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Modeling Poverty Incidence and Macroeconomic Volatility in Nigeria

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Abstract

In light of the exacerbation of economic challenges resulting from heightened inflation and the recent cessation of fuel subsidies, there has been a discernible escalation in the poverty rate across emerging economies globally, with particular emphasis on the Nigerian context. This research endeavors to scrutinize the intricate interconnection between the poverty rate and pertinent macroeconomic volatility indices, encompassing inflation, Gross National Income (GNI), unemployment, and Gross Domestic Product (GDP) within the Nigerian framework. Noteworthy in its contribution, this study addresses a notable lacuna by incorporating indices hitherto overlooked in antecedent research. Utilizing secondary data spanning the temporal continuum from 1990 to 2022, a meticulous analysis ensued. The knit root test was executed to rectify the presence of unit roots that might engender spurious findings. Subsequently, an Autoregressive Distributed Lag (ARDL) model of order (1, 1, 1, 1, 0) was employed. The findings divulge a discernible short-term and long-term nexus between poverty incidence and the identified macroeconomic volatility indices in Nigeria. The model further posits that an elevated poverty incidence precipitates a decline in economic growth in both temporal horizons, underscoring the adverse effects. Conversely, a heightened GNI manifests as a catalyst for enhanced economic growth in Nigeria. Consequently, this underscores the imperative for governmental intervention in productive endeavors aimed at augmenting Nigeria's GNI, thereby fostering economic growth, mitigating unemployment, and ultimately alleviating the elevated poverty rates pervasive in the nation.

Keywords: GDP, GNI, Inflation, Macroeconomic Volatility, Poverty, Unemployment.

Introduction

Diverse perspectives characterize the conceptualization of poverty, with interpretations ranging from inefficiency to pervasive deprivations and inadequacy (1). The multifaceted nature of poverty, encompassing economic, philosophical, historical, environmental, social, psychological, regional, international, and cultural dimensions, necessitates a comprehensive understanding. Disparities in global standards of living align with varying rates of economic growth among nations, ranging from affluence to destitution. Poverty is commonly understood as the inability to meet basic needs, entailing helplessness, deprivations and constraints on freedom of choice. Ojo (2) defines poverty as the absence of access to spectrum of living conditions, including clean drinking water, sanitation, hygiene, adequate health and education, social, economic and political participation, and the inability to influence decisions that impact long-term household welfare.

Consequent to the implementation of the Structural Adjustment Plan (SAP) in the 1980s, Nigeria experienced an escalation in the rate and level of poverty. A critical concern for Nigeria and other emerging nations is the sustainable provision of sustenance to their populations. Despite the country's abundance of natural resources, including minerals and crude oil, Nigeria grapples with a persistent high poverty rate, with 90.8% of its populace living on less than $5.50 per day (World Bank, 2018; Figure 1).

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Alongside the prevailing poverty incidence, Figure 1 illustrates key macroeconomic indicators, comprising GDP, gross national income (GNI), unemployment, and inflation. In 2021, GDP and GNI were estimated at approximately 441 billion USD and 452 billion USD, respectively. At the same time, the unemployment rate rose from 9.71% in 2020 to 9.79% in 2021, inflation surged from 13.2% in 2020 to around 17% in 2021, and the incidence of poverty among Nigerians earning less than $5 per day escalated from 90.6% in 2021 to 92.3% in 2022 (Figure 1).

The preeminent yardstick for evaluating a nation's economic performance lies in the macroeconomic volatility indicators. Therefore, imperative economic policies that bolster macroeconomic variables are indispensable in reversing the Nigeria's already elevated poverty incidence as well as reducing the overall poverty rate in the country.

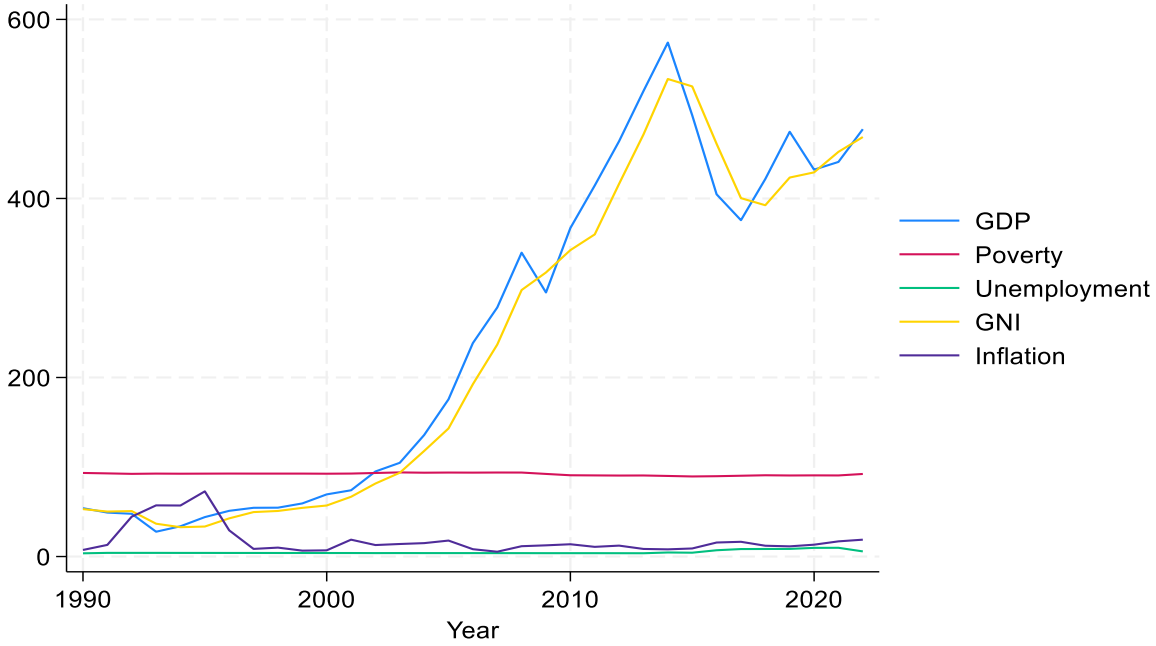

Figure 1: Graph of the poverty incidence rate and other macroeconomic volatility indices (Source: Authors' computation via STATA software)

Nigeria is endowed with abundance of natural resources, including substantial water reserves, fertile arable land and other valuable mineral assets. Additionally, it has a teaming population, therefore ranking as the seventh-most populous nation globally and the most populous in Africa. Projections from (3) and (4) estimate that Nigeria's population will surpass 200 million by 2020. Furthermore, Nigeria holds the eighth position among the world's largest crude oil suppliers and producers.

Despite this wealth of resources, Nigeria currently occupies the 158th position out of 189 countries on the Human Development Index, indicating a relatively low level of human development compared to its resources endowment. Moreover, a substantial proportion of its populace, 39.1%, lives below the daily poverty threshold of US$1.90, a markedly higher percentage than observed in other sub-Saharan African countries such as Rwanda (60%), Zambia (64.4%), and Mozambique (68.7%). These statistics, derived from the United Nations Development Programme in 2016 and 2018 (5, 6), underscore a disconcerting incongruity between resources abundance and human development outcomes.

The Brookings Institution's 2018 annual study further accentuated Nigeria's socioeconomic challenges, categorizing it among the world's poorest nations, surpassing even India. The transformation in Nigeria's poverty landscape has

been profound since gaining independence in 1960, evolving from a state of minimal poverty to one characterized by elevated rates. Persisting across successive military and democratic regimes, poverty remains an intractable issue impervious to resolution. Nigeria's entrenched poverty poses a formidable impediment to its economic development, persisting despite numerous poverty reduction and alleviation initiatives (7). Despite concerted efforts by various administrations since 1980 to address poverty, Nigeria failed to meet the Millennium Development Goals (MDGs) targets for poverty eradication at the end of 2015.

Poverty in Nigeria is a pervasive, it is an intricate issue that permeates all facets of society, engendering extensive discourse. Its persistence poses a formidable challenge, transcending geographical boundaries to impact both rural areas and urban centres, including slum and shanty communities. Poverty, as a subjective and tangible state, assumes a dual nature, comprising both physical and relative dimensions, evident in the discernible consequences it imposes on the affected persons.

The contextual understanding of poverty undergoes nuanced variations, illustrated by the stark disparities between extreme poverty in the United States of America (USA) and the United Kingdom (UK), which might be considered and perceived as a form of privilege in certain African and Asian nations. Galbraith (8) expounds on the afflictions of the poor, elucidating their limited access to essentials such as foods, drugs and clothing, coupled with residence in cramped, unhygienic dwellings marred by sanitary challenged situations. The ramifications extend to their struggle in meeting familial, communal and other fundamental survival demands, exacerbated by the inability to afford leisure activities or essential healthcare.

Furthermore, it is important to note that poverty transcends financial constraints; it encompasses the inability to seize opportunities and the curtailment of fundamental freedoms required by individuals to shape their chosen lives with minimal constraints. Beyond a mere lack of monetary means, poverty extends its grip to hindering autonomy, rendering individuals vulnerable to financial precariousness. This compounded state of deprivation perpetuates a cycle of impoverishment, further restricting the autonomy of the marginalized and disadvantaged population (9). This understanding of poverty is premised on the wide disparity in the income distribution among the population and the possible volatility growth among others.

The World Bank (10) has delineated several economic disparities, encompassing variations in size, population, wealth and developmental stages. To ensure a judicious allocation of fiscal resources across diverse economic strata, entities and sectors, careful considerations must be given to each of the elements. Such a strategic allocation is imperative for fostering the development and growth of the economy, constituting indispensable components of a thriving economic framework.

The imperative for income distribution arises predominantly from disparities in financial resources available to distinct governmental levels and comparatively marginalized entities. Given the discernible developmental discrepancies among the states in Nigeria, the formulation of specific policies becomes imperative to ensure an equitable allocation of financial resources. The concept of "equitable allocation of revenue" pertains to the fair and even distribution of financial resources based on contributions and needs throughout the economy, aiming to mitigate undue disparities among the various entities and sectors. It is noteworthy that the effective distribution and management of available resources emerge as one of the major pivotal determinants in addressing poverty in Nigeria, superseding the mere absence of resources.

Given the profound negative impact of poverty on economic and human development, coupled with its prevalence, concerted efforts to alleviate poverty remain central to the national agenda. Consequently, strategies aimed at influencing incidence of poverty continue to revolve around addressing the intricacies of resources distribution and management within the Nigerian economic landscape.

According to Tatum (11), the augmentation of per capita income does not invariably lead to a reduction in the prevalence of poverty. Unraveling the intricacies of poverty incidence in developing

nations necessitates a focused inquiry into the issues of income distribution. Tatum asserts that a confluence of human factors, particularly low average income persons and conspicuously disparity in wealth distribution, dictates the extent of extreme poverty. Consequently, the predicament of poverty and income inequality transcends beyond mere economic expansion and the equitable distribution of increasing wages among a substantial portion of the workforce; it is intricately intertwined with institutional and political structures that will influence the overall the social and economic development of the society.

In a comprehensive study spanning the years 1980 to 2010, Ogbeide et al. (12) delved into the causal relationship between poverty and inequality in Nigeria. Leveraging data from the Central Bank of Nigeria, the World Bank's World Development Indicators, and the National Bureau of Statistics, the analysis employed the Granger causality technique. Findings from the analysis reveal a cause-and-effect connection between poverty and inequality, yet poverty does not directly precipitate national unemployment. Consequently, while a direct relationship exists between poverty and inequality, an indirect linkage emerges between unemployment in relation to the escalation of inequality and poverty.

The report posits that prioritizing employment emerges as a paramount strategy in combating poverty and inequality in Nigeria. This underscores the multifaceted nature of addressing these issues, recognizing the intricate interplay of economic, social, and political factors within the context of poverty and income inequality.

Particularly noteworthy, Ogbu (13) scrutinizes the conceptual and methodological intricacies inherent in quantifying poverty in Nigeria, which differ significantly from challenges encountered in other nations. A substantial portion of the existing discordance, according to Ogbu, emanates from the World Bank's 1990 adoption of a poverty line benchmark set at one dollar per day. While this measure facilitates ease of use and cross-national comparisons, its simplicity oversimplifies the understanding of poverty by exclusively focusing on income poverty, neglecting other dimensions of the phenomenon.

The computation of the one-dollar-per-day poverty line was exclusively based on the cost of essential resources required by an average adult human over a year, contingent upon the year's purchasing power parity. In 2008, guided by the 2005 purchasing power parity, the World Bank revised the poverty line to 1.25 dollars per day, further adjusting it to 1.90 dollars (equivalent to 684 naira) in October 2015. For instance, applying the income poverty metric, a household of six would need to expend 4,104 Naira daily, totaling a monthly estimated expenditure of 127,224 Naira. It is imperative to note that the minimum wage in Nigeria stands at 30,000 naira, rendering the daily minimum equivalent to 14 percent of the nation's minimum salary. In the circumstance where an unemployed person heads the household, the minimum wage is expected to cover all expenses for approximately 4.4 days.

Conversely, to meet the global poverty threshold, a household of six would necessitate a monthly income of at least 127,224 naira. This, however, markedly diverges from the prevailing realities in Nigeria. Notably, the calculation omits rent as a significant and essential expense in the daily one-dollar benchmark. Moreover, even when disregarding the condition of dwellings, the analysis does not account for individuals who either own or inhabit the majority of rural residences. Acknowledging that poverty encompasses more than just income, the implication is that a larger proportion of the population in Nigeria falls within the poverty category than is currently anticipated.

In their comprehensive investigation spanning the years 1985 to 2015, Adelowokan et al. (14) scrutinized the relationship that exist among economic development, poverty and unemployment in Nigeria. Employing a methodological arsenal comprising the Granger causality test, Johansen cointegration analysis, error correction model, and augmented Dickey-Fuller test, the researchers sought to unveil the dynamics between these crucial variables. The unit root test results unveiled a lack of integration at the specified level, indicating the motionlessness of the variables over time. Contrary to expectations, the Granger causality analysis

concluded that there is no discernible connection between economic development, poverty, or unemployment. The cointegration study further substantiated this, revealing an absence of sustained correlation between poverty, unemployment and economic growth in Nigeria. While poverty linked to unemployment exhibited a positive correlation with growth, its impact was more pronounced in the short term. Conversely, unemployment emerged as a critical determinant of long-term growth, exerting a negative influence.

This implies that, despite the persistent existence of individuals in abject poverty, the nation's economy is poised for growth. The economic trajectory remains positive even amidst population expansion, corroborating this trend in the short run. The body of earlier research, encompassing studies by (7, 12, 15-17), focused on examining the prevalence of poverty in Nigeria and proposing various policy solutions. However, these studies did not empirically investigate the impact of poverty and its aftermath on achieving economic progress. A notable exception is Okonta and Nwankwo (18), who discerned a positive and significant impact of poverty reduction indicators on real GDP, suggesting that economic expansion leads to a decline in poverty.

In contrast, the present study contributes significantly by exploring the nexus between the poverty rate and macroeconomic volatility indices, such as inflation, GNI, unemployment, and GDP in Nigeria.

The concept of the gross domestic product refers to the total monetary value of all the goods and services produced in a country in a specific time period, usually a year, and it is the response variable in the study. The GDP is also a measure of macroeconomic volatility. The other measure of macroeconomic volatility includes the GNI, which is the total income earned by a nation both within and outside the country in a given period of time, usually a year; unemployment, which refers to individuals of employable age who are qualified to work but could not find gainful employment; and lastly, inflation, which is said to occur when there is a large volume of money in circulation, leading to a general hike in the price level of goods and services. Besides, the poverty incidence is the rate of people who are living below $5.50 per day and struggle to make ends meet. Conceptually, we can illustrate this in figure 2 as follows:

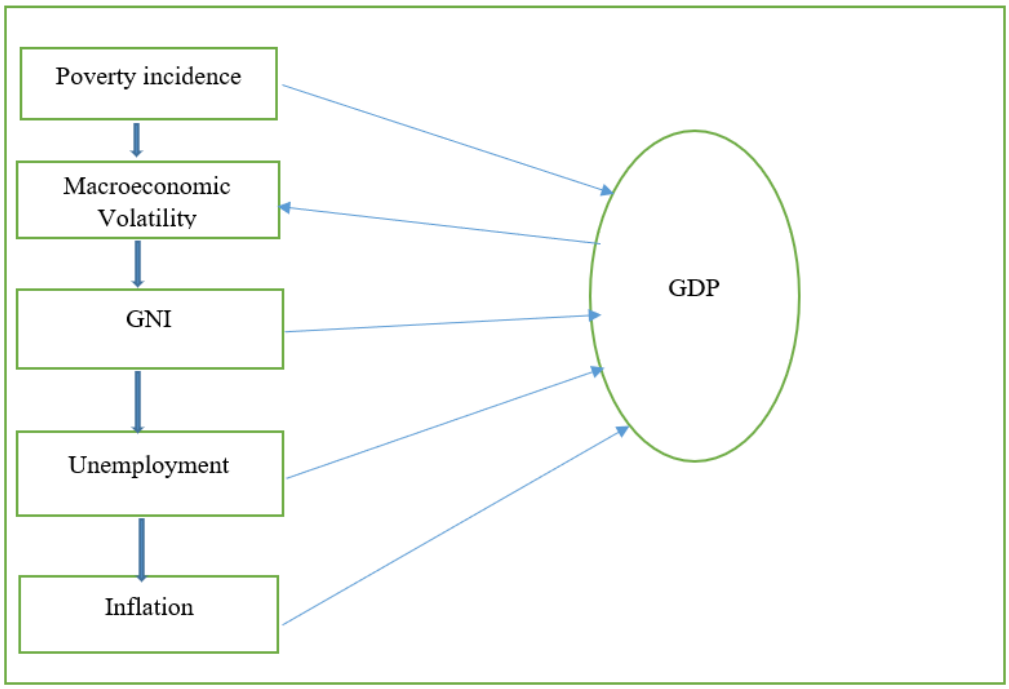

Figure 2: Conceptual framework of this study

This novel approach addresses a notable gap in prior research on the subject, as these crucial indicators were previously overlooked by providing insights that may help with evidence-based policy(ies) creation on how resources allocation choices influence reducing poverty.

Methodology

The secondary data for this research, spanning from 1990 to 2022, was sourced annually from the World Bank Development Indicator (https://www.macrotrends.net/countries/NGA/nigeria/), with careful consideration given to the dataset's availability. Adopting a causal research design, empirical methods such as the unit root test and Autoregressive Distributed Lags (ARDL) were employed for analysis, complemented by summary statistics like the mean and standard deviation. In-depth diagnostic tests encompassing normality, autocorrelation, heteroscedasticity, and model stability were conducted on the fitted empirical models to assess their validity and robustness. The ARDL model served as the analytical framework for investigating both short- and long-term relationships between the incidence of poverty and the selected macroeconomic variables. The unit root test played a pivotal role in ensuring the removal of unit roots among the series or variables of interest, mitigating the risk of erroneous conclusions. Consequently, the explication of functional parameters in the empirical models utilized in this study is imperative, elucidated as follows:

GDP = (Poverty incidence, Unemployment, GNI, Inflation) …… [1]

The macroeconomic volatility in this study is gauged through key indicators, namely GDP, unemployment, GNI, and inflation. The choice of GDP as the dependent variable and poverty incidence, unemployment rate, GNI, and inflation as independent or predictor variables forms the foundation for assessing the intricate relationships within the economic framework as shown in Table 1.

Table 1: Variable Measurement

Variables	Measurement
GDP	Billions of USD
Poverty rate	% Under US $5.50 Per Day
Unemployment	Percentage (%)
GNI	Billions of USD
Inflation	Percentage (%)

Source: World Bank

In parallel, the ARDL, employed as the second empirical model, is a linear time series model specifically suited for variables exhibiting a mix of I (0) and I (1) orders of integration (19). It is important to note that ARDL is not suitable when any of the pertinent variables demonstrate integration of order two, or I (2). A notable strength of the ARDL model lies in its ability to utilize the ARDL bound test, enabling the establishment of the Unconstrained Error Correction Model (UECM) for long-run relationships in the presence of cointegration and short-run relationships in its absence.

The decision rule for the bound test for cointegration stipulates that the null hypothesis should be rejected if the F-value surpasses the I (1) bound, indicating the presence of cointegration; conversely, if the F-value falls below the I(1) bound, there is no evidence of cointegration. In a broader context, the Linear ARDL model can be specified as follows:

$$Y_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i} \Delta Y_{t-1} + \sum_{i=1}^{q} \beta_{2i} \Delta X_{1t-i} + \cdots \sum_{i=0}^{r} \beta_{ki}\, \Delta X_{kt-i} + \varepsilon_t \quad \ldots\ldots [2]$$

β_0 is the constant and Δ is the difference operator. $\beta_{1i}$is the coefficient of order p lag of ΔY_{t-1}, β_{2i} is the coefficient of order q lag of X_{1t-i}.

ε_t is the error term. Y_t is the dependent variable (GDP), Y_{t-1} the lag of the dependent variable, while the independent variables (Poverty incidence, Unemployment, GNI, Inflation) is X_{1t} to X_{kt} and X_{kt-i} is the lag of the independent variables.

Meanwhile, the following notable assumptions and validations need to be carried out to determine the

model's accuracy and robustness, which include the normality of the residuals, the autocorrelation of the error terms, the heteroscedasticity check, and the model stability check.

Results

Table 2: Summary statistics

Statistics	GDP	Poverty	Unemployment	GNI	Inflation
Mean	246.7225	92.06515	4.860722	234.4007	18.08466
Maximum	574.1838	94.00000	9.788000	533.5136	72.83550
Minimum	27.75220	89.50000	3.630830	32.78878	5.388000
Std. Dev.	186.4928	1.385100	1.894459	182.4653	16.10793
Observations	33	33	33	33	33

Source: Author's computation using EViews Software

Table 2 presents a summary of key economic indicators for Nigeria spanning from 1990 to 2022. The average GDP for Nigeria during this period stands at approximately 245 billion USD, exhibiting a variability of around 187 billion USD. Concurrently, the average poverty rate is recorded at approximately 92% for individuals living under $5.5 per day, with a variation of about 1.4%. The average unemployment rate hovers around 5%, displaying a variability of approximately 2% over the reviewed period. GNI averages around 234 billion USD, manifesting a variability of approximately 182 billion USD. Additionally, the average inflation rate is noted at approximately 18%, with a variability of about 16% throughout the same period. This comprehensive snapshot provides a nuanced understanding of the economic landscape in Nigeria over the analyzed timeframe.

Table 3: Unit root test

Variables	Test Statistic	P-value	Order
GDP	-3.99	0.0044	I(1)
Poverty	-5.37	0.0001	I(1)
Unemployment	-2.70	0.0082	I(1)
GNI	-3.27	0.0257	I(1)
Inflation	-4.30	0.0021	I(1)

Source: Author's computation using EViews Software

Table 3 illustrates the statistical significance of various economic indicators after the first difference. GNI emerges as statistically significant at a 5% significance level, whereas series such as GDP, poverty rate, unemployment rate, and inflation exhibit statistical significance at a 1% significance level after the first difference. The integration of these series at order 1 signifies the removal of unit roots, mitigating the risk of drawing inaccurate conclusions. This preparatory step facilitates further rigorous econometric analysis, ensuring the reliability and validity of subsequent findings.

Table 4 indicates that the diagnostic test for heteroscedasticity reveals a P-value of 0.3447. This suggests that we do not reject the null hypothesis at a 5% significance level, indicating that the fitted ARDL model does exhibit heteroscedasticity.

Table 4: Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.120123	Prob. F(8,23)	0.3866
Obs*R-squared	8.971925	Prob. Chi-Square(8)	0.3447
Scaled explained SS	9.420427	Prob. Chi-Square(8)	0.3081

Source: Author's computation using EViews Software

On the other hand, Table 5 shows that the serial correlation test yields a P-value of 0.0201. This implies that we do not reject the null hypothesis at a 1% significance level, indicating that the fitted ARDL model does not suffer from autocorrelation.

Table 5: Breusch-Godfrey Serial Correlation LM Test

F-statistic	3.390589	Prob. F(2,21)	0.0530
Obs*R-squared	7.810961	Prob. Chi-Square(2)	0.0201

Source: Author's computation using EViews Software

Table 6 reveals that the initial lag of the poverty rate exerts a significant and negative influence on GDP, indicating that elevated levels of poverty contribute to a decline in GDP, serving as a proxy for economic growth in Nigeria. Conversely, GNI demonstrates a positive impact on GDP, implying that heightened levels of gross national income correlate with increased economic growth in Nigeria.

Table 6: ARDL Model [ARDL (1, 1, 1, 1, 0)]

GDP	Coefficient	Std. Error	t-Statistic	Prob.*
GDP(-1)	-0.313487	0.174575	-1.795714	0.0857
POVERTY	7.320563	6.129259	1.194363	0.2445
POVERTY(-1)	-14.14276	6.128960	-2.307530	0.0304
UNEMPLOYMENT	4.254278	3.791441	1.122074	0.2734
UNEMPLOYMENT(-1)	-4.582142	3.760752	-1.218411	0.2354
GNI	2.111137	0.178390	11.83439	0.0000
GNI(-1)	-0.847501	0.146389	-5.789389	0.0000
INFLATION	-0.118785	0.200457	-0.592570	0.5593
C	645.2576	399.4392	1.615409	0.1199
R-squared	0.995079			
Adjusted R-squared	0.993367			
Prob(F-statistic)	0.000000			

Source: Author's computation using EViews Software

The ARDL (1, 1, 1, 1, 0) model, fitted to the data, attains statistical significance at the 1% level, with an overall model P-value of 0.000. This suggests a substantial short-run association between the incidence of poverty and the selected macroeconomic volatility indices in Nigeria. The commendable R-squared value of approximately 0.995 signifies the model's adequacy in explaining the variability observed in the data. This robust statistical framework provides valuable insights into the dynamic relationships within the economic landscape of Nigeria. Table 7 demonstrates that the absolute value of the t-value = 7.52 exceeds the corresponding critical value of I(1) = 3.99 at the 5% level, and the F-value = 12.3656 exceeds the critical value of I(1) = 4.01, indicating that there is cointegration among the series. These findings suggest a long-term relationship between the incidence of poverty and the macroeconomic volatility indices in Nigeria.

Furthermore, Figure 3 displays the CUSUM test used to assess the stability of the fitted ARDL model. It is evident that the model parameters lie within the 95% confidence interval, indicating that the parameters of the fitted ARDL model are stable. Figure 4 displays the Criteria Graph of 16 potential ARDL Models. Among these models, the ARDL (1, 1, 1, 1, 0) has the lowest Akaike information criteria (AIC), indicating superior performance compared to the other models. Figure 5 presents the results of the Jarque-Bera normality test. The test reveals a p-value of 0.036, which exceeds the significance level of 0.01. Therefore, we do not reject the null hypothesis at the 1% level.

Table 7: ARDL Bound test

F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	12.36563	10%	2.45	3.52
K	4	5%	2.86	4.01
		2.5%	3.25	4.49
		1%	3.74	5.06
Actual Sample Size	32		Finite Sample: =35	
		10%	2.696	3.898
		5%	3.276	4.63
		1%	4.59	6.368
			Finite Sample: n=30	
		10%	2.752	3.994
		5%	3.354	4.774
		1%	4.768	6.67
t-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-7.523916	10%	-2.57	-3.66
		5%	-2.86	-3.99
		2.5%	-3.13	-4.26
		1%	-3.43	-4.6

Source: Author's computation using EViews Software

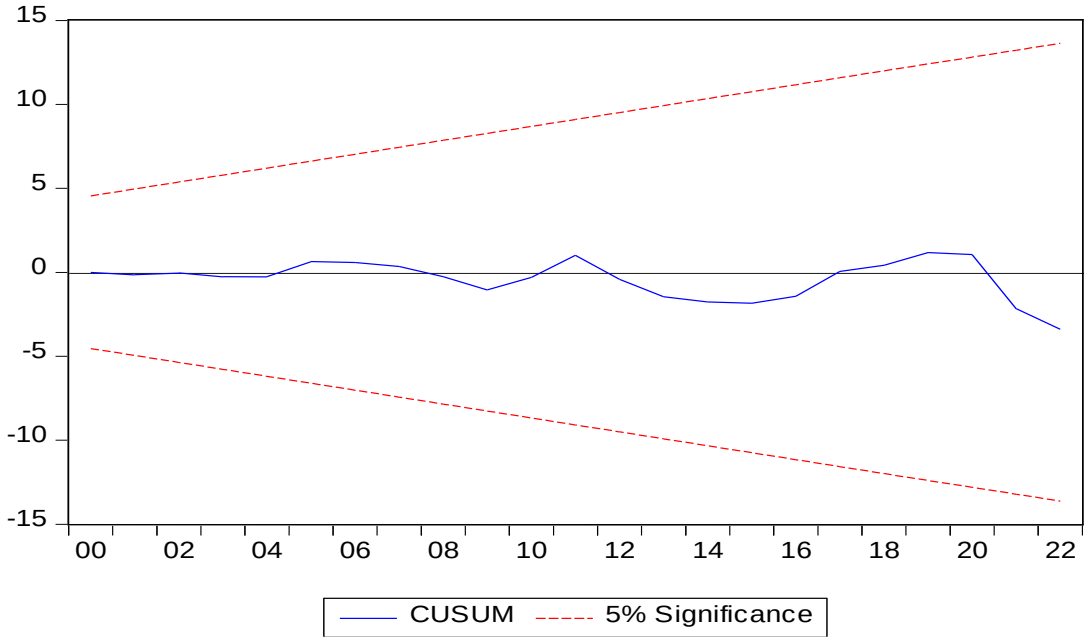

Figure 3: CUSUM Test For the fitted ARDL Model stability

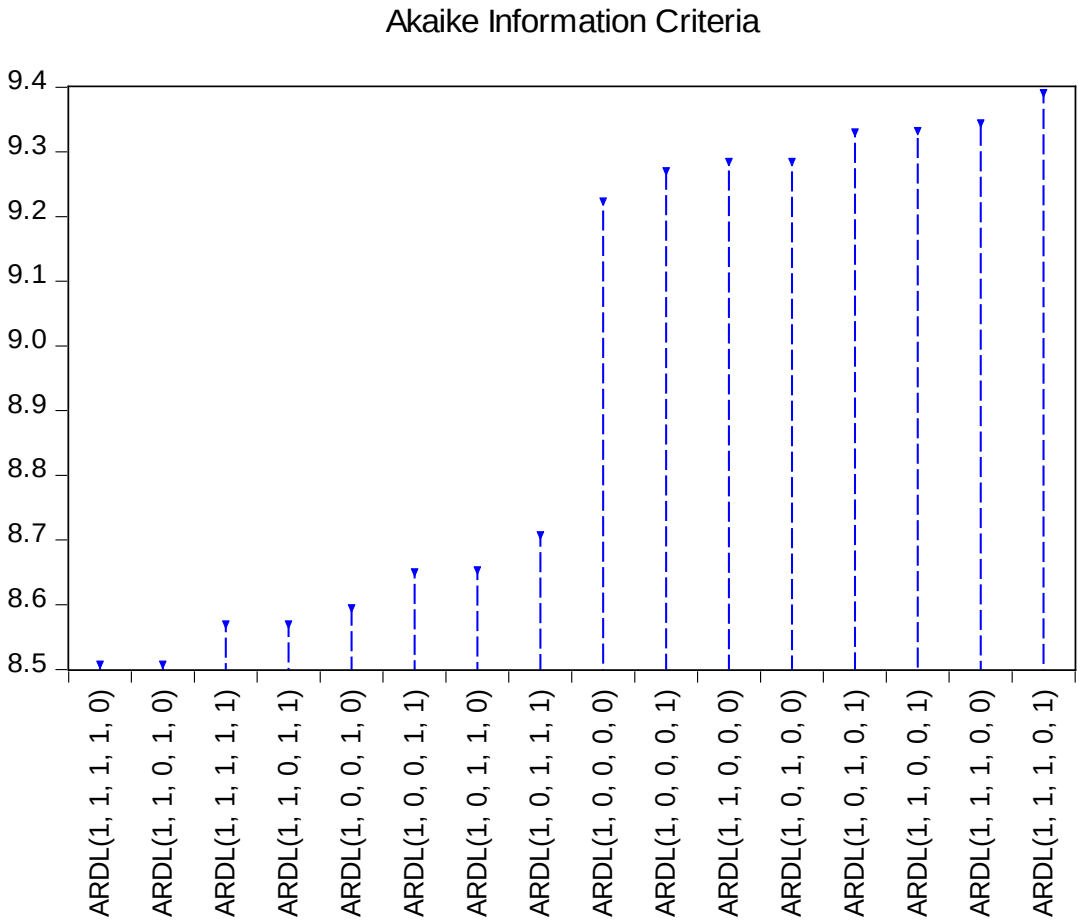

Figure 4: Criteria Graph of the tentative ARDL Models

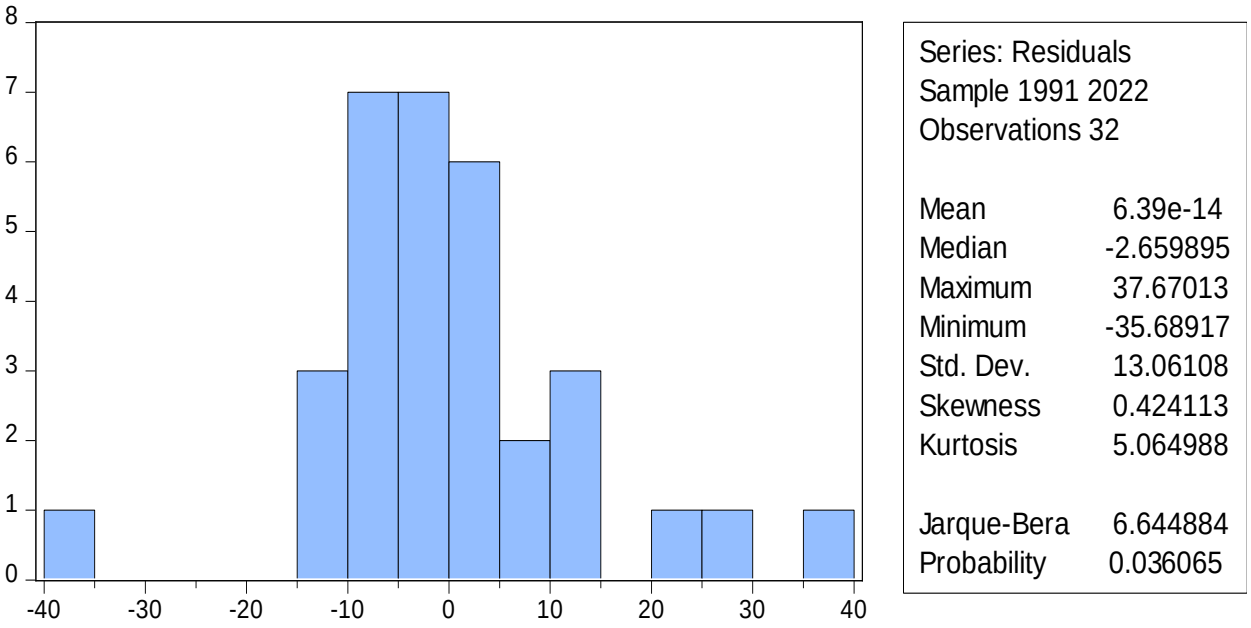

Figure 5: Normality test showing the distribution of the data

This suggests that the residuals of the fitted ARDL (1, 1, 1, 1, 0) model are approximately normally distributed.

Discussion

The outcomes of the analysis undertaken in this study reveal the statistical significance of GNI at a 5% level after the first difference. Similarly, series encompassing GDP, poverty rate, unemployment, and inflation exhibit statistical significance at a 1% level after the first difference. The integration of these series at order 1 eradicates the presence of a unit root, mitigating the risk of drawing erroneous conclusions and thereby facilitating rigorous exploration within the field of econometrics.

Table 6 underscores noteworthy findings, indicating that the initial lag in the poverty rate exerts a substantial and adverse impact on GDP, suggesting that heightened levels of poverty lead to a contraction in GDP, representative of economic growth in Nigeria. Conversely, GNI demonstrates a favorable influence on GDP, implying that elevated levels of national income contribute to substantial economic expansion in Nigeria. The sensitivity analysis reveals that GDP has a significant negative effect on poverty incidence but insignificant negative effect on unemployment rate. However, GDP has a significant positive effect on GNI and insignificant positive effect on inflation. The fitted ARDL (1, 1, 1, 1, 0) model attains statistical significance at a 1% level, denoted by an overall model P-value of 0.000, indicating a pronounced short-term relationship between poverty incidence and the selected macroeconomic volatility indices in Nigeria.

Additionally, Table 7 highlights critical statistical measures. The absolute t-value of 7.52 surpasses the threshold value of I(1) = 3.99 at the 5% significance level, and the F-value of 12.3656 exceeds the critical value of I(1) = 4.01. These results signify the presence of cointegration among the series, implying a sustained connection between poverty incidence and macroeconomic instability indicators in Nigeria. This contradicts the findings of Adelowokan et al. (1), suggesting a positive relationship between poverty resulting from unemployment and economic growth. Instead, this study aligns with the conclusions of Okonta and Nwanko (11), affirming that high economic growth contributes to poverty reduction. Furthermore, this study addresses the gaps in the observation of both short-term impacts and long-term connections between poverty reduction and economic growth, not covered by the previous study. It also expands the scope by considering additional macroeconomic factors, such as Gross National Income, that were not included in prior pertinent studies.

However, the World Bank (18) reports that developed nations, exemplified by the US and UK, effectively reduce poverty levels through substantial GNI and robust economic performance indicators. This success is attributed to equitable resource allocation and well-designed government plans effectively addressing inflation rates. In contrast, the study's findings shed light on the significant impoverishment experienced in Nigeria, due to a deteriorating economic situation. Consequently, the modelling insights as provided by this study can help in an evidence-based policy creation by the economic stakeholders in resource allocation choices, and best-fit methods to reducing poverty in Nigeria.

Conclusion

Rising inflation and the recent cessation of fuel subsidies have exacerbated the deteriorating economic climate, leading to a surge in the poverty rate within Nigeria. In response to this, the present study delves into the intricate relationship between the poverty rate and macroeconomic volatility indicators, encompassing inflation, GNI, unemployment, and GDP in Nigeria, presenting a significant contribution to existing knowledge. This study addresses the lacunae in prior studies by incorporating indicators that were overlooked in previous research efforts.

The findings underscore the adverse impact of a high poverty incidence rate on Nigeria's economic growth, evident both in the short-term and the long-term. On the other hand, we observe a positive correlation between elevated gross national income and robust economic growth in Nigeria. Consequently, it is imperative for the government evolve direct economic growth policies that focuses on reducing income disparity through strategic

allocation of resources towards fostering productivity, thereby elevating Nigeria's gross national income. This strategic approach should provide alternative choices that can stimulate sustainable economic development focusing on social welfarism and support for small-scale productions which will engage the current economically marginalized population. Thereby, alleviating the unemployment rate which is the primary contributor to high level of poverty incidence in the nation.

Abbreviations

Gross Domestic Product (GDP); Gross National Income (GNI).

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Authors' Contributions

AM led conceptualization, conducted formal analysis, and wrote the original draft. UOY and FO contributed to methodology and validation. EJ reviewed and edited the manuscript and JMA contributed to Data normalization and restructuring.

Conflict of Interest

The authors declare no conflict of interest.

Ethics Approval

Not applicable.

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