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Exchange Rate Unification and Poverty Nexus in Nigeria (1986–2024)

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Abstract

Nigeria has pursued exchange rate unification as a deliberate macroeconomic policy objective since the Structural Adjustment Programme (SAP) of 1986, culminating in the full unification of June 2023. Despite the centrality of this policy to Nigeria's economic governance, its poverty implications have received insufficient empirical examination. This study investigates the effect of exchange rate unification on poverty in Nigeria over the period 1986–2024, using the Autoregressive Distributed Lag (ARDL) bounds testing approach. Exchange rate unification is operationalised as the ratio of the official to the parallel market exchange rate, a continuous measure of the degree of rate convergence achieved at each point in time, which is mathematically the inverse of the conventional parallel market premium used to measure exchange rate distortion. While the parallel market premium measures the degree of exchange rate distortion, that is, how far apart the two rates are, the ERU ratio employed in this study measures the degree of exchange rate unification achieved, that is, how close the two rates are to convergence. Poverty is measured using the Multidimensional Poverty Index (MPI). The MPI is constructed using Principal Component Analysis (PCA) from per capita income, life expectancy at birth, agricultural value-added per worker, and household consumption expenditure per capita. The study finds that exchange rate unification significantly worsens poverty in both the short and long run, consistent with the sharp naira depreciation, inflationary pass-through, and deterioration in cost of living observed following Nigeria's exchange rate reforms. GDP growth reduces poverty marginally in the long run, confirming a modest pro-poor growth effect. These findings establish that exchange rate unification, while necessary for long-run macroeconomic efficiency, imposes significant poverty costs that require deliberate complementary fiscal and social protection policies to mitigate.

Keywords: exchange rate unification; poverty; ARDL model; Nigeria

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1. Introduction

Nigeria's economy has long been characterised by heavy dependence on oil exports for foreign exchange earnings, coupled with a high reliance on imports for essential goods such as food, raw materials, and manufactured products. This structural vulnerability has made the management of the exchange rate a critical policy instrument for macroeconomic stability. Historically, Nigeria operated multiple exchange rate regimes, including fixed, managed float, and segmented windows (official, Investors' and Exporters' (I&E), and parallel market rates), which created significant distortions, arbitrage opportunities, rent-seeking behaviour, and loss of investor confidence (Femi-Olagundoye & Adedokun,

2025). By early 2023, the gap between the official and parallel market rates had widened dramatically to over 60% in some periods, exacerbating price distortions and undermining the effectiveness of monetary policy (Ozili, 2024).

It is important to situate the June 2023 exchange rate unification within its proper historical context. Exchange rate unification is not a policy innovation that emerged in 2023; rather, it represents the culmination of a deliberate, yet uneven, policy process pursued by successive Nigerian governments since the Structural Adjustment Programme (SAP) of 1986. Under the SAP, Nigeria introduced the Second-tier Foreign Exchange Market (SFEM), which was the first formal attempt to move toward a market-determined, unified exchange rate. Subsequent administrations continued this pursuit through various auction-based systems, though episodes of administrative rate-fixing and foreign exchange rationing repeatedly reversed progress. The full unification of June 2023, therefore, represents the endpoint, not the starting point, of nearly four decades of exchange rate reform in Nigeria. Table 1 below summarises this historical evolution.

Table 1. Evolution of Nigeria's exchange rate unification process, 1986–2024.

Period	Administration	Exchange Rate Regime	ERU Status
1986–1988	Babangida	Second-tier Foreign Exchange Market (SFEM) was introduced under SAP	First attempt at market-determined unification; a premium emerged immediately
1989–1993	Babangida	Dutch Auction System (DAS) introduced; managed float	Partial unification; official–parallel premium persisted
1994–1998	Abacha	Fixed official rate reintroduced; parallel market effectively banned	Sharp reversal; ERU ratio fell sharply as the premium widened severely
1999–2002	Obasanjo	Managed float restored; Interbank Foreign Exchange Market (IFEM) introduced	Gradual convergence resumed; the premium narrowed moderately
2003–2014	Obasanjo/Yar'Adua/Jonathan	Wholesale Dutch Auction System (WDAS); relative exchange rate stability	Moderate unification achieved; premium relatively narrow
2015–2016	Buhari	Naira pegged at ₦197/$; parallel market surged to ₦400/$	Severe misalignment; ERU ratio fell to historic lows
2017–2022	Buhari	The Investors' and Exporters' (I&E) window was introduced as a partial unification measure	Gradual convergence; multiple windows persisted, creating segmentation
June 2023–2024	Tinubu	Full unification; all windows collapsed into a single Nigerian Foreign Exchange Market (NFEM)	ERU ratio approaches unity; full market-determined unification achieved

Source: Authors' compilation from Central Bank of Nigeria (2023b) and Ozili (2024).

Against this historical backdrop, the Central Bank of Nigeria (CBN), under the administration of President Bola Ahmed Tinubu, officially implemented a landmark exchange rate unification policy on 14 June 2023. The reform collapsed all segmented foreign exchange windows into a single Investors' and Exporters' (I&E) window (later renamed the Nigerian Foreign Exchange Market, NFEM) and adopted a 'willing buyer, willing seller' market-determined regime. The primary objectives were to eliminate arbitrage and round-tripping,

enhance price discovery, improve transparency, attract foreign investment, boost non-oil exports, and restore confidence in the foreign exchange market (Central Bank of Nigeria, 2023a; Ozili, 2024).

The immediate aftermath of unification was a sharp depreciation of the naira. The official rate moved from approximately ₦460–₦500 per US dollar pre-unification to over ₦700 immediately after the announcement and further to levels exceeding ₦1500–₦1600 per dollar in subsequent months. This depreciation triggered significant pass-through effects on domestic prices, particularly for imported essentials, leading to accelerated inflation, especially food inflation, which reached record highs. Households faced rising costs of living, reduced purchasing power, and heightened economic hardship, with low-income and rural populations bearing a disproportionate burden due to their high reliance on imported food items and limited access to foreign exchange hedging mechanisms (Ayodeji, 2024).

The link between exchange rate dynamics and poverty in Nigeria is well established. Exchange rate depreciation and volatility are transmitted to households through higher import costs, inflationary pressures, reduced real wages, and disruptions to employment, particularly in import-dependent sectors (Nzekwu, 2006; Edeme & Okafor, 2017). Parvin and Banouei (2020) confirm that unification, while aimed at long-term efficiency, may have short- to medium-term adverse welfare consequences as examined in Iran. Official poverty statistics underscore the urgency of examining this relationship. According to the National Bureau of Statistics (NBS, 2022), 63 percent of Nigerians—approximately 133 million people—were multidimensionally poor as of 2022, and World Bank projections suggest the poverty rate rose further following the 2023 macroeconomic reforms (World Bank, 2025).

This study examined the effect of exchange rate unification on poverty; while previous studies have examined exchange rate dynamics and poverty (Omojimite & Oriavwote, 2012; Adelowokan et al., 2019; Ashraq & Azhar, 2024; Chukwuka & Uduh, 2024; Gnangnon, 2021; Paul, 2025), none has specifically operationalised exchange rate unification as a continuous welfare determinant in Nigeria within a dynamic ARDL framework. This study fills that gap. The study comprises five sections. The literature review is in Section 2; the method is in Section 3; and Sections 4 and 5 contain the results, discussion, conclusion, and recommendations of the study.

2. Literature Review

Omoniyi (2018) reports that exchange rate volatility and inflation worsen poverty in Nigeria by decreasing real incomes, especially among vulnerable households. Similarly, Ebunoluwa and Yusuf (2018) discovered that inflation detected through exchange rates can lead to decreased access to necessities and services, thus further increasing welfare deprivation. Their results imply that the instability of exchange rates produces negative distributional effects, particularly in those economies that have weak social protection mechanisms. Chukwuka and Uduh (2024) employ a qualitative, exploratory research design to investigate the relationship among monetary policy, exchange rate stability, and poverty reduction in Nigeria. Their review highlights a strong relationship between volatility of the exchange rate and poor performance, as ineffective monetary coordination amplifies welfare reductions. Likewise, through ARDL modelling, error correction and Granger causality, Ashraq and Azhar (2024) in their study on Iraq conclude that the import inflation variable plays a role in the short-run dynamics of poverty, but no long-term causality association is determined. Their findings, however, support a long-run correlation between fluctuations in exchange rates and more general development indices, which validates the theoretical assumption that external price shocks do, in the long run, have

a welfare impact. In addition to inflation being a way of spreading poverty, changes in exchange rates also reveal significant overall macroeconomic interdependence.

Paul (2025) examined the nexus among inflation, interest rates, and exchange rate fluctuations in Nigeria and concluded that monetary shocks are the primary drivers of exchange rate movements. The study further established that coordinated policy frameworks, particularly exchange rate unification, serve as an effective mechanism for reducing volatility spillovers and promoting macroeconomic stability in Nigeria. The presence of a long-run relationship between the dynamics of the real exchange rate and poverty in Nigeria was established earlier by Omojimite and Oriavwote (2012), using annual data, 1980–2010, in the framework of a Vector Error Correction Model (VECM). According to their results, persistent exchange rate volatility worsens poverty by heightening domestic price volatility, decreasing real wages, and increasing production uncertainty. The authors suggest exchange rate management policies, with human capital investment as an invaluable element of the poverty reduction process. In a cross-country study, Apergis and Cooray (2018) examine 99 developing and emerging economies over the period 1980 to 2015 and report the presence of the asymmetric welfare impact of the exchange rate movements. Their findings indicate that real exchange rate depreciation can alleviate poverty in economies that rely on remittances by raising the domestic value of remittance inflows. Nevertheless, this effect is determined by structural factors such as the level of household involvement in trade and remittance channels. This study consequently highlights the relevance of structural features and nonlinear dynamics in evaluating the poverty bearing of exchange rate policy.

In addition to the effects of prices, exchange rate instability interacts with structural variables like employment and output growth. Adelowokan et al. (2019) reveal a negative relationship among unemployment, poverty, and economic growth, as well as the finding that exchange rate volatility limits industrial productivity and competitiveness. Long-term effects of persistent currency volatility will raise uncertainty among investors and entrepreneurs, discouraging long-term investment, and only a few jobs can be created. This means that inflationary exchange rate changes in Nigeria cannot be explained solely by macroeconomic shocks; however, they are structural shocks directly related to low poverty rates and inclusive development. The study by Emmanuela et al. (2018) examines how economic growth affects the reduction in poverty in Nigeria over the period 1980–2017. It used Ordinary Least Squares (OLS) and found a positive association between Gross Domestic Product and life expectancy, per capita income, and population. Conversely, the relationships between GDP and the mortality rate, corruption rate, and poverty rate are negative. Chude et al. (2019) investigated the correlation between government spending, economic growth, and poverty reduction in Nigeria using the technique of the Error Correction Model (ECM). The study was conducted over the period 1980–2013, and it was discovered that there exists a positive relationship between government spending and economic growth.

Dada and Fanowopo (2020) examined the institutions in the nexus of economic growth and poverty reduction in Nigeria over the period 1984–2018. The cointegration method of Auto Regression Distributed Lag used in the study showed that an economic environment which is free of corruption and has aggregate institutional quality with political stability reduces poverty in the short term. In the long run, institutions are directly related to household consumption and to alleviating poverty. The outcome also showed that capital accumulation is critical in minimising poverty whereas primary school enrolment cannot minimise poverty in the long run. Orajaka and Okoli (2018) empirically examined how human capital development influenced poverty reduction in Nigeria during the years 1991–2017. The study adopted the Ordinary Least Squares technique and found that the de-

velopment of human capital, government spending, skill acquisition, small-scale enterprise, health, and education are statistically significant in alleviating poverty in Nigeria.

3. Methodology

3.1. Theoretical Framework

The study is grounded in the pro-poor growth theory (Dollar & Kraay, 2002; Ravallion & Chen, 2003), which evolved the classic trickle-down hypothesis, according to which all sectors of society gain from economic growth, into a more complex interpretation: growth will alleviate poverty only when coupled with inclusionary policies such as employment creation, price stability, and social expenditure.

The basic poverty function can be written as

$$POV = f(Y) \tag{1}$$

Extending this to include macroeconomic controls,

$$\Delta POV_t = \theta_0 + \theta_1 \Delta Y_t + \theta_2 Z_t + \varepsilon_t \tag{2}$$

POV_t = poverty (proxied by Multidimensional Poverty Index), Y_t = real GDP (income), Z_t = vector of control variables (e.g., inflation, unemployment, government social expenditure), $\theta_1 < 0$ implies that higher growth reduces poverty (pro-poor growth), and ε_t = error term.

In cases where exchange rate unification improves growth (Y_t) and inflation stabilisation, the attained macroeconomic stability will generate greater purchasing power of households, hence decreasing poverty. This channel is the mechanism of transmission between growth and welfare.

Exchange rate unification can be defined to have the following effect on poverty:

$$POV_t = f(ERU_t, Y_t, Z_t) \tag{3}$$

Equation (3) is a functional form which implies that poverty (POV_t) is determined indirectly by exchange rate unification (ERU_t) through its effect on growth (Y_t) and directly through its influence on inflation, employment, and government expenditure (Z_t).

3.2. Model Specification

Based on the work by Gnangnon (2021), which models poverty based on exchange rate pressure and fiscal redistribution in developing countries, and Ebong and Ogwumike (2013), who analyse macroeconomic determinants (growth, inflation, unemployment, government expenditure) of poverty reduction in Nigeria using an ARDL, our extensions include exchange rate unification as a determinant of poverty, as well as measuring poverty using the Multidimensional Poverty Index (MPI) to include the non-income deprivations, without giving up dynamic estimation techniques.

This model specification can be written as follows:

$$POV_t = \alpha_0 + \alpha_1 ERU_t + \beta_2 GDPGR_t + \alpha_3 INF_t + \alpha_4 UNEMP_t + \alpha_5 GSEXP_t + \varepsilon_t \tag{4}$$

where POV_t is representing poverty, ERU_t is representing exchange rate unification, $GDPGR_t$ is representing economic growth, INF_t is representing inflation, $UNEMP_t$ is representing unemployment, and $GSEXP_t$ is representing government social expenditure.

The a priori assumption is that unification of exchange rates would have a negative impact on poverty, as it enhances macroeconomic stability, precludes inflationary trends,

and improves access to foreign exchange, thereby reducing poverty. Another hypothesis is that economic growth is expected to reduce poverty, consistent with the pro-poor growth hypothesis, which states that economic growth generates employment and income growth. Inflation would worsen poverty by diminishing purchasing power and escalating the cost of living, and unemployment is also supposedly positively correlated with poverty, as it directly exacerbates poverty conditions. Lastly, the social expenditure of the government is expected to reduce poverty, as increased spending on education, health, and social policies promotes redistribution and enhances living standards.

This study conducts preliminary Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) tests to determine the stationarity of the secondary data. These tests' statistics are adopted because they allow for control of higher-order autocorrelation (Harris & Sollis, 2003). Thereafter, the ARDL model was deployed to analyse the data. The ARDL is used because it is a consistent estimate that allows for a long-run normal coefficient regardless of whether the variables are stationary at order zero, i.e., I(0), or order one, i.e., I(1), or if the variables are a mixture of both (Harris & Sollis, 2003; Pesaran et al., 2001). In other words, the ARDL model places less emphasis on the degree of integration of the variables and yields an unbiased estimate of the long-run model even when the size of the sample is small (Harris & Sollis, 2003).

The ARDL model may be expressed as

$$\Delta POV_t = \beta_0 + \sum_{i=1}^{p} \alpha_1 \Delta POV_{t-i} + \sum_{j=1}^{q} \alpha_2 \Delta ERU_{t-j} + \sum_{m=1}^{U} \alpha_3 \Delta GDPGR_{t-m} + \sum_{y=1}^{s} \alpha_4 \Delta INF_{t-y} + \sum_{f=1}^{r} \alpha_5 \Delta UNEMP_{t-f} + \sum_{g=1}^{w} \alpha_6 \Delta GSEXP_{t-g} + \delta_1 POV_{t-1} + \delta_2 EXRU_{t-1} + \delta_3 GDP_{t-1} + \delta_4 INF_{t-1} + \delta_5 UNEMP_{t-1} + \delta_6 GSEXP_{t-1} + \varepsilon_t \quad (5)$$

where the short-run dynamics are captured by the coefficients α_1–α_6. The long-run effects are represented by the coefficients δ_1–δ_6. ε_t is the white-noise error term.

The bounds testing procedure is used to determine whether a long-run relationship exists among the variables. The null hypothesis of no cointegration ($H_0 : \delta_1 = \delta_2 = \ldots = \delta_6 = 0$) is rejected if the F-statistic exceeds the upper critical bound, confirming the existence of a long-run relationship between exchange rate unification and poverty in Nigeria.

To capture short-run adjustments, an Error Correction Model (ECM) is estimated:

$$\Delta POV_t = \beta_0 + \sum_{i=1}^{p} \alpha_1 \Delta POV_{t-i} + \sum_{j=1}^{q} \alpha_2 \Delta ERU_{t-j} + \sum_{m=1}^{U} \alpha_3 \Delta GDPGR_{t-m} + \sum_{y=1}^{s} \alpha_3 \Delta INF_{t-y} + \sum_{f=1}^{r} \alpha_4 \Delta UNEMP_{t-f} + \sum_{g=1}^{w} \alpha_5 \Delta GSEXP_{t-g} + \lambda ECM_{t-1} + \varepsilon_t \quad (6)$$

where ECM_{t-1} is the lagged error correction term derived from the long-run equation. λ (the adjustment coefficient) is expected to be negative and significant, indicating convergence back to equilibrium after short-run shocks. The data is managed and estimated using EViews 12.

3.3. Measurement of the Exchange Rate Unification

Exchange rate unification (ERU) is operationalised as the ratio of the official exchange rate to the parallel (black) market exchange rate:

$$ERU_t = Official\ Exchange\ Rate_t / Parallel\ Market\ Exchange\ Rate_t \quad (7)$$

A value of ERU_t approaching 1 indicates full unification (no premium between the two rates), while values substantially below 1 indicate a large misalignment. This operationalisation, used by Gray (2021) and consistent with the IMF literature on exchange rate unification, captures the degree of exchange rate alignment over time, rather than the binary policy event of June 2023. The study, therefore, models the historical relationship between exchange rate alignment and poverty over 1986–2024, treating the 2023 unification policy as a culminating observation within this longer trend.

3.4. Data and Variables

The data are sourced from the Statistical Bulletin of the Central Bank of Nigeria (CBN) and the World Bank Development Indicators (WDIs), as presented in Table 2 below.

Table 2. Measurement, description and sources of data.

Variable	Measurement	Definition	Source
Poverty (POV)	It is measured by the Multidimensional Poverty Index (MPI). According to Osinubi (2020), the MPI is calculated using Principal Component Analysis (PCA), which is constructed from per capita income, life expectancy at birth, agricultural value-added per worker, and final household consumption expenditure per capita.	Deprivation experienced by individuals across multiple dimensions of well-being, such as health, education, and living standards, rather than income alone.	World Bank (WDI)
Economic Growth (GDP)	Annual real GDP growth rate (%).	Sustained increase in an economy's output of goods and services over time.	CBN Statistical Bulletin
Exchange Rate Unification (ERU)	Ratio of official and parallel rate (Gray, 2021).	The extent to which official and parallel exchange rates converge.	CBN, World Bank (WDI)
Inflation (INF)	Consumer price index (CPI) annual % change.	A general rise in price level.	CBN, World Bank
Unemployment (UNEMP)	Unemployment rate (%).	Share of labour force without jobs but actively seeking work.	World Bank (WDI)
Government Social Expenditure (GSEXP)	Social spending as % of GDP (education, health, transfers).	Public expenditure aimed at welfare and poverty reduction.	CBN Statistical Bulletin

Source: Authors' Compilation.

An important clarification is necessary regarding the direction of the MPI constructed in this study. Because the PCA is applied to four positive indicators of living standards—per capita income, life expectancy at birth, agricultural value-added per worker, and household consumption expenditure per capita—higher values of the resulting MPI reflect better living conditions and therefore lower levels of poverty. Conversely, lower MPI values indicate worse living conditions and therefore higher poverty. This construction follows Osinubi (2020) and is consistent with the standard PCA aggregation of positive welfare indicators used in the empirical poverty literature. Accordingly, throughout this study, a positive coefficient on any explanatory variable indicates that the variable reduces poverty (raises the MPI), while a negative coefficient indicates that the variable worsens poverty (lowers the MPI).

4. Results

4.1. Descriptive Statistics

Table 3 presents the descriptive statistics of all variables over the sample period 1986–2024. The Multidimensional Poverty Index (MPI) has a mean of approximately zero, consistent with its standardised form, and ranges from −1.85 to 1.19, indicating considerable variation in welfare outcomes across the sample period. The exchange rate unification variable (ERU) averaged 0.55, meaning the official rate was, on average, only 55 percent of the parallel market rate, confirming that a sustained and substantial gap

between the two rates persisted throughout the period, reflecting the incomplete nature of Nigeria's exchange rate unification. The GDP growth rate averaged 1.45 percent per annum, relatively low for a developing economy, with a wide range from −4.60 to 12.21 percent, reflecting Nigeria's vulnerability to oil price cycles and macroeconomic shocks. Inflation averaged 19.92 percent with a maximum of 72.84 percent; its Jarque–Bera statistic firmly rejects normality (p = 0.00), consistent with the sporadic, exchange rate-driven inflationary episodes that characterised the sample period. Government social expenditure averaged ₦492.90 billion in nominal terms, with a standard deviation of ₦533.91 billion that exceeds the mean, reflecting the large nominal expansion of fiscal outlays over the period, driven largely by naira depreciation rather than real increases in service delivery; its Jarque–Bera probability of 0.04 indicates a marginal departure from normality. The unemployment variable exhibits extreme skewness (4.54) and kurtosis (25.45). Overall, the descriptive statistics are consistent with the macroeconomic instability and structural vulnerabilities that characterise Nigeria's economy over the sample period.

Table 3. Descriptive statistics of variables (1986–2024).

Variable	Mean	Median	Max	Min	Std. Dev.
POV	−0.00	−0.10	1.19	−1.85	0.60
ERU	0.55	0.67	0.99	0.09	0.32
GDPGR	1.45	1.38	12.21	−4.60	3.57
INF	19.92	13.01	72.84	5.39	17.03
UNEMP	4.21	3.87	11.59	2.99	1.33
GSEXP	492.90	152.19	1628.99	54.32	533.91

Source: Authors' calculations.

4.2. Multicollinearity Diagnostics

Prior to estimation, multicollinearity among the explanatory variables was assessed using both a pairwise correlation matrix and a Variance Inflation Factor (VIF) analysis. The results are presented in Tables 4 and 5, respectively.

Table 4. Pairwise correlation matrix of explanatory variables.

Variable	ERU	GDPGR	INF	GSEXP	UNEMP
ERU	1.000				
GDPGR	0.264	1.000			
INF	−0.383	−0.322	1.000		
GSEXP	0.546	−0.157	−0.185	1.000	
UNEMP	−0.134	−0.338	−0.157	0.021	1.000

Source: Authors' computation (2026).

Table 5. Variance Inflation Factor (VIF) results.

Variable	Coefficient Variance	Uncentered VIF	Centred VIF
C	0.1836	29.311	NA
ERU	0.1134	7.401	1.850
GDPGR	0.0008	1.826	1.561
INF	0.00003	3.397	1.413
GSEXP	0.0000000375	3.119	1.664
UNEMP	0.0046	14.349	1.275

Source: Authors' calculations.

The correlation matrix reveals that all pairwise correlation coefficients are well below the conventional threshold of 0.80 in absolute value. The highest observed correlation is

0.546 between ERU and GSEXP, while all remaining variable pairs exhibit correlations below 0.40. These results provide an initial indication that there is no severe multicollinearity among the explanatory variables.

The VIF results further corroborate the absence of multicollinearity. The centred VIF, which is the appropriate diagnostic measure for multicollinearity in regression models with a constant term because it isolates inter-regressor collinearity from the influence of the constant, ranges from 1.275 (UNEMP) to 1.850 (ERU) across all explanatory variables. All values are well below the critical threshold of 10, beyond which multicollinearity becomes a serious concern, and are also well below the more conservative threshold of 5. It is noted that the uncentered VIF for UNEMP (14.35) appears elevated; however, this is attributable to the correlation between UNEMP and the constant term rather than collinearity with other regressors, and is therefore not indicative of a multicollinearity problem. The centred VIF of 1.275 for UNEMP confirms this assessment.

Taken together, the correlation matrix and centred VIF results collectively confirm that the explanatory variables are not severely collinear and that the regression coefficients are stable and reliable. The counterintuitive signs observed for certain variables in the estimation results are therefore not statistical artefacts of multicollinearity but reflect genuine structural and institutional features of Nigeria's economy.

4.3. Unit Root Test

Preliminary Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) tests were examined and presented in Table 6, with the main aim of determining the unit root properties of the variables, since the ARDL bounds test exists and is premised on the hypothesis that the variables are either of the I(0) series or I(1) series (Ouattara, 2004). Therefore, to establish the stationarity properties, Oteng-Abayie and Frimpong (2006) asserted that no variable should be integrated of order two. The outcomes of the unit root test are presented in Table 6, which shows that all the variables are a mixture of series that are I(0) and I(1), which is the rationale for the use of the ARDL model.

Table 6. Stationarity test.

	Augmented Dickey–Fuller (ADF) Test			**Phillips–Perron (PP) Test**		
Variables	**Level**	**1st Diff.**	**Status**	**Level**	**1st Diff.**	**Status**
GDPGR	−4.30 ***	−11.01 ***	I(0)	−4.23 ***	−16.13 ***	I(0)
ERU	−1.48	−6.62 ***	I(1)	−1.56	−6.60 ***	I(1)
GSEXP	1.17	−4.93 ***	I(1)	1.05	−4.97 ***	I(1)
INF	−3.55 **	−5.39 ***	I(0)	−2.99 **	−6.37 ***	I(0)
UNEMP	−4.10 ***	−2.75 *	I(0)	−9.56 ***	−22.28 ***	I(0)
POV	−0.84	−4.39 ***	I(1)	−0.84	−4.41 ***	I(0)

Source: Authors' calculations. Note: * = 10%, ** = 5%, *** = 1% significance level.

4.4. Cointegration Test

The result confirms the rejection of the null hypothesis, indicating a long-run relationship among the variables. It shows the magnitude of the F-statistic for the effect of exchange rate unification on poverty in Nigeria. The ARDL bounds test results are reported in Table 7. Following Pesaran et al. (2001), the test is conducted with an intercept and no trend, with k = 5 regressors. The F-statistic of 3.823 exceeds the upper critical bound of 3.49 at the 5 percent significance level, providing evidence to reject the null hypothesis of no cointegration at the 5 percent level. The study, therefore, concludes that a long-run equilibrium relationship exists among the variables at the 5 percent level.

Table 7. ARDL bounds cointegration test.

Test Statistic	Value	K
F-statistic	3.8233	5
Significance	I(0) Bound	I(1) Bound
5%	2.56	3.49

Note: Critical values sourced from Pesaran et al. (2001), k = number of regressors. Authors' computation, 2026.

4.5. Lag Length Criteria

Furthermore, this study determines the maximum number of lags that should be used through the following criteria: (i) the Akaike Information Criterion (AIC); (ii) the Schwartz Information Criterion (SIC); and (iii) the Hannan–Quinn Information Criterion (HQC). Both the Akaike Information Criterion (AIC) and the Hannan–Quinn Information Criterion (HQC) suggested a maximum lag length of four, while the Schwarz Information Criterion (SC) recommended one. A maximum lag of 4 was selected based on the annual frequency and sample size of 39 observations. The optimal lag structure ARDL (1,1,0,0,2,4) was chosen using AIC. Hence, the long-run estimate of the effect of exchange rate unification on poverty is based on a maximum lag of four. The lag length selection criteria are reported in Table 8.

Table 8. Lag length selection criteria.

Endogenous Variables: ERU GDPGR INF UNEMP GSEXP						
Sample: 1986–2024						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	−527.3252	NA	11175984	30.41859	30.64078	30.49529
1	−402.0697	207.5664	36953.10	24.68969	26.02285 *	25.14990
2	−363.7463	52.55778 *	18940.43	23.92836	26.37248	24.77207
3	−334.9766	31.23563	19713.69	23.71295	27.26803	24.94016
4	−297.7744	29.76178	17287.96 *	23.01568 *	27.68172	24.62640 *

* indicates the lag order selected by the criterion. Source: Authors' computation.

4.6. ARDL Long-Run Estimate

The long-run ARDL estimates are presented in Table 9. The coefficient on ERU is negative and statistically significant at the 1 percent level (−2.0482, $p = 0.00$), indicating that exchange rate unification significantly worsens poverty in the long run. This finding is theoretically defensible within Nigeria's structural context, where exchange rate unification has historically been accompanied by sharp naira depreciation, generating persistent inflationary pass-through effects that erode real household incomes and worsen poverty, particularly among low-income groups who spend a disproportionately large share of their earnings on imported essentials. This result is consistent with Parvin and Banouei (2020), who report similar poverty-worsening effects of exchange rate unification in Iran, and with the broader literature on exchange rate pass-through in import-dependent developing economies.

The GDP growth rate (GDPGR) carries a positive coefficient (0.1544) that is marginally significant at the 10 percent level ($p = 0.08$), indicating that economic growth reduces poverty in the long run. Recall that in this study, higher MPI values reflect better living conditions and, therefore, lower poverty; a positive GDP coefficient, therefore, means that growth raises MPI, signifying poverty reduction. This confirms the pro-poor growth hypothesis (Dollar & Kraay, 2002; Ravallion & Chen, 2003). The modest magnitude and marginal significance of this coefficient, however, reflect the well-documented challenge of

translating aggregate output expansion into broad-based poverty reduction in Nigeria's resource-dependent, informality-dominated economy.

Table 9. Estimated long-run coefficient.

Variables	Coefficients	Standard Error	t-Statistic	Probability
C	3.0053	1.9087	1.5745	0.13
ERU	−2.0482	0.7043	−2.9106	0.00 ***
GDPGR	0.1544	0.0842	1.8339	0.08 *
INF	0.0248	0.0222	1.1165	0.28
UNEMP	−0.6952	0.5808	−1.1969	0.25
GSEXP	0.0007	0.0005	1.5745	0.13

Notes: (*) Significant at 10%. (***) Significant at 1%. Source: Authors' calculations.

Inflation (INF) carries a positive but statistically insignificant coefficient (0.0248, $p = 0.28$). When exchange rate distortions are explicitly controlled for through the ERU variable, autonomous price increases do not carry a separate long-run poverty effect, consistent with the view that inflation in Nigeria is primarily an exchange rate-driven phenomenon rather than an independent poverty determinant. The unemployment coefficient (UNEMP) is negative (−0.6952) and statistically insignificant ($p = 0.25$), carrying the expected poverty-worsening sign (a negative coefficient lowers MPI, meaning poverty worsens). Government social expenditure (GSEXP) carries a positive coefficient (0.0007) consistent with the expected poverty-reducing effect of public spending (a positive coefficient raises MPI, meaning poverty reduces), but is statistically insignificant ($p = 0.13$), reflecting the chronic governance and implementation challenges that have historically limited the poverty-reducing impact of public expenditure in Nigeria (World Bank, 2022).

4.7. ARDL Short-Run Estimate

The short-run ECM results are presented in Table 10. The coefficient on D(ERU) is negative and highly significant (−1.4843, $p = 0.00$), indicating that exchange rate unification significantly worsens poverty in the short run (a negative coefficient lowers MPI, meaning poverty deepens). This result is consistent with Nigeria's experience following the June 2023 unification, when the sharp depreciation of the naira triggered significant inflationary pass-through, eroding household purchasing power, particularly among low-income groups (Parvin & Banouei, 2020). The contemporaneous inflation coefficient D(INF) is negligible and insignificant (−0.0001, $p = 0.97$), suggesting that price increases do not immediately worsen poverty within the same period. However, the lagged inflation term D(INF(−1)) is negative and significant (−0.0065, $p = 0.03$), confirming that inflationary pressures from the previous year worsen poverty as savings buffers are exhausted and real incomes adjust downward. The contemporaneous unemployment coefficient D(UNEMP) is positive but insignificant ($p = 0.90$). The lagged unemployment terms D(UNEMP(−1)), D(UNEMP(−2)), and D(UNEMP(−3)) are all positive and highly significant. This pattern suggests that rising unemployment is associated with reduced poverty (higher MPI) with a delay of one to three years. This finding can be justified within Nigeria's specific structural context. Nigeria's labour market is predominantly informal, with a large share of the workforce engaged in subsistence agriculture, petty trading, and other informal livelihood activities that generate real income but are classified as unemployment under the official NBS definition. These findings are consistent with Adelowokan et al. (2019). The error correction term ECT(−1) is negative and highly significant (−0.3428, $p = 0.00$), confirming the existence of a valid long-run equilibrium relationship and indicating that approximately 34 percent of any short-run deviation from equilibrium is corrected within one year, implying a full adjustment period of approximately three years.

Table 10. ARDL short-run estimates.

Variables	Coefficients	Standard Error	t-Statistic	Probability
D(ERU)	−1.4843	0.2468	−6.0133	0.00 ***
D(INF)	−0.0001	0.0030	−0.0449	0.97
D(INF(−1))	−0.0065	0.0027	−2.3953	0.03 *
D(UNEMP)	0.0160	0.1217	0.1318	0.90
D(UNEMP(−1))	0.4553	0.1416	3.2148	0.00 ***
D(UNEMP(−2))	0.6579	0.1492	4.4084	0.00 ***
D(UNEMP(−3))	0.1245	0.0367	3.3970	0.00 ***
EC_{t-1}	−0.3428	0.0584	−5.8660	0.00 ***

Notes: (*) Significant at 10%; (**) Significant at the 5%; (***) Significant at 1%. Source: Authors' calculations.

4.8. Diagnostic Tests

The stability test of the macroeconomic variables used in this study was carried out using the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMsq), which are residual-based tests based on the Schwarz Bayesian Criterion. The plots in Figures 1 and 2 reveal that the CUSUM and the CUSUMsq remain relatively stable and inside the bounds of the 5% level of significance throughout the study. The Breusch–Godfrey LM test returns an F-statistic of 0.64 (p = 0.54), confirming the absence of debilitating serial correlation, while the Breusch-Pagan-Godfrey heteroskedasticity test yields an F-statistic of 1.38 (p = 0.25), indicating that the model is free from variance instability. These diagnostic results collectively confirm that the estimated ARDL model is well specified and that the residuals approximate white noise. The findings, therefore, validate the view that the observed poverty-worsening effects of exchange rate unification reflect genuine economic relationships rather than misspecification or statistical artefacts. Given this, we conclude that all variables used in this study are very stable. The serial correlation and heteroskedasticity test can be seen in the Table 11.

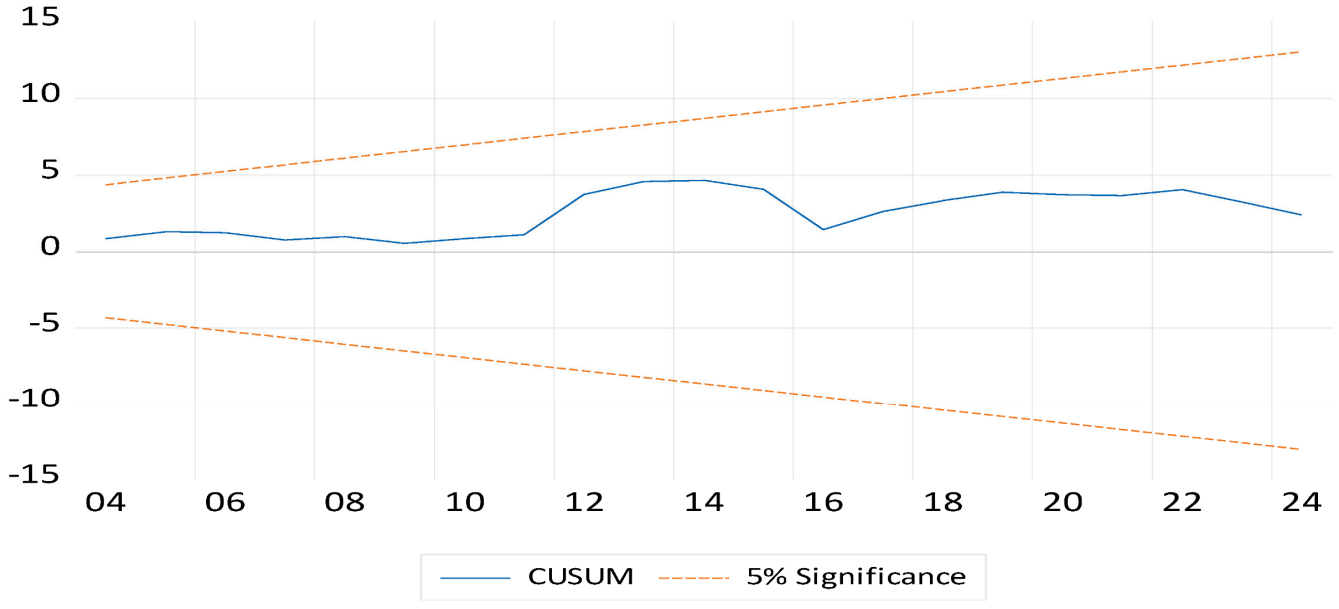

Figure 1. CUSUM at 5% significance level.

To address potential endogeneity concerns, a VAR Granger Causality/Block Exogeneity Wald Test was conducted on the MPI and ERU in Table 12. The results show that the MPI does not Granger-cause ERU (Chi-sq = 1.3674, df = 1, p = 0.2423), providing direct empirical evidence against reverse causality running from poverty to exchange rate policy in this

sample. This is consistent with Nigeria's institutional context, where exchange rate unification decisions have been driven by IMF conditionality, oil revenue pressures, and parallel market arbitrage rather than poverty outcomes. Furthermore, ERU does not Granger-cause the MPI in the short-run bivariate framework (Chi-sq = 0.8096, df = 1, $p = 0.3682$). This does not contradict the significant long-run ARDL results: Granger causality tests capture short-run predictive power in a bivariate VAR.

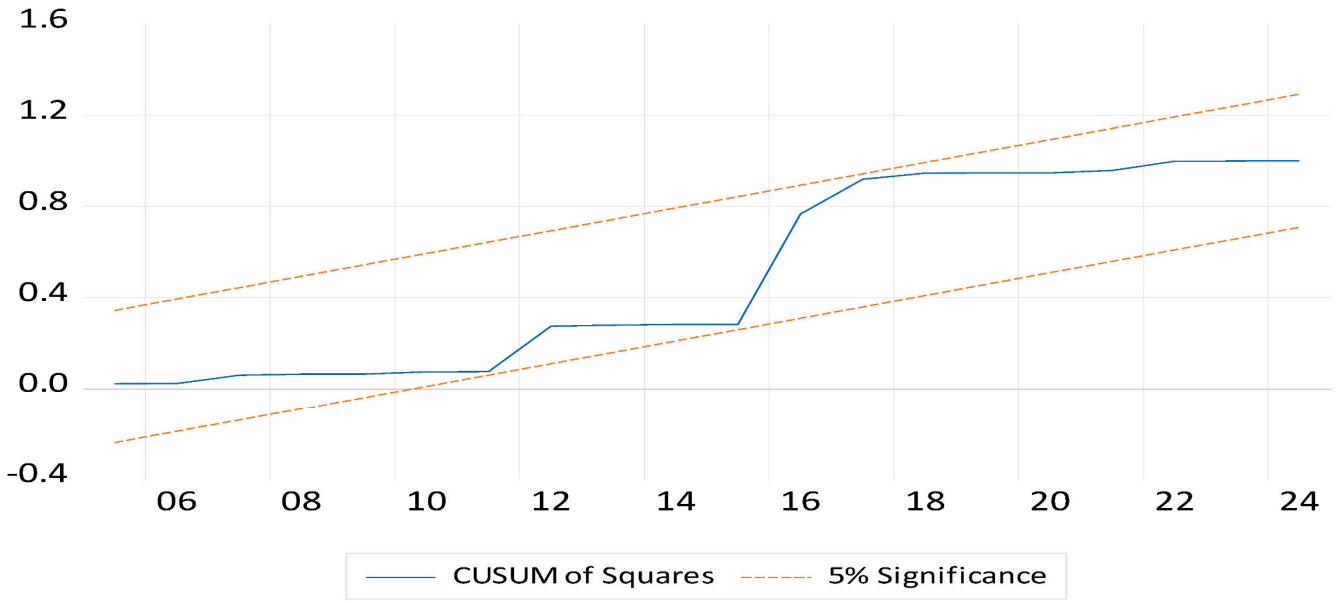

Figure 2. CUSUMsq at 5% significance level.

Table 11. Results of the diagnostic tests.

Test	F-Statistic	Prob. Value	Remarks
Serial Correlation Test	0.64	0.54	No serial correlation
Heteroskedasticity Test	1.38	0.25	No Heteroskedasticity

Source: Authors' computation, 2026.

Table 12. VAR Granger Causality/Block Exogeneity Wald Test results.

Null Hypothesis	Chi-sq Statistic	Prob.	Decision
ERU does not Granger-cause MPI	0.8096	0.3682	Fail to Reject H_0
MPI does not Granger-cause ERU	1.3674	0.2423	Fail to Reject H_0

Source: Authors' computation (2026). Note: Lag length = 1, selected by SIC. H_0 denotes the null hypothesis of no Granger causality.

In contrast, the ARDL bounds test estimates the long-run cointegrating relationship with full macroeconomic controls. It is well established in the literature that variables can exhibit a significant long-run relationship without short-run bivariate Granger causality, particularly when effects operate through distributed lags and multiple transmission channels. Taken together, these results confirm that the direction of causality runs from exchange rate policy to poverty outcomes rather than the reverse, supporting the consistency of the ARDL estimates.

To formally test for structural breaks across the 1986–2024 sample period, the Breakpoint Unit Root Test (Zivot–Andrews framework) was applied to both the MPI and ERU, with break specification set to trend and intercept, and break selection based on minimising the Dickey–Fuller t-statistic which can be seen in Table 13. For the MPI, the test identifies

a structural break in 2023 (t-statistic = −2.111, $p > 0.99$), confirming that the MPI remains non-stationary even after accounting for the break and is therefore I(1), fully consistent with the original unit root results. The 2023 break date corresponds directly to the full exchange rate unification implemented under President Tinubu in June 2023, which represents the most significant structural shift in Nigeria's exchange rate regime within the sample period. For ERU, the test identifies a break in 1998 (t-statistic = −7.051, $p < 0.01$), at which point ERU becomes stationary, confirming that ERU is I(0) with a structural break. The 1998 break date aligns precisely with the transition from the Abacha fixed exchange rate regime (1994–1998) to the Abubakar liberalisation period, one of the most dramatic exchange rate policy reversals in Nigeria's history. Both break dates are therefore historically grounded in documented policy events recorded in Table 1, confirming that the structural changes identified by the test are economically meaningful rather than statistical artefacts. Importantly, the mixed integration order of MPI (I(1)) and ERU (I(0)) with a break is fully accommodated by the ARDL bounds testing framework, which is specifically designed for variables of mixed integration orders. The ARDL estimator, therefore, remains the appropriate and valid choice for this study.

Table 13. Breakpoint Unit Root Test results (Zivot–Andrews framework).

Variable	Break Date	t-Statistic	5% Critical Value	Integration Order	Historical Event
MPI	2023	−2.111	−4.860	I(1)	Full exchange rate unification (Tinubu, June 2023)
ERU	1998	−7.051 ***	−4.860	I(0) with break	Abacha-to-Abubakar exchange rate liberalisation (1998)

Source: Authors' computation (2026). Break specification: trend and intercept; break selection: minimise Dickey–Fuller t-statistic; break type: innovational outlier. Critical values from Perron (1989). *** denotes significance at 1% level.

5. Conclusions and Policy Recommendations

This study examined the effect of exchange rate unification on poverty in Nigeria over the period 1986–2024, using the ARDL bounds testing framework. The exchange rate unification variable, measured as the ratio of the official to the parallel market exchange rate and spanning Nigeria's full history of rate convergence efforts from SAP 1986 to the full unification of June 2023, was found to worsen poverty in both the short run and long run significantly. This finding is theoretically consistent with Nigeria's structural realities: exchange rate unification triggers sharp naira depreciation, generating persistent inflationary pass-through effects that erode real household incomes, removing implicit subsidies previously embedded in the segmented foreign exchange regime, and disproportionately burdening low-income households who depend heavily on imported food and essential commodities. This result is corroborated by the macroeconomic hardship observed in Nigeria following the June 2023 reform and is consistent with the findings of Parvin and Banouei (2020) on the poverty-worsening effects of exchange rate unification in Iran. GDP growth exerts a modest but marginally significant poverty-reducing effect in the long run, confirming the pro-poor growth hypothesis, though the limited magnitude of this effect reflects the well-documented challenge of achieving broad-based, inclusive growth in Nigeria's oil-dependent, informality-dominated economy. Inflation, unemployment, and government social expenditure do not have statistically significant independent effects on poverty once exchange rate distortions are controlled for, suggesting that exchange rate alignment is the dominant macroeconomic channel shaping poverty outcomes in Nigeria.

The error correction term confirms a valid long-run equilibrium relationship, with approximately 34 percent of short-run deviations corrected annually, implying a full ad-

justment period of approximately 3 years. The diagnostic tests, including the Breusch–Godfrey LM test, the Breusch–Pagan–Godfrey heteroskedasticity test, and the CUSUM and CUSUMsq stability plots, confirm that the model is well specified and structurally stable throughout the sample period.

Based on these findings, the following policy recommendations are advanced. First, while exchange rate unification is a necessary and desirable long-run reform, its implementation must be accompanied by robust complementary fiscal measures, including targeted cash transfers, conditional subsidies on essential commodities, and strengthened social safety nets to cushion the immediate poverty costs borne by vulnerable households. Second, the government should prioritise labour-intensive, broad-based economic growth that generates productive employment and translates output gains into poverty reduction, rather than relying on capital-intensive, oil-driven growth that bypasses the poor. Third, the efficiency and targeting of government social expenditure must be substantially improved to unlock its poverty-reducing potential, addressing the chronic governance and implementation challenges that have historically limited the impact of public spending on poverty in Nigeria. Finally, drawing from the experiences of Egypt and Ghana in managing exchange rate reform consequences, Nigeria should institutionalise a dedicated monitoring framework anchored by the National Bureau of Statistics, the Central Bank of Nigeria, and multilateral partners to systematically track the real-time poverty impacts of exchange rate unification and ensure that policy responses remain evidence-driven and responsive to emerging poverty outcomes.

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