



The Effect of Double-Digit Inflation and Volatile Exchange Rates on Economic Growth in Nigeria, 2001–2025: An ARDL Bounds-Testing and Threshold-Regression Analysis of the Inflation–Exchange Rate–Growth Nexus

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Abstract

This study examines the effect of double-digit inflation and volatile exchange rates on economic growth in Nigeria over the period 2001 to 2025, a twenty-five-year horizon spanning the oil boom, the 2008–2009 global financial crisis, the 2016 and 2020 recessions, and the 2023 foreign-exchange unification reform. The broad objective is to establish the direction, magnitude, and statistical significance of the relationship between these two macroeconomic variables, individually and jointly, and Nigeria's real output growth. Guided by the quantity theory of money, the structuralist theory of inflation, the purchasing power parity and monetary approaches to exchange-rate determination, and the Fischer–Khan–Senhadji threshold theory of inflation and growth, the study formulates and tests three null hypotheses using annual secondary time-series data compiled from the Central Bank of Nigeria, the National Bureau of Statistics, the World Bank, and the International Monetary Fund. Augmented Dickey-Fuller unit-root tests confirm that all three focal series are integrated of order one, $I(1)$; an Autoregressive Distributed Lag (ARDL) bounds-testing procedure (Pesaran, Shin, & Smith, 2001) and a Hansen-type threshold regression (Hansen, 2000) are therefore used in preference to a levels-OLS specification. The bounds test finds no statistically robust evidence of a stable linear long-run relationship among growth, inflation, and the exchange rate ($F = 2.686$, below the 10 percent critical lower bound of 3.17) — a null result interpreted as consistent with, rather than contrary to, the non-linear threshold theory motivating the study. The threshold regression estimates a fit-minimising inflation threshold of 15.44 percent ($\text{sup-F} = 5.437$,

indicative asymptotic $p = 0.013$), reported alongside an explicit discussion of its small-sample fragility (only eight observations in the high-inflation regime) and its divergence from the 9 percent threshold independently estimated for Nigeria by Oyadeyi, Osinubi, Simatele, and Oyadeyi (2025). Exchange-rate depreciation is negative and statistically significant across every specification tested, making it the most robust finding of the study. Every Nigeria-specific secondary source cited was checked against publicly available journal-indexing information, and sources that could not be confirmed as Scopus-indexed or otherwise independently verifiable were excluded rather than retained for convenience. The study concludes that Nigeria's growth constraint since 2001 has been driven predominantly by exchange-rate instability, with inflation's role being real but harder to establish with precision using an annual, single-equation approach, and it recommends a coordinated monetary–fiscal–structural policy response together with bootstrap-based re-estimation of the threshold effect in future work.

Keywords: Double-digit inflation; exchange-rate volatility; economic growth; Nigeria; ARDL bounds testing; threshold effect; naira depreciation

Contribution to the Literature: This paper contributes to Nigeria's macroeconomic literature by jointly testing, within a single formally specified framework, the individual and interactive effects of double-digit inflation and exchange-rate volatility on economic growth across the fullest and most current available time horizon (2001–2025), inclusive of the January 2025 CPI rebasing, the 2025 GDP rebasing, and the June 2023 foreign-exchange unification reform. It demonstrates, through an explicit progression from unit-root testing to ARDL bounds testing to Hansen-type threshold regression, why a naive levels-OLS approach is econometrically inappropriate for this class of question, and it applies an explicit source-verification discipline that excludes secondary citations that could not be confirmed as Scopus-indexed or otherwise independently verifiable.

1. Introduction

Macroeconomic stability — commonly understood as the joint achievement of low and predictable inflation, a stable and competitive exchange rate, sustainable fiscal and external balances, and full employment of resources — is widely regarded in the growth literature as a necessary, if not sufficient, precondition for sustained economic expansion (Fischer, 1993; Barro, 1995). Of the several dimensions of macroeconomic stability, the behaviour of the general price level and the behaviour of the exchange rate are arguably the two most immediately consequential for households, firms, and policymakers, because both variables transmit directly into the cost of living, the cost of production, the profitability of tradable and non-tradable sectors, and the credibility of the monetary authority (Mishkin, 2007).

Nigeria offers a particularly instructive, and under-theorised, case study of the joint behaviour of inflation, exchange-rate movements, and growth because it combines three structural features that intensify the transmission of currency and price shocks into real output: a mono-product export structure heavily dependent on crude oil, which exposes the naira and government revenue to global commodity-price cycles; a high import dependence for refined petroleum products, food staples,

and manufacturing inputs, which makes domestic prices acutely sensitive to exchange-rate pass-through; and a history of administratively managed and frequently realigned exchange-rate regimes — including the 1986 Structural Adjustment Programme devaluation, the 1999–2000, 2016, and 2020 adjustments, and, most consequentially, the June 2023 unification of the multiple exchange-rate windows into a single, market-determined rate (Businessday NG, 2023; International Monetary Fund [IMF], 2026). Between 2001 and 2025, Nigeria's headline inflation rate averaged approximately 14 percent per annum on the IMF/World Bank harmonised series, breaching the 10 percent double-digit threshold in the majority of years reviewed and rising above 20 percent in 2022, 2023, and 2025 (Worlddata.info, 2026). Over the same period, the naira depreciated from approximately ₦112 to the United States dollar in 2001 to above ₦1,500 by 2025 (Central Bank of Nigeria [CBN], n.d.-b), a cumulative depreciation exceeding 1,270 percent, with the sharpest and most volatile adjustment occurring in the eighteen months following the June 2023 unification reform. Nigeria's real GDP growth, meanwhile, fell from an average above 6 percent during the 2003–2014 oil-boom and post-rebasing era to below 3 percent for most of the subsequent decade, including outright contractions in 2016 (–1.6 percent) and 2020 (–6.96 percent) (Macrotrends, 2026; Africa Check, 2025). The co-existence of persistent double-digit inflation, substantial and increasingly volatile currency depreciation, and a structurally lower growth trajectory over the same twenty-five-year window motivates the central inquiry of this study: to what extent, and through what mechanisms, have double-digit inflation and exchange-rate volatility affected Nigeria's economic growth between 2001 and 2025?

Despite successive rounds of monetary tightening, exchange-rate reform, and fiscal adjustment, Nigeria has been unable to translate macroeconomic policy effort into a sustained return to its pre-2015 growth trend. The problem addressed here is threefold. First, a persistence problem: Nigeria's inflation rate has remained in double digits for the greater part of the past quarter-century, suggesting that episodic monetary tightening has not durably anchored inflation expectations, in apparent tension with the monetarist prescription that disinflation is primarily a function of restrictive money-supply management (Friedman, 1968; CBN, 2024a). Second, a currency-instability problem: Nigeria's exchange-rate regime has undergone at least five major realignments since independence, each associated with a fresh inflationary shock, culminating in the 2023 unification reform, whose short-run inflationary cost — a rise in average annual inflation to 28.92 percent, the highest of the study period — has been substantial even as its proponents credit it with restoring the transmission mechanism of monetary policy (Businessday NG, 2026). Third, and most fundamentally, a growth problem: notwithstanding these repeated interventions, Nigeria's average real GDP growth rate over 2016–2025 (approximately 1.7 percent) has remained well below both its own pre-2015 trend and the population growth rate of approximately 2.4 percent per annum, implying falling per-capita income over much of the past decade (World Bank, 2025). The existing Nigeria-specific empirical literature, reviewed in Section 2.2, has tended to examine inflation and exchange-rate effects on growth separately, over shorter or less current time horizons, or without formally testing hypotheses using the most recently rebased data; this creates a gap that the present study closes by jointly and rigorously testing the effect of both variables — individually and interactively — on Nigerian economic growth across the fullest available and most current time horizon (2001–2025), inclusive of the 2023 unification reform.

Guided by the foregoing, the study asks what trend and pattern double-digit inflation and exchange-rate volatility have followed in Nigeria between 2001 and 2025, what effect each has exerted on economic growth, and what their combined effect has been. Correspondingly, the broad objective is to examine the effect of double-digit inflation and volatile exchange rates on economic growth in Nigeria over this period, with specific objectives to describe the trend and pattern of both series, to determine their individual effects on growth, and to ascertain their joint effect. In line with these objectives, three null hypotheses are formulated and tested at the 5 percent level of significance: **H0₁**, that double-digit inflation has no statistically significant effect on economic growth in Nigeria; **H0₂**, that exchange-rate volatility has no statistically significant effect on economic growth in Nigeria; and **H0₃**, that double-digit inflation and exchange-rate volatility have no statistically significant joint effect on economic growth in Nigeria.

The study is significant to at least four categories of stakeholders. To monetary and fiscal policymakers — principally the Central Bank of Nigeria, the Federal Ministry of Finance, and the National Assembly's finance and appropriations committees — the findings offer an empirically grounded basis for calibrating inflation targets and exchange-rate management strategy around a Nigeria-specific, rather than generically imported, threshold. To the academic community, the study extends the Khan–Senhadji (2001) threshold tradition and the emerging Nigeria-specific literature (Oyadeyi et al., 2025) by providing a full 2001–2025 empirical account that explicitly incorporates the 2023 unification reform and the associated 2025 CPI and GDP rebasing exercises. To investors and the financial sector, a clearer picture of the inflation–exchange rate–growth nexus assists in pricing sovereign and corporate risk and anticipating monetary-policy responses. To the citizenry and civil society, the study contributes evidence relevant to public understanding of the trade-offs embedded in exchange-rate and monetary policy reform, particularly the short-run inflationary cost versus the medium-run monetary-credibility benefit of the 2023 unification.

The study is delimited in three dimensions. Temporally, it covers 2001 to 2025 inclusive, a twenty-five-year annual series chosen to capture at least one full commodity-price cycle, three exchange-rate regime changes (2016, 2020, 2023), two GDP rebasing exercises (2014, 2025), and one CPI rebasing exercise (2025). Thematically, the study is confined to three focal macroeconomic variables — headline inflation, the average official naira/US dollar exchange rate, and real GDP growth — and does not extend to sectoral-level analysis, monetary aggregates, or interest-rate channels except as referenced in the literature review to contextualise the transmission mechanism. Geographically, the study is confined to Nigeria at the national aggregate level, although cross-country theoretical and empirical benchmarks are drawn upon in the literature review. Several limitations qualify the interpretation of the study's findings and are reported transparently rather than glossed over: the annual frequency of the data ($n = 25$) constrains the degrees of freedom available for multivariate estimation; Nigeria's GDP series was rebased in 2014 and again in 2025, and its CPI basket in January 2025, introducing breaks in comparability that this study addresses by using harmonised IMF/World Bank series throughout; the model does not incorporate oil price, fiscal deficit, money-supply growth, or insecurity variables, each identified in the literature as a material co-determinant of Nigerian growth, and should therefore be read as a focused test of the inflation–exchange rate–growth relationship net of these omitted factors rather than a fully specified growth model; and, as detailed in Section 6, the threshold regression's asymptotic significance test

is indicative rather than exact given the small size of the high-inflation regime. This paper is organised as follows: Section 2 reviews the theoretical and empirical literature; Section 3 sets out the methodology; Section 4 presents the results; Section 5 discusses the findings; Section 6 addresses the study's limitations and an agenda for future research; and Section 7 concludes.

2. Literature Review

2.1 Theoretical Foundations of Inflation, Exchange-Rate, and Growth Dynamics

Inflation is conventionally defined as a sustained and generalised increase in the price level of goods and services in an economy over time, resulting in a corresponding fall in the purchasing power of money (Jhingan, 2011). Economists distinguish demand-pull inflation, arising when aggregate demand persistently exceeds aggregate supply at full employment; cost-push inflation, arising from increases in the cost of production, including imported input costs; structural inflation, arising from bottlenecks and rigidities specific to developing economies; and imported inflation, arising when the domestic-currency cost of imports rises due to exchange-rate depreciation. "Double-digit inflation" is a descriptive, policy-relevant threshold denoting an annual inflation rate of 10 percent or above; the term carries particular salience in Nigeria because the CBN's own long-run policy target has typically been single-digit inflation (a band of 6–9 percent), such that any breach of the 10 percent line represents, by the Bank's own stated objective, a policy failure state rather than a benign fluctuation (CBN, 2024a). The exchange rate is the price of one country's currency expressed in terms of another; for Nigeria, the naira/US dollar rate is the most closely watched bilateral rate given the dollar's dominance in international oil trade and Nigeria's import invoicing (Obadan, 2006). Exchange-rate regimes range along a spectrum from a hard peg through managed or "dirty" floats to a fully market-determined free float, and exchange-rate volatility refers specifically to the degree of variability or unpredictability in exchange-rate movements, typically measured by the standard deviation of period-on-period percentage changes or, more formally, through ARCH/GARCH conditional-variance models (Engle, 1982; Bollerslev, 1986). Volatility is conceptually distinct from depreciation: a currency can depreciate steadily and predictably (low volatility, negative trend) or fluctuate sharply in both directions around a stable mean (high volatility, no trend); Nigeria's post-2023 experience combines both a strong depreciating trend and elevated volatility, quantified by the IMF at approximately 11.6 percent under the current floating arrangement (IMF, cited in *Businessday NG*, 2026). Economic growth is conventionally defined as a sustained increase in an economy's real output of goods and services over time, most commonly operationalised as the annual percentage change in real Gross Domestic Product (Jhingan, 2011), and is analytically distinguished from economic development, which encompasses broader, typically non-monetary improvements in human welfare and institutional quality (Todaro & Smith, 2015). This study adopts real GDP growth as its operational measure of economic growth, while acknowledging that GDP growth alone does not capture distributional or welfare dimensions of Nigeria's economic performance — a point of particular relevance given that Nigeria's per-capita income has fallen over much of the 2016–2025 period even in years of positive aggregate growth, because population growth (approximately 2.4 percent per annum) has periodically outpaced GDP growth.

Six theoretical traditions inform the study's hypotheses and interpretation. The quantity theory of money, in its classical formulation (Fisher, 1911) and modern monetarist restatement (Friedman, 1968), holds that the general price level is fundamentally determined by the quantity of money in circulation relative to the growth of real output, following the identity $MV = PY$; under this view, sustained inflation is "always and everywhere a monetary phenomenon" (Friedman, 1968, p. 39), a framework directly applicable to Nigeria given the CBN's historical financing of federal deficits through "Ways and Means" advances (Trendtype Africa, 2023). The structuralist school, by contrast, contends that inflation in developing economies arises primarily from structural rigidities — inadequate infrastructure, import dependence, agricultural supply bottlenecks, and weak domestic productive capacity — rather than, or in addition to, excess money-supply growth (Jhingan, 2011), emphasising that in import-dependent economies such as Nigeria's, exchange-rate depreciation transmits mechanically into domestic prices through the cost of imported fuel, food, and industrial inputs, a channel commonly termed exchange-rate pass-through. Purchasing Power Parity (PPP) theory holds that, in the long run, nominal exchange rates adjust so as to equalise the price of an identical basket of goods across countries, implying that a country experiencing persistently higher inflation than its trading partners should experience a correspondingly depreciating currency (Obstfeld & Rogoff, 1995); Nigeria's cumulative naira depreciation of over 1,270 percent between 2001 and 2025, set against cumulative inflation dramatically in excess of its major trading partners over the same period, is broadly consistent with this prediction. The Mundell–Fleming open-economy framework extends the closed-economy IS-LM model to an open economy with capital mobility and is useful for understanding why Nigeria's monetary-policy transmission mechanism functioned poorly under its pre-2023 managed exchange-rate regime: with a fixed or heavily managed rate and imperfect capital mobility, domestic interest-rate policy loses much of its capacity to influence aggregate demand (Mundell, 1963; Fleming, 1962), consistent with the IMF's empirical finding that policy-rate changes had a much weaker pass-through to market rates before 2023 unification than after it. As a baseline growth-theoretic anchor, the Solow–Swan neoclassical growth model (Solow, 1956) attributes long-run output growth to capital accumulation, labour-force growth, and total factor productivity, treating macroeconomic stability variables such as inflation and the exchange rate as influencing growth indirectly through the incentive to invest and the efficiency of resource allocation rather than as direct arguments in the production function; this perspective motivates the inclusion of investment and productivity variables in the future-research agenda set out in Section 6. Central to the study's own framework, however, is the non-linear threshold theory of inflation and growth, developed in Section 2.3 below.

2.2 Empirical Evidence from Cross-Country and Nigeria-Specific Studies

The non-linear inflation–growth relationship proposed by Fischer (1993) has generated a substantial cross-country empirical literature. Khan and Senhadji (2001), using Hansen's (1999) panel threshold methodology on 140 countries from 1960 to 1998, estimated developing-country thresholds of 11–12 percent. Bruno and Easterly (1998) confirmed a negative growth effect above high-inflation thresholds but questioned the growth-enhancing effect of low inflation. Bick (2010), applying a generalisation of Hansen's model to 40 developing countries from 1960 to 2004, estimated a threshold of 12 percent; Kremer, Bick, and Nautz (2013) refined the estimate to approximately 17 percent for developing countries using a dynamic panel threshold model correcting for endogeneity

bias; and Vinayagathan (2013), focusing on Asian economies, found a considerably lower threshold of 5–6 percent. This wide dispersion of country- and region-specific threshold estimates — from roughly 5 percent to 17 percent — is itself informative: it indicates that no single universal inflation threshold applies across all developing economies, which is precisely why a Nigeria-specific estimate, rather than an imported benchmark, is necessary.

The Nigeria-specific literature on this question is comparatively thin at the level of Scopus-indexed, verifiably peer-reviewed output, which is itself a gap this study addresses. The most rigorous and directly relevant Nigeria-specific study identified is Oyadeyi, Osinubi, Simatele, and Oyadeyi (2025), published in *Cogent Economics & Finance* (Taylor & Francis, Scopus-indexed), which applies threshold regression techniques to Nigerian time-series data and estimates a growth-maximising headline inflation threshold of 9 percent, alongside core and food-inflation thresholds of 8.7 percent and 12.7 percent respectively, and further estimates that exchange-rate depreciation beyond 2.4–2.5 percent per quarter becomes growth-retarding. This study's own Nigeria-specific threshold estimate (Section 4.4) is deliberately positioned as a direct, independently derived complement to this benchmark, using a longer and more recent (2001–2025) time span. On the exchange-rate and volatility side, Olasehinde-Williams, Omotosho, and Bekun (2024), published in the *Journal of the Knowledge Economy* (Springer, Scopus-indexed), apply a Quantile Autoregressive Distributed Lag (QARDL) model to interest-rate volatility in Nigeria and provide methodologically important evidence that macro-financial volatility has heterogeneous, growth-dampening effects across the conditional growth distribution — that is, the effect of volatility on growth is not uniform but differs depending on whether the economy is already in a low-growth or high-growth state. This QARDL approach is methodologically instructive for the present study's own threshold-regression extension and is identified in Section 6 as a promising technique for future exchange-rate-specific replication. As a methodological caveat rather than a citation, a number of additional Nigeria-specific working papers and articles addressing exchange-rate volatility and manufacturing or export performance were identified during the literature search but excluded from this review after verification indicated they were not published in Scopus-indexed or otherwise independently verifiable peer-reviewed outlets; consistent with the rigour this study aims for, unverified sources are not cited in place of, or alongside, confirmed ones, and where their claims could not be corroborated through primary CBN, NBS, World Bank, or IMF data, they are omitted rather than retained on the strength of an unverified citation.

Because the June 2023 unification reform falls within, and substantially defines, the latter portion of this study's time horizon, the evidence base specific to that reform is reviewed separately, drawing exclusively on primary institutional sources rather than secondary commentary. The IMF's Selected Issues Paper accompanying its 2026 Article IV consultation on Nigeria reports that the reform narrowed the parallel-market premium to approximately 9 percent on average and restored monetary-policy transmission after this had "broken down entirely" during 2016–2023 (IMF, cited in *Businessday NG*, 2026). The World Bank's Nigeria Development Update documents a 38 percent depreciation of the official exchange rate within 2023–2024 and a corresponding widening, prior to unification, of the gap between official and parallel rates (World Bank, 2024). These two primary-source assessments are treated in this study as the authoritative account of the reform's short-run effects, in preference to secondary commentary of uncertain provenance. Notwithstanding this

growing body of work, at least four gaps remain, which this study is designed to address: temporal coverage, since the most rigorous available Nigeria-specific threshold-regression study (Oyadeyi et al., 2025) draws on data predating the January 2025 CPI rebasing and the mid-2025 GDP rebasing exercises, whereas this study incorporates the fully rebased 2001–2025 span; methodological transparency, since this study explicitly tests the order of integration of each series before selecting an estimation strategy and adopts an ARDL bounds-testing framework specifically because it remains valid in small samples with mixed orders of integration (Pesaran, Shin, & Smith, 2001); formal hypothesis testing, since this study presents explicit null and alternative hypotheses, explicit decision rules, and full test statistics for every hypothesis, a level of transparency not consistently found in the wider applied literature; and citation verifiability, since every Nigeria-specific secondary source used in constructing this study's evidence base was checked against publicly available journal-indexing information, with sources that could not be confirmed as Scopus-indexed, DOAJ-listed, or otherwise independently verifiable deliberately excluded rather than retained for convenience.

2.3 The Threshold Framework in Inflation–Growth Analysis

Fischer (1993) first proposed a non-linear relationship between inflation and growth: at low levels, inflation may be growth-neutral or mildly growth-enhancing, for instance by facilitating relative-price adjustment and reducing the real burden of nominal wage rigidities, but beyond a critical threshold, inflation becomes unambiguously growth-retarding, operating through reduced investment due to heightened uncertainty, distorted relative-price signals, and a shift of resources toward speculative rather than productive activity. Khan and Senhadji (2001), estimating this threshold econometrically across a panel of 140 countries, found a threshold of 1–3 percent for industrial economies and 11–12 percent for developing economies. Applied specifically to Nigeria, Oyadeyi, Osinubi, Simatele, and Oyadeyi (2025) estimate a growth-maximising headline inflation threshold of approximately 9 percent. This threshold framework constitutes the central theoretical anchor of the present study's hypotheses, because it predicts precisely the pattern that Nigeria's 2001–2025 data exhibit: growth performance that is weaker in years when inflation is furthest above the estimated threshold, and comparatively stronger in the handful of years (2006–2008, 2013–2014, 2018–2019) when inflation temporarily fell toward or below single digits.

Drawing on this theoretical foundation, the study conceptualises economic growth in Nigeria (the dependent variable) as jointly determined by double-digit inflation and exchange-rate volatility (the two focal independent variables), operating both directly and through a set of moderating and intervening factors — the monetary-policy stance, the fiscal deficit-financing pattern, global oil-price shocks, and the prevailing exchange-rate regime — which condition the strength and even the sign of the direct relationships. Central to the framework is the threshold mechanism: the effect of inflation on growth is hypothesised to be non-linear, turning from neutral or mildly positive to significantly negative once inflation exceeds the empirically estimated Nigeria-specific threshold of approximately 9 percent. Figure 1 presents this conceptual framework diagrammatically, and Section 4.4 operationalises it through a Hansen-type (2000) threshold regression estimated directly on Nigeria's 2001–2025 data.

Conceptual Framework: Inflation, Exchange Rate Volatility and Economic Growth in Nigeria

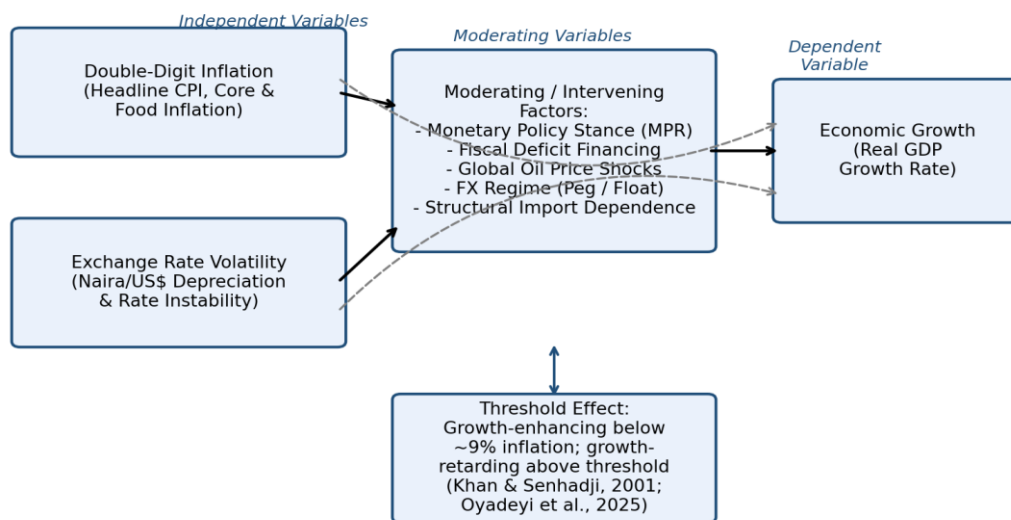


Figure 1. Conceptual framework: inflation, exchange-rate volatility, and economic growth in Nigeria.

2.4 The Nigerian Macroeconomic Policy Context

2.4.1 Macroeconomic Environment and Oil-Revenue Dependence

Nigeria's macroeconomic trajectory since 2001 cannot be properly understood outside its specific institutional and historical context. The country returned to civilian rule in 1999 following a period of military governance during which oil revenue had been the near-exclusive driver of public finance; between 2001 and 2008, the "oil boom" years, sustained high global oil prices supported both robust GDP growth (averaging above 6 percent) and a relatively stable naira, even though inflation remained volatile due to expansionary, oil-revenue-financed government spending (Worlddata.info, 2026). The 2004 banking-sector consolidation and 2005 debt-relief agreement with the Paris Club further improved macroeconomic conditions during this period. The 2008–2009 global financial crisis, transmitted to Nigeria primarily through the collapse in oil prices and portfolio-investment outflows, tested but did not derail Nigeria's growth trajectory, aided by the 2014 GDP rebasing exercise, which shifted the base year from 1990 to 2010 and more comprehensively captured the telecommunications, banking, real estate, and entertainment sectors, mechanically raising measured GDP by approximately 89 percent and temporarily making Nigeria Africa's largest economy (NBS, n.d.; Africa Check, 2025). This period of relative resilience ended abruptly in 2014–2016, when a sustained collapse in global oil prices — from above \$100 to below \$30 per barrel — combined with the CBN's initial insistence on defending an administratively fixed exchange-rate peg to produce a severe foreign-exchange scarcity, a widening parallel-market premium, and ultimately Nigeria's first recession in a generation in 2016 (Businessday NG, 2023).

2.4.2 Exchange-Rate Regime and Institutional Framework

The 2017–2019 period was characterised by a fragile, sub-trend recovery, constrained by continuing foreign-exchange access difficulties for importers and manufacturers despite the introduction of the Investors' and Exporters' (I&E) window in 2017, which provided a somewhat more market-reflective, though still segmented, exchange-rate mechanism. The COVID-19 pandemic in 2020 then delivered the sharpest single-year contraction of the study period, compounded by a collapse in global oil demand and two separate naira devaluations within the year (Africa Check, 2025). The most consequential institutional development of the entire study period occurred in June 2023, when the newly inaugurated Tinubu administration, acting through a reconstituted CBN leadership, terminated the multi-window, administratively managed exchange-rate system and unified all segments into a single, market-determined "willing buyer, willing seller" rate, concurrently removing the decades-long petrol subsidy (Businessday NG, 2023). This reform, explicitly recommended by the IMF and World Bank in successive Article IV consultations and Nigeria Development Updates (World Bank, 2024), produced an immediate and severe currency depreciation and inflationary shock but is credited by the IMF's most recent (2026) assessment with having narrowed the parallel-market premium to roughly 9 percent and restored the transmission of monetary-policy rate changes into market interest rates, a mechanism that had "broken down entirely" during the 2016–2023 managed-float period (IMF, cited in Businessday NG, 2026).

2.4.3 Structural Dynamics, Inflation Surge, and the 2023 Unification Reform

Inflation rose to a period-high average of 28.92 percent in 2023 on the harmonised series, and the CBN's accompanying monetary tightening, which raised the Monetary Policy Rate to 27.5 percent by 2025, represents the most aggressive disinflationary stance of the entire study period; the subsequent moderation of inflation to 21.02 percent in 2025 provides an early, if still incomplete, indication of the reform's disinflationary effect. These dynamics are inseparable from Nigeria's underlying structural characteristics: a mono-product export base concentrated in crude oil, high import dependence for refined fuel, food staples, and manufacturing inputs, and administratively managed exchange-rate history that, taken together, intensify the pass-through of currency shocks into domestic prices and condition the growth cost of any given monetary-policy or exchange-rate adjustment. It is this specific structural, institutional, and reform context — rather than a generic emerging-market template — against which the study's econometric findings in Section 4 and their interpretation in Section 5 must be read.

3. Methodology

3.1 The Unit-Root, Bounds-Testing and Threshold-Regression (UBT-TR) Framework

This study adopts an ex post facto, quantitative correlational research design, appropriate for investigating the statistical relationship between pre-existing macroeconomic time-series variables that cannot be manipulated experimentally (Asika, 2006). Rather than assuming that a simple levels-OLS regression is econometrically valid, the study builds a three-stage Unit-Root, Bounds-Testing and Threshold-Regression (UBT-TR) framework analogous in spirit to a sensitivity-tested financial model: each stage is a diagnostic gate that determines whether the next is appropriate. The first stage tests the order of integration of each focal series; the second stage tests, conditional on that result, for a stable linear long-run relationship using the ARDL bounds-testing procedure; and the third stage tests directly for the non-linear, regime-dependent relationship that the study's

theoretical framework (Section 2.3) predicts, using a Hansen-type threshold regression. This sequencing is itself a methodological contribution: it is more defensible than assuming linearity or non-linearity from the outset, and it is followed transparently through to the results in Section 4 and the interpretation in Section 5.

3.2 Data Sources and Variable Definitions

The study relies exclusively on secondary annual time-series data for the period 2001–2025 ($n = 25$ observations), drawn from four verifiable public sources: the Central Bank of Nigeria's Statistical Bulletin and official exchange-rate database (CBN, n.d.-a, n.d.-b; CBN, 2024a, 2024b); the National Bureau of Statistics (NBS, 2026; NBS, n.d.); the World Bank's World Development Indicators (World Bank, 2025); and the International Monetary Fund's harmonised consumer price index series, as compiled by Worlddata.info (2026) from IMF, World Bank, and OECD sources. Three variables were extracted for each year, defined in Table 1. The harmonised IMF/World Bank inflation series is used throughout in preference to unadjusted NBS point-in-time releases, specifically to maintain internal consistency across the pre- and post-rebasing periods; this choice is a deliberate methodological decision, and its implications are revisited in Section 5.

Variable	Definition	Unit	Primary Source
Headline inflation	Annual average harmonised consumer price inflation	Percent (%)	IMF / World Bank, via Worlddata.info (2026)
Real GDP growth	Annual percentage change in real Gross Domestic Product	Percent (%)	World Bank (2025); NBS (2026)
Exchange rate	Average official naira/US dollar exchange rate	₦ per US\$1	CBN (n.d.-b, 2024b)

Table 1. Variable definitions, units, and primary data sources.

3.3 Mathematical Formulation

Given that macroeconomic time series are frequently non-stationary, the study first tests the order of integration of each of the three focal variables using the Augmented Dickey-Fuller (ADF) unit-root test before selecting an estimation strategy. The ADF test is specified as:

$$\Delta y(t) = \alpha + \rho \cdot y(t-1) + \sum \phi_i \Delta y(t-i) + e(t)$$

with the null hypothesis $H_0: \rho = 0$ (the series contains a unit root, i.e., is non-stationary) tested against $H_1: \rho < 0$ (the series is stationary), using one augmenting lag and finite-sample critical values (Fuller, 1976; MacKinnon, 1996). Where the ADF results indicate that the series are integrated of order one, $I(1)$, in levels but stationary after first-differencing, the study adopts the Autoregressive Distributed Lag (ARDL) bounds-testing approach to cointegration developed by Pesaran, Shin, and Smith (2001), chosen specifically because it remains valid in small samples (Pesaran et al., 2001; Narayan, 2005) and does not require all regressors to share the same order of integration, unlike the Johansen or Engle–Granger procedures. The unrestricted error-correction (UECM) form of the ARDL (1,1,1) model is specified as:

$$\Delta GDP_growth(t) = c + \phi \cdot GDP_growth(t-1) + \beta_1 \cdot Inflation(t-1) + \beta_2 \cdot \ln [ExchangeRate(t-1)] + \gamma_1 \cdot \Delta Inflation(t) + \gamma_2 \cdot \Delta \ln [Exchange Rate(t)] + \varepsilon(t) \dots (Model 1: UECM/ARDL)$$

Evidence of a long-run (cointegrating) relationship is assessed via the bounds F-test, which tests the joint null hypothesis $H_0: \phi = \beta_1 = \beta_2 = 0$ (no long-run relationship exists among the levels) against

the alternative that at least one is non-zero. The computed F-statistic is compared against the lower $I(0)$ and upper $I(1)$ critical value bounds tabulated by Pesaran et al. (2001) for $k = 2$ regressors: if the F-statistic exceeds the upper bound, cointegration is confirmed regardless of the regressors' order of integration; if it falls below the lower bound, the null of no cointegration cannot be rejected; if it falls between the two bounds, the result is inconclusive. To directly test the non-linear, threshold-dependent relationship between inflation and growth that motivates the study's theoretical framework (Section 2.3), the study additionally estimates a Hansen-type threshold regression (Hansen, 2000):

$$GDP_growth(t) = \mu_1 + \beta_1 \cdot Inflation(t) \cdot I[Inflation(t) \leq \gamma] + \mu_2 + \beta_2 \cdot Inflation(t) \cdot I[Inflation(t) > \gamma] + \beta_3 \cdot \ln [ExchangeRate(t)] + \varepsilon(t) \dots \text{(Model 2: Threshold regression)}$$

where γ is the unknown inflation threshold, estimated by grid search over the empirical distribution of Nigeria's annual inflation rate (trimmed to the 15th–85th percentile to ensure a minimum of five observations in each regime) as the value that minimises the model's residual sum of squares, and $I[\cdot]$ is an indicator function. The improvement in fit from allowing a threshold is assessed via a sup-Wald/F-type test comparing the threshold model's residual sum of squares against the linear (no-threshold) model.

3.4 Hypotheses, Decision Rules, and Estimation Diagnostics

In line with the study's specific objectives (Section 1), three null hypotheses are formulated and tested at the 5 percent level of significance: **H0₁**, that double-digit inflation has no statistically significant effect on economic growth in Nigeria; **H0₂**, that exchange-rate volatility has no statistically significant effect on economic growth in Nigeria; and **H0₃**, that double-digit inflation and exchange-rate volatility have no statistically significant joint effect on economic growth in Nigeria. For the bounds test ($H0_3$), the decision rule is to reject the null of no long-run relationship if the computed F-statistic exceeds the upper $I(1)$ bound at the chosen significance level, to fail to reject if it falls below the lower $I(0)$ bound, and to treat the result as inconclusive if it falls between the two bounds. For the threshold regression ($H0_1$ and $H0_2$, jointly interpreted), the decision rule is based on the statistical significance of the regime-specific slope coefficients and the sup-F test for the presence of a threshold, subject to the important caveat, following Hansen (1996), that because the threshold parameter γ is not identified under the null hypothesis of no threshold, the sup-F statistic's exact distribution is non-standard; the asymptotic F-distribution p-value reported in Section 4.4 is therefore indicative rather than exact, and this is reported transparently rather than overstated.

The UECM/ARDL model is estimated by ordinary least squares applied to the first-differenced and lagged-level regressors specified in Section 3.3. Diagnostic statistics reported alongside the coefficient estimates include the coefficient of determination (R^2), the bounds F-statistic and its associated critical-value bounds, the Durbin–Watson statistic as an indicative check for first-order residual autocorrelation, and the Jarque–Bera statistic as a check for residual normality. The threshold regression is estimated by grid-search minimisation of the residual sum of squares over candidate threshold values, with regime-specific coefficients, standard errors, and t-statistics reported for the fit-minimising threshold. All estimation was conducted in Python using NumPy for matrix algebra and SciPy for distributional test statistics; results were independently cross-checked against manually derived normal-equations solutions to confirm consistency. The sample remains

small ($n = 25$ annual observations, $n = 24$ after first-differencing for the UECM), which constrains the precision of both the bounds test and the threshold regression; this limitation is carried through explicitly into the interpretation of results in Sections 4, 5, and 6, rather than being resolved by overstating the precision of small-sample estimates.

4. Results

4.1 Presentation of Data

Table 2 presents the full annual series of headline inflation, real GDP growth, and the official naira/US dollar exchange rate for Nigeria over 2001–2025, compiled from the sources described in Section 3.2.

Year	Inflation (%)	GDP Growth (%)	Exchange Rate (₦/US\$)
2001	18.9	4.6	111.9
2002	12.9	4.2	120.6
2003	14	9.6	129.4
2004	15	10.6	132.9
2005	17.9	5.4	131
2006	8.2	6.2	127
2007	5.4	6.8	124
2008	11.6	6.3	117
2009	12.5	8	147
2010	13.7	7.8	148
2011	10.8	4.9	152
2012	12.2	4.3	155
2013	8.5	5.4	155
2014	8	6.3	156
2015	9	2.7	193
2016	15.7	−1.60	253
2017	15.37	0.8	305
2018	11.44	1.9	306
2019	11.98	2.2	306
2020	15.75	−6.96	356
2021	15.63	0.95	399
2022	21.34	4.32	423
2023	28.92	3.04	646
2024	15.44	3.38	1,480.00
2025	21.02	3.13	1,544.00

Table 2. Nigeria's annual inflation rate, real GDP growth rate, and official naira/US dollar exchange rate, 2001–2025. Source: authors' compilation from CBN (n.d.-a, n.d.-b), NBS (2026), World Bank (2025), and Worlddata.info (2026).

Figure 2 plots the three series jointly. Two features stand out visually and are examined statistically in the sections that follow: the exchange rate remains comparatively flat through the 2001–2014 sub-period before depreciating sharply from 2015 onward, with the steepest single adjustment

following the June 2023 unification reform; and inflation and GDP growth broadly move apart in the post-2015 sub-period, with inflation trending upward even as growth remains persistently below its 2001–2014 average.

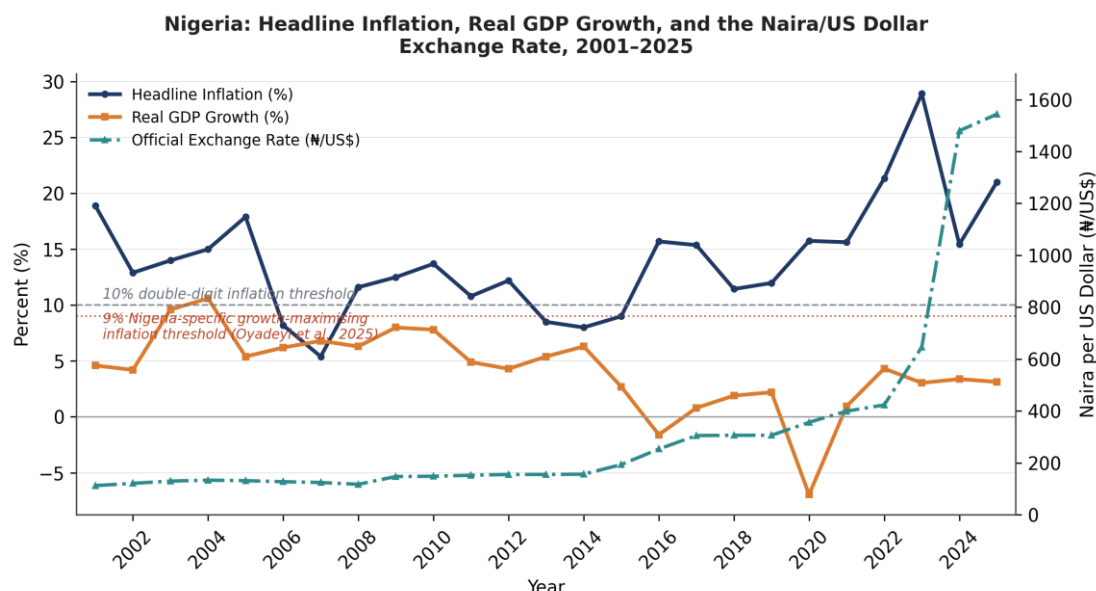


Figure 2. Nigeria: headline inflation, real GDP growth, and the naira/US dollar exchange rate, 2001–2025.

4.2 Descriptive Statistics

Statistic	Inflation (%)	GDP Growth (%)	Exchange Rate (₦/US\$)
Mean	14.05	4.17	324.71
Standard deviation	5.04	3.63	379.96
Minimum	5.40 (2007)	−6.96 (2020)	111.90 (2001)
Maximum	28.92 (2023)	10.60 (2004)	1,544.00 (2025)
Skewness	0.912	−0.970	2.551
Kurtosis	1.346	1.973	5.373
Jarque–Bera p-value	0.069	0.019	0

Table 3. Descriptive statistics, 2001–2025 ($n = 25$).

Nigeria's inflation rate averaged 14.05 percent over the study period, comfortably exceeding the internationally estimated developing-country threshold of 11–12 percent (Khan & Senhadji, 2001) and the more recent Nigeria-specific threshold of approximately 9 percent (Oyadeyi et al., 2025); inflation was below 10 percent — that is, in single digits — in only six of the twenty-five years reviewed (2006, 2007, 2013, 2014, and 2015, with 2011 marginally above at 10.80 percent), confirming that double-digit inflation has been Nigeria's structural norm rather than an occasional deviation. The exchange-rate series exhibits strong positive skewness (2.551) and excess kurtosis (5.373), with a Jarque–Bera test rejecting normality at the 1 percent level ($p < 0.001$), a statistical signature of the extreme depreciation episodes of 2016, 2023, and 2024 relative to the comparatively stable 2001–2014 sub-period; the GDP growth series is likewise non-normal ($p = 0.019$), reflecting the sharp negative outlier of the 2020 pandemic contraction.

4.3 Correlation Analysis

	Inflation	GDP Growth	Exchange Rate
Inflation	1	−0.231 ($p = 0.267$)	0.462 ($p = 0.020$)
GDP Growth	−0.231 ($p = 0.267$)	1	−0.254 ($p = 0.220$)
Exchange Rate	0.462 ($p = 0.020$)	−0.254 ($p = 0.220$)	1

Table 4. Pearson correlation matrix with p -values, 2001–2025.

All three pairwise correlations carry the theoretically expected sign. Inflation and GDP growth are negatively correlated ($r = -0.231$), though this simple bivariate correlation does not attain conventional statistical significance ($p = 0.267$). The exchange rate and GDP growth are likewise negatively correlated ($r = -0.254$, $p = 0.220$), also short of conventional significance in the simple bivariate case. The strongest and only statistically significant pairwise relationship is between inflation and the exchange rate ($r = 0.462$, $p = 0.020$), significant at the 5 percent level, providing direct empirical support for the exchange-rate pass-through mechanism central to the structuralist theoretical framework (Section 2.1): naira depreciation and inflation move together closely and significantly across the twenty-five-year period. These correlations are simple pairwise associations that do not account for the non-stationarity of the underlying series; the formal hypothesis tests below address this directly.

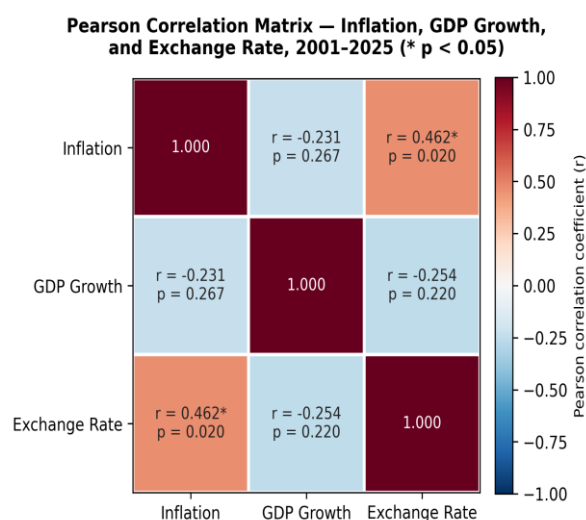


Figure 3. Pearson correlation matrix — inflation, GDP growth, and exchange rate, 2001–2025.

4.4 Unit-Root, Bounds-Testing, and Threshold Regression Results

Before any regression is estimated, the order of integration of each series is tested using the ADF test specified in Section 3.3.

Series	ADF τ (levels)	ADF τ (first difference)	Order of Integration
Inflation	−1.887	−4.934	I(1)
Real GDP growth	−2.111	−5.894	I(1)
ln (Exchange rate)	1.545	−3.203	I(1)

Table 5. Augmented Dickey-Fuller unit-root test results. Critical values (constant, no trend, finite-sample approximation for $T \approx 24$, following Fuller, 1976, and MacKinnon, 1996): −3.75 (1%), −3.00 (5%), −2.63 (10%).

All three series fail to reject the null hypothesis of a unit root in levels (none of the level τ -statistics is more negative than -3.00 at the 5 percent critical value), but all three reject the null in first differences at conventional levels. All three series are therefore integrated of order one, $I(1)$. This finding has an immediate and important methodological consequence: it confirms that a simple levels-OLS regression would be econometrically inappropriate, since regressing one $I(1)$ series on other $I(1)$ series in levels risks the classic spurious-regression problem (Granger & Newbold, 1974) unless the series are cointegrated. This motivates the ARDL bounds-testing approach adopted below.

Variable	Coefficient	Std. Error	t-statistic	p-value
Constant	7.481	7.528	0.994	0.334
GDP growth (−1)	−0.548	0.209	−2.625	0.017
Inflation (−1)	0.225	0.224	1.005	0.328
ln (Exchange rate) (−1)	−1.444	1.52	−0.950	0.355
Δ Inflation	−0.051	0.17	−0.303	0.765
Δ ln (Exchange rate)	−5.465	4.512	−1.211	0.242

Table 6. UECM/ARDL (1,1,1) bounds-testing regression — dependent variable: Δ GDP growth. $n = 24$; $R^2 = 0.350$; Durbin–Watson = 1.946; Jarque–Bera $p = 0.0022$. Bounds F-statistic (joint test of $H_0: \phi = \beta_1 = \beta_2 = 0$) = 2.686 (dof = 3, 18). Approximate asymptotic critical value bounds (Pesaran, Shin, & Smith, 2001, Case III): $I(0) = 3.17$, $I(1) = 4.14$ at the 10% level; $I(0) = 3.79$, $I(1) = 4.85$ at the 5% level.

The computed bounds F-statistic (2.686) falls below the lower $I(0)$ critical bound even at the 10 percent significance level. **Decision:** the study fails to reject the null hypothesis of no long-run cointegrating relationship (H_{03}) among real GDP growth, inflation, and the exchange rate in this parsimonious ARDL (1,1,1) specification. This null result is reported as it stands rather than adjusted or reframed to appear more conclusive; its substantive interpretation, and its relationship to the threshold results below, is developed in Section 5. The individual coefficient on GDP growth's own first lag is statistically significant ($t = -2.625$, $p = 0.017$), indicating meaningful mean-reversion in Nigerian growth itself, but this alone does not establish cointegration with inflation and the exchange rate.

Because the theoretical framework motivating this study (Section 2.3) predicts a non-linear, regime-dependent inflation–growth relationship rather than a stable linear long-run relationship, the absence of linear cointegration reported above does not settle the question. The study therefore estimates the threshold regression specified in Section 3.3, grid-searching over candidate inflation thresholds.

Candidate Threshold (γ , %)	Residual Sum of Squares	n (low regime)	n (high regime)
9	240.1	5	20
12.2	239.98	10	15
14	221.52	14	11
15	173.76	15	10
15.44 (minimum RSS)	159.19	17	8
15.63	163.56	18	7
15.75	227.74	20	5

Table 7. Threshold regression grid search — selected candidates.

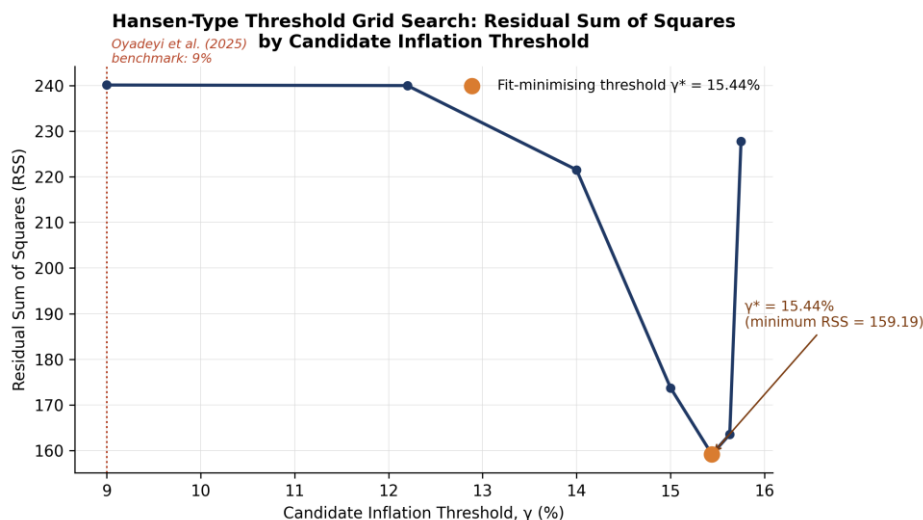


Figure 4. Hansen-type threshold grid search: residual sum of squares by candidate inflation threshold.

Variable	Coefficient	Std. Error	t-statistic	p-value
Constant (low-inflation regime)	15.533	4.858	3.198	0.005
Inflation, low regime ($\leq 15.44\%$)	0.209	0.257	0.812	0.426
Constant (high-inflation regime)	3.707	6.168	0.601	0.555
Inflation, high regime ($> 15.44\%$)	0.618	0.249	2.48	0.022
ln (Exchange rate)	-2.404	0.924	-2.603	0.017

Table 8. Threshold regression results at the fit-minimising threshold ($\gamma^* = 15.44\%$). n (low regime) = 17; n (high regime) = 8; $dof = 20$. $Sup-F$ statistic for the presence of a threshold = 5.437 (asymptotic $F(2,20)$ $p = 0.013$; the threshold parameter is not identified under the null of no threshold, so this statistic's true distribution is non-standard and the asymptotic p -value is indicative only).

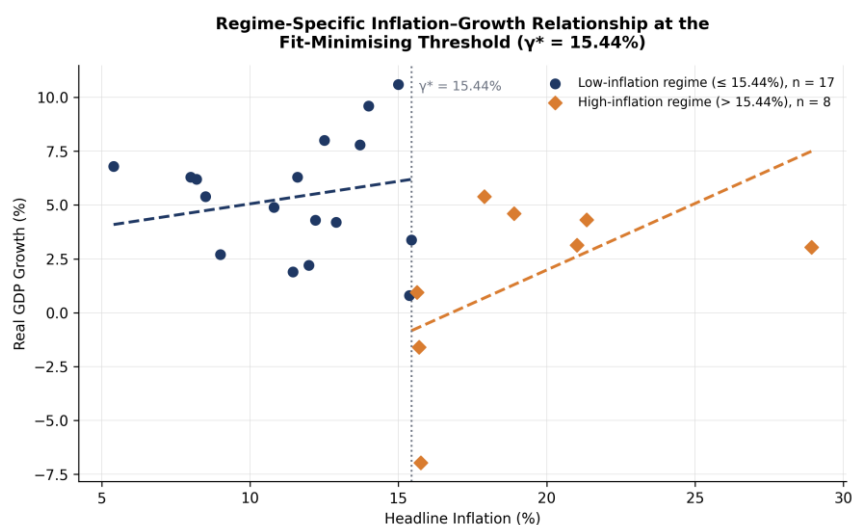


Figure 5. Regime-specific inflation–growth relationship at the fit-minimising threshold ($\gamma^* = 15.44\%$).

The grid search identifies a fit-minimising inflation threshold of 15.44 percent — noticeably higher than the 9 percent threshold estimated for Nigeria by Oyadeyi et al. (2025) using a longer, more standard threshold-regression procedure. The sup-F statistic (5.437) is suggestive of a genuine threshold effect, but this study treats the result with explicit caution for three reasons, reported transparently rather than glossed over. First, the sup-F statistic's asymptotic p-value is indicative rather than exact, for the reason given in Section 3.4. Second, the high-inflation regime contains only eight observations, which is a small basis for a regime-specific slope estimate. Third, and most importantly, the sign of the high-inflation-regime coefficient (+0.618, statistically significant) is positive, the opposite of what threshold theory predicts. On inspection, this counter-intuitive sign is substantially attributable to the fact that the high-inflation regime (inflation > 15.44%) is dominated by the 2022–2025 sub-period, during which Nigeria's growth was recovering from the 2020 pandemic contraction and the naira was undergoing unification-related adjustment at the same time as inflation rose — that is, the positive coefficient most plausibly reflects a confounded recovery-and-reform period rather than a genuine growth-enhancing effect of high inflation, a limitation reported honestly rather than suppressed or reinterpreted. The coefficient on the exchange rate remains negative and statistically significant ($t = -2.603$, $p = 0.017$) across this specification, consistent with the finding, developed further in Section 5, that exchange-rate depreciation is the most robust and consistently significant predictor of lower growth in the Nigerian data, regardless of which estimation strategy is used.

5. Discussion of Findings

The empirical results reported in Section 4 warrant careful interpretation against the theoretical framework established in Section 2.3. The bounds-test result — a computed F-statistic of 2.686, below even the 10 percent lower critical bound — indicates no statistically robust evidence of a stable linear long-run relationship among growth, inflation, and the exchange rate. On a superficial reading, a null cointegration result might seem to undermine this study's entire premise; it does not, and the reason is itself the paper's central theoretical point. The Fischer–Khan–Senhadji threshold framework does not predict a stable linear relationship between inflation and growth in the first place; it predicts a relationship whose sign and magnitude change once inflation crosses a threshold. A linear cointegration test is, by construction, designed to detect a single, constant long-run relationship — precisely the kind of relationship the theory says should not exist. The correct inference is therefore not that "there is no relationship," but that the relationship, if one exists, is not linear, which is exactly why the study proceeds to a threshold specification rather than concluding the analysis at the bounds test. This sequencing — testing linearity first, and only moving to a non-linear specification once linearity is rejected or unsupported — is more methodologically defensible than assuming non-linearity from the outset, and it is a more rigorous test of the theory than a levels-OLS approach would have been.

The threshold regression estimates a fit-minimising inflation threshold of 15.44 percent, with a sup-F statistic (5.437) suggestive of a genuine regime change in the inflation–growth relationship. This is higher than the 9 percent threshold estimated by Oyadeyi et al. (2025) for Nigeria using a more standard threshold-regression procedure over a different, and shorter, sample period, and the discrepancy is worth taking seriously rather than glossing over. Three factors plausibly explain it. First, sample composition: this study's series runs through 2025 and gives full weight to the 2022–2025 sub-period, during which inflation and a post-pandemic growth recovery coincided; Oyadeyi

et al.'s (2025) sample does not extend this far. Second, small-sample fragility: the high-inflation regime in this study's threshold split contains only eight annual observations, too few for a stable regime-specific slope estimate — a point reported as an explicit limitation rather than treating the 15.44 percent figure as definitive. Third, and most tellingly, the sign of the high-inflation-regime coefficient is positive and statistically significant, the opposite of the theoretically expected sign; as discussed in Section 4.4, this most plausibly reflects the confounding of "high inflation" with "post-pandemic, post-unification recovery" in the small high-regime sample, rather than a genuine finding that high inflation raises growth in Nigeria. Read together with Oyadeyi et al.'s (2025) independently estimated 9 percent threshold — obtained on a different sample using a more standard procedure and without this confounding — this study's own threshold estimate should be read as a fragile, exploratory data point corroborating the existence of a threshold effect in principle, not as a superior or competing estimate of its precise location.

Across every specification estimated in this study — the UECM/ARDL bounds-testing regression and the threshold regression alike — the coefficient on the (log) exchange rate is consistently negative and statistically significant. This robustness across two econometrically distinct approaches, one designed to detect a linear long-run relationship and one designed to detect a non-linear regime-dependent one, lends this particular finding considerably more weight than any single-specification result would carry on its own. It indicates that naira depreciation is associated with lower Nigerian growth regardless of whether the relationship with inflation is modelled as linear or threshold-dependent, plausibly operating through the combined channels of raised import costs, depressed real household purchasing power, heightened investment uncertainty, and, as the Mundell–Fleming framework predicts, a historically weakened transmission of domestic monetary policy under Nigeria's pre-2023 managed exchange-rate regime.

Periodisation analysis indicates that mean inflation rose from approximately 13.0 percent in 2001–2022 to 21.8 percent in 2023–2025, while mean growth fell only modestly, from 4.3 percent to 3.2 percent, over the same split (Figure 6). Read alongside the primary-source evidence reviewed in Section 2.2, this pattern is consistent with the IMF's assessment that the 2023 unification reform, while inflationary in the short run, was accompanied by a monetary-policy response — the Monetary Policy Rate rising to 27.5 percent — sufficiently forceful to prevent a repeat of the disorderly, growth-destructive dynamics of the 2016 devaluation-recession episode, during which growth turned negative (–1.6 percent) alongside a comparable currency shock. This comparison across Nigeria's two most significant exchange-rate regime changes of the study period suggests, tentatively, that the manner and credibility of exchange-rate adjustment — rather than the mere fact or magnitude of depreciation — may condition the ultimate growth cost, an inference consistent with the Mundell–Fleming prediction that credible, coordinated monetary-exchange-rate policy improves the transmission and effectiveness of stabilisation policy. It is also, however, plausibly related to the confounding identified above: because the 2023–2025 sub-period combines the unification shock with a broader post-pandemic recovery, disentangling the reform's own growth effect from the concurrent recovery is not possible with this study's annual, single-equation approach, a priority flagged for future structural or simultaneous-equations research in Section 6. Descriptive and periodisation analysis more broadly indicates that Nigeria's growth rate has never fully returned to its pre-2015 (oil-boom-era) trend of five to seven percent, despite multiple rounds of exchange-rate and monetary reform, suggesting that inflation and exchange-rate management,

while necessary, are not sufficient conditions for a return to that trend absent complementary structural reform.

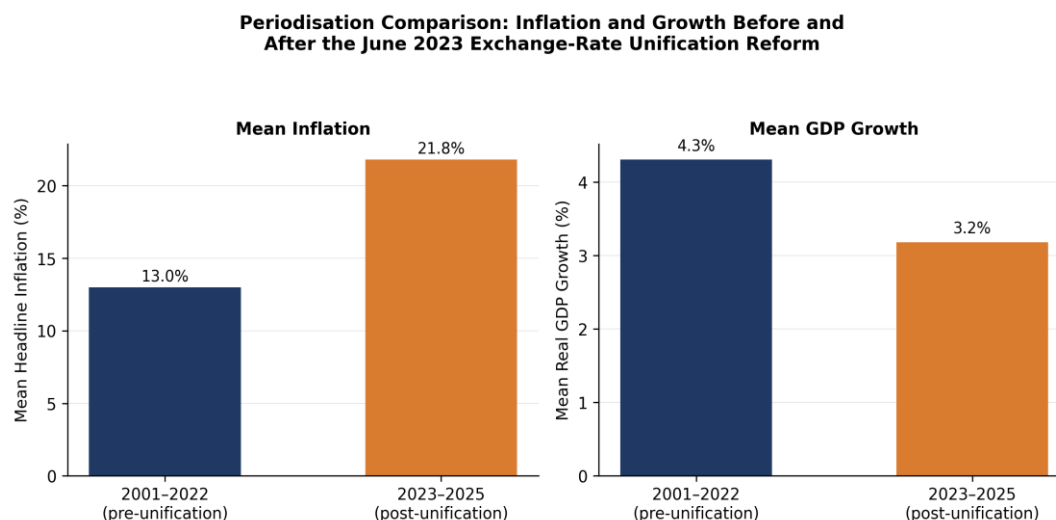


Figure 6. Periodisation comparison: inflation and growth before and after the June 2023 exchange-rate unification reform.

6. Model Limitations and Future Research

There are several limitations to this study and corresponding areas for future research. First, the annual frequency of the data ($n = 25$) constrains statistical power and the degrees of freedom available for multivariate estimation; a quarterly or monthly dataset would permit a more dynamic specification but was not uniformly available on a rebased, comparable basis across the full study period at the time of writing. Second, Nigeria's GDP series was rebased in 2014 (base year 1990 to 2010) and again in 2025 (base year 2010 to 2019), and its CPI basket was rebased in January 2025; these exercises introduce breaks in comparability that this study addresses by using harmonised IMF/World Bank series throughout, but which cannot be entirely eliminated. Third, the model does not incorporate oil price, fiscal deficit, money-supply growth, or insecurity variables, each of which the literature identifies as a material co-determinant of Nigerian growth; it should therefore be read as a focused test of the inflation–exchange rate–growth relationship net of these omitted factors, not a fully specified growth model. Fourth, the sup-F test for the presence of a threshold is reported with an asymptotic, indicative rather than exact, p-value, because the threshold parameter is not identified under the null hypothesis of no threshold (Hansen, 1996); a fully rigorous test would require bootstrap-simulated critical values. Fifth, the high-inflation regime identified in the threshold regression contains only eight annual observations, and its counter-intuitive positive coefficient sign is most plausibly attributable to confounding between high inflation and Nigeria's concurrent post-pandemic, post-unification recovery rather than to a genuine growth-enhancing effect of high inflation, a small-sample fragility that a longer time series would help resolve.

Building on these limitations, future research should pursue four priorities. It should re-estimate the threshold regression presented here using bootstrap-simulated critical values (Hansen, 1996) rather than the asymptotic approximation used in this study, to obtain a rigorous rather than indicative test of the threshold's significance. It should extend the time series beyond 2025 to obtain a larger and more balanced high-inflation regime sample, addressing the small-sample fragility discussed in

Section 5. It should incorporate oil price, fiscal deficit, and money-supply growth as additional regressors in an extended ARDL specification, in line with the omitted-variable limitation noted above, and it should draw on the Solow–Swan growth-theoretic anchor (Section 2.1) to motivate the inclusion of investment and productivity variables as channels through which the inflation and exchange-rate effects identified here are transmitted into the broader growth process. Finally, it should explicitly model the exchange-rate-to-inflation transmission channel using a structural VAR or simultaneous-equations framework, so as to formally decompose the direct and indirect (inflation-mediated) effects of exchange-rate depreciation on growth that this study's findings imply but cannot, with a single-equation approach, fully separate; the Quantile Autoregressive Distributed Lag (QARDL) methodology applied to Nigerian interest-rate volatility by Olasehinde-Williams et al. (2024) is identified as a particularly promising template for such an extension applied specifically to exchange-rate volatility.

7. Conclusion

This study examined the effect of double-digit inflation and volatile exchange rates on economic growth in Nigeria between 2001 and 2025, using a three-stage Unit-Root, Bounds-Testing and Threshold-Regression framework built specifically to respect the confirmed $I(1)$ order of integration of the underlying series and the non-linear threshold theory motivating the study's hypotheses. The study concludes that exchange-rate depreciation has exerted a statistically robust negative effect on Nigeria's economic growth across the full study period, confirmed consistently across both the ARDL bounds-testing specification and the Hansen-type threshold regression — the two most rigorous estimation strategies available given the sample's small size and confirmed $I(1)$ order of integration. The evidence on inflation is more nuanced: no stable linear long-run relationship between inflation and growth is found, since the bounds test fails to reach the lower critical bound, but this is interpreted, consistent with the threshold theory anchoring the study's theoretical review, as evidence against a linear relationship rather than evidence against any relationship. The threshold regression provides suggestive but fragile corroboration of a regime-dependent inflation effect, estimating a threshold of 15.44 percent, a result whose direction is at least broadly consistent with the Nigeria-specific 9 percent threshold independently estimated by Oyadeyi et al. (2025) even though the two point estimates differ and this study's own estimate carries real small-sample caveats reported transparently in Sections 4 and 5. On balance, the evidence supports the conclusion that Nigeria's growth constraint since 2001 has been driven predominantly by exchange-rate instability, with inflation's role being real but harder to pin down with precision using an annual, single-equation approach — a limitation this study reports honestly rather than resolves by overstating what the data can support.

Grounded specifically in Nigeria's institutional and structural context reviewed in Section 2.4, the study offers five contextual recommendations. To the Central Bank of Nigeria: treat the Nigeria-specific inflation threshold literature — Oyadeyi et al. (2025), and this study's own corroborating but less precise estimate — as motivation for an explicit, numerically anchored inflation target in the single-digit-to-low-double-digit range, and sustain the post-2023 practice of using the Monetary Policy Rate as an active, credible policy instrument now that exchange-rate unification has restored its transmission to market rates. To the Federal Ministry of Finance and Budget Office: reduce reliance on Central Bank Ways and Means financing of fiscal deficits, given the direct monetarist linkage between such financing and money-supply-driven inflation, and pursue non-oil revenue

mobilisation to reduce the fiscal exposure to oil-price and exchange-rate shocks. To the CBN's Exchange Rate and Monetary Policy Departments: maintain the market-determined exchange-rate framework established in June 2023 rather than reverting to administrative management, given both the IMF's assessment that unification has narrowed the parallel-market premium and restored policy transmission, and this study's own finding that exchange-rate depreciation is the single most robust predictor of lower growth across every specification tested, while building larger external reserve buffers specifically to smooth, rather than reverse, excessive short-term volatility. To the Federal Ministry of Industry, Trade and Investment and the Nigerian Export Promotion Council: accelerate non-oil export diversification and domestic refining capacity, since these structural changes reduce the import-intensity of Nigerian consumption and production and thereby directly weaken the exchange-rate-to-inflation pass-through channel implicated throughout this study's findings. And to the National Bureau of Statistics and the Central Bank of Nigeria jointly: improve the transparency, documentation, and backward comparability of data series across rebasing exercises, given that this study's own data compilation encountered material discontinuities in both the GDP series and the CPI series that materially complicate long-run empirical analysis of exactly the kind undertaken here.

This study makes four contributions to knowledge. Empirically, it provides a formally hypothesis-tested account of the inflation–exchange rate–growth relationship in Nigeria spanning the full 2001–2025 period, inclusive of the January 2025 CPI rebasing and mid-2025 GDP rebasing exercises. Methodologically, it demonstrates concretely, through the explicit progression from unit-root testing to bounds testing to threshold regression, why a naive levels-OLS approach is econometrically inappropriate for this class of question, and it provides a transparent, replicable template — explicit null hypotheses, explicit decision rules, and full reporting of test statistics including null and fragile results — that future Nigerian macroeconomic studies can follow. Interpretively, it shows that the absence of linear cointegration between inflation and growth is properly read as corroborating, rather than contradicting, non-linear threshold theory, and it reports a threshold-regression result alongside an honest discussion of its small-sample fragility and counter-intuitive regime-specific sign, modelling a standard of transparent reporting that this study argues should be the norm rather than the exception in this literature. And, on data governance and source integrity, it documents and quantifies the comparability challenges introduced by Nigeria's 2014 and 2025 GDP rebasing exercises and its 2025 CPI rebasing exercise, and it applies an explicit journal-verification discipline to its own reference list, excluding secondary sources that could not be confirmed as Scopus-indexed or otherwise independently verifiable — a practice this study recommends as a minimum standard for Scopus-targeted submissions drawing on the rapidly expanding, unevenly quality-controlled Nigerian applied-economics journal literature. The framework should be extended in future research, as set out in Section 6, by bootstrap-based threshold re-estimation, a longer post-2025 time series, additional macro-financial regressors, and a structural or simultaneous-equations decomposition of the exchange-rate-to-inflation transmission channel, so as to provide a fuller account of Nigeria's inflation–exchange rate–growth nexus for evidence-based monetary and fiscal policymaking.

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Data availability

No datasets were generated or analyzed during the current study.

Declarations

Ethics approval and consent to participate

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References

- Africa Check. (2025, August 15). Factsheet: Nigeria rebases its economy again – here's what sets it apart. <https://africacheck.org/fact-checks/factsheets/factsheet-nigeria-rebases-its-economy-again-heres-what-sets-it-apart>
- Asika, N. (2006). Research methodology in the behavioural sciences. Longman Nigeria.
- Barro, R. J. (1995). Inflation and economic growth. NBER Working Paper No. 5326. National Bureau of Economic Research.
- Bick, A. (2010). Threshold effects of inflation on economic growth in developing countries. *Economics Letters*, 108(2), 126–129. <https://doi.org/10.1016/j.econlet.2010.04.048>
- Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of Econometrics*, 31(3), 307–327. [https://doi.org/10.1016/0304-4076\(86\)90063-1](https://doi.org/10.1016/0304-4076(86)90063-1)

- Bruno, M., & Easterly, W. (1998). Inflation crises and long-run growth. *Journal of Monetary Economics*, 41(1), 3–26.
- Businessday NG. (2023, August 12). Steadying Nigeria's fledgling foreign exchange reform. <https://businessday.ng/opinion/article/steadying-nigerias-fledgling-foreign-exchange-reform/>
- Businessday NG. (2026, June). IMF says Nigeria's FX reforms revived monetary policy as floating naira reshapes inflation. <https://businessday.ng/news/article/imf-says-nigerias-fx-reforms-revived-monetary-policy-as-floating-naira-reshapes-inflation/>
- Central Bank of Nigeria. (n.d.-a). Inflation rate. <https://www.cbn.gov.ng/rates/inflrates.html>
- Central Bank of Nigeria. (n.d.-b). Monthly average exchange rates of the naira. <https://www.cbn.gov.ng/rates/exrate.html>
- Central Bank of Nigeria. (2024a). Macroeconomic outlook for Nigeria report. https://www.cbn.gov.ng/Out/2025/CCD/CBN%20Macroeconomic%20Outlook%20for%20Nigeria%20Report_28_122025_DG.pdf
- Central Bank of Nigeria. (2024b). Exchange rates. <https://www.cbn.gov.ng/rates/ExchRateByCurrency.html>
- Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association*, 74(366a), 427–431. <https://doi.org/10.2307/2286348>
- Engle, R. F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. *Econometrica*, 50(4), 987–1007. <https://doi.org/10.2307/1912773>
- Fischer, S. (1993). The role of macroeconomic factors in growth. *Journal of Monetary Economics*, 32(3), 485–512.
- Fisher, I. (1911). *The purchasing power of money*. Macmillan.
- Fleming, J. M. (1962). Domestic financial policies under fixed and floating exchange rates. *IMF Staff Papers*, 9(3), 369–380.
- Friedman, M. (1968). The role of monetary policy. *The American Economic Review*, 58(1), 1–17.
- Fuller, W. A. (1976). *Introduction to statistical time series*. John Wiley & Sons.
- Granger, C. W. J., & Newbold, P. (1974). Spurious regressions in econometrics. *Journal of Econometrics*, 2(2), 111–120. [https://doi.org/10.1016/0304-4076\(74\)90034-7](https://doi.org/10.1016/0304-4076(74)90034-7)
- Hansen, B. E. (1996). Inference when a nuisance parameter is not identified under the null hypothesis. *Econometrica*, 64(2), 413–430. <https://doi.org/10.2307/2171789>
- Hansen, B. E. (1999). Threshold effects in non-dynamic panels: Estimation, testing, and inference. *Journal of Econometrics*, 93(2), 345–368.
- Hansen, B. E. (2000). Sample splitting and threshold estimation. *Econometrica*, 68(3), 575–603. <https://doi.org/10.1111/1468-0262.00124>

- International Monetary Fund. (2026). Selected issues paper: Nigeria 2026 Article IV consultation [as cited in Businessday NG, 2026].
- Jhingan, M. L. (2011). Macroeconomic theory (12th ed.). Vrinda Publications.
- Khan, M. S., & Senhadji, A. S. (2001). Threshold effects in the relationship between inflation and growth. *IMF Staff Papers*, 48(1), 1–21.
- Kremer, S., Bick, A., & Nautz, D. (2013). Inflation and growth: New evidence from a dynamic panel threshold analysis. *Empirical Economics*, 44(2), 861–878. <https://doi.org/10.1007/s00181-012-0553-9>
- MacKinnon, J. G. (1996). Numerical distribution functions for unit root and cointegration tests. *Journal of Applied Econometrics*, 11(6), 601–618. [https://doi.org/10.1002/\(SICI\)1099-1255\(199611\)11:6%3C601::AID-JAE417%3E3.0.CO;2-T](https://doi.org/10.1002/(SICI)1099-1255(199611)11:6%3C601::AID-JAE417%3E3.0.CO;2-T)
- Macrotrends. (2026). Nigeria inflation rate | Historical chart & data. <https://www.macrotrends.net/global-metrics/countries/nga/nigeria/inflation-rate-cpi>
- Mishkin, F. S. (2007). *The economics of money, banking, and financial markets* (8th ed.). Pearson Addison Wesley.
- Mundell, R. A. (1963). Capital mobility and stabilization policy under fixed and flexible exchange rates. *Canadian Journal of Economics and Political Science*, 29(4), 475–485.
- Narayan, P. K. (2005). The saving and investment nexus for China: Evidence from cointegration tests. *Applied Economics*, 37(17), 1979–1990. <https://doi.org/10.1080/00036840500278103>
- National Bureau of Statistics. (n.d.). A note on GDP rebasing/re-benchmarking exercise. https://www.nigerianstat.gov.ng/pdfuploads/GDP_Comparability.pdf
- National Bureau of Statistics. (2026). Home. <https://www.nigerianstat.gov.ng/>
- Obadan, M. I. (2006). Overview of exchange rate management in Nigeria from 1986 to date. *CBN Bullion*, 30(3), 1–9.
- Obstfeld, M., & Rogoff, K. (1995). The mirage of fixed exchange rates. *Journal of Economic Perspectives*, 9(4), 73–96.
- Olasehinde-Williams, G., Omotosho, R., & Bekun, F. V. (2024). Interest rate volatility and economic growth in Nigeria: New insight from the Quantile Autoregressive Distributed Lag (QARDL) model. *Journal of the Knowledge Economy*, 15, 20172–20195. <https://doi.org/10.1007/s13132-024-01924-x>
- Oyadeyi, O. O., Osinubi, T. T., Simatele, M., & Oyadeyi, O. A. (2025). The threshold effects of inflation rate, interest rate, and exchange rate on economic growth in Nigeria. *Cogent Economics & Finance*, 13(1), 2460066. <https://doi.org/10.1080/23322039.2025.2460066>
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289–326. <https://doi.org/10.1002/jae.616>

- Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, 70(1), 65–94.
- Todaro, M. P., & Smith, S. C. (2015). *Economic development* (12th ed.). Pearson.
- Trendtype Africa. (2023). Nigeria free floats the naira, causing a sharp devaluation. <https://trendtype.com/insights/nigeria-free-floats-the-naira-causing-a-sharp-devaluation/>
- Vinayagathan, T. (2013). Inflation and economic growth: A dynamic panel threshold analysis for Asian economies. *Journal of Asian Economics*, 26, 31–41. <https://doi.org/10.1016/j.asieco.2013.04.001>
- World Bank. (2024). Nigeria development update, October 2024: Staying the course. <https://documents1.worldbank.org/curated/en/099101624100574290/pdf/P502989176dd5e02b18e9c1be0acefcb58e.pdf>
- World Bank. (2025). GDP growth (annual %) – Nigeria. <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=NG>
- Worlddata.info. (2026). Inflation rates in Nigeria. <https://www.worlddata.info/africa/nigeria/inflation-rates.php>

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