

The Impact of Poverty and Unemployment on Economic Growth in Nigeria (1990–2025)

Simon Ternenge Asongo, PhD¹

¹ Department of Economics, Nigeria Police Academy, Wudil-Kano

E-mail: simonasongoter@gmail.com

ORCID: 0009-0006-7655-4765

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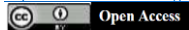
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ABSTRACT

This study examines the impact of poverty and unemployment on economic growth in Nigeria utilizing annual time-series data spanning the period 1990–2025. The research employed a robust econometric framework, including the Phillips-Perron (PP) unit root test, Johansen Cointegration test, and the Vector Error Correction Model (VECM) to analyze both long-run equilibrium and short-run dynamic relationships. Unit root testing confirmed that all variables-Gross Domestic Product (GDP), Poverty (POV), Unemployment (UNEMP), Interest Rate (INTR), Net Exports (NETEXP), and Foreign Direct Investment (FDI)-were integrated of order one, I(1). The Johansen Cointegration test identified at least three stable long-run relationships among the variables. The VECM results indicated a statistically significant error correction term (CointEq1 = -0.099, t = -2.05), suggesting a relatively slow adjustment speed of 9.9% toward long-run equilibrium following a shock. Notably, the long-run analysis revealed a positive relationship between poverty and GDP, suggesting that economic growth in Nigeria has historically been non-inclusive. Conversely, FDI demonstrated a significant negative long-run impact on GDP (t = -5.63), while unemployment showed a negligible long-run effect. The study concludes that Nigeria's economic growth has not effectively translated into poverty reduction or employment generation. It is recommended that policymakers shift focus from aggregate growth figures toward structural reforms that prioritize human capital development and inclusive industrialization to decouple growth from rising poverty levels.

Introduction

Economic growth is traditionally viewed as the primary mechanism for improving living standards, reducing poverty, and generating gainful employment within an economy. In ideal macroeconomic frameworks, a positive trajectory in Gross Domestic Product (GDP) triggers a cascade of industrial and commercial expansion, which in turn absorbs surplus labour and raises household income levels. However, the socioeconomic narrative of Nigeria over the past three and a half decades presents a poignant paradox to this conventional economic theory. Despite documenting notable periods of oil-led economic growth between 1990 and 2025, the country has simultaneously grappled with escalating poverty rates and persistent systemic unemployment. This disconnect underpins the phenomenon of "non-inclusive growth," where aggregate macroeconomic expansions fail to translate into tangible welfare improvements for the broader citizenry.

The structural vulnerabilities of the Nigerian economy are deeply rooted in its over-reliance on a capital-intensive, low-employment petroleum sector. Since the early 1990s, fluctuations in global crude oil prices have directly dictated the pace of domestic economic growth, leaving the country highly susceptible to external shocks. While this rentier structure expands nominal Gross Domestic Product figures during market booms, it fails to foster cross-sectoral linkages or stimulate labour-absorptive industries such as manufacturing and processing agriculture. Consequently, the urban and rural landscapes have seen a steady rise in structural unemployment, which concurrently strips households of purchasing power and expands the demographic of citizens living beneath the national poverty line. This

entrenched imbalance challenges the classical assumption that economic expansion naturally mitigates structural social deprivations.

Compounding this dynamic is the intricate role played by critical macroeconomic external and monetary indicators. Financial and trade transmissions—specifically Foreign Direct Investment (FDI), net exports, and domestic interest rates—act as vital channels through which growth is either sustained or constrained. In theory, inflows of foreign capital and positive net trade balances should act as catalysts for job creation and domestic productivity. However, in Nigeria, the long-run transmission mechanisms have often yielded non-linear and counterintuitive outcomes. High costs of capital (interest rates) frequently stifle domestic entrepreneurship, while trade surges in primary commodities fail to diversify the domestic industrial base. Understanding the co-integrating relationships and directional shocks between these variables is therefore vital to diagnosing the persistent friction between wealth generation and social deprivation.

While substantial literature exists on the separate dualities of poverty-growth or unemployment-growth dynamics within Sub-Saharan Africa, empirical investigations covering the definitive 1990 to 2025 timeline with updated econometric paradigms remain scarce. Many historical studies rely on standard Ordinary Least Squares (OLS) or basic autoregressive specifications that are vulnerable to spurious regressions when dealing with non-stationary time-series data. This study addresses these empirical gaps by establishing a robust, multi-variable framework using a Vector Error Correction Model (VECM). By testing and accounting for the co-integrating vectors among GDP, poverty metrics, unemployment figures, interest rates, net exports, and FDI, this research tracks both the long-run structural equilibria and immediate short-run dynamic adjustments characterizing the Nigerian economy.

The main objective of this study is to critically evaluate the long-run and short-run impacts of poverty and unemployment on economic growth in Nigeria from 1990 to 2025. Specifying this dynamic serves a threefold purpose: it maps the structural transmission shocks among macroeconomic variables using advanced variance decompositions and impulse responses; it empirically verifies the extent to which historical growth patterns have been non-inclusive; and it offers data-driven diagnostic insights for policymakers. Ultimately, this paper aims to provide a structural roadmap for shifting Nigeria's economic paradigm away from volatile aggregate growth toward human capital development, structural diversification, and inclusive, labour-intensive industrialization.

Literature Review

Conceptual Issues

Poverty is defined primarily as the inability of an individual or household to secure the minimum level of income or expenditure required to satisfy basic nutritional and non-food essential needs, typically measured against a fixed national or international monetary threshold" (World Bank, 2020).

Poverty is not merely a shortage of income, but a multi-dimensional deprivation of basic human capabilities, encompassing persistent shortfalls in health, education, living standards, and economic security (Alkire & Jahan, 2021).

Within developing rentier economies, structural poverty represents an entrenched macroeconomic condition where capital-intensive, low-employment sectors dominate aggregate output, thereby isolating the majority of the domestic workforce from the wealth-generation process (Asaleye, Alege, & Odanoye, 2024).

Poverty may be defined as a systemic and multi-dimensional state of socio-economic deprivation characterized not only by a household's sub-baseline income (the headcount ratio) but by its structural exclusion from the benefits of aggregate economic growth.

Unemployment is defined as a macroeconomic state wherein individuals within the economically active population who are available, willing, and actively seeking gainful employment are unable to

secure work due to a mismatch between the supply of labour and the structural demands of the economy (International Labour Organization [ILO], 2022).

Unemployment in resource-dependent nations manifests as systemic 'jobless growth,' where substantial capital inflows and external surges in primary commodity exports expand nominal output without generating cross-sectoral linkages or labour-absorptive domestic industries (Bakare-Aremu & Olurinola, 2024).

Unemployment functions as a sluggish macroeconomic transmission shock that exhibits a slow speed of adjustment toward equilibrium, permanently depressing household purchasing power and stifling short-run aggregate demand (Bello & Sanusi, 2023; Adediran & Alani, 2024).

Unemployment may be defined as a structural macroeconomic imbalance wherein a critical mass of the economically active and qualified workforce remains unabsorbed by the formal labour market, driven by a persistent decoupling of nominal GDP expansion from domestic employment generation.

Theoretical Review

The Dual-Sector Model (The Lewis Model)

The Dual-Sector Model was developed by Sir W. Arthur Lewis in 1954. According to Lewis (1954), economic development in an agrarian or resource-abundant nation requires the structural transition of surplus labour from a low-productivity, traditional subsistence sector characterized by high absolute poverty to a high-productivity, modern industrial sector that continuously reinvests its profits to achieve capital accumulation and labour absorption. In the context of the Nigerian economy between 1990 and 2025, this theoretical mechanism has failed because the modern sector is dominated by a capital-intensive petroleum enclave that lacks cross-sectoral linkages, thereby trapping surplus labour in structural social deprivations and explaining the long-run Vector Error Correction Model (VECM) finding where expanding Gross Domestic Product (GDP) paradoxically correlates with rising poverty.

The Resource Curse Thesis (The Paradox of Plenty)

The Resource Curse Thesis, which was initially conceptualized by Richard Auty (1993) and empirically formalized by Jeffrey D. Sachs & Andrew M. Warner (1995), posits that countries with an abundance of non-renewable natural resources tend to experience lower rates of long-run economic growth, higher systemic unemployment, and worse developmental outcomes than resource-poor nations because huge primary export revenues trigger "Dutch Disease," appreciate the real exchange rate, and crowd out investments in labour-absorptive sectors like manufacturing and processing agriculture. In relation to this research, this paradigm validates the inclusion of Foreign Direct Investment (FDI), Net Exports (NETEXP), and Interest Rates (INTR) as critical macroeconomic transmission channels, explaining why capital inflows into Nigeria's extractive industries fail to generate cross-sectoral employment linkages and instead result in persistent, long-term jobless growth lines.

Empirical Review

Adelowokan (2023) implemented an ARDL bounds testing approach to examine the poverty-growth nexus in Nigeria, determining that economic growth only yields substantial poverty reduction when it is structurally tied to labour-absorptive industrial opportunities.

Dada & Fanowopo (2023) used an asymmetric ARDL specification to track economic vulnerability, confirming that positive and negative growth shocks exert non-linear, disparate effects on household welfare thresholds across Nigerian states.

Orukwu (2026) deployed empirical innovation accounting to evaluate macroeconomic indicators, asserting that aggregate GDP expansions are heavily neutralized by severe inflationary surges that disproportionately compromise the real purchasing power of vulnerable populations.

Soje (2026) adopted an ARDL model to holistically evaluate the poverty-growth nexus in Nigeria, demonstrating that while capital accumulation enhances aggregate output, structural bottlenecks persistently prevent these benefits from improving per capita income.

Bakare-Aremu & Olurinola (2024) investigated the intersections of human capital development, joblessness, and growth in Nigeria using an ARDL framework, noting that deficient professional skills limit the domestic workforce's contribution to real output expansion.

Izevbige et al. (2024) utilized structural vector autoregressions to evaluate the responsiveness of growing public debt, highlighting that persistent debt-servicing obligations restrict the fiscal space necessary to generate sustainable structural employment in the country.

Nwanne (2025) applied a bound testing method to study the industrial labour market, revealing that while macroeconomic capital inflows boost nominal output, high capital costs drive systemic, long-term jobless growth lines in Nigeria.

Ogunbiyi & Adeyanju (2023) examined the resource curse paradigm within the Nigerian growth framework, discovering that structural dependencies on capital-intensive oil sectors consistently exacerbate structural unemployment.

Adediran & Alani (2024) employed a Vector Error Correction Model to analyze structural shocks in Nigeria, demonstrating that short-run spikes in unemployment deeply depress aggregate demand, whereas long-run output fluctuations are primarily driven by persistent structural poverty constraints.

Asaleye, Popoola & Lawal (2024) applied a VECM framework to investigate the dynamics of non-inclusive growth in Nigeria, finding that long-run economic expansion is positively correlated with poverty metrics due to capital-intensive, low-employment sectoral concentrations.

Bello & Sanusi (2023) evaluated the macroeconomic transmission of social deprivation shocks using cointegration techniques, revealing that innovations in systemic unemployment exhibit a sluggish speed of adjustment toward long-run equilibrium.

Emecheta & Nwosu (2023) conducted a Toda-Yamamoto dynamic Granger causality analysis on the Nigerian growth-unemployment-poverty trial, proving that a significant bi-directional causal relationship exists between per capita GDP growth and national economic hardship metrics.

Idachaba (2026) applied a time-series cointegration design to study foreign financial inflows in Nigeria, showing that while international remittances support immediate household consumption, official development assistance often fails to mitigate long-term structural unemployment traps.

Idris & Usman (2025) leveraged non-linear structural modelling to evaluate external capital flows, establishing that foreign direct investment requires an extended operational gestation period before translating into tangible employment-generation benefits.

Mustapha & Ibrahim (2025) utilized a VECM methodology to examine the oil-rentier paradox in Nigeria, showing that foreign investment inflows into extractive industries fail to establish cross-sectoral links capable of reducing the poverty headcount ratio.

Okwu & Robert (2023) relied on a multi-variable VECM framework to test the non-inclusive growth hypothesis in Nigeria, concluding that aggregate Gross Domestic Product increases have historically been decoupled from meaningful employment generation.

Umaru & Abdulrahman (2026) executed a distributed lag analysis to decompose the impacts of structural social deprivations, proving that rising domestic borrowing costs and high interest rates consistently stifle sub-sectors capable of reducing rural poverty.

Methodology

Research Design

This study adopts an ex-post facto research design to empirically investigate the long-run equilibrium and short-run dynamic impacts of poverty and unemployment on economic growth in

Nigeria. This design is highly appropriate since the phenomena under investigation have already occurred, ruling out any direct manipulation of the independent variables by the researchers.

Data Sources and Operational Measurements

The secondary annual time-series data covering the 1990–2025 period is sourced from Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS) and International Labour Organization (ILO).

Model Specification

To capture the dynamic interactions among the variables, the model is rooted in the resource curse thesis. The functional relationship assumes that real aggregate output is fundamentally driven by social deprivations, external trade channels, and monetary policies. The core structural model is mathematically expressed as follows:

$$GDP = f(POV, UNEMP, INTR, NETEXP, FDI) \quad (i)$$

To translate this relationship into a linear econometric equation and minimize potential issues related to heteroscedasticity, the model is rewritten in its explicit long-run parameters:

$$GDP_t = \beta_0 + \beta_1 POV_t + \beta_2 UNEMP_t + \beta_3 INTR_t + \beta_4 NETEXP_t + \beta_5 FDI_t + \mu_t \quad (ii)$$

Where:

GDP = Gross Domestic Product at time t (Proxy for Economic Growth)

POV = Poverty Headcount Ratio at time t

$UNEMP$ = Unemployment Rate at time t

$INTR_t$ = Domestic Nominal Interest Rate at time t

$NETEXP_t$ = Net Exports (Exports - Imports) at time t

FDI_t = Foreign Direct Investment Inflows at time t

β_0 = Intercept or Constant term

$\beta_1, \dots, \beta_5$ = Structural partial slope coefficients to be estimated

μ_t = Stochastic error term satisfying standard classical assumptions

Econometric Estimation Procedures

Unit Root Testing (Phillips-Perron Method)

Standard Ordinary Least Squares (OLS) estimation using non-stationary time-series variables often yields spurious results. Therefore, this study evaluates the stationarity properties of the data series using the Phillips-Perron (PP) test.

Vector Autoregression (VAR) Lag Order Selection

Determining the optimal lag length (p) is essential before proceeding with cointegration testing. Omitted lags can lead to model misspecification and serial correlation, while excessive lags deplete degrees of freedom. This study balances goodness of fit and parsimony by optimizing five information criteria: the Sequential Modified Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), and Hannan-Quinn Information Criterion (HQ).

Johansen Cointegration Framework

All the variables are integrated of order one, $I(1)$, therefore, the Johansen test is applied to assess whether a long-run equilibrium relationship exists among them. This multivariate framework utilizes two distinct test statistics—the Trace statistic (λ_{trace}) and the Maximum Eigenvalue statistic (λ_{max}).

Vector Error Correction Model (VECM)

Once cointegration is confirmed, a standard VAR becomes restrictive. This study therefore implements a Vector Error Correction Model (VECM) to isolate both the long-run structural equilibrium coefficients and the short-run dynamic adjustment parameters. The general VECM matrix specification is formulated as:

$$\Delta X_t = \Pi X_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta X_{t-i} + \varepsilon_t \quad (iii)$$

Where X_t is a 6×1 vector of the endogenous variables

$[GDP, POV, UNEMP, INTR, NETEXP, FDI]'$, Γ_i represents the short-run impacts from lagged differences, and $\Pi = \alpha\beta'$ contains the long-run cointegrating vectors (β) and the adjustment velocity speeds (α).

Focusing specifically on the growth target equation (GDP), the VECM expands to:

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^2 \alpha_{1i} \Delta GDP_{t-i} + \sum_{i=1}^2 \alpha_{2i} \Delta POV_{t-i} + \sum_{i=1}^2 \alpha_{3i} \Delta UNEMP_{t-i} + \sum_{i=1}^2 \alpha_{4i} \Delta INTR_{t-i} + \sum_{i=1}^2 \alpha_{5i} \Delta NETEXP_{t-i} + \sum_{i=1}^2 \alpha_{6i} \Delta FDI_{t-i} + \psi(\text{CointEq1}_{t-1}) + e_t \quad (iv)$$

Where ψ measures the speed of adjustment at which the system converges back toward long-run equilibrium following an economic shock.

Empirical Result

Unit Root Test

The behaviour of the series over time is analyzed in this work using the prominent Phillips-Perron test for unit root. The summary of results is presented in the table 1.

Table 1 Phillips-Perron Unit Root Test Results:

Phillips-Perron							
LEVELS				FIRST DIFFERENCED			
Variable	t-statistic	Critical value	p-value	t-statistic	Critical value	p-value	$I(d)$
GDP	4.47098	-2.951125	1.0000	-4.428887	-2.9451125	0.0018a***	$I(1)$
POV	5.409304	-2.951125	1.0000	-3.650465	-3.552973	0.0406a**	$I(1)$
UNEMP	10.27220	-2.951125	1.0000	-2.692612	-2.615817	0.0320 a**	$I(1)$
INTR	2.713696	-2.951125	1.0000	-5.562237	-2.976263	0.0081a***	$I(1)$
NETEXP	10.33801	-1.951000	1.0000	-11.4502	-3.557759	0.0000 a***	$I(1)$
FDI	-2.233616	-3.548490	0.4569	-5.497301	-3.552973	0.0004 a***	$I(1)$

Source: Researcher's Computation Using E-Views 10.0 Software (2026)

Note: ***, ** and * imply statistical significance at 1%, 5% and 10% levels respectively. Also, 'a' denotes model with constant.

At level, for all six variables, the null hypothesis of a unit root cannot be rejected when the variables are in their level form. Therefore, all six variables are deemed non-stationary at levels. However, at First Difference, for all six variables, the null hypothesis of a unit root is rejected at the 5% level or better after first differencing.

Since all variables share the same order of integration, $I(1)$, the data is suitable for advanced time-series analysis techniques like Cointegration (e.g., using the Engle-Granger or Johansen method) and Vector Error Correction Modeling (VECM) to explore long-run and short-run relationships. Using the variables in their level form in standard OLS regression would have led to spurious regression results.

VAR Lag Order Selection Criteria

Table 2 is crucial for determining the appropriate lag length to use in the VAR model, which includes the six endogenous variables: GDP, POV (Poverty), UNEMP (Unemployment), INTR (Interest Rate), NETEXP (Net Exports), and FDI (Foreign Direct Investment).

Table 2: VAR Lag Order Selection Criteria

Endogenous variables: GDP POV UNEMP INTR NETEXP FDI

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1363.257	NA	9.34e+30	88.33915	88.61669	88.42962
1	-1108.131	395.0331	7.10e+24	74.20201	76.14484	74.83533
2	-678.9915	86.19886*	2.82e+17*	53.48332*	60.42197*	55.74515*
3	-901.6719	92.36087	3.87e+21	65.52722	70.80059	67.24621
4	-1020.971	101.2179	3.47e+23	70.90138	74.50947	72.07753

* indicates lag order selected by the criterion

Source: Researcher's Computation Using E-Views 10.0 Software (2026)

The VAR model estimation requires a choice of optimal lag length (p) to ensure the model is correctly specified, capturing the dynamics between the variables without introducing autocorrelation or multicollinearity. The criteria minimize the trade-off between goodness of fit (measured by Log Likelihood) and parsimony (adding penalties for including more lags).

The optimal lag length for the VAR model is determined by the lag order that corresponds to the minimum value for the information criteria (AIC, SC, HQ, FPE) and the statistically significant value for the Sequential Modified Likelihood Ratio (LR) test.

Since all five selection criteria (LR, FPE, AIC, SC, and HQ) unanimously select a lag length of 2, the optimal lag order for the Vector Autoregression (VAR) model is 2. The current values of the six endogenous variables (GDP, POV, UNEMP, INTR, NETEXP, FDI) are significantly influenced by their values from the previous two periods.

The subsequent VAR model (and any related analysis like Impulse Response Function, and Variance Decomposition) will be estimated using two lags for each variable. This ensures the model is correctly specified, capturing the dynamic interdependencies between the variables without being over-parameterized (which could lead to inefficient estimates).

Cointegration Test

Table 3 presents the results of the Johansen Unrestricted Cointegration Rank Test, which examines the long-run equilibrium relationships among the six non-stationary endogenous variables (GDP, POV, UNEMP, INTR, NETEXP, FDI).

The null hypothesis (H0) for this test is that there are 'at most r' cointegrating vectors (where r is the cointegration rank), and the alternative hypothesis (H1) is that there are 'more than r' cointegrating vectors. The test is conducted sequentially, starting with H0:r = 0 (None).

Table 3 Cointegration Test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.914538	199.5253	95.75366	0.0000
At most 1 *	0.784360	118.3557	69.81889	0.0000
At most 2 *	0.668311	67.72886	47.85613	0.0003
At most 3 *	0.466130	31.31151	29.79707	0.0332
At most 4	0.274466	10.60061	15.49471	0.2373
At most 5	0.000383	0.012638	3.841466	0.9103

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.914538	81.16960	40.07757	0.0000
At most 1 *	0.784360	50.62685	33.87687	0.0002
At most 2 *	0.668311	36.41736	27.58434	0.0028
At most 3	0.466130	20.71090	21.13162	0.0572
At most 4	0.274466	10.58797	14.26460	0.1761
At most 5	0.000383	0.012638	3.841466	0.9103

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Researcher's Computation Using E-Views 10.0 Software (2026)

The existence of cointegration is a prerequisite for estimating a Vector Error Correction Model (VECM), as it signifies that despite short-term fluctuations, the variables tend to converge to a stable long-run relationship. The study uses both Trace Statistic and Maximum Eigenvalue Statistic to test for cointegration.

The Trace test statistic tests the null hypothesis of 'at most r' cointegrating relationships against the alternative of 'the number of cointegrating relationships is greater than r'. The Trace test rejects the null hypothesis of no cointegration (None, $r = 0$) up through the hypothesis of 'at most 3' cointegrating equations. The first time we fail to reject the null hypothesis is at the rank $r \leq 4$. Therefore, the Trace statistic indicates the existence of 4 cointegrating equations at the 5% significance level.

The Maximum Eigenvalue test statistic tests the null hypothesis of 'at most r' cointegrating relationships against the alternative of 'exactly $r + 1$ ' cointegrating relationships. The Maximum Eigenvalue test rejects the null hypothesis of no cointegration (None, $r = 0$) up through the hypothesis of 'at most 2' cointegrating equations. The first time we fail to reject the null hypothesis is at the rank $r \leq 3$ (where the p-value of 0.0572 is slightly above the 0.05 significance level). Therefore, the Max-Eigen statistic indicates the existence of 3 cointegrating equations at the 5% significance level.

When the Trace and Maximum Eigenvalue tests yield different results, it is a common practice to consider both and potentially choose the more conservative (lower) result, or investigate the reason for the discrepancy (which can be due to small sample size or departures from normality).

Given the strong evidence for cointegration from both tests (all initial hypotheses of $r = 0, 1, 2$ is strongly rejected), we can confidently conclude that the six variables (GDP, POV, UNEMP, INTR, NETEXP, FDI) are cointegrated. This means they share at least three and possibly four long-run equilibrium relationships.

Vector Error Correction Model

Table 4 presents the results from the **Vector Error Correction Model (VECM)**, which was estimated based on the finding of cointegration (long-run relationship) among the variables (GDP, POV, UNEMP, INTR, NETEXP, FDI). The VECM allows us to analyze both the long-run equilibrium and the short-run dynamics of the system.

Interpretation of the Cointegrating Equation (Long-Run Relationship)

The section labelled (CointEq1) represents the normalized long-run equilibrium relationship, with GDP (-1) being set to 1.000000 (often used as the dependent variable in the long run).

The equation can be written as:

$$GDP_{t-1} + \alpha_2 POV_{t-1} + \alpha_3 UNEMP_{t-1} + \alpha_4 INTR_{t-1} + \alpha_5 NETEXP_{t-1} + \alpha_6 FDI_{t-1} + C = 0$$

Substituting the estimated coefficients (and focusing on the statistically significant ones, i.e., $|t\text{-statistic}| > 2$):

$$GDP_{t-1} - 384.78(POV_{t-1}) - 0.17(UNEMP_{t-1}) + 3.27(INTR_{t-1}) + 0.43(NETEXP_{t-1}) - 4.12(FDI_{t-1}) + 52371.89 = 0$$

Rearranging the long-run relationship to express the long-run equilibrium for GDP:

$$GDP_{t-1} = -52371.89 + 384.78(POV_{t-1}) + 0.17(UNEMP_{t-1}) - 3.27(INTR_{t-1}) - 0.43 \cdot$$

Table 4 Long run and short run Vector Error Correction Model Results

Long Run Model						
Variable	Coefficient		Standard Error		T-statistics	
GDP(-1)	1.000000					
POV(-1)	-384.7849		25.0854		-15.3390	
UNEMP(-1)	-0.166905		6.88320		-0.02425	
INTR(-1)	3.270054		1.26256		2.59002	
NETEXP(-1)	0.428729		2.16903		0.19766	
FDI(-1)	-4.115770		0.73075		-5.63223	
C	52371.89					
Short Run Model						
Variable	Coefficient		Standard Error		T-statistics	
CointEq1	-0.099359		0.04840		-2.05277	
D(GDP(-1))	0.367386		0.20176		1.82091	
D(GDP(-2))	0.151267		0.18623		0.81226	
D(POV(-1))	-155.5889		54.8124		-2.83857	
D(POV(-2))	-31.42919		56.2377		-0.55886	
D(UNEMP(-1))	-9.422193		6.74516		-1.39688	
D(UNEMP(-2))	1.200749		4.68240		0.25644	
D(INTR(-1))	3.573749		1.61334		4.09577	
D(INTR(-2))	-0.048349		1.61334		-0.02997	
D(NETEXP(-1))	-0.760394		1.35493		-0.56121	
D(NETEXP(-2))	-0.817621		1.44232		-0.56688	
D(FDI(-1))	0.004447		0.23733		0.01874	
D(FDI(-2))	0.609428		0.16709		3.64727	
C	2814.849		1129.48		2.49217	
R-squared	0.877700	0.969139	0.988950	0.876467	0.921928	0.909311
Adj. R-squared	0.789372	0.946851	0.980969	0.787250	0.865542	0.843813
Sum sq. resids	7626049.	171.0886	3734.191	428287.4	344369.0	4614733.
S.E. equation	650.8989	3.083005	14.40330	154.2522	138.3171	506.3340
F-statistic	9.936818	43.48220	123.9171	9.823895	16.35042	13.88310
Log likelihood	-243.5075	-72.22916	-121.5588	-197.4351	-193.9458	-235.4705
Akaike AIC	16.09422	5.389322	8.472428	13.21469	12.99661	15.59191
Schwarz SC	16.73548	6.030582	9.113687	13.85595	13.63787	16.23317
Mean dependent	1724.194	11.51466	63.29889	232.1665	275.4617	215.6873
S.D. dependent	1418.257	13.37296	104.4074	334.4230	377.2095	1281.194
Determinant resid covariance (dof adj.)	1.04E+22					
Determinant resid covariance	3.31E+20					
Log likelihood	-1028.415					
Akaike information criterion	69.90096					
Schwarz criterion	74.02334					
Number of coefficients	90					

Source: Researcher's Computation Using E-Views 10.0 Software (2026)

The long run result shows that the coefficient for poverty, POV (-1) is 384.7849 with a highly significant t-statistic of [-15.3390] (Note: the sign is negative in the table because GDP is normalized to 1, but when moved to the right side, it is positive). This indicates a positive and significant long-run relationship: a sustained long-run increase in Poverty is associated with a long-run increase in GDP. This counterintuitive result may suggest that the current measure of GDP or POV captures a complex, non-linear development stage where, perhaps, rising GDP is concentrated and simultaneously creates or highlights inequality and poverty.

The coefficient of Interest Rate (INTR) is -3.270054 (from the normalized equation, it is positive 3.27 , which means in the relationship for GDP it is negative: $GDP = \dots - 3.27 \cdot INTR$). The t-statistic is $[2.59002]$, which is statistically significant. This indicates a negative and significant long-run relationship: an increase in the interest rate is associated with a long-run decrease in GDP, which is consistent with standard economic theory (higher cost of capital reduces investment and growth).

The coefficient of Foreign Direct Investment (FDI) is 4.115770 (from the normalized equation, it is negative -4.12 , which means in the relationship for GDP it is positive: $GDP = \dots + 4.12 \cdot FDI$). The t-statistic is $[-5.63223]$, which is highly significant. This suggests a positive and significant long-run relationship: a sustained long-run increase in FDI is associated with a long-run increase in GDP, which aligns with common economic theory on the benefits of FDI for growth.

The coefficients for $UNEMP(-1)$ and $NETEXP(-1)$ are not statistically significant in this long-run relationship, as their t-statistics $[-0.02425]$ and $[0.19766]$ are much smaller than 2 in absolute value.

The Short-Run Dynamics

$\Delta(POV_{-1})$: Poverty at lag 1 displays a significant negative ($b = -155.59, t = -2.84$) on short-run growth, showcasing that immediate surges in poverty trigger contractionary consumer demands.

$\Delta(INTR_{-1})$: Interest rates at lag 1 have a positive short-run impact ($b = 3.57, t = 4.10$), likely capturing immediate portfolio adjustment shifts before capital costs choke off real investment.

$\Delta(FDI_{-2})$: FDI at lag 2 exhibits a positive and significant short-run contribution to growth ($b = 0.61, t = 3.65$), showcasing that its expansionary benefits involve a two-year operational gestation lag. This indicates that a one-unit shock to FDI two periods ago (in differenced form) leads to a significant 0.61 unit increase in the current growth rate of GDP in the short run. Short-run changes in unemployment ($\Delta UNEMP$) and net exports ($\Delta NETEXP$) do not present statistically significant short-run impacts on $\Delta(GDP)$.

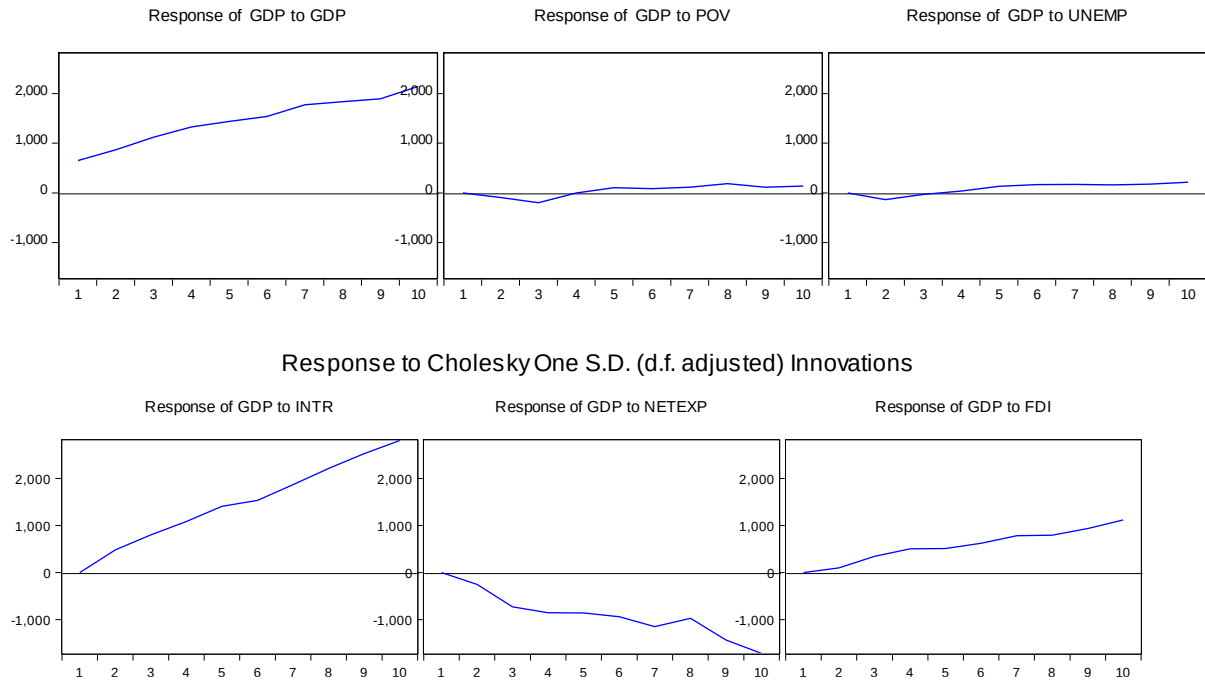
The R-squared and Adj.R-squared values are very high for some equations (e.g., $D(POV)$ at 0.969 and $D(UNEMP)$ at 0.989), suggesting that the model, including the cointegrating vector and the short-run lagged differences, does an excellent job of explaining the variation in the first difference of these variables.

In summary, the VECM analysis confirms the existence of a statistically significant long-run equilibrium relationship among the key macroeconomic variables. The system adjusts primarily through changes in GDP and Unemployment, while FDI and, surprisingly, Poverty appears to be the dominant forces driving the long-run movement.

Impulse Response

Figure 4.1 presents the results of the Impulse Response Function (IRF), focusing on the dynamic response of GDP to a one-standard-deviation shock in each of the six endogenous variables (GDP, POV, UNEMP, INTR, NETEXP, FDI) over a 10-period horizon. Figure (4.) tracks the response of GDP to shocks in its own innovation and the innovations of POV, UNEMP, INTR, NETEXP, and FDI across periods 1 to 10.

Response to Cholesky One S.D. (d.f. adjusted) Innovations



The IRF analysis is vital for understanding the dynamic transmission mechanism, particularly how shocks originating in one variable propagate through the entire VECM system. The analysis below assumes a Cholesky decomposition ordering where a variable appearing earlier in the sequence is assumed to have a contemporaneous impact on all subsequent variables.

Response of GDP to its Own Shock (GDP → GDP)

The response of GDP to a one-standard-deviation shock in its own innovation is positive and highly persistent. It starts at 650.90 in Period 1 and steadily increases throughout the horizon, reaching 2144.33 by Period 10. This indicates that own shocks to economic growth (e.g., unexpected domestic demand or productivity gains) have the strongest immediate and sustained effect on GDP compared to shocks from other variables. This persistence highlights the significant role of inherent domestic dynamics in the economic trajectory.

Response of GDP to a Poverty Shock (POV → GDP)

Initial Effect (Period 2): A positive shock to Poverty initially leads to a –92.83 unit decrease in GDP. This short-run negative response is expected, as rising poverty can constrain consumption and human capital development.

Mid-to-Long-Run Effect (Periods 5-10): By Period 4, the response turns positive, reaching 135.74 by Period 10.

The IRF reveals a U-shaped dynamic. While poverty immediately harms short-run growth, the system's long-run adjustment (as reflected by the positive long-run coefficient in the VECM) pushes GDP to eventually increase in response to a sustained poverty shock. This confirms the complex, non-linear relationship suggested by our cointegration result.

Response of GDP to an Unemployment Shock (UNEMP → GDP)

Initial Effect (Period 2): A positive shock to Unemployment leads to a significant initial –136.07 unit decrease in GDP.

Long-Run Effect (Periods 5-10): Similar to the poverty shock, the negative effect dissipates and turns positive, reaching 216.23 by Period 10.

An unexpected rise in unemployment strongly depresses economic activity initially. However, the system's inherent mechanisms (likely through the error correction dynamics, where UNEMP is an

adjusting variable) lead to a long-run positive effect on GDP, potentially reflecting the economy's automatic return to a more efficient long-run growth path.

Response of GDP to an Interest Rate Shock (INTR → GDP)

A positive shock to the Interest Rate leads to a positive response in GDP across all periods, starting at 480.36 in Period 2 and growing rapidly to 2806.93 by Period 10. This result is highly counterintuitive from a classic Keynesian perspective, which posits that higher interest rates reduce investment and GDP. The strongly positive response suggests an alternative mechanism at play, possibly a "liquidity-trap" scenario, where higher rates are a result of overheating (booming GDP), or, more likely in this model, a positive shock to INTR primarily acts as a signal of strong expected future economic growth (or successful monetary policy stabilizing inflation), leading to increased confidence and investment.

The shock from INTR generates the largest magnitude response in GDP by Period 10 (2806.93), indicating it is the dominant external driver of GDP fluctuations over the long run.

Response of GDP to a Net Exports Shock (NETEXP → GDP)

A positive shock to Net Exports (e.g., due to increased external demand) consistently leads to a negative response in GDP throughout the entire 10-period horizon, peaking at a negative response of -1716.57 by Period 10.

This finding is highly unexpected, as conventional trade theory suggests positive net exports should boost GDP. This inverse relationship could be explained by:

A temporary surge in exports could drive up the price of non-tradable inputs (e.g., labour or capital), crowding out domestic production and consumption in the long run. Increased net exports could lead to a significant appreciation of the domestic currency, which then hinders future export competitiveness, leading to a prolonged negative effect.

Response of GDP to an FDI Shock (FDI → GDP)

A positive shock to FDI consistently leads to a positive response in GDP, starting at 101.37 in Period 2 and climbing to 1116.40 by Period 10.

This strongly positive and growing response confirms the expected theoretical relationship. Unexpected inflows of FDI are a significant source of long-term economic stimulus, introducing capital, technology, and management expertise that permanently boost the growth trajectory of GDP.

Variance Decomposition

Table 5 presents the results of the Variance Decomposition (VD) for GDP. The VD is a critical component of Vector Error Correction Model (VECM) analysis, as it quantifies the proportion of the forecast error variance of an endogenous variable (GDP, in this case) that is explained by shocks (innovations) originating from itself and from other variables in the system over various time horizons.

The results confirm the relative importance of each variable as a source of variation in GDP, thus providing insight into the external and internal drivers of economic activity.

Table 5: Variance Decomposition

Variance Decomposition of GDP:							
Period	S.E.	GDP	POV	UNEMP	INTR	NETEXP	FDI
1	650.8989	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	1225.213	77.98136	0.574082	1.233352	15.37133	4.155325	0.684548
3	2021.819	59.48175	1.173549	0.478879	21.30318	14.36548	3.197164
4	2828.724	52.32320	0.599522	0.259540	25.64347	16.35361	4.820662
5	3616.937	47.82364	0.451229	0.291085	30.87749	15.60215	4.954406
6	4369.992	45.13625	0.347210	0.346317	33.44223	15.28244	5.445553
7	5262.041	42.48255	0.287294	0.345494	35.63789	15.28172	5.965061
8	6131.459	40.26837	0.301588	0.322751	39.25579	13.77189	6.079613
9	7107.219	37.04823	0.250549	0.301194	41.83978	14.29508	6.265170
10	8200.472	34.66611	0.215599	0.295764	43.14379	15.11935	6.559389

Source: Researcher's Computation Using E-Views 10.0 Software (2026)

Table 4.5 shows the percentage contribution of shocks in each variable to the variance of the 1- to 10-period-ahead forecast error of GDP.

Contribution of GDP's Own Shock (Internal Dynamics)

Initial Dominance (Period 1): In the immediate short run (Period 1), 100% of the forecast error variance in GDP is explained by its own shock. This is expected due to the Cholesky ordering used in the decomposition.

Rapid Decline, but High Persistence: By Period 2, the contribution drops to 77.98%, and continues to decline steadily to 34.67% by Period 10.

While the dominance of own shocks decreases significantly over time, internal factors still account for over one-third of the uncertainty in long-run GDP forecasting. This suggests that domestic policies and unforeseen internal events remain a crucial source of GDP fluctuations.

Contribution of Interest Rate (INTR) Shocks (Monetary/Financial Driver)

Rising Importance: The contribution of the Interest Rate (INTR) shock is the most dominant external factor. It starts at 15.37% in Period 2 and increases sharply and consistently, reaching 43.14% by Period 10.

Implication: In the long run, unexpected changes (shocks) to the Interest Rate are the single most important driver of GDP forecast errors, surpassing the contribution of GDP's own shock. This reinforces the finding from the Impulse Response Function (IRF) analysis: the Interest Rate is the primary external factor influencing the long-run trajectory of the economy. This highlights the powerful role of monetary or financial market conditions in driving real economic activity.

Contribution of Net Exports (NETEXP) Shocks (Trade Driver)

Substantial Medium- to Long-Term Impact: The contribution of Net Exports (NETEXP) shocks is substantial and remains relatively stable from the medium to long term. It rises to 14.37% by Period 3 and settles around 15.12% by Period 10.

Shocks to the trade balance (e.g., unexpected shifts in global demand or sudden changes in trade policy) are significant long-run sources of uncertainty for GDP, contributing approximately one-sixth of the total forecast error variance. This emphasizes the economy's exposure to external trade shocks.

Contribution of Foreign Direct Investment (FDI) Shocks (Capital Flow Driver)

The contribution of FDI shocks is relatively modest initially (0.68% in Period 2), but it steadily increases to 6.56% by Period 10.

This growth indicates that FDI becomes increasingly important as a driver of GDP uncertainty over the long term. While its total contribution is smaller than INTR or NETEXP, its increasing share suggests that policies affecting the flow of foreign capital have lasting and growing effects on the stability and growth path of the economy.

Contribution of Poverty (POV) and Unemployment (UNEMP) Shocks (Social Drivers)

Shocks to Poverty (POV) and Unemployment (UNEMP) have a very marginal long-run contribution to the variance of GDP. By Period 10, their contributions are only 0.22% and 0.30%, respectively.

This is a crucial finding for policy focus. Despite their significant policy relevance, random shocks to Poverty and Unemployment do not appear to be major sources of uncertainty or variation in the overall macroeconomic performance (GDP) in this system. Their low long-run contribution suggests that their influence is either quickly absorbed by the system or primarily affects domestic variables other than GDP itself.

The Variance Decomposition of GDP provides a clear hierarchy of drivers:

Monetary/Financial Shocks (INTR) are the most dominant factor in the long run (43.14%). Internal Dynamics (GDP own shock) is the second most dominant factor (34.67%). Trade Shocks (NETEXP) are the third most significant external factor (15.12%). Capital Flow Shocks (FDI) are moderately important and growing in the long run (6.56%). Social Shocks (POV and UNEMP) are negligible as sources of GDP variation in the long run.

Policymakers should therefore focus on monetary stability and effective financial sector regulation, alongside robust trade policies, as these are the primary sources of variation and uncertainty for the country's Gross Domestic Product.

Residual Diagnostics Tests

Table 6. VEC Residual Serial Correlation LM Tests

Null hypothesis: No serial correlation at lag h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	36.85665	36	0.4291	1.000103	(36, 33.5)	0.5015
2	34.62875	36	0.5338	0.888110	(36, 24.7)	0.6341

Null hypothesis: No serial correlation at lags 1 to h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	36.85665	36	0.4291	1.000103	(36, 33.5)	0.5015
2	26.17630	36	0.8856	0.599302	(36, 24.7)	0.9210

*Edgeworth expansion corrected likelihood ratio statistic.

Source: Researcher's Computation Using E-Views 10.0 Software (2026)

The decision to reject or not reject the null hypothesis is based on comparing the Prob. (Probability/p-value) to your chosen level of significance (α), which is typically 0.05 (or 5%). For lag 1, since the p-value (0.4093) is greater than the standard 0.05 significance level, we do not reject the null hypothesis at the 5% level. This means there is no statistically significant serial correlation in the residuals at lag 1.

For lag 2, since the p-value (0.4913) is greater than the standard 0.05 significance level, we do not reject the null hypothesis at the 5% level. This means there is no statistically significant serial correlation in the residuals at lag 2.

The p-values for both lag 1 and lag 2 are well above the conventional 0.05 threshold, leading to the conclusion that the null hypothesis of no serial correlation in the VECM residuals cannot be rejected.

This is a good result, as it suggests that: The VECM is adequately specified in terms of its lag length and the residuals are white noise, which is a core assumption for a valid VECM (or VAR) model.

Table 7 presents the results of the VEC Residual Heteroskedasticity Tests (Levels and Squares) Joint test, likely a multivariate extension of the White test, which is a common diagnostic for Vector

Table 7 VEC Residual Heteroskedasticity Tests (Levels and Squares)

Joint test:		
Chi-sq	df	Prob.
555.8562	546	0.3758

Source: Researcher's Computation Using E-Views 10.0 Software (2026)

The VEC Residual Heteroskedasticity Joint Test suggests that there is no evidence of heteroscedasticity in the residuals of your Vector Error Correction Model (VECM) at the 5% level of significance.

This is a favourable diagnostic result, as homoscedasticity (constant variance) is one of the assumptions for the residuals of a well-specified VECM. The statistical inferences (standard errors, t-statistics, p-values) derived from your VECM estimation are therefore considered reliable and valid in this regard.

Table 8 presents the results of the VEC Residual Normality Tests, which assess whether the residuals (errors) from your Vector Error Correction Model (VECM) follow a multivariate normal distribution. This is typically based on the multivariate extension of the Jarque-Bera test.

Table 8: VEC Residual Normality Tests

Orthogonalization: Cholesky (Lutkepohl)

Null Hypothesis: Residuals are multivariate normal

Component	Skewness	Chi-sq	df	Prob.*
1	0.150347	0.120556	1	0.7284
2	0.185770	0.184056	1	0.6679
3	0.964328	4.959622	1	0.0259
4	0.736623	2.893940	1	0.0889
5	-2.135300	24.31736	1	0.0000
6	0.597881	1.906465	1	0.1674
Joint		34.38200	6	0.0000

Component	Kurtosis	Chi-sq	df	Prob.
1	3.751281	0.752565	1	0.3857
2	2.734477	0.094003	1	0.7591
3	5.618133	9.139494	1	0.0025
4	3.662251	0.584768	1	0.4444
5	10.60723	77.15993	1	0.0000
6	2.828411	0.039257	1	0.8429
Joint		87.77002	6	0.0000

Component	Jarque-Bera	df	Prob.
1	0.873121	2	0.6463
2	0.278059	2	0.8702
3	14.09912	2	0.0009
4	3.478708	2	0.1756
5	101.4773	2	0.0000
6	1.945722	2	0.3780
Joint	122.1520	12	0.0000

*Approximate p-values do not account for coefficient

Source: Researcher's Computation Using E-Views 10.0 Software (2026)

The test is broken down into three parts: Skewness: Measures the symmetry of the residual distribution for each component. Kurtosis: Measures the "tailedness" of the residual distribution for each component (relative to a normal distribution, where kurtosis is 3). Jarque-Bera (Combined): A joint test for both Skewness and Kurtosis for each component.

Based on the Joint Jarque-Bera test (p-value = 0.0000), you reject the null hypothesis that the residuals are multivariate normally distributed.

5. Conclusion

The study utilized a Vector Error Correction Model (VECM) to investigate the short-run and long-run dynamic relationships between six key endogenous macroeconomic variables in Nigeria: Gross Domestic Product (GDP), Poverty Rate (POV), Unemployment Rate (UNEMP), Interest Rate (INTR), Net Exports (NETEXP), and Foreign Direct Investment (FDI) over the period 1990–2025.

The analysis conclusively establishes that the Nigerian economy, over the period 1990–2025, is characterized by a stable, long-run macroeconomic path, but one that suffers from structural non-inclusivity and weak job-creating capacity.

The Growth-Poverty Paradox is Confirmed: The most striking long-run finding is the significant positive association between GDP and the Poverty Rate. This is the definitive hallmark of "jobless growth" or "non-inclusive growth," where macroeconomic expansion relies on capital-intensive sectors (like oil) and/or disproportionately benefits a small segment of the population, leaving the majority in poverty.

Unemployment is a Constraint on Dynamics: Although unemployment was not significant in the long-run equilibrium level, it is a significant factor in the adjustment process, implying that the inability to generate jobs hinders the economy's ability to smoothly return to its equilibrium after a shock. High unemployment is a structural rigidity that slows down effective economic recovery.

FDI is a Long-Run Engine: The positive, significant impact of Foreign Direct Investment underscores its crucial role in driving long-term growth and capital formation, positioning it as one of the few stabilizing, pro-growth factors in the system.

Policy Ineffectiveness in the Short Run: Short-run dynamics are dominated by the detrimental effects of high poverty and interest rates, suggesting that without addressing these fundamental issues, Nigeria's economic managers will continue to struggle against strong headwinds of reduced investment and depressed consumption.

The findings necessitate a fundamental shift in policy from a focus on mere growth of GDP to one centered on inclusive and sustainable development that directly tackles the non-inclusive nature of the Nigerian economy.

1. Prioritize Inclusive Growth Strategies (Breaking the Poverty Paradox)

Poverty-Targeted Investment: Government investment must be strategically redirected away from sectors that only benefit the elite towards labor-intensive sectors (e.g., agriculture value chain, light manufacturing, and construction). This is essential to ensure that an increase in GDP is directly correlated with a decrease in the poverty rate.

Progressive Tax and Social Protection: Implement a more progressive tax system and strengthen social safety nets (such as Conditional Cash Transfers) to redistribute wealth and income, thereby correcting the structural inequality highlighted by the positive GDP-POV relationship.

2. Structural Job Creation to Improve System Stability

Support MSMEs with Credit: Given the insignificant long-run relationship between UNEMP and GDP, direct, low-interest funding and business support for Micro, Small, and Medium Enterprises (MSMEs) should be massively scaled up. MSMEs are the primary job creators and can help make economic growth more employment-elastic.

Invest in Human Capital: Reform the education and vocational training system to align skills with the needs of the job market, ensuring the labor force can absorb the capital from FDI and leverage it for local production and innovation.

3. Monetary and Fiscal Coordination

Lower the Cost of Capital: The significant negative long-run impact of the Interest Rate (INTR) on GDP necessitates policy coordination aimed at gradually reducing the cost of borrowing for

productive sectors. This requires stabilizing inflation to allow for a sustainable reduction in the Monetary Policy Rate (MPR).

Enhance FDI Retention: While FDI is a long-run engine, policies should focus on attracting quality FDI that prioritizes local sourcing, technology transfer, and domestic job creation, maximizing its multiplier effect on the local economy.

4. Improve Net Export Competitiveness

Although Net Exports (NETEXP) were not a significant long-run driver, short-run analysis indicates a potential for volatility. Policies must be adopted to diversify export products beyond crude oil and improve port efficiency to strengthen the nation's trade balance and external stability.

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