationship with poverty.

Consequently, the study recommends that in order to reduce poverty, measures aimed at further reducing fertility in the country should be intensified. These measures include fertility education and family planning advocacy, among others. In other words, poverty reduction strategies that emphasizes fertility education and family planning measures should be prioritised. Given the effects of unemployment on poverty, efforts should be made to curb the increasing rate of unemployment in the country. In this regard, policy measures that promote labour intensive investment strategies should be implemented at all levels of government.

These include policies that encourage investment in agriculture and Micro and Small ScaleEnterprises. Also, since poverty impinges on unemployment, poverty reduction measures that make use of empowerment strategies and entrepreneurship development should be instituted by relevant government agencies as means of bringing down the unemployment rate.

References

Abiodun, A., Amao, A. O., Oluwatusin F. M. &Farayola C. O. (2020). Analysis of poverty status among small holder arable farm households in South Western Nigeria. *International Journal of Agriculture and Earth Science*, *6*(2), 71-77.

Adelowokan O.A., Maku O.E., Babasanya A.O. and Adesoye A.B. (2019). Unemployment, poverty and economic growth in Nigeria.*Journal of Economics and Management*, *35* (1): 5-17. https://doi.org/10.22367/jem.2019.35.01

Aderounmu, B., Azuh, D., Onanuga, O., Oluwatomisin, O., Ebenezer, B. &Azuh, K. (2021) Poverty drivers and Nigeria's development: Implications for policy intervention.*Cogent Arts & Humanities*, *8*(1). https://doi.org/10.1080/23311983.2021.1927495

Aigheyisi O. A. &Oligbi, B. O. (2019). Adolescent fertility in Nigeria: Implications for economic growth. *Academic Journal of Economic Studies*, *5*(3), 51-57.

Ajakaiye D.O. & Adeyeye V.A. (2001) Concepts, measurement and causes of poverty, *CBNEconomic & Financial Review*, *39*(4), 1-31.

Ajani, O. I. Y. (2009). Gender dimensions of agriculture, poverty, nutrition, and food security in Nigeria. *IFPRI Nigeria Strategy Support Program Brief 5*. Washington, D.C.: International Food Policy Research Institute.

Anowor O.F. & Okorie G. C. (2017). Empirical appraisal of poverty-unemployment relationship in Nigeria.*International Journal of Economics and Financial Research*, *3*(6), 91-97.

Anyanwu, J. C. (2013). The correlates of poverty in Nigeria and policy implications.*African Journal of Economic and Sustainable Development*, *2*(1): 23–52.DOI: 10.1504/AJESD.2013.053053

Becker, G. S., & Chiswick, B. R. (1966). Education and the distribution of earnings.*American Economic Review*, *56*, 358-369.

Becker, G.S. (1992). Fertility and the economy. *Journal of Population Economics*, *5*, 185–201. https://doi.org/10.1007/BF00172092

Benigno P., Ricci L.A., & Surico P. (2010). Unemployment and Productivity in the Long Run: the Role of Macroeconomic Volatility, IMF Working PaperWP/10/259.

Cardoso E. (1992). Inflation and Poverty, NBER Working Papers Series Working Paper No. 4006

Castells-Quintana, D. & Royuela, V. (2012). Unemployment and long-run economic growth: The role of income inequality and urbanisation.*InvestigacionesRegionales*, *24*, 153-173.

Danlami I.A., Bin Hidthiir M.H. and Hassan S. (2020) Evidence of inflation-poverty causality in Nigeria based on the Toda-Yamamoto dynamic causality test. *Journal of Business and Social Review in Emerging Economies*, *6*(1), 277-286.DOI: 10.26710/jbsee.v6i1.993

Department for International Development (2005). *Growth and Poverty Reduction: The Role of Agriculture*. Policy Paper. London, DFID

Doguwa S. I. (2012) Inflation and economic growth in Nigeria: Detecting the threshold level, *CBN Journal of Applied Statistics, 3*(2), 99-124.

Dreze J. & Murthi M. (2000). Fertility, Education and Development: Further Evidence from India. Centre for Development Economics Working Paper No. 76, March, http://www.cdedse.org/pdf/work76.pdf

Egunjobi E. & Adenike T. (2014). Poverty and unemployment paradox in Nigeria. *IOSR Journal of Humanities and Social Science*, *19*(5), 106 - 116.DOI: 10.9790/0837-1954106116

Encyclopedia Britannica, Fertility Rate, https://www.britannica.com/topic/fertility-rate/

Idenyi, O.S, Elom-Obed, F.O, Johnson, O.N & Thomas, O.O. (2017). Understanding the relationship between unemployment and inflation in Nigeria.*Advances in Research9*(2), 1-12. DOI: 10.9734/AIR/2017/32218

Inegbedion H. &Obadiaru E. (2022). Perceived predictors of poverty: Evidence from Nigeria.*Journal of Poverty*, *26*(7), 549-566. DOI: 10.1080/10875549.2021.1925804

Isiaka, N.A. and Olayiwola, H.O. (2022) Inflation rate and poverty incidence nexus in Nigeria: Does lending rate moderates the effect?*International Journal of Economics, Social Science, Entrepreneurship and Technology (IJESET),1*(5), 307 – 315, DOI: 10.55983/ijeset.v1i5.327

Katz L.F. (1986). Efficiency Wage Theories: A Partial Evaluation. In Fischer S. (1986) NBER Macroeconomics Annual 1986, Vol. 1. MIT Press, 235 – 290. http://www.nber.org/chapters/c4248

Lee, J. & Lee H. (2018) *Human capital and income inequality*.*Journal of the Asia Pacific Economy*, *23*(4), 554-583. DOI: 10.1080/13547860.2018.1515002

Mincer J. (1974). *Schooling, Experience and Earnings*, New York, National Bureau of Economic Research.

Muhammad U.F. and David J. (2019) Relationship between poverty and unemployment in Niger State, *Signifikan: JurnalIlmu Ekonomi*, *8* (1): 71-78.DOI: 10.15408/sjie.v8i1.6725

Murjani, A. (2019). Short-run and long-run impact of inflation, unemployment, and economic growth towards poverty in Indonesia: ARDL Approach. *JurnalDinamika Ekonomi Pembangunan*, *2*(1), 15–29. https://doi.org/10.14710/jdep.2.1.15-29

Musa, I., Magaji S., Eke C.I., Yakeen O.A. (2022)Poverty and its intractability: Causes and consequences, *Inclusive Society and Sustainability Studies*, 2 (2), 48-58. https://doi.org/10.31098/issues.v2i2.1218

Mussa, R. (2009)Impact of fertility on objective andsubjective poverty in Malawi, MPRA Paper No. 16089, Online at https://mpra.ub.uni-muenchen.de/16089/

Nabassaga, T., C. Chuku, A. Mukasa and H. Amusa (2020). How Does Educational Inequality Affect Income Inequality in Africa?. Working Paper Series N° 343, African Development Bank, Abidjan, Côte d'Ivoire

Narayan D., Patel R., Schafft K., Rademacher A. & Koch-Schutte S. (2000) *Voices of the Poor, Can Anyone Hear Us*? New York, Oxford University Press.

National Bureau of Statistics (2022). Nigeria Multidimensional Poverty Index, 2022, https://www.nigerianstat.gov.ng › pdfuploads

National Bureau of Statistics (2020), *2018/19 Nigeria Living Standards Survey: Executive Summary*, Abuja, National Bureau of Statistics.

National Bureau of Statistics (2019) Poverty and Inequality in Nigeria, 2019: Executive Summary

Ncube, M., Anyanwu, J.C. & Hausken, K. (2013) Inequality, Economic Growth, and Poverty in the Middle East and North Africa (MENA), Working Paper Series No. 195, African Development Bank, Tunis, Tunisia.DOI: 10.1111/1467-8268.12103

Nwadike, E.C, Njoku, &Badmos, S.O. (2020) Inflation and poverty in Nigeria: A Granger causality approach, *The International Journal of Business Management and Technology*, 4 (3).

Obadan, M. (1997) Analytical framework for poverty reduction: issues of economic growth versus other strategies, In: Poverty Alleviation in Nigeria, Selected Papers for the 1997 Annual Conference of Nigerian Economic Society.

Odusola A.F. (2001) Poverty and Fertility Dynamics in Nigeria: A Micro Evidence, UNDP Africa Research Discussion Papers 267048, United Nations Development Programme, DOI:10.22004/ag.econ.267048

Okoroafor, M., & Nwaeze, C. (2013). Poverty and economic growth in Nigeria, 1990-2011. *The Macrotheme Review*, *2*(6), 51-63.

Olayemi, A. O. (2012). Effects of Family Size on Household Food Security in Osun State, Nigeria. *Asian Journal of Agriculture and Rural Development*, *2*, 136-141.10.22004/ag.econ.197951

Sinnathurai V. (2013). An empirical study on the nexus of poverty, GDP growth, dependency ratio and employment in developing countries.*Journal of Competitiveness*, *5*(2): 67 – 82.DOI: 10.7441/joc.2013.02.05

Siyan, P.,Adegoriola, A. E. & Adolphus, J. A.(2016). Unemployment and Inflation: Implication on Poverty Level in Nigeria, MPRA Paper 79765, University Library of Munich, Germany.

United Nations (2016) Leaving no one behind: the imperative of inclusive development, Report on the World Social Situation 2016. ST/ESA/362, Department of Economic and Social Affairs, United Nations, New York.

Velichkovska K. &Georgievski B. (2022). The causal relationship between income inequality and educational attainment. *Economic Development*, *24*(4), 94-110, DOI:10.55302/ED22244094v

Wietzke F. (2020) Poverty, inequality and fertility: The contribution of demographic change to global poverty reduction, *Population and Development Review46*(1): 65–99.DOI: 10.1111/padr.12317

World Bank (2000). *World Development Report 2000-2001*. Washington DC

World Bank (2005) *World Development Indicators*, Washington D. C.

World Bank (2014). *World Development Report 2014*.Washington DC

Yahie A.M. (1993) *The design and management of poverty alleviation projects in Africa: Evolving guidelines based on experience*, World Bank EDI Human Resources Department.